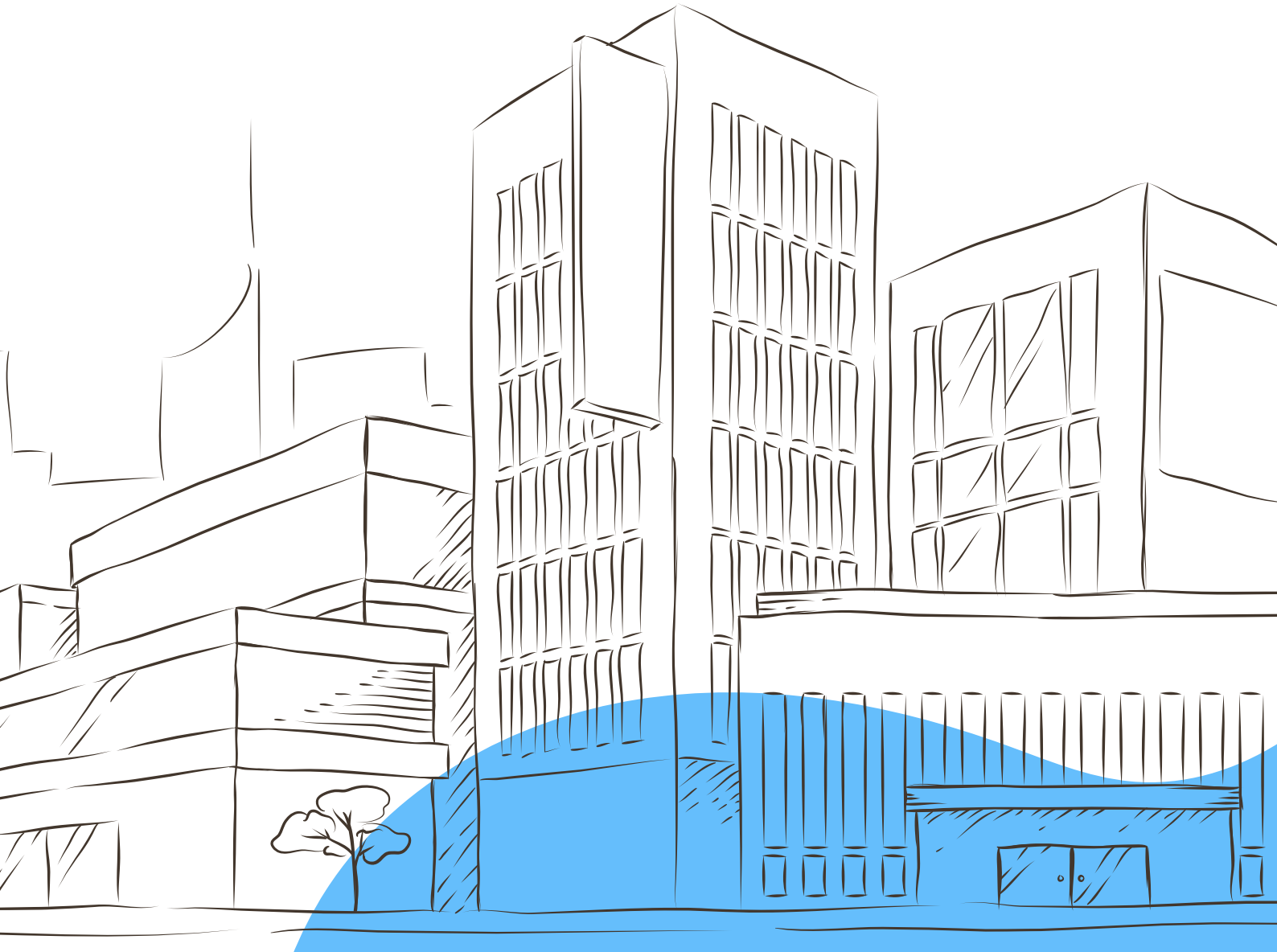
Global Gateway

Funded by the European Union

HANDBOOK

of Construction Materials and Engineering Equipment for Green Public Procurement



Acknowledgements

This Handbook is a technical background document to Policy Paper 1 Comprehensive Green Public Procurement System as a Mechanism for Implementing the Concept of Managing All Types of Waste in the Republic of Kazakhstan for 2026–2030 (Government Resolution No. 1201 of 31.12.2025). It provides full technical profiles for 41 standard positions of construction materials and engineering equipment eligible for Green Public Procurement in Kazakhstan.

This Handbook was developed under the EU SWITCH-Asia Policy Support Component (2024–2026). The technical content was jointly developed by the Sustainable Construction Expert Team: Muhammad Faisal Rehman, MSc, Daliya Madyarova, MSc, and Ferhat Karaca, PhD. Structural integration and visualisation were carried out by Nurgali Rakhmanov, National GPP Expert. Overall guidance and quality assurance were provided by the SWITCH-Asia research team: Elodie Maria-Sube, Key Expert on EU Policy Development and Partnership Building; Sanjay Kumar, Senior GPP Expert; Dr. Lunchakorn Prathumratana, GPP Expert, SWITCH-Asia Policy Support Component; Sachin Joshi, Key Expert on SCP Policy Options and SDG 12 Progress; and Dr. Zinaida Fadeeva, Team Leader, SWITCH-Asia Policy Support Component. The expert team made every effort to ensure the highest quality of this document; any errors remain the responsibility of the respective authors.

The SWITCH-Asia Programme

SWITCH-Asia is an EU-funded programme supporting the transition to sustainable consumption and production in Asian countries. The Policy Support Component (PSC) provides technical assistance and capacity development to governments and stakeholders to develop, adopt and implement sustainable consumption and production policies and legislation. This Handbook was produced under the SWITCH-Asia PSC Kazakhstan component (2024–2026).

Disclaimer

The information and contents in this document are the sole responsibility of the authors and do not necessarily reflect the views of the European Union.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

The following abbreviations are used throughout this Handbook, organised by thematic group. On first occurrence in the main text, each abbreviation is expanded in full. Standards designators used as prefix codes (EN, ISO, GOST, ST RK, GB/T, JIS, KS) and currency symbols (USD, KZT) are not listed separately.

Standards Bodies & Testing Organisations

AHRI	Air-Conditioning, Heating, and Refrigeration Institute (USA)
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BSI	British Standards Institution
CASBEE	Comprehensive Assessment System for Built Environment Efficiency (Japan)
CEN	European Committee for Standardization
DIN	Deutsches Institut für Normung — German Institute for Standardization
EAEU TR	Eurasian Economic Union Technical Regulation
EPA	U.S. Environmental Protection Agency
FEICA	Association of the European Adhesive and Sealant Industry
FLL	Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau — German green roof guidelines
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
JAS	Japanese Agricultural Standards
JIS	Japanese Industrial Standards
JRC	Joint Research Centre (European Commission)
KS	Korean Industrial Standards
NFPA	National Fire Protection Association (USA)
NSF	NSF International — National Sanitation Foundation (USA)
SN RK	Stroitelnye Normy Respubliki Kazakhstan — Construction Norms of the Republic of Kazakhstan
WQA	Water Quality Association (USA)

EU Regulatory & Policy

CE	Conformité Européenne — European Conformity marking (mandatory for regulated products on the EU market)
CLP	Classification, Labelling and Packaging Regulation — Regulation (EC) No 1272/2008
CPR	Construction Products Regulation — Regulation (EU) No 305/2011
DG	Directorate-General (European Commission)
EAD	European Assessment Document
EAEU	Eurasian Economic Union
EPBD	Energy Performance of Buildings Directive — Directive 2010/31/EU

ESPR	Ecodesign for Sustainable Products Regulation — Regulation (EU) 2024/1781
ETA	European Technical Assessment
EU	European Union
EUTR	EU Timber Regulation — Regulation (EU) No 995/2010
FLEGT	Forest Law Enforcement, Governance and Trade — EU licensing scheme for legal timber
GPP	Green Public Procurement
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals — Regulation (EC) No 1907/2006

Kazakhstan Standards & Institutions

GOST	Gosudarstvennyy Standart — Interstate standard of the Commonwealth of Independent States (CIS)
GVS	Green Value Share — methodology for quantifying the ecological benefit of green procurement choices
IGTIPC	International Centre for Green Technologies and Investment Projects of the Republic of Kazakhstan
KazGBC	Kazakhstan Green Building Council
MENR	Ministry of Ecology and Natural Resources of the Republic of Kazakhstan
OMIR	National Green Building Certification Standard of Kazakhstan (QazaqGreen / KazGBC)
SP RK	Svod Pravil Respubliki Kazakhstan — Construction Rules of the Republic of Kazakhstan
ST RK	Gosudarstvennyy Standart Respubliki Kazakhstan — State Standard of the Republic of Kazakhstan
TR DT	Technical Regulation of the Republic of Kazakhstan / Customs Union Technical Regulation

Environmental Assessment & Chemicals

CDW	Construction and Demolition Waste
EMS	Environmental Management System
EPD	Environmental Product Declaration — in accordance with EN 15804 / ISO 14025
GHG	Greenhouse Gas
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GWP	Global Warming Potential (expressed in kg CO_2 equivalent per declared unit)
HBCD	Hexabromocyclododecane — brominated flame retardant restricted under REACH (SVHC)
LCA	Life Cycle Assessment — in accordance with ISO 14040 / ISO 14044
LCC	Life Cycle Costing
MTC	Mill Test Certificate
NMVOC	Non-Methane Volatile Organic Compound
PCR	Product Category Rules — governing rules for Environmental Product Declarations
PFAS	Per- and Polyfluoroalkyl Substances — persistent synthetic chemicals subject to REACH restrictions
POCP	Photochemical Ozone Creation Potential
QMS	Quality Management System
SCS	SCS Global Services — third-party sustainability certification body

SDS	Safety Data Sheet — required under CLP Regulation
SVHC	Substance of Very High Concern — per REACH Annex XIV and SVHC Candidate List
TCO	Total Cost of Ownership
TVOC	Total Volatile Organic Compound
VOC	Volatile Organic Compound

Construction Materials

AAC	Autoclaved Aerated Concrete
BOF	Basic Oxygen Furnace (primary steelmaking route)
CAGR	Compound Annual Growth Rate
CBR	California Bearing Ratio (geotechnical bearing-capacity test)
CLT	Cross-Laminated Timber
DPC	Damp-Proof Course
EAF	Electric Arc Furnace (recycled-steel production route)
EPS	Expanded Polystyrene
ETICS	External Thermal Insulation Composite System
FDI	Foreign Direct Investment
FRP	Fibre-Reinforced Polymer
GAC	Granular Activated Carbon
GGBFS	Ground Granulated Blast-furnace Slag (see also: GGBS)
GGBS	Ground Granulated Blast-furnace Slag (see also: GGBFS)
GLT	Glued Laminated Timber (Glulam)
GRP	Glass-Reinforced Plastic
HDF	High-Density Fibreboard
HDPE	High-Density Polyethylene
IGU	Insulating Glass Unit
LDPE	Low-Density Polyethylene
LVL	Laminated Veneer Lumber
LVT	Luxury Vinyl Tile
MDF	Medium-Density Fibreboard
OPC	Ordinary Portland Cement
OSB	Oriented Strand Board
PUR	Polyurethane (adhesive / sealant / foam)
PVC	Polyvinyl Chloride
PW	Plywood
SCM	Supplementary Cementitious Material (e.g., fly ash, GGBS, silica fume)
XPS	Extruded Polystyrene

Building Services & Systems

AHU	Air Handling Unit
BESS	Battery Energy Storage System

COP	Coefficient of Performance
DALI	Digital Addressable Lighting Interface
EMC	Electromagnetic Compatibility
EMICODE	Emission Code — GEV certification mark for adhesives, sealants and flooring installation products
ESS	Electrical Energy Storage System
HVAC	Heating, Ventilation and Air Conditioning
LED	Light-Emitting Diode
LENI	Lighting Energy Numeric Indicator (EN 15193)
MEI	Minimum Efficiency Index — hydraulic efficiency metric for water pumps
NRC	Noise Reduction Coefficient
PV	Photovoltaic
SEER	Seasonal Energy Efficiency Ratio
UPS	Uninterruptible Power Supply
WC	Water Closet (toilet fixture)

Certification & Ecolabels

BREEAM	Building Research Establishment Environmental Assessment Method
CARB	California Air Resources Board (Phase 2 formaldehyde emission limits for composite wood)
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen — German Sustainable Building Council
FSC	Forest Stewardship Council
GECA	Good Environmental Choice Australia — ISO 14024 Type I ecolabel
LEED	Leadership in Energy and Environmental Design (US Green Building Council)
PEFC	Programme for the Endorsement of Forest Certification
WELL	WELL Building Standard — performance-based building certification focused on human health

INTRODUCTION

1. Purpose and Scope

This Handbook is a technical background document to Policy Paper 1 Comprehensive Green Public Procurement System as a Mechanism for Implementing the Concept of Managing All Types of Waste in the Republic of Kazakhstan for 2026–2030 (Government Decree of the Republic of Kazakhstan No. 1201 of 31 December 2025), prepared under the EU SWITCH-Asia Policy Support Component programme (2024–2026).

The Handbook sets out the full content of the 41 standard positions of construction materials and engineering equipment delegated to it by Policy Paper 1 — items 1–41 in the classification proposed in PP1 Tables 61 and 62, distributed across 12 established categories (A–M). For each position, the Handbook provides regulatory standards from three jurisdictions (EU, Japan, Asia); Kazakhstan equivalents — intergovernmental standards (GOST) and national standards (ST RK) — with references to corresponding international standards; a market-readiness assessment; a three-tier price analysis; green public procurement environmental criteria; per-unit carbon benefit; and environmental requirements for the technical specification to be used on the public procurement web portal of the Republic of Kazakhstan (goszakup.gov.kz).

The intended audience comprises public procurement specialists, sustainable construction experts, and the International Centre for Green Technologies and Investment Projects (IGTIPC) as the single operator of the registries of green technologies (L1), green products (L2), and green services and works (L3).

This Handbook serves as the technical data source for the green products registry (L2). The architecture of the L1→L2→L3 cascade is set out in PP1 (Section 3.4) and PP2 (Section 3.1).

2. Relationship with Policy Paper 1

Policy Paper 1 (PP1) and this Handbook function as a complementary pair: PP1 establishes the policy architecture, legal foundations, and institutional framework of the proposed comprehensive Green Public Procurement system, while this Handbook provides the underlying technical data layer for the IGTIPC L2 registry of green products envisaged in PP1. The division of content between the two documents follows the classification framework set out in PP1 Tables 61 and 62, comprising 49 items of construction materials across 20 categories (12 established + 3 developing + 5 emerging).

The 41 standard positions of established construction materials and engineering equipment (items 1–41), distributed across 12 categories (A–M), are covered exhaustively in this Handbook. Items 42–44 (categories N–P) — construction materials from industrial waste — are presented in PP1, Appendix D.3 (road materials, aggregates from anthropogenic sources, gypsum materials from phosphogypsum). Items 45–49 (categories R–V) — construction materials from consumer waste — are presented in PP1, Appendix C, section C.7.

Within PP1 Appendix D.2, six baseline conventional materials drawn from items 1–41 — concrete (item 1), cement (item 2), gypsum plasterboard (item 18), plasters (item 19), recycled aggregates (item 39), and landscape materials (item 40) — are presented separately to provide the substitution context for the developing categories of Appendix D.3. Three further structural elements of the GPP system remain exclusively within PP1: the regulatory-analytical rationale, the link to the Waste Management Concept, and the institutional architecture of the cascading verification system (L1 → L2 → L3) proposed for adoption in Kazakhstan.

3. Classification Principle and Arrangement

The 41 standard positions of construction materials and engineering equipment are arranged by functional role in the building — that is, by the building element or system of which each position forms a part. This approach is consistent with international practice for the classification of construction materials and equipment and aligns with the sectional structure of the Construction Norms and Rules (SNiP RK) and Codes of Practice (SP RK) of Kazakhstan.

Arrangement by location within the building reflects the logic of design-and-estimate documentation: requirements for materials and equipment are specified by building elements and systems — load-bearing

structure, building envelope, interior finishes, building services, and other design sections. The Handbook follows the same logic, providing convenient navigation through a structure familiar to participants in the construction process.

The Handbook comprises six sections:

Section A — Load-bearing structure (9 positions): concrete, cement, reinforcing steel, structural steel, structural timber, engineered wood, composites and fibre-reinforced polymer, concrete admixtures, fasteners.

Section B — Building envelope (8 positions): waterproofing, thermal insulation, roofing systems, green roofs, facade claddings, exterior wood cladding, insulating glass units, windows and doors.

Section C — Interior finishes (10 positions): gypsum plasterboard, plasters, ceramics, screeds, wood floor coverings, PVC/vinyl floor coverings, raised access floors, acoustic panels, paints, adhesives and sealants.

Section D — Building services (8 positions): heating, ventilation, and air conditioning (HVAC); lighting; cables; sanitary fittings; pumps; water treatment; fire protection; firestop sealants.

Section E — Renewable energy (2 positions): photovoltaic modules, energy storage.

Section F — Site works and landscaping (4 positions): geotextiles, recycled aggregates, landscaping materials, formwork.

4. Profile Structure

Each profile in the Handbook opens with the name of the position and consists of five functional blocks, forming a single sequence from the regulatory context to the environmental requirements for the tender technical specification.

Block 1. Regulatory framework. Standards from the EU, Japan, and Asia set the international best-practice benchmark. Kazakhstan equivalents — intergovernmental standards (GOST) and national standards (ST RK) — establish the applicable legal framework. The block concludes with a list of international standards permitted for use in Kazakhstan on the basis of established correspondence with national norms.

Block 2. Market readiness. An integrated assessment of the domestic market on a three-level scale — high, moderate, low — supported by a description of its actual state.

Block 3. Price dimension. For each sample of the material or equipment, three prices are compared: the price under the international standard, the price under the national standard, and the Market/Ex-Factory price. Annexure-A is attached to this document which encapsulates the detailed methodology and approach utilized in developing this Block 3 Price Dimension section.

Block 4. Environmental criteria. Qualitative criteria are determined by the specifics of the position — including the Environmental Product Declaration (EPD), recycled content, restrictions on Substances of Very High Concern (SVHC) and on Volatile Organic Compounds (VOC); for wood, sustainable forest management certification is added (Forest Stewardship Council, FSC / Programme for the Endorsement of Forest Certification, PEFC). The quantitative indicator is the volume of avoided CO_2 emissions per unit of measure.

Block 5. Procurement action. Environmental requirements for the technical specification of the tender documentation, together with a verified bibliographic reference to the sources, are the operational outcome of each profile.

SECTION A

LOAD-BEARING STRUCTURE

9 positions

SECTION A — LOAD-BEARING STRUCTURE | Material A.1 of 9

Concrete (ready-mix, precast)

Concrete (ready-mix, precast)

BLOCK 1 — REGULATORY FRAMEWORK

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 206 (concrete); EN 1504 (protection and repair of concrete structures); EN 15804 / ISO 14025 (Environmental Product Declaration, EPD); GECA (Good Environmental Choice Australia, ISO 14024 Type I ecolabel).
Japan Standards	JIS A 5308 (ready-mixed concrete) and related JIS; CASBEE references
Asia Standards	China GB/T standards for concrete; Korea KS standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 206-2017 Concrete. Specification, performance, production and conformity ST RK EN 447-2014 Grout for prestressing tendons. Test methods ST RK EN 450-1-2020 Fly ash for concrete. Part 1. Definition, specifications and conformity criteria ST RK EN 934-1-2017 Admixtures for concrete, mortar and grout. Part 1. Common requirements ST RK EN 934-2-2011 Admixtures for concrete, mortar and grout. Part 2. Concrete admixtures. Definitions, requirements, conformity, marking and labelling ST RK EN 934-3-2011 Admixtures for concrete, mortar and grout. Part 3. Admixtures for masonry mortar. Definitions, requirements, conformity, marking and labelling ST RK EN 934-4-2018 Admixtures for concrete, mortar and grout. Part 4. Admixtures for grout for prestressing tendons. Definitions, requirements, conformity, marking and labelling ST RK EN 934-5-2018 Admixtures for concrete, mortar and grout. Part 5. Admixtures for sprayed concrete. Definitions, requirements, conformity, marking and labelling ST RK EN 998-1-2021 Specification for mortar for masonry. Part 1. Rendering and plastering mortar ST RK EN 998-2-2023 Specification for mortar for masonry. Part 2. Masonry mortar. Requirements ST RK 1216-2003 Black crushed stone-gravel-sand mixes. Specifications. ST RK 1225-2019 Road, airfield asphalt concrete mixes and asphalt concrete. Specifications ST RK STB 1416-2008 Liquids for anticorrosive protection of concrete. General specifications ST RK EN 1504-7-2019 Products and systems for the protection and repair of concrete structures. Definitions, requirements, quality control and evaluation of conformity. Part 7. Reinforcement corrosion protection ST RK STB 1534-2008 Dry concrete mix on shrinkage-compensating cement. Specifications ST RK 1549-2006 Crushed stone-gravel-sand mixes and crushed stone for road and airfield pavements and bases. Specifications ST RK 2857-2016 Structures using autoclaved aerated concrete in building construction. Design and construction requirements ST RK 3186-2018 Concrete products. Three-layer wall heat-effective blocks. Technical requirements

Kazakhstan Equivalents (GOST / ST RK)	ST RK 3250-2018 Quartzite refractory mixture. Specifications ST RK 3597-2020 Aluminosilicate concrete refractory mixtures. Specifications ST RK 3789-2022 Conformity assessment. Procedure for confirmation of conformity of dry construction mixtures ST RK 3797-2022 Sulfur concrete mixes and sulfur concrete. Specifications ST RK ISO 4103-2007 Concrete. Classification by consistency GOST 6665-91 Concrete and reinforced concrete kerb stones. Specifications (Valid until 20.06.2025) GOST 6665-2023 Concrete and reinforced concrete kerb stones. Specifications GOST 6927-2018 Concrete facade slabs. Technical requirements GOST 7473-2010 Concrete mixes. Specifications ST RK ISO 7870-2-2023 Control charts. Part 2. Shewhart control charts ST RK ISO 7870-4-2023 Control charts. Part 4. Cumulative sum charts ST RK EN 12602-2021 Prefabricated reinforced components of autoclaved aerated concrete ST RK EN 12620-2011 Aggregates for concrete GOST 12871-2013 Chrysotile asbestos. General specifications ST RK EN 13055-2022 Lightweight aggregates ST RK EN 13139-2015 Aggregates for mortar ST RK EN 13263-1-2013 Silica fume for concrete. Part 1. Definitions, requirements and conformity criteria ST RK EN 13263-2-2014 Silica fume for concrete. Part 2. Conformity evaluation ST RK EN 13383-1-2022 Armourstone. Part 1. Specification ST RK EN 13670-2015 Execution of concrete structures ST RK EN 13813-2017 Screed material and floor screeds. Properties and requirements ST RK EN 13888-2017 Grout for tiles. Requirements, evaluation of conformity, classification and designation ST RK EN 13978-1-2018 Precast concrete garages. Part 1. Requirements for reinforced monolithic or single-skin garages with room dimensions ST RK EN 14487-1-2023 Sprayed concrete. Part 1. Definitions, specifications and conformity ST RK EN 15050-2016 Precast concrete products. Bridge elements ST RK CEN/TR 16349-2023 Framework for the specification of concrete – Part 1: Basis of requirements for concrete and materials ST RK CEN/TR 16369-2023 Application of control charts in concrete production GOST 20425-2016 Tetrapods for shore protection and breakwater structures GOST 20910-90 Heat-resistant concrete. Specifications (Valid until 20.06.2025) GOST 20910-2019 Heat-resistant concrete. Specifications GOST 23233-78 Cellular paper filler. Specifications GOST 23735-2014 Sand-gravel mixes for construction works. Specifications GOST 24211-2008 Additives for concrete and mortars. General technical requirements GOST 25192-2012 Concretes. Classification and general technical requirements GOST 25214-82 Dense silicate concrete. Specifications (Valid until 20.06.2025) GOST 25214-2021 Dense silicate concrete. Specifications GOST 25246-82 Chemically resistant concrete. Specifications GOST 25485-89 Cellular concretes. General specifications (Valid until 20.06.2025)

Kazakhstan Equivalents (GOST / ST RK)	GOST 25485-2019 Cellular concretes. General specifications GOST 25592-91 Ash and slag mixes from thermal power plants for concrete. Specifications (Valid until 20.06.2025) GOST 25592-2019 Ash and slag mixes from thermal power plants for concrete. Specifications GOST 25607-2009 Crushed stone-gravel-sand mixes for road and airfield pavements and bases. Specifications GOST 25795-83 Clay raw material for the production of clay powders for drilling fluids. Specifications GOST 25820-2021 Lightweight concretes. Specifications GOST 26633-2015 Heavy-weight and fine-grained concretes. Specifications GOST 27006-2019 Concretes. Rules for mix proportioning GOST 28013-98 Construction mortars. General specifications (Valid until 20.06.2025) GOST 28013-2023 Construction mortars. General specifications ST RK DIN 30672-2018 Organic external coatings for corrosion protection of buried and immersed pipelines for operating temperatures up to 50 °C without cathodic protection. Tapes and shrinkable materials GOST 31015-2002 Asphalt concrete mixes and stone mastic asphalt concrete. Specifications GOST 31357-2007 Dry cementitious construction mixes. General specifications GOST 31358-2007 Dry cementitious floor construction mixes. Specifications (Valid until 20.06.2025) GOST 31358-2019 Dry floor construction mixes. Specifications GOST 31359-2007 Autoclaved cellular concretes. Specifications GOST 31360-2007 Unreinforced wall products made of autoclaved cellular concrete (Valid until 20.06.2025) GOST 31360-2024 Masonry units. Autoclaved aerated concrete blocks. Specifications GOST 31377-2008 Dry gypsum binder plastering construction mixes. Specifications GOST 31386-2008 Dry gypsum binder adhesive construction mixes. Specifications GOST 31387-2008 Dry gypsum binder filling construction mixes. Specifications GOST 32021-2012 Aggregates and fillers from dense rocks for dry construction mixes production. Specifications GOST 32026-2012 Clay raw material for production of expanded clay gravel, crushed stone and sand. Specifications GOST 32496-2013 Porous aggregates for lightweight concrete. Specifications GOST 32497-2013 Porous thermal insulation aggregates for buildings and structures. Specifications GOST 33699-2015 Dry cementitious filler construction mixes. Specifications ST RK GOST R 51263-2008 Polystyrene concrete. Specifications
International standards with functional alignment to Kazakhstan/EAEU systems	ST RK EN 197-1-2017 / 2022 → EN 197-1:2011+A1:2015 / EN 197-1:2020 → ISO 679 (cement strength testing – supporting test standard) GOST 31108-2020 / GOST 30515-2013 (General construction cements) → EN 197-1 (composition and conformity) → ASTM C150 (Portland Cement)/ASTM C595 (Blended Cement)

International standards with functional alignment to Kazakhstan/EAEU systems	**Masonry Cement** ST RK EN 413-1-2015 → EN 413-1:2011 (Masonry cement) **Building Lime** ST RK EN 459-1-2015 → EN 459-1:2010 (Building lime) GOST 9179-2018 (Construction lime. Technical specifications) → EN 459 series (functional equivalent) **White, Sulfate-Resistant & Special Cements** GOST 965-89 (White Portland cement) → EN 197-1 (CEM I – white cement provisions) → ASTM C150 Type I White GOST 22266-2013 (Sulfate-resistant cement) → EN 197-1 (CEM I SR (Sulfate-Resisting Portland Cement) and CEM III SR (Sulfate-Resisting Blast Furnace Cement)) → ASTM C150 Type V (High Sulphate resistant Portland Cement) GOST 969-2019 (High-alumina cement) → EN 14647:2018 (Calcium aluminate cement) **Oil-well & Expanding Cements** GOST 1581-2019 (Oil-well cement) → ISO 10426-1 (Technical conditions for Well Cement) and ISO 10426-2 (Testing of Well Cement) → API Spec 10A (Cements and Materials for Well Cementing) GOST 11052-74 (Expanding gypsum-alumina cement) → EN 197-1 (special cement category) → ASTM C845 (Expansive hydraulic cement) **Clinker & Raw Materials** ST RK 2332-2013 (Waelz slag) / ST RK 3184-2018 (Clinker) → EN 197-1 (clinker definition & limits) ST RK 3185-2018 (Limestone & shale) → EN 197-1 (constituents of cement) ST RK 3495-2019 (Belite material) → EN 197-1 (belite-rich cement classification) **Transport & Infrastructure Cement** ST RK 3716-2021 (Transport construction cements) → EN 197-1 (CEM I–V performance-based use) → EN 206 (application-related reference) **Composite & Blended Cements** ST RK 3839-2023 (Composite cements) → EN 197-1 (CEM II / CEM III / CEM V) **Gypsum & Gypsum Binders** GOST 125-2018 / GOST 26871-86 → EN 13279-1 / EN 13279-2 ST RK EN 13279-1-2012 / 13279-2-2014 → EN 13279-1 / EN 13279-2

International standards with functional alignment to Kazakhstan/EAEU systems	GOST 4013-2019 (Gypsum stone) → EN 13279 (raw gypsum reference) **Supplementary Cementitious Materials (SCMs)** ST RK EN 15167-1-2017 (GGBFS) → EN 15167-1:2006 → ASTM C989 **Hydraulic & Non-Structural Binders** ST RK EN 15368-2018 → EN 15368:2008 (Hydraulic binders for non-structural use) **Pigments & Mixing Water** ST RK EN 12878-2013 (Pigments) → EN 12878:2014 ST RK ISO 12439-2012 (Mixing water) → ISO 12439:2010
BLOCK 2 — MARKET READINESS	
Kazakhstan Market Assessment	High
Kazakhstan Market Description	Kazakhstan demonstrates strong market readiness underpinned by substantial domestic cement production capacity. The country has harmonized EN 206 via ST RK EN 206-2017, with local plants (e.g., Standard Cement at 2 Mt/yr [214]) meeting the large majority (70–80%) of national demand. This solid local supply base, together with a robust infrastructure boom (18.4% growth in H1 2025 [215]), is accelerating widespread adoption of EN 934 for concrete admixtures. In addition, EAEU TR 048/2019 on energy efficiency supports broader sustainability goals, while import reliance remains low (5–10%). Local producers such as Semey Cement consistently meet international quality benchmarks.

BLOCK 3 — PRICE DIMENSION

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Heavy concrete, class B3.5, no additives	1. $36–$45/m³	1. $51–$56/m³	1. $40–$45/m³
2. Heavy concrete, class B20, F200 (frost-resistant), W10 (waterproof)	2. $63–$70/m³	2. $64–$70/m³	2. $53–$58/m³
3. Cellular concrete — polystyrene concrete, grade D160	3. $44–$56/m³	3. $51–$55/m³	3. $49–$54/m³
4. Heat-resistant concrete on Portland cement	4. $90–$130/m³	4. $105–$115/m³	4. $98–$110/m³
5. Lightweight concrete on porous aggregates, grade D1200, class B7.5	5. $53–$64/m³	5. $86–$95/m³	5. $93–$102/m³

BLOCK 4 — ENVIRONMENTAL CRITERIA
▶️ **Green Criteria (Mandatory)**
Minimum SCM (e.g., GGBS, Flyash etc.) substitution rate of ≥ 30%; minimum recycled coarse aggregate content of ≥ 20%; cradle-to-gate EPD with GWP (kg CO_2e/m³) in accordance with EN 15804 / ISO 14025 (Type III environmental declarations).
Carbon benefit per unit of measure: Per cubic metre of concrete, 64–195 kg CO_2 emissions can be avoided through low carbon methods approved by mentioned EU, Japan and Asia standards
BLOCK 5 — PROCUREMENT ACTION
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Concrete shall include supplementary cementitious materials (SCMs), or demonstrate equivalent embodied-carbon reduction through verified life cycle carbon assessment and following the ISO 14067 standards. Indicative substitution rates and associated CO_2 reductions: fly ash 15–45% (20–40% reduction); ground granulated blast-furnace slag (GGBS) 30–70% (30–60% reduction). The supplier shall provide a cradle-to-gate Environmental Product Declaration (EPD) in accordance with EN 15804 / ISO 14025, reporting the Global Warming Potential (GWP).

Sources: [1],[3],[13],[14],[15],[105],[106],[107],[116],[117],[118],[214],[215],[520],[526]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.2 of 9

Cement and binders

Cement & binders

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 197-1 (Common cement types and composition); EN 197-5 (Composite cements — low clinker content, introduced 2021); EN 14647 (Calcium aluminate cement); EN 413-1 (Masonry cement); EN 459-1 (Building lime); EN 15804 / ISO 14025 (Environmental Product Declaration, EPD).
Japan Standards	JIS R 5210 / JIS A for cement types; national JIS certifications
Asia Standards	China GB/T 175; Korea KS L 5206
Kazakhstan Equivalents (GOST / ST RK)	GOST 125-2018 Gypsum binders. Technical specifications ST RK EN 197-1-2017 Cement. Part 1. Composition, technical requirements and conformity criteria for common cements ST RK EN 413-1-2015 Masonry cement. Part 1. Composition, technical specifications and conformity criteria ST RK EN 459-1-2015 Building lime. Part 1. Definitions, technical specifications and conformity criteria GOST 965-89 White Portland cements. Specifications GOST 969-2019 Aluminous and high-alumina cements. Specifications GOST 1581-2019 Oil-well Portland cements. Specifications ST RK 2332-2013 Clinker. Specifications ST RK 2804-2015 Portland cement grade 700, class D0. Specifications ST RK 3184-2018 Portland cement clinker. Specifications ST RK 3185-2018 Limestones and shales of the Agalatasskoye deposit. Specifications ST RK 3495-2019 Belite material. Specifications ST RK 3716-2021 Cements for transport construction. Specifications ST RK 3839-2023 Composite portland cement and composite cement. Specifications GOST 4013-2019 Gypsum and gypsum-anhydrite stone for the production of binding materials. Specifications GOST 9179-2018 Building lime. Specifications GOST 11052-74 Expanding gypsum-alumina cement ST RK ISO 12439-2012 Mixing water for concrete ST RK EN 12878-2013 Pigments for the colouring of building materials based on cement and/or lime. Technical requirements and test methods ST RK EN 13279-1-2012 Gypsum binders and gypsum plasters. Part 1. Definitions and requirements ST RK EN 13279-2-2015 Gypsum binders and gypsum plasters. Part 2. Test methods ST RK EN 14647-2018 Calcium aluminate cement. Composition, technical requirements and conformity criteria ST RK EN 15167-1-2017 Ground granulated blast furnace slag for concrete, mortar and grout. Part 1. Definitions, specifications and conformity criteria ST RK EN 15368-2018 Hydraulic binder for non-structural applications. Definitions, technical requirements and conformity criteria GOST 15825-80 Coloured Portland cement. Specifications GOST 22266-2013 Sulfate-resistant cements. Specifications GOST 25328-82 Cement for mortars. Specifications GOST 26871-86 Gypsum binding materials. Acceptance rules. Packing, marking, transportation and storage

Kazakhstan Equivalents (GOST / ST RK)	GOST 30515-2013 Cements. General specifications GOST 31108-2020 General construction cements. Specifications
International standards with functional alignment to Kazakhstan/EAEU systems	**Common & Composite Cements** ST RK EN 197-1-2022 / ST RK EN 197-1-2017 (Cement) → EN 197-1 – Common cements GOST 30515-2013 / GOST 31108-2020 (General construction cements) → EN 197-1 → EN 197-5 (Composite cements – low clinker content) ST RK 3839-2023 (Composite Portland cement) → EN 197-5 – Composite cements **Special Cements** GOST 965-89 (White Portland cement) → EN 197-1 (White cement classes) GOST 969-2019 (Aluminous / high-alumina cement) → EN 14647 – Calcium aluminate cement ST RK EN 14647-2018 (Calcium aluminate cement) → EN 14647 GOST 1581-2019 (Oil-well Portland cement) → ISO 10426-1 – Oil-well cements GOST 22266-2013 (Sulfate-resistant cement) → EN 197-1 (SR cement types) → EN 197-5 (SR composite cements) ST RK 3716-2021 (Cements for transport construction) → EN 197-1 → EN 197-5 (Performance-based equivalence) ST RK 2804-2015 (Portland cement grade 700) → EN 197-1 (High-strength cement classes) **Masonry Cement** ST RK EN 413-1-2015 (Masonry cement) → EN 413-1 GOST 25328-82 (Cement for mortars) → EN 413-1 → EN 998-2 (Mortars for masonry – performance context) **Clinker & Cement Constituents** ST RK 2332-2013 / ST RK 3184-2018 (Clinker) → EN 197-1 (Clinker definition & requirements) ST RK 3185-2018 (Limestone, shale raw materials) → EN 197-1 (Main constituents) ST RK 3495-2019 (Belite material) → EN 197-1 → EN 197-5 (Low-carbon clinker systems) ST RK EN 15167-1-2017 (GGBFS) → EN 15167-1 **Lime** ST RK EN 459-1-2015 (Building lime) → EN 459-1 GOST 9179-2018 (Building lime) → EN 459-1

International standards with functional alignment to Kazakhstan/EAEU systems	**Gypsum & Gypsum-Based Binders** GOST 125-2018 (Gypsum binders) → EN 13279-1 GOST 4013-2019 (Gypsum & anhydrite stone) → EN 13279-1 ST RK EN 13279-1-2012 (Gypsum binders) → EN 13279-1 ST RK EN 13279-2-2015 (Test methods) → EN 13279-2 GOST 26871-86 (Gypsum acceptance, packaging) → EN 13279-1 / EN 13279-2 GOST 11052-74 (Expanding gypsum-alumina cement) → EN 14647 (Functional equivalence – calcium aluminate systems) **Hydraulic & Special Binders** ST RK EN 15368-2018 (Hydraulic binder, non-structural) → EN 15368 ST RK ISO 12439-2012 (Mixing water for concrete) → ISO 12439 **Pigments & Additives** ST RK EN 12878-2013 (Pigments for cement/lime) → EN 12878 GOST 15825-80 (Coloured Portland cement) → EN 197-1 + EN 12878
Block 2 — Market Readiness	
Kazakhstan Market Assessment	High
Kazakhstan Market Description	Kazakhstan has substantial cement production capacity, supported by ST RK EN 197-1:2017, the national adoption of EN 197-1. National cement production capacity exceeds 13 million tonnes per year (e.g., Steppe Cement reported approximately 1.55 million tonnes of clinker production in 2025 [216]). Domestic production reportedly satisfies approximately 95% of national cement demand. Market growth of approximately 19% in H1 2025 [217] has strengthened incentives for EN-compliant production and export competitiveness. Challenges include decarbonization requirements under international cement-industry net-zero roadmaps and emerging carbon-regulation mechanisms [218], but EAEU technical harmonization supports broader alignment with international cement testing methodologies, including ISO 679.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Portland cement 500-D0	1. $60–$65/ton	1. $69–$76/ton	1. $62–$68/ton
2. Sulfate-resistant Portland cement without additives, SSPC 400-D0	2. $55–$65/ton	2. $81–$92/ton	2. $75–$82/ton
3. White Portland cement 1-500-D0	3. $120–$200/ton	3. $137–$150/ton	3. $130–$145/ton
4. Aluminous cement GC 40 EN	4. $250–$600/ton	4. $636–$720/ton	4. $618–$700/ton
5. Hydrated lime (1st grade)	5. $100–$150/ton	5. $170–$190/ton	5. $163–$180/ton
6. Gypsum G-4	6. $91–$121/ton	6. $76–$83/ton	6. $71–$80/ton

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

Target clinker factor ≤0.60 to reduce embodied carbon intensity; Encourage supplementary cementitious material (SCM) substitution levels of approximately 30–40%, subject to compliance with performance and durability requirements under EN 197-1 and EN 206; require supplier EPD (Environmental Product Declaration) reporting GWP (kg CO_2e per kg of cement) in accordance with EN 15804 / ISO 14025.

Carbon benefit per unit of measure:

For every tonne of cement, approximately 300–350 kg of CO_2 emissions can be avoided by combining a clinker factor of 0.60 with 40% SCM substitution. Source calculation: baseline CEM I emissions ≈ 860 kg CO_2/tonne; where clinker-related (calcination + combustion) emissions scale down to approximately 520–550 kg CO_2/tonne, yielding a reduction in the order of 327 kg CO_2/tonne under simplified linear assumptions.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

The cement supplied shall have a maximum clinker factor of ≤ 60% for general-construction (CEM I / CEM II / CEM III / CEM IV / CEM V) applications, and shall be accompanied by a cradle-to-gate Environmental Product Declaration (EPD) in accordance with EN 15804 / ISO 14025, reporting the Global Warming Potential (GWP). For special cements (white, sulfate-resistant, calcium aluminate, oil-well, expanding — where the clinker factor by definition exceeds 60%), the ≤ 60% requirement does not apply; instead, the cement shall be accompanied by an EPD demonstrating GWP not exceeding the relevant category-specific benchmark published by a recognized industry association (e.g., CEMBUREAU).

Sources: [3],[4],[16],[14],[15],[17],[105],[106],[107],[119],[120],[121],[216],[217],[218],[520],[527], [528]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.3 of 9

Reinforcing steel

Reinforcing steel (rebar)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 10080 (Steel for the reinforcement of concrete — Weldable reinforcing steel — General); EN ISO 15630-1 (Steel for the reinforcement and prestressing of concrete — Test methods — Part 1: Reinforcing bars, rods and wire); EN 10204 (Types of inspection documents); EN 1992-1-1 (Eurocode 2 — Structural Concrete Design); EN 15804 / ISO 14025 (Environmental Product Declaration, EPD).
Japan Standards	JIS G3112 (steel bars for concrete reinforcement)
Asia Standards	China GB/T 1499.2 (Hot-rolled ribbed steel bars for reinforced concrete); South Korea KS D 3504 (Steel bars for concrete reinforcement).
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN ISO 15630-3-2014 Standard for steel reinforcement and prestressing of concrete. Test methods. Part 3: Steel reinforcement for prestressing ST RK EN 10080-2013 Reinforcement for reinforced concrete structures. Welded reinforcement. General requirements.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 1992-1-1 (Eurocode 2) – Design of concrete structures EN 10204 – Metallic products – Types of inspection documents ISO 6935 (series) – Steel for the reinforcement of concrete

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Moderate capacity, adopting EN 10080 via ST RK, but GOST 5781 dominates. Domestic output (e.g., ArcelorMittal Temirtau) meets 70% needs, with new plants like Taraz Rebar (2025) (capacity ~0.35 Mt/yr) [219]. Strong construction sector growth (14.7–18.4% in 2025) supports demand for higher-specification rebar and gradual uptake of international equivalents [220]) encourages ASTM A615/A706 (US) or EN 10080, although export restrictions on semi-finished steel (billets) and entrenched GOST preferences continue to slow full transition to EN standards.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Rebar, Class A-III (A400), periodic profile, diameter 14–32 mm	1. $566.00–$647.00/ton	1. $600–$658/ton	1. $592–$651/ton
2. Rebar, Class A500C, periodic profile, diameter 12–40 mm	2. $590–$620/ton	2. $600–$650/ton	2. $594–$654/ton
3. Rebar, thermomechanically strengthened, Class At600–At800, diameter 10–18 mm	3. $626–$707/ton	3. $838–$921/ton	3. $83–$91/ton (see A3-13 note: currency mismatch)

Block 4 — Environmental Criteria
▶️ **Green Criteria (Mandatory)**
Minimum recycled scrap content ≥ 90% (EAF — electric arc furnace route) or ≥ 25% (BOF — basic oxygen furnace route, where permitted); mill test certificates (EN 10204 3.1 type); cradle-to-gate Environmental Product Declaration (EPD) per EN 15804 / ISO 14025 for consignments above 100 tonnes.
Carbon benefit per unit of measure: With EN 10080-compliant rebar produced via the EAF (electric arc furnace) route from recycled scrap content, approximately 1,600–1,900 kg of CO_2 emissions per tonne can be avoided compared with the BOF (basic oxygen furnace) primary-steel route. Source calculation: BOF Primary steel typical embodied carbon values of ≈ 2,000–2,300 kg CO_2/tonne; EAF recycled-steel embodied carbon ≈ 200–600 kg CO_2/tonne (worldsteel, 2024).
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Rebar shall conform to EN 10080, JIS G3112, or GB/T 1499 (or equivalent) as specified in the project. The supplier shall provide: (i) a manufacturer's declaration of recycled scrap content, stating the production route (EAF / BOF); (ii) material test certificates per EN 10204 (type 3.1 for structural applications); and (iii) a cradle-to-gate Environmental Product Declaration (EPD) in accordance with EN 15804 / ISO 14025 for consignments above 100 tonnes, reporting the Global Warming Potential (GWP).

Sources: [3],[14],[15],[19],[20],[21],[22],[105],[106],[107],[124],[125],[219],[220],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.4 of 9

Structural steel and metal framing

Structural steel & metal framing

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 10025 (hot rolled steels); EN 1090 (execution of steel structures); EPD (EN 15804)
Japan Standards	JIS G3101 (rolled steels), JIS standards for structural steel
Asia Standards	China GB/T 700; Korea KS standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 10025 Hot-rolled products of structural steels. ST RK GOST 27772-2015 Rolled products for building steel structures. General specifications. ST RK EN 10219 Cold-formed welded structural hollow sections of non-alloy and fine grain steels. ST RK EN 1993-1-1 Eurocode 3: Design of steel structures. Part 1-1: General rules and rules for buildings.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 10025, EN 1090, ISO and ASTM equivalents

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's structural steel and metal framing market exhibits moderate capacity for international standards, with ST RK EN 10025 fully adopting EN 10025 for hot-rolled structural steels and ST RK EN 1090 for execution of steel structures, including ST RK EN 10219 for cold-formed sections [235], [236]. Domestic production, dominated by Qarmet (3.8 million tonnes of steel in 2025, up from prior years), satisfies 65–75% of demand, with strong emphasis on recycled scrap content (often 50–80% depending on route) and verified EPDs aligned with EN 15804 [237], [238], [239]. The 2025 construction boom, 4.8 trillion tenge in completed works for January–August (+18.1% YoY), accelerates adoption in high-rise and infrastructure projects [240], [241]. Legacy GOST standards persist in cost-driven rural segments, but EAEU harmonization and OMIR green criteria are steadily improving market responsiveness.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Corrugated galvanized steel sheets, type LMG 15.30, bending diameter 1.5 m, thickness 3 mm	1. $850–$1,150/ton	1. $574–$632/ton	1. $568–$625/ton
2. Three-layer metal wall panel (mineral wool core), open fastening, thickness 100 mm	2. $15.00–$25.00/m²	2. $33–$36/m²	2. $32–$35/m²

Block 4 — Environmental Criteria

▶️ Green Criteria (Mandatory)

Declare recycled content % (70-80% of scrap steel is used for reducing CO_2 emissions; provide (MTC) Mill Test Certificates in accordance with EN 10204 Type 3.1 (or Type 3.2 for critical structural applications) and a Cradle-to-gate Environmental Product Declaration (EPD) in accordance with EN 15804+A2 and ISO 14025, reporting Global Warming Potential (GWP) and other relevant indicators.

Carbon benefit per unit of measure:

Galvanized structural steel produced via high-recycled content routes, when assessed with Module D recycling credits under EN 15804+A2 (density 7.85 t/m³), can achieve significant carbon savings. Typical avoided emissions can reach approximately 1,500–2,500 kg CO_2e per cubic metre compared to primary production routes, depending on the specific EPD and electricity mix.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Steel sections supplied under this contract shall be accompanied by the following documentation:

- Material test certificates in accordance with EN 10204 Type 3.1 (or Type 3.2 for critical structural elements as specified by the Engineer);
- A manufacturer's declaration stating the recycled scrap content (%) and the steel production route (Electric Arc Furnace — EAF or Basic Oxygen Furnace — BOF);
- A cradle-to-gate Environmental Product Declaration (EPD) in accordance with EN 15804+A2 and ISO 14025 for consignments exceeding 100 tonnes, reporting at minimum the Global Warming Potential (GWP).

Sources: [3],[4],[14],[15],[18],[19],[20],[105],[106], [107],[122],[123],[235],[236],[237],[238], [239],[240],[241],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.5 of 9

Structural timber (sawn timber, CLT)

Structural timber (sawn timber, CLT)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	FSC (Forest Stewardship Council); PEFC (Programme for the Endorsement of Forest Certification); EU Timber Regulation (EUTR) — Regulation (EU) No 995/2010 (being phased into EUDR Regulation (EU) 2023/1115); EN 14080 (timber structures — glued laminated timber and glued solid timber); EN 14081 (timber structures — strength-graded structural timber with rectangular cross section); EN 338 (structural timber — strength classes); EN 14374 (timber structures — laminated veneer lumber — LVL); EN 1995-1-1 (Eurocode 5 — design of timber structures); EN 15804 / ISO 14025 (EPD).
Japan Standards	JAS (Japanese Agricultural Standards) for wood products Structural Lumber Wood Frame Construction (JAS0600); Eco Mark Japan (for qualifying products such as wood)
Asia Standards	China Green Label (for wood products), China Environmental Labeling Program (CEC), Korea Eco-Label
Kazakhstan Equivalents (GOST / ST RK)	GOST 99-2016: Peeled veneer. Technical specifications. GOST 475-2016: Wooden and combined door units. General technical specifications. GOST 616-83: Mine timber props. Technical specifications. GOST 1005-86: Wooden floor panels for low-rise buildings. Technical specifications. GOST 2695-83: Sawn timber of deciduous species. Technical specifications. GOST 4981-87: Wooden floor beams. Technical specifications. GOST 8242-88: Profiled parts made of wood and wood-based materials for construction. Technical specifications. GOST 8486-86: Sawn timber of coniferous species. Technical specifications. GOST 9463-88: Round timber of coniferous species. Technical specifications. (Valid until 20.06.2025) GOST 9463-2016: Round timber of coniferous species. Technical specifications. GOST 11047-90: Wooden parts and products for low-rise residential and public buildings. Technical specifications. GOST 13715-78: Joiner's boards. Technical specifications. GOST 19414-90: Solid glued laminated timber. General requirements for finger joints. (Valid until 20.06.2025) GOST 19414-2023: Glued laminated timber structures. General requirements for finger joints. GOST 20850-2014: Load-bearing glued laminated timber structures. General technical specifications. GOST 21178-2006: Glued blanks. Technical specifications. GOST 22297-76: Coniferous mine timber props (pit props), supplied for export. Technical requirements. GOST 22298-76: Coniferous sawlogs, supplied for export. Technical requirements. GOST 22299-79: Deciduous sawlogs, supplied for export. Technical requirements. GOST 25458-82: Wooden supports for road signs. Technical specifications. GOST 28015-89: Single-layer wooden floor covering panels. Technical specifications. GOST 28450-2014: Wooden bridge beams. Technical specifications. GOST 30972-2002: Glued wooden blanks and parts for window and door units. Technical specifications. GOST 31922-2012: Impregnated poles logs. Technical specifications. GOST 33124-2021: Multi-layer glued laminated veneer lumber (LVL). Technical specifications.

Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 338-2016: Structural timber. Strength classes. ST RK EN 385-2012: Finger jointed structural timber - Performance requirements and minimum production requirements. ST RK 2150-2011: Timber structures. Glued laminated timber from boards. Requirements. ST RK EN 14229-2018: Structural timber. Wood poles for overhead lines. ST RK EN 14545-2017: Timber structures. Connectors. Requirements.
International standards with functional alignment to Kazakhstan/EAEU systems	**Sawn Timber (Coniferous & Deciduous)** GOST 2695-83 (Deciduous sawn timber) → EN 1313-1 / EN 1313-2 (Sawn timber – dimensions & deviations) → EN 14081-1 (Strength-graded structural timber) GOST 8486-86 (Coniferous sawn timber) → EN 14081-1 → EN 1313 series **Round Timber, Logs & Poles** GOST 9463-88 / GOST 9463-2016 (Round timber) → EN 1315-1 / EN 1315-2 (Classification of round timber) GOST 31922-2012 (Impregnated poles) → EN 14229 (Wood poles for overhead lines) ST RK EN 14229-2018 → EN 14229:2010 **Structural Strength & Grading** ST RK EN 338-2016 → EN 338:2016 (Strength classes for structural timber) ST RK EN 385-2012 → EN 385:2001+A1:2007 (Finger-jointed structural timber) **Glued Laminated Timber (GLT / Glulam)** GOST 19414-90 / GOST 19414-2023 (Finger joints) → EN 385 → EN 14080 (Glued laminated timber) GOST 20850-2014 (Load-bearing glulam) → EN 14080:2013 ST RK 2150-2011 → EN 14080 **Laminated Veneer Lumber (LVL)** GOST 33124-2021 (LVL) → EN 14374 (LVL – requirements) **Veneer & Glued Wood Product** GOST 99-96 / GOST 99-2016 (Peeled veneer) → EN 635 (veneer classification) → ISO 12465 / ISO 12466 (mechanical properties – functional equivalence) GOST 21178-2006 / GOST 30972-2002 (Glued blanks & parts) → EN 14080 → EN 15425 (Adhesives for load-bearing timber structures) **Floor Beams, Panels & Structural Elements** GOST 4981-87 (Wooden floor beams) → EN 14081-1 → Eurocode 5 – EN 1995-1-1 (design reference) GOST 1005-86 / GOST 28015-89 (Floor panels) → EN 13986 (Wood-based panels for construction)

International standards with functional alignment to Kazakhstan/EAEU systems	GOST 28450-2014 (Wooden bridge beams) → EN 14080 → EN 1995-2 (Timber bridges) **Construction Timber Components** GOST 8242-88 (Profiled wood parts) → EN 336 (Structural timber – sizes & tolerances) GOST 11047-90 / GOST 13715-78 (Joinery & components) → EN 942 (Timber in joinery) GOST 25458-82 (Road sign supports) → EN 12899-1 (Functional equivalence – structural supports) **Mine Timber & Export Logs** GOST 616-83 / GOST 22297-76 (Mine props) → EN 12369-1 (Performance declaration for structural timber) GOST 22298-76 / GOST 22299-79 (Export sawlogs) → EN 1315 / EN 1316 (Round and sawn timber classification) **Timber Connections** ST RK EN 14545-2017 → EN 14545:2008 (Connectors for timber structures)
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's market shows moderate capacity for international standards like EN 338 and EN 14081, adopted via ST RK EN 338-2016 and ST RK EN 385-2012. Domestic production is limited due to deforestation concerns and export bans on lumber (extended to 2025 [211]), leading to 80-90% import reliance from Russia and Europe. Receptiveness is growing with FSC/PEFC certifications in urban projects, but rural markets stick to GOST 8486-86. Government policies under the OMIR green building standard promote EN alignment for sustainability [212].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Round timber (logs)	1. $120–$180/m³	1. $250- $280/m³	1. $245- $270/m³
2. Structural sawn timber	2. $ $265 – $560/m³	2. $165 – $215/m³	2. $125 – $155/m³
3. Wooden poles	3. $250–$380/m³	3. $160–$240/m³	3. $180–$260/m³

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Sourcing-FSC/PEFC chain-of-custody; legal origin Eu's (FLEGT) and Timer regulations (EUTR); Species diversification; low formaldehyde emissions-Class E1 (EN 13986); Creosote treatment recommended for timber; recycled content where applicable; durability

Carbon benefit per unit of measure:

One cubic metre of certified sustainable timber sequesters approximately 0.9–1.0 tonne of CO_2 through biogenic carbon storage. When including substitution benefits (replacing higher-carbon materials such as concrete or steel) and recycling credits under EN 15804, the total carbon benefit can reach 1.0–1.35 tonnes CO_2e per m³, depending on species, density, and end-of-life scenario.

Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Timber shall be legally harvested and supplied with FSC or PEFC chain-of-custody documentation. Provide formaldehyde class (E1 or better) and an EPD or manufacturer environmental declaration.

Sources: [1],[4],[9],[10],[105],[106],[107],[108],[109], [110],[111],[211],[212],[520],[522],[523]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.6 of 9

Engineered wood (plywood, OSB, MDF)

Engineered wood (plywood (PW), OSB, MDF)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	FSC (Forest Stewardship Council); PEFC (Programme for the Endorsement of Forest Certification); EN 13986 (wood-based panels for use in construction — characteristics, evaluation of conformity and marking); EN 717-1 (wood-based panels — determination of formaldehyde release — formaldehyde emission by the chamber method); EN 16516 (assessment of release of dangerous substances — determination of emissions to indoor air from construction products); EN 15804 / ISO 14025 (EPD).
Japan Standards	JAS/JIS for wood panels; Eco Mark Japan for low-emission products
Asia Standards	China Green Product (CGP) certification (wood-based panels); Korea Eco-Label
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 622-2-2012: Fiberboards. Specifications. Part 2: Requirements for hardboards. ST RK EN 622-3-2012: Fiberboards. Specifications. Part 3: Requirements for medium boards. ST RK EN 622-4-2012: Fiberboards. Specifications. Part 4: Requirements for softboards. ST RK EN 622-5-2012: Fiberboards. Specifications. Part 5: Requirements for dry-process boards (MDF). ST RK EN 636-2018: Plywood. Specifications. GOST 3916.2-2018: General purpose plywood with coniferous veneer outer plies. Technical specifications. GOST 4598-86: Wood fiber boards. Technical specifications. (Valid until 20.06.2025) GOST 4598-2018: Wet process wood fiber boards. Technical specifications. GOST 8673-93: Plywood boards. Technical specifications. (Valid until 20.06.2025) GOST 8673-2018: Plywood boards. Technical specifications. GOST 8904-2014: Hard wood-fiber boards with paint and varnish coating. Technical specifications. GOST 10632-2014: Particleboards. Technical specifications. GOST 11368-89: Moulding wood masses. Technical specifications. GOST 11539-83: Bakelized plywood. Technical specifications. (Valid until 20.06.2025) GOST 11539-2014: Bakelized plywood. Technical specifications. GOST 14614-79: Decorative plywood. Technical specifications. GOST 26816-86: Cement-bonded particleboards. Technical specifications. (Valid until 20.06.2025) GOST 26816-2016: Cement-bonded particleboards. Technical specifications. GOST 32158-2013: Construction plywood with scarf-jointed outer veneers. Technical specifications. GOST 32289-2013: Particleboards faced with films based on thermosetting polymers. Technical specifications. GOST 32297-2013: Decorative wall panels based on dry-process fiberboards. Technical specifications. (Valid until 20.06.2025) GOST 32297-2021: Decorative wall panels based on dry-process wood fiber boards. Technical specifications. GOST 32304-2013: Laminate floor coverings based on dry-process wood fiber boards. Technical specifications. GOST 32687-2021: Dry-process wood fiber boards faced with films based on thermosetting polymers. Technical specifications. GOST 34026-2016: Wood fiber boards. Definition, classification and symbols. ST RK EN 316-2012: Wood-based panels. Definition, classification and symbols.

Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 12871-2015: Wood-based panels. Performance specifications and requirements for load-bearing boards for floors, walls and roofs. ST RK CEN/TR 12872-2016: Wood-based panels. Guidance on the use of load-bearing boards in floors, walls and roofs. ST RK EN 14755-2016: Extruded particleboards. Technical specifications. ST RK ISO 16893-2-2012: Wood-based panels. Particleboard. Part 2: Requirements. ST RK GOST R 52078-2008: Particleboards faced with films based on thermosetting polymers. Technical specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	(Fiberboards – specifications for hardboard, MDF, softboard, dry-process boards) GOST 4598-86 / GOST 4598-2018 → EN 622 series → ISO 16895 / ISO 16893 (wood-based panel requirements & test principles) GOST 8904-2014 → EN 622-2 (hardboards with surface treatment) GOST 34026-2016 → EN 316 (definitions, classification, symbols) **Plywood** ST RK EN 636-2018 → EN 636:2012+A1:2015 (Plywood – specifications) GOST 3916.2-2018 → EN 636 → ISO 12466-1 / ISO 12466-2 (mechanical properties of plywood) GOST 8673-93 / 8673-2018 → EN 636 GOST 11539-83 / 11539-2014 (Bakelized plywood) → EN 636 (special performance plywood) → ISO 12466 series GOST 14614-79 (Decorative plywood) → EN 636 + EN 438 (decorative surfaces – functional equivalence) GOST 32158-2013 (Scarf-jointed plywood) → EN 636 → EN 314-1 / EN 314-2 (bonding quality) **Particleboards (PB, OSB, Special Boards)** GOST 10632-2014 (Particleboards) → EN 312 (Particleboards – specifications) → ISO 16893-2 ST RK ISO 16893-2-2012 → ISO 16893-2:2016 ST RK EN 14755-2016 (Extruded particleboards) → EN 14755:2005 GOST 32289-2013 / ST RK GOST R 52078-2008 → EN 14322 (Melamine-faced boards) → EN 312 **Cement-Bonded & Special Boards** GOST 26816-86 / GOST 26816-2016 (Cement-bonded particleboards) → EN 634-1 / EN 634-2 (Cement-bonded particleboards) GOST 11368-89 (Moulding wood masses) → EN 312 / ISO 16893 (functional equivalent) **Decorative Panels & Laminated Flooring Cores** GOST 32297-2013 / 32297-2021 (Decorative wall panels MDF) → EN 622-5 + EN 14322

International standards with functional alignment to Kazakhstan/EAEU systems	GOST 32304-2013 (Laminate flooring HDF core) → EN 13329 (Laminate floor coverings) GOST 32687-2021 (Film-faced MDF/HDF) → EN 622-5 + EN 14322 **Definitions, Load-Bearing & Structural Use** ST RK EN 316-2012 → EN 316:2009 ST RK EN 12871-2015 → EN 12871:2013 (Load-bearing boards) ST RK CEN/TR 12872-2016 → CEN/TR 12872 (Guidance document)
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	The market exhibits moderate capacity, with ST RK EN 636-2018 and EN 622 series widely adopted for plywood and fiberboards. Local production (e.g., particleboards under GOST 10632-2014) meets a significant portion of domestic demand (estimated 50–65%), but advanced OSB/MDF imports from Europe comply with EN 13986. Furniture and construction sectors drive acceptance, Export of wood products has shown strong growth in recent years, and receptiveness to higher-quality certified materials is increasing [213]. Key barriers include stricter formaldehyde emission requirements (aligned with EN 16516 / EN 717-1), which are enforced moderately, along with competition from lower-cost regional suppliers.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. OSB-3 board	1 $6.5–$10/m²	1 $.4.5–$6.5/m²	1. $4–$6/m²
2. Soft fiberboard	2. $4.0–$6.0/m²	2. $2.5–$4.0/m²	2. $2–$3.5/m²
3. Hardwood plywood, (interior), unpolished	3. $7–$12/m²	3. $5–$7/m²	3. $4–$6/m²
4. Softwood plywood, (interior), unpolished	4. $10–$16/m²	4. $7–$10/m²	4. $6–$9/m²
5. Softwood plywood, polished	5. $28–$45/m²	5. $20–$28/m²	5. $18–$25/m²

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

FSC/PEFC CoC; formaldehyde emission limits (CARB Phase 2 / EN 16516); preferential use of EPDs

Carbon benefit per unit of measure:

Certified plywood (PW) and oriented strand board (OSB) at 1 m³ avoid approximately from 700–900 kg CO_2e/m³ depending on density and species through carbon storage in harvested wood products (biogenic carbon sequestration); certified medium-density fibreboard (MDF) avoids approximately 800–1000 kg CO_2e per cubic metre.

Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Engineered wood products must possess FSC/PEFC CoC and meet formaldehyde emission class E1 or equivalent. Submit a manufacturer's environmental declaration or cradle-to-gate EPD in accordance with EN 15804 and ISO 14025 (for consignments above 50 m³).

Sources: [1],[5],[10],[9],[11],[12],[105],[106],[107], [112],[113],[114],[115],[213],[520],[524], [525]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.7 of 9

Composites and fibre-reinforced polymer (FRP)

Composite materials & FRP (structural/non-structural)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 13706 series (pultruded fibre-reinforced polymer (FRP) composites — Parts 1–3: designation, tolerances and properties); EN 13121 series (GRP tanks and vessels for use above ground); EN 1090-1 (execution of steel structures and aluminium structures — assessment of conformity of structural components); REACH Regulation (EC) No 1907/2006 (substance restrictions for composite matrix resins and sizing agents); EN 15804 / ISO 14025 (EPD encouraged).
Japan Standards	JIS standards for composites; Eco Mark where applicable
Asia Standards	China/Korea standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 13706-3-2014 Reinforced plastics composites - Specifications for pultruded profiles - Part 3: Specific requirements. ST RK 3365-2019 Glass-composite profiles. Technical conditions.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 13706-1 / EN 13706-2 / EN 13706-3 – Pultruded FRP profiles (specifications & test methods) ISO 16611 – Fibre-reinforced plastic composites – Terminology ISO 14125 – Determination of flexural properties ISO 527 (series) – Tensile properties of plastics ISO 178 – Flexural properties of plastics EN 15418 – FRP bars for concrete reinforcement ISO 10406-1 / ISO 10406-2 – FRP bars and grids for concrete reinforcement
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's composite materials and fibre-reinforced polymer (FRP) sector, spanning structural profiles and non-structural elements, maintains a moderate level of domestic capacity for international standards. National regulations incorporate ST RK EN 13706 (pultruded profiles) across its three parts, specifying mechanical performance, fire behaviour, and long-term durability for load-bearing and architectural applications [407], [408]. Local activity is centred on assembly and finishing of pultruded sections using imported glass-fibre rovings and resins, with several workshops in Almaty and Atyrau producing custom gratings, handrails, and cladding panels for corrosive industrial environments [409]. Demand is rising in the oil and gas sector, where FRP offers clear advantages in weight reduction and resistance to aggressive media, prompting local fabricators to invest in CNC machining and quality testing facilities [410]. Although raw material production and large-scale pultrusion lines are not yet established, ongoing technology partnerships and pilot projects in bridge rehabilitation and chemical storage are building technical competence and market confidence [411],[412]

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. FRP sleeve, UV-curing, ø200 mm, thickness 6.2 mm	1. $85.00 – $160.00/m	1. $45.00 – $75.00/m	1. $85.00 – $160.00
2. Decking board (Wood-Polymer Composite), hollow, 140x25 mm	2. $12.50 – $25.00/m	2. $5.50 – $8.00/m	2. $4.71 – $5.50
3. Polycarbonate panel, cellular, transparent, 16 mm	3. $22.00 – $35.00/m²	3. $12.00 – $18.00/m²	3. $14.50 – $19.50

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Avoid PFAS and restricted flame retardants; provide recyclability statement and EPD

Carbon benefit per unit of measure:

Types and quantities: Dura Composites Pultruded GRP Eco Report (2021) directly references BS EN 13706 E23 grade ("Pultrusion Standard BS EN 13706 defines two performance grades, namely E17 and E23, with our pultrusions designed to meet or exceed the higher performance E23 grade") and reports a cradle-to-gate carbon footprint of approximately 3.0–3.5 kg CO_2eq/kg (e.g., 3.13 kg CO_2eq/kg reported by Dura Composites for E23-grade profiles, 2021) of GRP (GHG Protocol v1.01; cumulative energy demand 56.86 MJ/kg). This equates to roughly 5,400–6,300 kg CO_2eq per m³ (density 1,800 kg/m³) or ≈113 kg CO_2eq/m² for a typical 20 mm thick decking panel (0.02 m³/m² = 36 kg/m²). CO_2 emissions avoidance: Vs hot-rolled steel (typical GWP 1.2–2.5 kg CO_2eq/kg but 4–5× heavier): 40–80 % lower CO_2eq per functional unit (lightweighting + no corrosion-driven replacement over 50+ year life). Glass-fibre component alone (Glass Fibre Europe LCA 2023, ISO 14040/44): 1.44 kg CO_2eq/kg CFGF (37 % direct emissions).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Composites must disclose resin and additive chemistry, avoid listed persistent hazardous substances, and provide a cradle-to-gate EPD in accordance with EN 15804 and ISO 14025, or equivalent environmental declaration; or evidence of recyclability / end-of-life management options.

Sources: [1],[14],[15],[105],[106],[107],[193], [194],[195],[407],[408],[409],[410], [411],[412],[480],[481],[482],[483],[484],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.8 of 9

Concrete admixtures

Admixtures & chemical additives for concrete

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 934 (admixtures); REACH substance restrictions; EPD for admixture-intensive products
Japan Standards	JIS for admixtures
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 934-1-2017 Admixtures for concrete, mortar and grout. Part 1: Common requirements ST RK EN 934-2-2011 Admixtures for concrete, mortar and grout. Part 2: Concrete admixtures. Definitions, requirements, conformity, marking and labelling. ST RK EN 934-3-2011 Admixtures for concrete, mortar and grout. Part 3: Admixtures for masonry mortar. Definitions, requirements, conformity, marking and labelling. ST RK EN 934-4-2018 Admixtures for concrete, mortar and grout. Part 4: Admixtures for prestressing tendons. ST RK EN 934-5-2018 Admixtures for concrete, mortar and grout. Part 5: Admixtures for sprayed concrete. Definitions, requirements, conformity, marking and labelling.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 934-1:2008 EN 934-2:2009 (Identical) EN 934-3:2009 (Identical) EN 934-4 (Current EN version) EN 934-5 (Current EN version)

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's admixtures and chemical additives for the concrete segment display a progressing local alignment with established benchmarks, grounded in the adoption of ST RK EN 934-2, which outlines definitions, requirements, conformity criteria, marking, and labeling for various types, including water-reducers, accelerators, and air-entrainers vital for improving concrete workability and strength [334]. Domestic providers cover an estimated 30-40% of demands for essential formulations, highlighted by companies like BASF Central Asia operating a production facility in Astana since 2006, and Sika Kazakhstan inaugurating its fourth plant in Ust-Kamenogorsk in 2025, dedicated to high-performance admixtures tailored for mining and infrastructure needs [335], [336]. Noteworthy developments include BASF's launch of a state-of-the-art R&D and technical service laboratory in Almaty in August 2025 to refine solutions for the construction sector, coinciding with the nation's unprecedented cement output of 13.1 million tonnes in the first 11 months of 2025 [337], [338]. While abundant cement supplies facilitate the integration of locally compounded additives, sophisticated superplasticizers and corrosion inhibitors maintain partial reliance on imports, with investments aiming to broaden internal synthesis and R&D capacities [339].

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. Masonry Mortar M100	1. $48.00 – $65.00	1. $56.9–$62/m³	1. $46.6–$51.00/m³
2. Heavy Cement Plaster 1:2	2. $85.00 – $115.00	2. $50.6–$55.5/m³	2. $42.0–$46.2/m³
3. Light Cement-Lime Plaster 1:1:12 [1]	3. $38.00 – $55.00	3. $53.8–$59.00/m³	3. $46.8–$52.00/m³

Block 4 — Environmental Criteria

▶️Green Criteria (Mandatory)

Avoid harmful plasticizers/biocides; provide SDS and emissions data; EPD if relevant

Carbon benefit per unit of measure:

Polycarboxylate/lignosulphonate superplasticizers & plasticizers (EN 934-2:2009 compliant, EFCA Group A)

Dosage: 0.2–2.0 % by cement mass (2–10 L/m³ concrete).

CO_2 avoidance per m³ concrete: 40–55 kg CO_2e (via 50–70 kg cement/clinker reduction; up to >100 kg).
GWP-total A1-A3 = 0.514 kg CO_2e/kg

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Admixtures must comply with EN 934, include SDS, and be free from REACH-listed hazardous substances; disclose composition to contracting authority.

Sources: [1],[14],[15],[105],[106],[107],[164], [165],[334],[335],[336],[337],[338], [339],[445],[446],[447],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION A — LOAD-BEARING STRUCTURE | Material A.9 of 9

Fasteners

Fasteners, anchors & fixings

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN ISO 898-1 (mechanical properties of fasteners made of carbon steel and alloy steel — bolts, screws and studs); EN ISO 3506 series (mechanical properties of corrosion-resistant stainless-steel fasteners — Parts 1–4); EN 14399 series (high-strength structural bolting assemblies for preloading — Parts 1–10); EN 15048 series (non-preloaded structural bolting assemblies — general requirements and suitability test); REACH Regulation (EC) No 1907/2006 (compliance for metallic coatings and surface treatments); EN 15804 / ISO 14025 (EPD).
Japan Standards	JIS for fasteners
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK ENV 13381-3-2012 Test methods for determining the contribution to the fire resistance of structural members — Part 3: Applied protection to concrete members. Identical to: ENV 13381-3:2002 (IDT). SP RK EN 1993-1-8:2005/2011 Design of steel structures — Part 1-8: Design of joints. Identical to: EN 1993-1-8:2005. ST RK EN 14592-2011 Timber structures — Dowel-type fasteners — Requirements. Identical to: EN 14592:2008 (IDT). ST RK 1875-2009 Anchor fixings for facade systems. Technical specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	ENV 13381-3:2002 EN 1993-1-8:2005 EN 14592:2008
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's branch for fasteners, anchors, and fixings exhibits an increasing home-based proficiency attuned to accepted protocols, strengthened through the embrace of ST RK ISO 4017-2012 specifying hexagon head screws with product grades A and B, as well as ST RK ISO 4759-1-2010 which establishes tolerances for bolts, screws, pins, and nuts across grades A, B, and C [328], [329]. Regional suppliers address an approximate 40-50% of sector requirements for everyday items, showcased by operations such as Fasteners Group LLP, which fabricates elastic rail fastenings compliant with railway operator specs, alongside Rebolt Alloys that outputs nuts, bolts, screws, and threaded rods meeting diverse industrial needs [330], [331]. Key advancements include a 13.6% surge in fabricated metal goods during 2025, propelled by countrywide initiatives that amplified mechanical engineering by 12.9% and building supplies by 9.7% to support expanding infrastructure [332]. Although standard steel-based anchors benefit from accessible wire rod sources for solid internal fulfilment, advanced chemical fixings and precision expansion bolts involve ongoing overseas acquisitions, with efforts to upgrade forging and heat-treatment sites poised to heighten self-reliance [333].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Bolt with nut and washer, zinc-plated	1. $1.50 – $4.50 per kg	1. $2.23–$2.50/kg	1. $2.20–$2.44/kg
2. Self-tapping screw, zinc-plated	2. $1750 – $2300 per ton	2. $4813–$5300/ton	2. $4751–$5200/ton
3. Drive anchor, size 10 mm × 40 mm	3. $35.00 – $65.00 per 1,000 pcs	3. $42.52–$47.5/1000 pc	3. $41.91–$46.5 /1000 pc
4. Universal polypropylene dowel with screws	4. $4.50 – $7.50 per kg	4. $2.42–$2.7/kg	4. $2.39–$2.6/kg

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Corrosion-resistant coatings with low-toxicity, recycled steel preference, supplier sustainability statements

Carbon benefit per unit of measure:

Steel bolt anchors (fischer FAZ II Plus HCR, EN 15804/ISO 14025 compliant): Avoid 1.0–1.5 kg CO_2 emissions per kg lifecycle through recycling. Per m³ with (~7850 kg density steel): up to ~11,068 kg of CO_2 emissions can be avoided.

Steel screws (Wurth, EN 15804/ISO 14025 compliant): Avoid approximately 1.4–1.7 kg CO_2e avoided per kg lifecycle via recycling. Per m³ with (~7850 kg density): Up to ~12,874 kg of CO_2 emissions can be avoided as when high recycled content steel is used in manufacturing, additional cradle-to-gate (A1-A3) reductions are achieved compared to primary steel production.

ETICS fastening systems (EJOT, EN 15804/ISO 14025 compliant, CE marked with ETA): Avoid 0.2–0.3 kg CO_2e/m² lifecycle via steel recycling. Savings scale with the number of fixings per m² (typically 4–12 anchors/m² depending on wind load and insulation thickness). Per m³ (density ~2000 kg/m³), up to ~2,340 kg of CO_2 emissions can be avoided.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Supply recycled steel products compliant with EN and CPR codes. Should have ≥70–90% recycled content, and EPD-verified GWP. It should be verified via EPDs/REACH 1907/2006 standards.

Sources: [3],[14],[15],[105],[106],[107],[162], [163],[208],[209],[210],[328],[329], [330],[331],[332],[333],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B
BUILDING ENVELOPE
8 positions

SECTION B — BUILDING ENVELOPE | Material B.1 of 8

Waterproofing

Waterproofing & damp-proof courses

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN 13967 (flexible sheets for waterproofing — plastic and rubber sheets for damp-proof courses in walls, including sheets for foundations); EN 14909 (flexible sheets for waterproofing — plastic and rubber damp-proof courses in walls — definitions and characteristics); EN 1849-1 / EN 1849-2 (flexible sheets for waterproofing — determination of thickness and mass per unit area); EN 1928 (flexible sheets for waterproofing — determination of watertightness); EN 15804 / ISO 14025 (EPD). [Note: EN 13318 (screed material and floor screeds — definitions) is NOT a waterproofing standard and has been removed from this entry — see Systematic Finding B.1-CRITICAL.]
Japan Standards	JIS standards; Eco Mark
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	GOST 30693-2000 Roofing and waterproofing mastics
International standards with functional alignment to Kazakhstan/EAEU systems	ISO 9001:2015 for quality management ISO 14001:2015 for environmental management EN 14909 flexible sheets for waterproofing EN 13969 bitumen damp-proof sheets
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's waterproofing and damp-proof courses industry indicates a strengthening native ability matched to accepted measures, reinforced by the utilization of ST RK 3444-2019, which details specifications for roofing and waterproofing roll materials, including resistance to water penetration, flexibility at low temperatures, and tensile strength [340]. Local entities supply an estimated 40-50% of essentials for conventional bitumen-based options, exemplified by Matizol's plant producing bitumen membranes and liquids, alongside GIDROKOR specializing in geomembrane installations for containment applications, and KazPolimer Trading House offering geosynthetics for drainage and barrier systems [341], [342], [343]. Substantial steps include Corrocoat Caspian's certified protective coatings achieving over 70% local content and VMP Astana Plant's high-tech output of anti-corrosion materials for concrete surfaces, supporting the sector's 9.8% chemical industry growth in 2025 amid broader manufacturing expansion [344], [345]. Whereas basic roll and coating types draw on available bitumen resources for reasonable autonomy, refined polymer membranes and liquid-applied elastomers require sustained external acquisitions, as programs to enhance quality consistency and technological upgrades pursue greater independence [346].

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. Gidrostekloizol (Waterproofing Glass Felt)	1. $1.85 – $2.50 per m²	1. $1.38–$1.5/m²	1. $1.35–$1.48/m²
2. Profiled Polyethylene Membrane – High Strength	2. $1.25 – $2.30 per m²	2. $4.22–$4.7/m²	2. $4.17–$4.6/m²
3. Polymer Waterproofing Membrane – Reinforced, Low-Temperature Flexible	3. $2.00 – $5.00 per m²	3. $9.06–$10.00/m²	3. $8.94–$9.8/m²
4. Liquid Polyurethane Waterproofing – One-Component, Flexible	4. $1.50 – $3.50 per kg	4. $5.84–$6.30/kg	4. $5.76–$6.2/kg

Block 4 — Environmental Criteria

▶️ Green Criteria (Mandatory)

Durability, absence of PFAS where applicable, recyclability

Carbon benefit per unit of measure:

Types of waterproofing materials: Recycled LDPE damp-proof course sheets (e.g., DAFA DPC, EN 13967:2012+A1:2017 compliant for plastic damp-proof sheets, CE marked per CPR) or flexible bitumen waterproofing membranes. LDPE DPC sheets (DAFA DPC, EN 15804+A2 / ISO 14025 / ISO 21930 compliant): Avoid ~0.55 kg CO_2e/m² over the full lifecycle via Module D recycling/energy recovery credits. Bitumen waterproofing sheets (Sika flexible bitumen systems, EN 15804 compliant): Avoid ~0.03–0.05 kg CO_2e/m² net lifecycle via Module D credits. Other emissions avoided: AP ~0.0036 mol H^+ eq./m², EP ~0.000025–0.00071 kg eq./m², POCP ~0.00345 kg NMVOC eq./m² (D credits).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Waterproofing membranes must have a minimum design life of [insert years], include EPD or manufacturer environmental data, and be free from PFAS treatments.

Sources: [3],[14],[15],[105],[106],[107],[166], [167],[168],[340],[341],[342],[343], [344],[345],[346],[448],[449],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.2 of 8

Thermal insulation (mineral wool, EPS/XPS, cellulose, bio-based)

Insulation (mineral wool, EPS/XPS, cellulose, bio-based)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EU Ecolabel where applicable; EN 1609-A5 (water absorption), EN ISO 11654 (sound absorption), EN 13162/13163 (thermal insulation)
Japan Standards	JIS thermal insulation standards; Eco Mark for low-impact insulation
Asia Standards	Korea Eco-Label; China energy/insulation standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 13162 (Factory made mineral wool products - specification). ST RK 2625-2015 (Polystyrene thermal insulation plates-specification). ST RK 3364-2019 (Thermal insulation products made of foamed rubber. Technical requirements)
International standards with functional alignment to Kazakhstan/EAEU systems	EN 13162–13165, ISO thermal and acoustic performance standards

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Moderate capacity, with ST RK EN 13162 aligning to EN 13162. significant growth in local production capacity in recent years, supported by companies such as TechnoNICOL [221], covering 60% market via local firms like TechnoNICOL. Imports (e.g., mineral wool) comply with EN 13501 for fire safety. Energy efficiency laws (EAEU TR 048/2019) drive adoption, but rural enforcement is poor.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Mineral Wool (Standard) P-50	1. $55/m³	1. $52.4–$58/m³	1. $50–$55/m³
2. Basalt Mineral Wool P 100-110	2. $84–$110 /m³	2. $94–$102/m³	2.90-$99/m³
3. EPS (Expanded Polystyrene) PSB-S-25	3. $56/m³	3. $42–$47/m³	3. $41–$46/m³
4. XPS (Extruded Polystyrene) XPS 40-44	4. $90–$130 /m³	4. $84–$93/m³	4. $82-90/m³
5. PIR (Polyisocyanurate) PIR with kraft paper (30-40mm)	5. $220–$310 /m³	5. $130–$146/m³	5. $125–$129/m³
6. Polystyrene Concrete D200, 100 mm thickness	6. $140 – $180 /m³	6. $115–$126/m³	6. $110–$115/m³

Block 4 — Environmental Criteria
▶️ **Green Criteria (Mandatory)**
Avoid use of HBCD/PFAS flame retardants; provide EPD; prefer bio-based or recycled-content materials such as (hydrocarbons, silicones, dendrimers, polyurethane); show recyclability or take-back
Carbon benefit per unit of measure: Dense-packed Bio-based cellulose insulation at 3.5 lb/ft³ density for R-10 value can reduce building assembly carbon footprints by up to 210% compared to conventional insulation. Up to approximately 3.5 – 5.0 kg of CO_2 emissions can be avoided per square metre of insulation
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Insulation materials shall be free from HBCD and PFAS flame retardants, include manufacturer EPDs compliant with EN 15804+A2 should be provided for verification, and demonstrate excellent recyclability potential at end-of-life.

Sources: [1],[2],[8],[14],[23],[24],[25],[105],[106], [107],[126],[127],[221],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.3 of 8

Roofing systems and membranes

Roofing systems, membranes & waterproofing

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 13956 (flexible sheets for waterproofing — plastic and rubber sheets for roof waterproofing); EN 13707 (flexible sheets for waterproofing — reinforced bitumen sheets for roof waterproofing); EN 1849-1 / EN 1849-2 (flexible sheets for waterproofing — determination of thickness and mass per unit area); EN 1928 (flexible sheets for waterproofing — determination of watertightness); EN 13501-5 (fire classification of construction products and building elements — external fire performance of roofs); EN 15804 / ISO 14025 (EPD framework).
Japan Standards	JIS standards for roofing materials; Eco Mark where applicable
Asia Standards	China GB/T roofing standards; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 502-2018 Roofing products from metal sheet. Technical requirements for fully supported products made of stainless steel sheet; ST RK EN 504-2018 Roofing products from metal sheet. Technical requirements for fully supported products made of copper sheet; ST RK EN 505-2018 Roofing products from metal sheet. Technical requirements for fully supported products made of steel sheet; ST RK EN 508-1-2012 Roofing products from metal sheet. Specification for self-supporting products of steel, aluminium or stainless steel sheet. Part 1: Steel; ST RK EN 508-2-2021 Roofing and cladding products from metal sheet. Specification for self-supporting products of steel, aluminium or stainless steel sheet. Part 2: Aluminium; ST RK EN 508-3-2012 Roofing products from metal sheet. Specification for self-supporting products of steel, aluminium or stainless steel sheet. Part 3: Stainless steel; ST RK EN 516-2018 Prefabricated accessories for roofing. Roof access equipment. Walkways, treads and steps; ST RK EN 517-2018 Prefabricated accessories for roofing. Safety hooks for roofing; ST RK EN 539-1-2018 Clay roofing tiles for discontinuous laying. Determination of physical characteristics. Part 1: Impermeability test; ST RK EN 534-2018 Corrugated bitumen sheets. Technical requirements and test methods; ST RK EN 1304-2018 Clay roofing tiles and fittings. Definitions and technical requirements; ST RK EN 1462-2018 Brackets for eaves gutters. Requirements and testing; ST RK 2083-2011 Metal tile (profiled metal roofing sheets). General technical conditions; ST RK 2301-2013 Granulated electrothermophosphoric slags. Technical conditions; ST RK 2372-2013 Geotextile materials. Nonwoven geotextile fabric. Technical conditions; GOST 2697-83 Roofing pergamin (underlay felt). Specifications; ST RK 2790-2015 Geosynthetic materials. Polyethylene roll waterproofing geomembranes. Technical conditions; GOST 2889-80 Hot-applied bituminous roofing mastic. Specifications; ST RK 3365-2019 Fiberglass composite profiles. Technical conditions; ST RK 3444-2019 Roll roofing and waterproofing material. Technical conditions; ST RK 3729-2021 Adhesives for floor coverings. General technical conditions; ST RK 3743-2021 Geosynthetic bentonite clay roll materials for waterproofing. Technical conditions; ST RK 3829-2022 Mineral wool slabs on synthetic binder. Technical conditions; GOST 7415-86 Gidroizol (a waterproofing material). Specifications; GOST 10296-79 Izol (a waterproofing material). Specifications; GOST 10923-93 Ruberoid (roofing felt). Specifications; GOST 13489-79 Sealants grades U-30M and UT-31. Specifications;

Kazakhstan Equivalents (GOST / ST RK)	GOST 14791-79 Non-hardening construction sealing mastic. Specifications; GOST 15836-79 Bitumen-rubber insulating mastic. Specifications; GOST 15879-70 Glass Ruberoid (glass-felt roofing). Specifications; GOST 19177-81 Porous rubber sealing gaskets. Specifications; GOST 20429-84 Folgoizol (foil-backed waterproofing). Specifications; GOST 23744-79 Non-drying mastic grade 51-G-6. Specifications; GOST E624025-80 Non-drying mastic 51-G-7. Specifications; GOST 24064-80 Rubber-based adhesive mastics. Specifications; GOST 24285-80 Sealant grade UT-34. Specifications; GOST 24986-81 High profile (51/177) asbestos-cement corrugated sheets. Specifications; GOST 30340-2012 Chrysotile-cement corrugated sheets. Specifications; GOST 30547-97 Roll roofing and waterproofing materials. General specifications; GOST 30693-2000 Roofing and waterproofing mastics. General technical conditions; GOST 30740-2000 Sealing materials for airfield pavement joints. General technical conditions; GOST 31309-2005 Thermal insulation building materials based on mineral fibers. General technical conditions; GOST 32310-2020 Extruded polystyrene foam products for use in construction. Specifications; GOST 32311-2012 Ceramic clinker bricks for paving. Specifications; GOST 32314-2012 Factory-made mineral wool thermal insulation products for use in construction. General specifications (Valid until 20.06.2025); GOST 32314-2023 Factory-made mineral wool thermal insulation products for use in construction. General specifications; GOST 33676-2015 Thermal insulation cellular glass materials and products for buildings and structures. Classification. Terms and definitions; GOST 32806-2014 Bituminous shingles. General specifications
International standards with functional alignment to Kazakhstan/EAEU systems	**Metal Roofing & Cladding Sheets** ST RK EN 502 / 504 / 505 → EN 502 / EN 504 / EN 505 (Fully supported metal roofing sheets: stainless steel, copper, steel) ST RK EN 508-1 / 508-2 / 508-3 → EN 508-1 / EN 508-2 / EN 508-3 (Self-supporting metal roofing and cladding products) ST RK 2083-2011 (Metal tiles) → EN 508 series → EN 14782 (Metal sheet roofing & cladding – general equivalence) **Roofing Accessories & Safety Equipment** ST RK EN 516-2018 (Walkways, treads, steps) → EN 516:2006 ST RK EN 517-2018 (Safety hooks) → EN 517:200 ST RK EN 1462-2018 (Eaves gutter brackets) → EN 1462:2004 **Clay & Mineral Roofing Tiles** ST RK EN 1304-2018 (Clay roofing tiles) → EN 1304:2013 ST RK EN 539-1-2018 (Impermeability test) → EN 539-1 GOST 24986-81 / GOST 30340-2012 (Chrysotile-cement sheets) → EN 494 (Fibre-cement corrugated sheets – functional equivalent) **Bituminous Roofing Sheets & Shingles** ST RK EN 534-2018 (Corrugated bitumen sheets) → EN 534:2015

International standards with functional alignment to Kazakhstan/EAEU systems	GOST 2697-83 / GOST 10923-93 / GOST 15879-70 / GOST 20429-84 (Pergamin, ruberoid, glass-felt, foil-backed membranes) → EN 13707 (Bitumen sheets for roof waterproofing) GOST 32806-2014 (Bituminous shingles) → EN 544 (Bitumen shingles) GOST 30547-97 (Roll roofing materials) → EN 13707 / EN 13969 (Roof & foundation waterproofing membranes) **Roofing & Waterproofing Mastics / Sealants** GOST 2889-80 / GOST 30693-2000 → EN 15814 (Polymer-modified bituminous thick coatings) GOST 13489-79 / 14791-79 / 23744-79 / 24064-80 / 24285-80 → EN 15651 (Sealants for non-structural applications) GOST 30740-2000 (Airfield joint sealants) → EN 14188 (Joint sealing systems) **Geotextiles & Geosynthetic Waterproofing** ST RK 2372-2013 (Nonwoven geotextiles) → EN ISO 10319 (Tensile test) → EN 13249–13256 (Geotextiles for civil engineering) ST RK 2790-2015 (Polyethylene geomembranes) → EN 13361 / EN 13362 (Geomembranes for waterproofing) ST RK 3743-2021 (Bentonite clay membranes) → EN 14416 (Geosynthetic clay barriers) **Thermal Insulation within Roofing Systems** GOST 31309-2005 / GOST 32314-2012 / 32314-2023 (Mineral wool) → EN 13162 (Mineral wool insulation) GOST 32310-2020 (XPS) → EN 13164 (Extruded polystyrene foam) GOST 33676-2015 (Cellular glass) → EN 13167 (Cellular glass insulation) **Roll Waterproofing & Composite Products** ST RK 3444-2019 (Roll waterproofing materials) → EN 13707 / EN 13969 ST RK 3365-2019 (Fiberglass composite profiles) → EN 13706 (Pultruded FRP profiles)
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Moderate capacity, adopting EN 13707 for bituminous membranes. Domestic metal roofing (e.g., galvanized steel) meets 50% demand, with imports from Russia complying with EN 14782. Construction growth (approximately 4.8-4.85 trillion tenge (about $9.9-10 billion USD at current exchange rates) in the first eight months (January-August) of 2025 [222], which positions the roofing segment for moderate-to-high readiness if sustained FDI and infrastructure momentum continue into 2026-2029, where annual sector growth is forecasted at 3.1% [223]. Kazakhstan's roofing waterproofing market exhibits a moderate capacity for international standards, such as EN 13967 for flexible sheets. Domestic mastics, as specified in GOST 30693-2000, cover 40-50% of the demand, while imports align with EN 14909 and ISO 9001 for enhanced durability [224], [225]. Growth is driven by 2025 construction volumes of 4.8 trillion tenge, boosting adoption in urban areas via OMIR standards for low-VOC, EPD-verified materials, reducing carbon by 20-30% [226], [227]. Rural areas lag with legacy GOST, but FDI and 9.24% CAGR through 2027 signal improving responsiveness [228], [229].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Windproof, vapor-permeable membrane (120 g/m²)	1. $0.40–$0.75 per m²	1. $0.50–$0.60/m²	1. $0.53–$0.58/m²
2. Polymer membrane, 1.2mm, reinforced, flexible to -45°C	2. $8.00–$13.50 per m²	2. $7.88–$8.5/m²	2. $7.78–$8.4/m²
3. Polyethylene film, 0.15mm (calculated per m²)	3. $2.00 per m²	3. $0.20–$0.25/m²	3. $0.19–$0.23/m²
4. Bitumen-polymer, SBS-modified	4. $4.50–$7.00 per m²	4. $6–$6.5/m²	4. $5.85–$6.4/m²
5. Roofing Ruberoid, RKK-350B	5. $0.60-1 per m²	5. $0.88–$0.96/m²	5. $0.86–$0.94/m²
6. Foil isol, SRF 0.1-200	6. $2.50–$4.50 per m²	6. $5–$5.5/m²	6. $4.97–$5.3/m²
7. Metal Tile Steel thickness 0.45 mm, coating 31–40 µm	7. $6.50–$9.50 per m²	7. 5.74-6.4/m²	7. $5.69–$6.3/m²
8. Flexible Bituminous Shingles Single-layer, standard class, 3.3 mm thick with basalt topping	8. $6.50 and $10.50 per m².	8. 8.11-9/m²	8. $7.87–$8.8/m²
9. Corrugated Galvanized Sheeting Profile height 20 mm, steel thickness 0.5 mm [2]	9. $5.90 and $8.20 per m²	9. 4.90-5.4/m²	9. $4.86–$5.2/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Long-term warranty (≥20 years), recyclability or take-back scheme, restriction on PFAS

Carbon benefit per unit of measure:

Roofing membranes compliant with EN 13956 up to 0.5–2.5 kg CO_2 emissions can be avoided per m² of membrane through recycling. Actual benefits must be verified via manufacturer-specific EPDs.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Roof membranes must carry a minimum 20-year product warranty, include an EPD where available, and should be free from PFAS-based treatments. Preference will be given to products with documented recyclability and compliance with relevant ST RK / EN standards.

Sources: [3],[26],[27],[14],[15],[28],[29],[30],[105], [106],[107],[128],[129],[222],[223],[224],[225],[226],[227],[228],[229],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.4 of 8

Green roof systems

Green roof systems (substrate, vegetation)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	FLL guidelines; EN standards for waterproofing/substrates
Japan Standards	Japanese green roof guidance; Eco Mark for substrates where applicable
Asia Standards	Local national standards; China/Korea guidance
Kazakhstan Equivalents (GOST / ST RK)	There are no direct standards on green roofs. OMIR System: Integrates global LEED/ BREEAM principles with local Kazakh conditions (climate, economic factors) for green building standards, including green roofs.
International standards with functional alignment to Kazakhstan/EAEU systems	FLL Guidelines (Germany): Widely influential, setting benchmarks for substrate water holding capacity (WHC >20%) and porosity (>10%) for plant establishment, often using high inorganic content (80-90%). ASTM E2777: A guide for vegetative roof systems, providing an international framework. GRO Code (UK): A recognized best practice guide for design, installation, and maintenance. EPA (USA): Guidance for arid/semi-arid regions, highlighting core layers: waterproofing, root barrier, drainage, filter, growing medium, plants.

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's green roof systems sector remains at an emerging stage of domestic capacity, with the OMIR national green building standard actively promoting vegetated roofs for stormwater retention, urban cooling, and biodiversity enhancement, drawing on adapted international guidelines such as the German FLL recommendations [389], [390]. Local substrate formulations are now produced using recycled mineral aggregates, expanded clay, and compost from domestic waste streams, while vegetation palettes favour hardy native species like fescue grasses and sedums that withstand prolonged frost and summer drought [391]. Pilot installations on commercial and public buildings in Astana and Almaty have proven effective in reducing roof surface temperatures by up to 15 °C and managing rainwater runoff, encouraging wider uptake among developers seeking OMIR certification [392]. Although specialized drainage and root-barrier membranes are still largely imported, Kazakh landscape firms and material suppliers are rapidly building technical know-how through joint training programmes and demonstration projects [393].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Green roof substrate / growing medium	1. $120 – $200/m³	1. $100 – $180/m³	1. $90 – $160/m³

Block 4 — Environmental Criteria

▶️ Green Criteria (Mandatory)

Lightweight recycled substrate, native species planting, biodiversity support, minimal irrigation

Carbon benefit per unit of measure:

Direct sequestration (plants + substrate):

0.14–4.12 kg CO_2/m²/year (extensive roofs; varies by species: e.g. common Sedum spurium = 0.14 kg, optimal Lavandula = 4.12 kg).

Or 1.375 kg CO_2/m² total stored in 2 years (≈0.69 kg CO_2/m²/year average) for typical Sedum extensive roofs. Indirect avoided emissions (energy savings for heating/cooling): 9.35–78.71 kg CO_2/m²/year (climate-dependent; higher in hot/tropical climates due to cooling-load reduction)

Embodied CO_2 (construction phase, additional vs conventional roof): 5–80 kg CO_2e/m²; carbon payback period 5.8–15.9 years.

Net effect: Green roofs are a net CO_2 sink after payback; other emissions (NO_x, SO_2, $PM_{2.5}$) are also avoided via reduced power-plant demand.

Example: EPA Kansas City (USA) projected 2020 scenario: ~68 300 m² green roofs avoided 1 150 tonnes CO_2/year (indirect, energy savings) + 1 800 lbs NO_x and 2 690 lbs SO_2 annually.

Per m² ≈ 16.8 kg CO_2 avoided/year.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Green roof systems must use substrates with documented composition (including recycled content), prioritize native plants, and include a maintenance and irrigation reduction plan.

Sources: [1],[14],[15],[105],[106],[107],[186],[187], [389],[390],[391],[392],[393],[469],[470], [471],[472],[473],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.5 of 8

Facade claddings and composite panels

Façade cladding & composite panels

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 13501 (fire classification of construction products), DGNB (German Sustainable Building Council certification scheme); EN 14782/EN 1396 (cladding/panels); EPDs
Japan Standards	JIS for cladding panels; Eco Mark for applicable products
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK 958-93 Concrete Facade Slabs. Technical Requirements GOST 13996-2019 Ceramic Facade Tiles and Tiles. Technical Requirements ST RK 3149-2018 Chrysotile Cement Facade Slabs. Technical Requirements
International standards with functional alignment to Kazakhstan/EAEU systems	EN Fire Classification (EN 13501), EN cladding product standards, and ISO testing standards

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's facade and cladding market exhibits moderate capacity for international standards, with EN 13501-1 (reaction to fire classification) adopted through national adoption mechanisms (ST RK alignment) for safety in building envelopes [230], [231]. Market growth remains steady in 2025, favouring aluminium composites (EN 485 for aluminium alloys) and fireproof systems, though domestic production is limited to 30-40% share, with heavy reliance on imports [232], [233]. The OMIR green building standard promotes EPDs (EN 15804-based) and REACH compliance for low-impact, sustainable materials in urban projects [234].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market
1. Granite cladding tile, 20 mm thick, sawn, polished	1. $45.00 – $65.00	1. $34.5–$38/m²	1. $33.44–$37.00/m²
2. Aluminium facade panels	2. $25.00–$45.00 per m²	2. $20.6–$23/m²	2. $20.04–$22.00/m²
3. Fibre Cement Panel, coloured, 8 mm thick	3. $22.00–$45.00 per m²	3. $14.85–$14.39/m²	3. $14.39–$16.00/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Fire performance per EN 13501; EPD for GWP; low-toxicity surface finishes

Carbon benefit per unit of measure:

Fire-rated aluminium composite panels (ACP) with mineral-filled polymer core(4mm thick, 34.7% metals, 44.2% minerals, 21.1% fossils)avoid up to 15–20 kg of CO_2 emissions per square metres having potential Module D credit. While fibre cement cladding (8mm thick, 25-40% sand/cement with <10% cellulose) avoids up to 0.06-6 Kg of CO_2 emissions per square metres through recycling. Note: Module D figures represent potential future credits assuming high recycling rates and must be verified via project-specific EPDs. They are reported separately from production impacts.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Façade panels must meet required fire classification (EN 13501-1), provide an EPD documenting cradle-to-gate GWP in accordance with EN 15804, and disclose surface treatment chemistry.

Sources: [3],[1],[14],[15],[31],[32],[33], [34],[105],[106],[107],[130],[131],[230],[231],[232],[233],[234],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.6 of 8

Exterior wood cladding and decking

Exterior timber cladding & decking

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	FSC/PEFC; EN 335 (durability of wood); FLEGT Licensed; EUTR legality
Japan Standards	JAS for wood products; Eco Mark
Asia Standards	China Green Label; Korea Eco-Label
Kazakhstan Equivalents (GOST / ST RK)	GOST 8242-88 — Profiled wood details. General specifications (primary standard for cladding profiles). GOST 8486-2015 — Softwood sawn timber. GOST 2695-2015 — Hardwood sawn timber. ST RK EN 335 — Durability of wood and wood-based products (Use Class 3). ST RK EN 350 — Natural durability of solid wood. ST RK EN 13501-1 — Fire classification ST RK 943-92: Wooden doors. General technical specifications. ST RK 950-92: Wooden windows and balcony doors. General technical specifications. GOST 11214-2003: Wooden window units with sheet glazing. Technical specifications. GOST 24699-2002: Wooden window units with glazing beads and insulating glass units. Technical specifications. GOST 24700-99: Wooden window units with insulating glass units. Technical specifications. ST RK EN 13810-1-2016: Wood-based panels. Floating floors. Part 1: Performance specifications and requirements.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 14915 — Solid wood panelling and cladding. EN 335 — Durability of wood and wood-based products (Use Class 3 for exterior cladding). EN 350 — Natural durability of solid wood. EN 13986 — Wood-based panels for use in construction. EN 1910 / EN 927 series for coatings and surface finishes. EN 14915 — Solid wood panelling and cladding EN 927 series — Exterior wood coatings Fire performance: EN 13501-1. FSC / PEFC Chain of Custody; EUTR / FLEGT legality requirements **Wooden Doors & Windows** ST RK 943-92 (Wooden doors) → EN 14351-1 – Windows and doors – Product standard ST RK 950-92 (Wooden windows & balcony doors) → EN 14351-1 GOST 11214-2003 (Wooden windows with sheet glazing) → EN 14351-1 → EN 13126 (series) – Hardware for windows & balcony doors GOST 30777-2012 / GOST 30777-2023 (Opening devices, fittings) → EN 13126 (series) → EN 1670 (Corrosion resistance – supporting) **Floating Floors / Panels (Interface with Joinery Systems)** ST RK EN 13810-1-2016 (Wood-based floating floors) → EN 13810-1

Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's exterior timber cladding and decking market demonstrates moderate capacity for international standards, with national adoption of EN 335 (durability of wood) and EN 350 (natural durability) through ST RK alignments, alongside mandatory FSC/ PEFC chain-of-custody for certified products in public and green projects [242], [243]. Domestic production remains limited (20–30% market share), constrained by low forest cover (4.8% of land area) and reliance on coniferous sawn timber from local mills, while 70–80% of premium cladding and decking is imported (primarily Russia and Europe) to meet EN 942 and low-emission requirements [244], [245]. Accelerating demand for sustainable timber facades in urban developments under the OMIR green building standard explicitly rewards EPD-verified, FSC-certified materials [246], [247]. Legacy GOST 8242-88 and cost-driven rural projects slow full transition, but EAEU harmonization and FDI in wood processing are steadily raising receptiveness

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Unedged softwood board, length up to 6.5 m, any width, thickness 19-22 mm, grade 1	1. $235 - $270/m³	1. $185–$204/m³	1. $181.30–$198/m³
2. Softwood edged board, 19-22mm thick, Grade 1	2. $245 - $290/m³	2. $224–$246/m³	2. $219–$240/m³

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

FSC/PEFC sourced; durability class and preservative limits; low-emission treatments

Carbon benefit per unit of measure:

Using FSC-certified glulam (GLT) timber for unitised façade system, typical values for 20–28 mm softwood cladding: 20–50 kg CO_2e stored per m² (depending on species, thickness, and density). When substituted for high-impact materials (e.g., aluminium, fibre cement, or brick), timber cladding can deliver substantial whole-life carbon reductions. Actual benefits must be verified via manufacturer EPDs compliant with EN 15804. Biogenic carbon storage for timber cladding is usually 15–60 kg CO_2e/m² depending on thickness (e.g., 20–40 mm) boards.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Timber cladding and decking must be FSC or PEFC certified; provide durability classification and supplier chain-of-custody documentation.

Sources: [1],[14],[15],[35],[36].[37],[38],[105],[106],[107],[132],[133],[242],[243].[244],[245],[246], [247],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.7 of 8

Insulating glass units

Glazing — insulated & coated glazing units

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 1279 (insulating glass), EN 1096 (glass in building); Passive House criteria for performance
Japan Standards	JIS for glass products; CASBEE guidance for fenestration
Asia Standards	China GB/T for insulating glass; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	**1. Insulating Glass Unit (IGU) Product Specs** GOST EN 1279-1-2014 Glass in building. Insulating glass units. Part 1: General provisions, dimensional tolerances. GOST 24866-2014 Glued insulating glass units. Technical specifications. **2. IGU Performance & Durability Tests** ST RK ISO 20492-1-2015 Glass in building. Insulating glass units. Part 1: Test methods for durability of edge seals. ST RK ISO 20492-2-2015 Glass in building. Insulating glass units. Part 2: Chemical test methods for fogging. ST RK ISO 20492-3-2015 Glass in building. Insulating glass units. Part 3: Gas concentration and gas leakage determination. GOST 32998.4-2014 Glued insulating glass units. Methods for determination of physical characteristics of sealing layers. **3. Coated Glass (Component for IGUs)** ST RK ISO 9050-2009 (Current, identical to ISO 9050:2003) Glass in building. Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors. **4. Safety Glass (Components for IGUs)** GOST 32539-2013 Laminated architectural glass. Technical specifications. GOST 30826-2014 Thermally toughened architectural glass. Technical specifications. **5. Window Units (Final Assembly with IGUs)** GOST 24699-2002 Wooden window blocks with glazing beads and insulating glass units. Technical specifications. GOST 24700-99 Wooden window blocks with insulating glass units. Technical specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 1279 (series) – Insulating glass units ISO 19916 – Glass in building – Insulating glass units (global ISO framework) ISO 20492-1 / 20492-2 / 20492-3 – IGU durability, fogging, gas retention EN 1279-2 / EN 1279-3 – Moisture penetration & gas leakage EN 1279-6 – Factory production control and periodic testing

Block 2 — Market Readiness

Kazakhstan Market Assessment	

Kazakhstan Market Description	Kazakhstan's segment for insulated and coated glazing units indicates a developing alignment with global benchmarks, supported by the enactment of ST RK EN 1279 series standards that specify criteria for thermal performance, edge seal integrity, and gas retention in multi-pane assemblies, complemented by national guidelines echoing EU directives on low-emissivity coatings for energy conservation [295], [296]. Local firms fulfil about 40-50% of requirements for standard double-glazed products, exemplified by Orda Glass Ltd in Kyzylorda and Modern Glass operations that fabricate units with thermal breaks and reflective layers suitable for extreme temperature variations [297], [298]. Notable advancements encompass the 2022 activation of a float glass line yielding 197,100 tonnes yearly, alongside partnerships introducing vacuum-insulated variants projected to expand output by 15% through 2027 for commercial and housing sectors [299]. Despite robust supply of base float glass nearing full internal coverage, sophisticated solar-control and acoustic-coated options depend on overseas procurement to some extent, yet policy-driven incentives foster increased homegrown innovation and compliance with sustainability goals [300].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. General-purpose insulating glass unit, single-chamber, СПО 20 (20 mm thick)	1. $28.00 – $38.00	1. $21.78–$23.20/m²	1. $21.14–$23.00/m²
2. Energy-saving (low-E) insulating glass unit, double-chamber, СПД 30 (30 mm thick)	2. $45.00 – $62.00	2. $34.31–$37.00/m²	2. $33.34–$36.7/m²
3. Solar-control insulating glass unit, double-chamber, СПД 30 (30 mm thick)	3. $55.00 – $78.00	3. $38.05–$42.00/m²	3. $37.00–$41.1/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

U-value targets, solar heat gain coefficients, coated low-E glass, recyclability of frames

Carbon benefit per unit of measure:

Passive House certified triple-glazed low-e coated insulating glass units (EN 1279 for IGUs, EN 1096 for coatings; U-value <0.8 W/m²K). In Kazakhstan's continental climate, replacement with low-E IGUs can typically achieve energy savings of 25–45% compared to standard double glazing, resulting in potential avoided CO_2 emissions of 8–25 kg CO_2e/m²/year (depending on building type, heating system, and baseline).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Insulating glazing units shall achieve a maximum U-value of [insert project-specific value, e.g. ≤ 1.0 W/m²K] (or better), comply with EN 1279 (all relevant parts) and ST RK / GOST equivalents, and be supplied with manufacturer Environmental Product Declarations (EPDs) for glass and associated frame materials. Preference will be given to units with low-E coatings, argon-filled cavities, and verified recyclability.

Sources: [3],[6],[14],[15],[86],[105],[106],[107],[152],[153],[295],[296],[297],[298], [299],[300],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION B — BUILDING ENVELOPE | Material B.8 of 8

Window and door units

Windows & doors (frames)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 14351 (windows & doors), CE marking (Construction Products Regulation), EPD
Japan Standards	JIS window/door standards; Eco Mark
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	**1. Performance & Classification Standards (ST RK EN)** ST RK EN 12207-2016 Windows and doors. Air permeability. Classification. ST RK EN 12210-2020 Windows and doors. Resistance to wind load. Classification. ST RK EN 12217-2020 Doors. Operating forces. Requirements and classification. ST RK EN13123-1-2020 Windows, doors and shutters. Explosion resistance. Requirements and classification. Part 1: Shock tube. **2. General Product Specifications** ST RK 943-92 Wooden doors. General technical conditions. ST RK 950-92 Windows and balcony doors, wooden. General technical conditions. GOST 26601-85 Wooden windows and balcony doors for low-rise residential buildings. Types, design and dimensions. GOST 23747-88 Doors from aluminium alloys. General technical conditions. Valid until 20.06.2025 GOST 23747-2015 Doors from aluminium alloys. General technical conditions. Current (Replaces GOST 23747-88) **3. Fire & Smoke Safety Standards** ST RK 2110-2011 Building structures. Fire-resistant doors and gates. Fire resistance test method. ST RK 2429-2013 Building structures. Fire-resistant doors and gates. Method for testing smoke and gas tightness. GOST 30247.2-97 Building structures. Fire resistance test methods. Doors and gates. GOST 30247.3-2002 Building structures. Fire resistance test methods. Lift shaft doors. **4. Mechanical Testing Methods** These are standards for testing mechanical performance. GOST 24033-80 Wooden windows and balcony doors. Mechanical test methods. Valid until 20.06.2025 GOST24033-2018 Windows, doors, gates. Mechanical test methods. (Replaces GOST 24033-80)
International standards with functional alignment to Kazakhstan/EAEU systems	EN 14351 ISO performance and testing standards

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate

Kazakhstan Market Description	Kazakhstan's industry for windows and door frames shows an advancing level of indigenous expertise consistent with worldwide practices, facilitated by the use of ST RK 950-92 guidelines for wooden variants and related norms for steel structures that emphasize durability, thermal efficiency, and safety features [301], [302]. Native enterprises handle approximately 45-55% of total requirements, led by entities including AKS, which provides fittings for plastic and metal assemblies, alongside AFK Leader, specializing in integrated facade elements [303]. Fresh initiatives feature the setup of Eagle Architecture Technology's manufacturing unit in Akmola region during 2025, capable of yielding aluminium-based facades, glazing systems, and entry units as part of broader zone expansions drawing over 1.1 trillion tenge in funds [304], [305]. Basic frame types benefit from rising internal output linked to urban growth, yet certain high-end insulated or automated models draw from external markets, with focused efforts to elevate local tech and meet expanding building needs [306].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Wooden window block (78mm), single-sash, with double-chamber glass unit, tilt & turn hardware	1. $185 – $260	1. 236.84-$250/m²	1. $233–$237/m²
2. PVC window block (60mm), single-sash, with double-chamber glass unit, tilt & turn hardware	2. $75 – $115	2. 138.74-$150/m²	2. $136–$139/m²
3. Aluminium window block (55-62mm), single-sash, with double-chamber glass unit, tilt & turn hardware	3. $145 – $210	3. 248.92-$270/m²	3. $246–$249/m²
4. Internal PVC door block, glazed with single-chamber glass unit	4. $95 – $140	4. 129.53-$145/m²	4. $127.86–$140/m²
5. Aluminium interior door (45-48mm), single-panel, solid lower part + single glass upper part	5. $165 – $235	5. 328.53-$360/m²	5. $324–$356/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Thermal performance (U-value), airtightness, recycled content in frames, EPD for frames

Carbon benefit per unit of measure:

Triple-glazed wooden windows (IV90, EN 14351-1 compliant): Avoid up to 22–26 kg CO_2 emissions per m² embodied via biogenic sequestration (net cradle-to-gate GWP: 39–40 kg CO_2 emissions per m² after credits). Steel-framed windows (Janisol Arte 66, EN 14351-1 compliant): Avoid up to 10–25 kg CO_2 emissions per m² lifecycle via recycling credits (cradle-to-gate GWP: 88 kg CO_2 emissions per m²).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Windows and external doors shall meet project-specified U-values (e.g., Uw ≤ 1.0–1.3 W/m²K depending on climate zone), demonstrate documented airtightness performance (EN 12207), and be supplied with manufacturer Environmental Product Declarations (EPDs) compliant with EN 15804 for frame and glazing materials. Preference will be given to FSC/PEFC-certified wooden frames and products with high recycled content.

Sources: [3],[14],[15],[87],[88],[105],[106],[107],[133],[154],[155],[301],[302],[303],[304],[305],[306],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C

INTERIOR FINISHES

10 positions

SECTION C — INTERIOR FINISHES | Material C.1 of 10

Gypsum plasterboard / drywall

Gypsum board / plasterboard

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 520; EN 15283 where applicable; EPD
Japan Standards	JIS for gypsum products
Asia Standards	China GB/T for gypsum board; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 520-2012: Gypsum plasterboards. Definitions, requirements and test methods. GOST 6266-97: Gypsum plasterboards. Technical specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 520 and ISO gypsum product standards

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's gypsum board and plasterboard sector has reached a moderate level of readiness for international standards, anchored by the direct adoption of ST RK EN 520-2012, which fully incorporates EN 520 specifications for board classification, dimensional stability, flexural strength and reaction to fire [266]. Leveraging extensive local gypsum deposits in Zhambyl and Karaganda regions, domestic producers now satisfy roughly 70–75 % of overall demand for standard wall and ceiling boards, with several plants having upgraded their lines in the past two years to deliver consistent performance data required under European norms [267], [268]. While moisture-resistant and fire-rated boards still account for about 25–30 % of imports—primarily from Russia and China—targeted state support for raw-material processing and product certification is steadily shifting the balance toward greater self-sufficiency [269]. This material's lightweight, fire-resistant and acoustic properties make it a preferred choice for interior fit-outs in the country's accelerating residential and commercial construction pipeline, further reinforcing alignment with global quality expectations [270].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Standard gypsum board (GKL), thickness 12.5 mm	1. $4.50–$8.50/m²	1. $1.6–$1.7/m²	1. $48–$1.6/m²
2. Moisture-resistant gypsum particle board (GSPV), thickness 10 mm	2. $5.50–$10.00 /m²	2. $6.73–$7.2/m²	2. $58–$7.1/m²

Block 4 — Environmental Criteria
▶️ **Green Criteria (Mandatory)**
Recycled gypsum content, low-emission additives, EPD where available
Carbon benefit per unit of measure: EN 520-compliant standard gypsum plasterboards (12.5mm thick, 8–10 kg/m²) with high recycled content avoid approximately 10.5 kg CO_2 emissions per m² through end-of-life recycling credits
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Gypsum boards shall conform to EN 520 and include documentary evidence of recycled gypsum content and emissions profile (EPD preferred).

Sources: [3],[14],[15],[47],[105],[106],[107],[142],[143],[266],[267],[268],[269],[270],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.2 of 10

Plasters and mortars

Plasters, renders & mortars

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 998-1 (specification for mortar for masonry — rendering and plastering mortar); EN 998-2 (specification for mortar for masonry — masonry mortar); EN 1015 series (methods of test for mortar for masonry); EN 15804 / ISO 14025 (EPD for cementitious mortars).
Japan Standards	JIS for mortars; Eco Mark where applicable
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 998-1-2021: Specification for mortar for masonry. Part 1. Rendering and plastering mortar based on inorganic binders. GOST 31377-2008: Dry building plaster mixtures on gypsum binder. Technical specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 998 series and ISO testing standards

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's plasters, renders and mortar sector shows moderate domestic capacity for international standards, built on the adoption of ST RK EN 998-1-2021 (rendering and plastering mortars) and ST RK EN 998-2 (masonry mortars), which define performance requirements for consistency, adhesion, strength, and water retention [271]. Abundant local gypsum deposits enable producers to meet nearly full domestic demand for standard gypsum-based plasters and dry-mix formulations, creating notable export opportunities [272]. Recent foreign direct investments have strengthened specialized output: Sika commissioned a new mortar and admixture plant in Ust-Kamenogorsk (2025), while Lasselsberger established a modern dry-mix facility in Astana to produce ready-to-use renders and construction adhesives [273], [274]. Although premium polymer-modified repair mortars and certain thin-bed adhesives remain partially import-dependent, the expanding use of pre-mixed dry systems improves quality control and reduces site waste [275].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. M50 Cement-Clay-Mortar	1. $0.015–$0.025/kg	1. $0.013–$0.015/kg	1. $0.010–$0.020/kg
2. M25 Cement Mortar	2. $0.025–$0.040/kg	2. $0.022–$.0.025/kg	2. $0.020–$0.030/kg
3. M100 Cement Mortar	3. $0.030–$0.045/kg	3. $0.024–$0.026/kg	3. $0.022–$0.035/kg
4. Heavy Cement-Lime Mortar	4. $0.025–$0.040/kg	4. $0.020–$0.030/kg	4. $0.018–$0.028/kg
5. Decorative Paste (all types) 668	5. $1.10 – $2.50/kg	5. $0.90–$2.00/kg	5. $0.80–$1.80 /kg

Block 4 — Environmental Criteria
▶️ **Green Criteria (Mandatory)**
Low VOC, absence of specified hazardous additives, durability
Carbon benefit per unit of measure: Cement-lime rendering mortars with recycled aggregate (EN 998-1 compliant), reduce production emissions by 8%, or 1.8 – 3.5 kg CO_2/m³. Mortars capture max 25.4 kg CO_2/m³ through carbonation, that is (≈0.5 to 1.5 kg CO_2/m² at 20 mm thickness). Cement-rich (OPC type) mortars with >50% recycled content significantly lower embodied carbon compared to virgin gypsum products and avoid 10 times more total embodied CO_2 over 100 years span.
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Renders and mortars shall be free from specified hazardous additives, have documented technical properties and include SDS and EPD if available.

Sources: [3],[14],[15],[48],[49],[50],[51], [52],[105],[106],[107],[144],[145],[271], [272],[273],[274],[275],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.3 of 10

Ceramic tile and masonry units

Ceramic tiles & masonry units (bricks, blocks)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 14411 (ceramic tiles), EN 771 (masonry units); EPD
Japan Standards	JIS for tiles and bricks
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	**I. Ceramic Tiles** GOST 961-89: Acid-resistant and thermocid-resistant ceramic tiles. Technical specifications. GOST 6141-2021: Glazed ceramic tiles for internal wall cladding. Technical specifications. GOST 13996-2019: Ceramic facade tiles and carpets made from them. Technical specifications. GOST 17057-89: Glass mosaic facing tiles and carpets made from them. Technical specifications. GOST 18623-82: Cast ceramic tiles and carpets made from them. Technical specifications. **II. Masonry Units (Bricks, Blocks) & Ancillary Products** Clay Ceramic Units: GOST 530-2012: Ceramic brick and stone. General technical specifications. ST RK EN 771-1-2011: Specification for masonry units. Part 1: Clay masonry units. ST RK STB 1719-2011: Porous hollow ceramic blocks. Technical specifications. GOST 8426-75: Clay brick for chimneys. Silicate (Calcium Silicate) Units: GOST 379-2015: Silicate brick, stones, blocks and partition slabs. General technical specifications. ST RK EN 771-2-2011: Specification for masonry units. Part 2: Calcium silicate masonry units. Concrete & Autoclaved Aerated Concrete (AAC) Units: ST RK EN 771-3-2011: Specification for masonry units. Part 3: Aggregate concrete masonry units (Dense and lightweight aggregates). ST RK EN 771-4-2011: Specification for masonry units. Part 4: Autoclaved aerated concrete masonry units. ST RK EN 771-5-2011: Specification for masonry units. Part 5: Manufactured stone masonry units. ST RK 945-92: Concrete wall stones. Technical specifications. ST RK 3370-2019: Hyperpressed cement-sand brick. Technical specifications. GOST 6133-99: Concrete wall stones. Technical specifications. (Valid until 20.06.2025) GOST 6133-2019: Concrete wall stones. Technical specifications. Natural Stone Units: ST RK EN 771-6-2017: Specification for masonry units. Part 6: Natural stone masonry units. ST RK 3619-2020: Products from natural stone. General technical specifications. GOST 4001-2013: Wall stones from natural rock. Technical specifications. GOST 9479-2011: Blocks from natural rock for the production of facing, architectural-construction, memorial and other products. Technical specifications. GOST 23342-2012: Architectural-construction products from natural stone. Technical specifications. Ancillary Masonry Elements (Ties, Lintels, Reinforcement): ST RK EN 845-1-2023: Specification for ancillary components for masonry. Part 1: Wall ties, tension straps, hangers and brackets.

International standards with functional alignment to Kazakhstan/EAEU systems	ST RK EN 845-2-2023: Specification for ancillary components for masonry. Part 2: Lintels. ST RK EN 845-3-2023: Specification for ancillary components for masonry. Part 3: Bed joint reinforcement of steel meshwork. EN 14411 – Ceramic tiles – Definitions, classification, characteristics and marking ISO 13006 – Ceramic tiles (equivalent to EN 14411) EN ISO 10545 (series) – Test methods (water absorption, strength, frost resistance, chemical resistance) EN 12004 – Ceramic tile adhesives EN 13888 – Grouts for ceramic tiles
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's ceramic tiles and masonry units market demonstrates moderate domestic capacity for international standards, with full national adoption of ST RK EN 14411 (ceramic tiles – classification, characteristics and marking) and the complete ST RK EN 771 series (masonry units: clay, calcium silicate, concrete, AAC and natural stone) [260], [261]. The sector is undergoing rapid localization: the Wan Sheng Ceramics plant in Shymkent commissioned its first line in 2024 at 12.7 million m² of porcelain tiles per year and is on track to reach 25.4 million m² by 2026, directly addressing one-third of the national market previously met almost entirely by imports [262]. Parallel investments in brick production, including a new high-tech clay brick facility in Zhambyl region (36 million units' annual capacity) and expansions in concrete and silicate blocks, have lifted local supply to 50–60% of demand, with producers now routinely declaring performance to EN 771 levels [263], [264]. Government import-substitution programmes and the 2026 manufacturing growth target (6.2% PVI) explicitly prioritize these materials, accelerating the shift from legacy GOST to harmonized European norms in urban and infrastructure projects [265].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Solid Ceramic Brick M100	1. $90–$140 /1000 pcs	1. $146–$160 /1000 pcs	1. $144–$147 /1000 pcs
2. Solid Ceramic Brick M150	2. $100–$160 /1000 pcs	2. $184–$202 /1000 pcs	2. $183–$185 /1000 pcs
3. Hollow Ceramic Brick M150	3. $95–$150 /1000 pcs	3. $181–$200 /1000 pcs	3. $165–$181 /1000 pcs
4. Facing Hollow Ceramic Brick M150	4. $150–$250 /1000 pcs	4. $227.5–$240 /1000 pcs	4. $211–$228 /1000 pcs
5. Solid Silicate Brick M100	5. $80–$120 /1000 pcs	5. $140–$159/1000 pcs	5. $127–$140/1000 pcs
6. Solid Silicate Brick M150	6. $90–$130 /1000 pcs	6. $146–$160 /1000 pcs	6. $131–$146 /1000 pcs
7. Coloured Facing Silicate Brick	7. $160–$260 /1000 pc	7. $159–$175 /1000 pcs	7. $146–$160 /1000 pcs
8. Solid Hyperpressed Brick M150	8. $110–$180 /1000 pc	8. $199.6–$220 /1000 pcs	8. $200–$209/1000 pcs

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
9. Hollow Hyperpressed Brick M150	9. $100–$170 /1000 pcs	9. $199.4–$221/1000 pcs	9. $199–$218 /1000 pcs
10. Coloured Facing Solid	10. $170–$300 /1000 pcs	10. $207–$227 /1000 pcs	10. $207–$219/1000 pcs
11. Fireclay Brick	11. $300–$600/ton	11. $346–$380/ton	11. $341–$370/ton
12. Acid-Resistant Brick Class A	12. $400–$750/ton	12. $488–$537/ton	12. $479–$527/ton
13. Diatomite Brick	13. $500–$900/ton	13. $572–$629/ton	13. $562–$618/ton
14. Ceramic Block 380x250x219³	14. $70–$140/m³	14. $49.8–$54/m³	14. $46–$50/m³
Block 4 — Environmental Criteria			
▶️ **Green Criteria (Mandatory)**			
Local sourcing encouraged, recycled content in aggregates, EPD preferred			
Carbon benefit per unit of measure: For EU Ecolabel ceramic tiles (<6mm thick), up to 1.4 - 4 kg CO_2 eq is avoided per m². For ceramic tiles ≥6mm, 73 kg CO_2 eq/t avoided per m², For EU ecolabel masonry units (bricks/blocks), 0.5–2.5 kg CO_2 emissions per square meters (m²) avoided			
Block 5 — Procurement Action			
Environmental Requirements for the Technical Specification — Text for Tender Documentation			
Tiles and masonry units should indicate origin and transport distance; where available provide EPD and evidence of recycled aggregate content.			

Sources: [3],[14],[15],[45],[46],[105],[106],[107], [140],[141],[260,[261],[262],[263], [264],[265],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.4 of 10

Floor screeds

Floor screed & toppings (concrete/anhydrite)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 13813 (screed materials), EN 1504 for concrete toppings
Japan Standards	JIS equivalents
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	SNiP RK 2.04-10-2004 Insulating and finishing coatings GOST 28013-2023 Mortars. General specifications ST RK EN 13813-2017 Seamless Flooring and Seamless Flooring Materials. Characteristics and Requirements GOST 31358-2019 Floor Screeds. Specifications
International standards with functional alignment to Kazakhstan/EAEU systems	EN 13813 EN 1504

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's industry for floor screeds and toppings, encompassing concrete and anhydrite varieties, reveals an improving local alignment with established benchmarks, guided by the implementation of ST RK 3361-2022, which updates cement production norms critical for screed formulations, alongside broader technical regulations emphasizing durability, environmental sustainability, and performance in bonded or floating applications [307]. Indigenous operations satisfy an estimated 50-60% of consumption for conventional cementitious options, supported by entities including International Cement Group and Sika Kazakhstan, which deliver ready-mix and specialized toppings tested for load-bearing and levelling requirements in diverse climates [308], [309]. Substantial strides feature Sika's 2025 facility launch in Ust-Kamenogorsk, incorporating lines for advanced anhydrite-based self-levelling products to support annual outputs aligned with mining and urban projects [310]. While ample cement resources enable strong coverage for basic concrete toppings, premium anhydrite binders and rapid-setting variants retain some reliance on foreign inputs from Russia and China, though policy incentives for deeper processing seek to expand autonomous capabilities [311].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Cementitious Screed M200	1. $0.31–$0.60 per kg	1. $0.19–$0.20/kg	1. $0.16–$0.18/kg
2. Dry mixture - cementitious, self-levelling floor for final levelling M200	2. $0.28–$0.55 per kg	2. $0.35–$0.37/kg [2]	2. $0.33–$0.36/kg

Block 4 — Environmental Criteria
▶️ **Green Criteria (Mandatory)**
Use of supplementary cementitious materials, low-VOC additives, local sourcing
Carbon benefit per unit of measure: Topflow Screed A (anhydrite): Avoids 20.45 kg CO_2 emissions per m² (70–85% reduction). Gypsol (anhydrite): Up to 90% overall reduction; binder avoids 873.74 kg CO_2 emissions per tonne. General: Anhydrite ~26-100 kg CO_2 emissions per tonne and per cubic metre 50-200 kg CO_2 is avoided. CEM3b mix (50% GGBS): Avoids 120 kg CO_2 per m³. Flowcrete modified mortars (cement-based, EN 13813): 800 to 900 kg CO_2 emissions per m³.
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Screeds and toppings shall use SCMs where possible, include SDS for additives and demonstrate low-emission curing/installation products.

Sources: [3],[14],[15],[89],[90],[91],[92],[93], [94], [95],[96],[105],[106],[107],[156], [157],[307],[308],[309],[310],[311],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.5 of 10

Floor coverings — wood

Floor coverings — timber & engineered wood flooring

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EU Ecolabel; EN 14342 (wood flooring), EN 16516 (emissions)
Japan Standards	JIS for flooring materials; Eco Mark
Asia Standards	Korean eco-labels; China standards
Kazakhstan Equivalents (GOST / ST RK)	GOST 862.1-85: Parquet products. Block parquet. Technical specifications. (Valid until 20.06.2025) GOST 862.1-2020: Parquet products. Block parquet. Technical specifications. GOST 862.2-85: Parquet products. Mosaic parquet. Technical specifications. GOST 862.3-86: Parquet products. Parquet boards. Technical specifications. (Valid until 20.06.2025) GOST 862.3-2020: Parquet products. Parquet boards. Technical specifications. GOST 862.4-87: Parquet products. Parquet panels. Technical specifications. (Valid until 20.06.2025) GOST 862.4-2020: Parquet products. Parquet panels. Technical specifications. GOST 1005-86: Wooden floor panels for low-rise buildings. Technical specifications. (Structural subfloor) GOST 4981-87: Wooden floor beams. Technical specifications. (Structural support) GOST 28015-89: Single-layer wooden floor covering panels. Technical specifications. ST RK EN 13810-1-2016: Wood-based panels. Floating floors. Part 1: Performance specifications and requirements. GOST 32304-2013: Laminate floor coverings on the basis of dry-process wood fiber boards. Technical specifications. GOST 10632-2014: Particleboards. Technical specifications. ST RK EN 12871-2015: Wood-based panels. Performance specifications and requirements for load-bearing boards for floors, walls and roofs. ST RK CEN/TR 12872-2016: Wood-based panels. Guidance on the use of load-bearing boards in floors, walls and roofs. GOST 32289-2013: Particleboards faced with films based on thermosetting polymers. Technical specifications. (Often used as flooring substrate) GOST 32687-2021: Dry-process wood fiber boards (MDF/HDF) faced with films based on thermosetting polymers. Technical specifications. (Core material for laminate flooring)
International standards with functional alignment to Kazakhstan/EAEU systems	EN 14342, ISO emissions and performance standards EN 13986 – Wood-based panels for use in construction EN 12871 – Load-bearing wood-based panels for floors EN 1995-1-1 (Eurocode 5) – Design of timber structures (design reference)
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate

Kazakhstan Market Description	Kazakhstan's market for timber and engineered wood flooring (parquet, laminate, engineered boards) demonstrates moderate capacity for international standards, with ST RK EN 14342 (wood flooring characteristics, evaluation of conformity and marking) and ST RK EN 16516 (indoor air emissions) adopted nationally, enforcing E1 formaldehyde class and durability performance [248], [249]. Domestic production, primarily parquet from local birch and pine under GOST 862 series, meets 30–40% of demand, while higher-spec engineered and laminate products rely 60–70% on imports from Russia, China, and Europe to satisfy EN 13986 and low-VOC criteria [250], [251]. Rising trend in the construction sector, driving strong residential and commercial uptake, supported by OMIR green building standards that reward FSC/PEFC chain-of-custody, EPD-verified materials, and formaldehyde Class E1 [252], [253]. GOST standards remains prevalent in cost-sensitive rural and budget segments, but urban projects and government import-substitution programmes are steadily improving market receptiveness.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Laminate flooring, Class 33 (Highest wear resistance)	1. $8–$22/m²	1. $11.45–$12.55/m²	1. $11.12–$12.4 /m²
2. Multi-layer parquet board, 14 mm thick (Engineered wood)	2. $25–$75/m²	2. $41.05–$45.00 /m²	2. $39.91–$42.00/m²
3. Tongue & groove floorboard, anti-septic type 1, 28 mm thick[2]	3. $520 – $680/m³	3. $199.41–$220/m³	3. $191.99–$215.00/m³

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Low VOC emissions (formaldehyde/Class E1 or better), FSC/PEFC optional, durability warranty

Carbon benefit per unit of measure:

Cross-laminated timber (CLT) or engineered wood floor coverings avoids up to 0.9–1 tonne CO_2 emissions per cubic metre through biogenic sequestration and substitution for concrete or ceramics.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Wood flooring must meet formaldehyde emission class E1 or better and be accompanied by an emissions test report or EPD and comply with EN 14342 / ST RK EN 14342.

Sources: [5],[14],[15],[39],[40],[41],[42],[105], [106],[107],[134],[135],[136],[248],[249], [250],[251],[252],[253],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.6 of 10

Floor coverings — PVC/vinyl

Floor coverings — resilient (vinyl or PVC)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	Ecolabels (Austrian Ecolabel UZ 56, Natureplus RL1200, or Blue Angel), REACH compliance, EN ISO standards for flooring performance
Japan Standards	Eco Mark Japan (as per the products), JIS for floor coverings
Asia Standards	China Green Label; Korea Eco-Label
Kazakhstan Equivalents (GOST / ST RK)	GOST 16475-81: Polyvinyl chloride floor tiles. Specifications. GOST 14632-79: Multi-layer and single-layer polyvinyl chloride linoleum without backing. Specifications. GOST 7251-77: Polyvinyl chloride linoleum on woven and non-woven backing. Specifications. (Valid until 20.06.2025) GOST 7251-2016: Polyvinyl chloride linoleum on woven and non-woven backing. Specifications. GOST 18108-80: Polyvinyl chloride linoleum on a heat and sound insulating base. Specifications. (Valid until 20.06.2025) GOST 18108-2016: Polyvinyl chloride linoleum on a heat and sound insulating base. Specifications. GOST 27023-86: Welded carpets made of polyvinyl chloride linoleum on a heat and sound insulating base. Specifications. GOST 24944-81: Decorative finishing polyvinyl chloride film. Specifications. GOST 11529-86: Polyvinyl chloride materials for floors. Control methods. (Valid until 20.06.2025) GOST 11529-2016: Polyvinyl chloride materials for floors. Control methods.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 649 – Homogeneous and heterogeneous PVC floor coverings (tiles & sheets) ISO 10582 – Resilient floor coverings – Heterogeneous PVC tiles ISO 10581 – Resilient floor coverings – Homogeneous PVC tiles
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's resilient (vinyl/PVC) flooring market exhibits moderate capacity for international standards, with EN 649 (homogeneous and heterogeneous PVC floor coverings) and ISO 10582/ISO 10581 (heterogeneous/homogeneous resilient tiles) permitted under national technical regulations, supported by EAEU TR 037/2016 for phthalate and SVHC restrictions and low-emission requirements [254], [255]. Domestic production, centred on basic linoleum and PVC tiles under GOST 7251-2016 and GOST 16475-81, accounts for 25–35% of supply, while 65–75% of premium LVT and heterogeneous sheets are imported (mainly from China, Russia, and Turkey) to satisfy recycled-content and REACH-aligned criteria [256], [257]. The prevalent construction boom in Kazakhstan is reinforced by the OMIR green building standard that rewards EPD-verified, low-VOC, and phthalate-free products [258], [259]. GOST standards dominate cost-sensitive rural projects, but urban developments and import-substitution incentives are gradually raising market receptiveness.

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. PVC Linoleum, commercial heterogeneous, class 33/34	1. $6 – $18/m²	1. $10.64–$12 /m²	1. $10.51–$11.5/m²
2. Heterogeneous vinyl flooring, 2.5 mm thick, class 33	2. $5 – $15/m²	2. $20.42–$22.42 /m²	2. $20–$22 /m²
3. Homogeneous PVC coating for sports grounds, 6 mm total)	3. $18 – $45/m²	3. $24.5–$25/m²	3. $24.00–$26.2 /m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

(i) Prefer non-PVC or low-impact PVC with recycled content ≥ 25% (or per applicable EU GPP benchmark); (ii) restrict phthalates and listed SVHCs per REACH Annex XIV; (iii) low VOC emissions per EN 16516.

Carbon benefit per unit of measure:

Recycled flexible PVC resilient flooring avoids approximately 9.68–22.46 kg CO_2 emissions per m² for 1.2 - 5 kg/m² density

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Resilient flooring PVC/Vinyl floors that must comply with REACH restrictions, be free from specified phthalates/ SVHCs and provide EPD or declaration of plasticizer content.

Sources: [1],[2],[14],[43],[44],[105],[106],[107], [137],[138],[139],[254],[255],[256],[257], [258],[259],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.7 of 10

Raised access floors

Raised floors & access flooring systems

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 12825 (access flooring performance), FloorScore for emissions
Japan Standards	JIS standards for raised floors
Asia Standards	China/Korea standards; national ecolabels
Kazakhstan Equivalents (GOST / ST RK)	ST RK EN 1366-6-2014 Fire resistance tests for service installations -Part 6: Raised access and hollow core floors, (IDT from EN 1366-6:2004)
International standards with functional alignment to Kazakhstan/EAEU systems	EN 1366-6:2004

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's area for raised floors and access flooring systems exhibits a progressing internal competence matched to recognized measures, backed by the integration of EN 12825 norms outlining specifications for maximum bearing capacity, deformation thresholds, and overall framework stability in modular panel arrangements [312]. Home-based activities cover around 30-40% of application demands through customization and installation, illustrated by companies like Eximpedia, expowindow, Kahr's, Wesco Anixter, Karzah, and RST Energo LLC., offering versatile configurations for operational areas and business sites that align with earthquake resistance and electrical grounding standards [313], [314],[315],[316],[317],[318]. Important developments involve collaborations with international partners to install durable elevated base structures, such as Lindner Group's involvement in setups within Almaty, anticipated to increase annual installation volumes by 20% amid rising needs from technology centers [319]. Although core part manufacturing depends significantly on imports from Asia and Europe due to limited advanced fabrication facilities, initiatives encouraging technology transfer aim to strengthen local expertise and reduce dependence on outsiders [320].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Raised access floor panel system	1. $45 – $95/m²	1. $40 – $80/m²	1. $35 – $70/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Low emissions, recycled content in panels, durability/warranty

Carbon benefit per unit of measure:

Steel Panels: E.g., Kingspan (recycled steel), avoids up to ~32–40 kg of CO_2/m². Concrete Composites: E.g., TecCrete (recycled steel-concrete), avoids up to 40–50 kg of CO_2/m². Wood-Based: E.g., Lindner (chipboard), 25–35 kg of CO_2/m². Gypsum-Based: E.g., Knauf (fiber), ~58 kg of CO_2/m². Kingspan: Avoids CO_2 about 50–60% (~8 kg/m² net, biogenic). Tate: avoids CO_2 up to ~38 kg/m² total, avoids 5 to 18 kg CO_2/m² (wood). TecCrete: Avoids 40–60 kg of CO_2/m² vs. non-recycled. Lindner: Avoids ~25 to 42 kg of CO_2/m² (biogenic storage). Knauf: Avoids ~5-8 kg of CO_2/m² net.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Raised floor panels must have documented recycled content, meet FloorScore emissions limits, and include a minimum 10-year warranty.

Sources: [1],[14],[15],[97],[98],[99],[100],[101],[102],[103],[104],[105],[106],[107],[158],[159],[312],[313],[314],[315],[316],[317],[318],319],[320], [520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.8 of 10

Acoustic panels and ceilings

Acoustic panels & ceiling systems

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN ISO 354 (acoustic absorption), EU Ecolabel for certain products
Japan Standards	JIS acoustics standards; Eco Mark
Asia Standards	National ecolabels
Kazakhstan Equivalents (GOST / ST RK)	**1. Product: Acoustic Panels & Ceiling Systems** GOST 23499-2022 Sound-insulating and sound-absorbing building materials and products. General specifications **2. Tests: Laboratory & Field Tests** ST RK EN ISO 10140-2-2018 (Airborne sound insulation lab test) ST RK EN ISO 10140-3-2018 (Impact sound insulation lab test) ST RK EN 29052-1-2015 (Dynamic stiffness for floating floors) GOST EN 29053-2011 (Airflow resistance) **3. Performance Classification** ST RK ISO 717-1-2016 (Rating of airborne sound insulation) ST RK ISO 12354-2-2018 (Calculation of impact sound insulation)
International standards with functional alignment to Kazakhstan/EAEU systems	ISO 354 (Sound absorption test) EN ISO 10140 series EN 29052-1 ISO 9053 ISO 717-1 ISO 12354-2
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's acoustic panels and ceiling systems domain exhibits a growing local proficiency in line with accepted benchmarks, supported by the assimilation of ST RK EN 13964 norms, which set out demands for suspended arrangements, including noise reduction, load-bearing capacity, and protective features [321]. Indigenous activities fulfil an estimated 35-45% of needs for standard mineral wool and gypsum types, illustrated by enterprises such as Kazakhstan Acoustics LLP in Almaty focusing on sound-absorbing panel production, Knauf Kazakhstan offering gypsum-based acoustic setups, and Saint-Gobain Kazakhstan providing advanced noise-control options [322], [323]. Additional contributors include MTC-Service Group as the official Rockfon distributor delivering rockwool-based ceilings across the country, and Lindner Group participating in key installations like the JTI Kazakhstan project with integrated chilled and acoustic elements [324], [325]. Significant evolutions feature rising infrastructure expenditures driving demand, with the sector benefiting from economic upgrades and anticipated steady expansion to 2035 during urban and commercial constructs [326]. Though essential formats utilize regional resources for fair self-reliance, intricate customized absorbers depend partly on inflows from Russia, China, and Europe, as measures encourage heightened domestic evolution [327].
Block 3 — Price Dimension	

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Suspended Ceiling from Mineral Panels, 20 mm thick	$18.50 – $28.00 per m²	$17.67–$19.8/m²	$17.29–$19.00/m²
Block 4 — Environmental Criteria			
▶️ Green Criteria (Mandatory)			
Low-VOC, recycled-content options, acoustic performance data			
Carbon benefit per unit of measure: Wood wool acoustic panels (e.g., CEWOOD CW-W25S, EN ISO 354 compliant) avoid ~4-7 kg CO_2 emissions per square metre. Mineral fiber low-embodied carbon ceilings (e.g., Ultima LEC, ASTM E1264 Type III, NRC 0.70-0.90) avoid ~1.5-4 kg CO_2e (biogenic sequestration in GWP). Note: Actual benefits must be verified via manufacturer-specific EPDs compliant with EN 15804			
Block 5 — Procurement Action			
Environmental Requirements for the Technical Specification — Text for Tender Documentation			
Ceiling and acoustic panels must meet acoustic performance criteria (NRC ≥(given value) and be low-emission with documented recycled content.			

Sources: [1],[14],[15],[105],[106],[107],[160], [161],[206],[207],[321],[322],[323], [324], [325],[326],[327],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.9 of 10

Paints and coatings

Paints, varnishes & coatings

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EU GPP criteria for paints and varnishes (DG Environment); EU Ecolabel (Commission Decision 2014/312/EU — paints and varnishes for interior and exterior use); EN 13300 (water-borne coating materials and systems for interior walls and ceilings — classification); EN ISO 4618 (paints and varnishes — terms and definitions); Directive 2004/42/CE (limitation of emissions of volatile organic compounds in decorative paints and vehicle refinishing products); REACH Regulation (EC) No 1907/2006; Nordic Swan Ecolabel (optional — Type I ecolabel for paints); EN 15804 / ISO 14025 (EPD).
Japan Standards	Eco Mark (Category No. 126)(paints/varnishes); JIS standards JIS K 5600 series; GHS Labels- Hazard pictograms/SDS for safety
Asia Standards	China Environmental Labelling for paints- China GB 30981.1/2-2025; China CCC (CNCA-C21-01:2024); Korea Eco-Label-Korea KC Mark/GHS
Kazakhstan Equivalents (GOST / ST RK)	ST RK GOST R 51694-2007: Paint materials. Determination of coating thickness. GOST 31149-2014 (ISO 2409:2013): INTERSTATE STANDARD. Paint materials. DETERMINATION OF ADHESION BY CROSS-CUT METHOD. ST RK ISO 12944-5-2013: Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 5. Protective paint systems.
International standards with functional alignment to Kazakhstan/EAEU systems	EN ISO coating standards, EU Ecolabel criteria, and international VOC regulations
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's paints, varnishes and coatings sector displays moderate domestic capacity for international standards, centred on the integration of EN 13300 performance requirements for water-borne interior and exterior coatings, together with national rules that mirror REACH limits on volatile organic compounds and restricted substances [276], [277]. Around 15 established local producers now cover close to 50 % of the market, with companies such as Raduga Paint and Varnish Plant in Almaty and VMP Astana Plant delivering decorative enamels, primers and industrial protective systems that consistently meet durability and emission tests [278], [279]. Recent capacity additions, including a Kazakhstan–Iran joint venture producing 40 000 tonnes annually and Asian Paints' monthly output exceeding 1 000 tonnes, are strengthening the supply of low-VOC and eco-friendly formulations for both residential and infrastructure applications [280]. Although specialized high-performance marine and anti-corrosion coatings still rely partly on imports, the sector's steady modernization and growing participation in regional exhibitions portray a defined trail toward higher technical and environmental compliance [281].

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. Polyurethane Varnish (one-component)	1. $4.50 – $7.20	1. $4.07–$4.5/kg	1. $4.03–$4.4/kg
2. Epoxy Paint (two-component, 150-300µm)	2. $4.80 – $8.50	2. $5.76–$6.2/kg	2. $4.65–$5.2/kg
3. Weather-resistant Enamel	3. $1.45 – $2.30	3. $7.85–$8.50/kg	3. $7.35–$8.00/kg
4. Acrylic-Polyurethane Enamel	4. $6.80 – $11.00	4. $8.83–$9.7/kg	4. $8.82–$9.6/kg
Block 4 — Environmental Criteria			
▶️Green Criteria (Mandatory)			
Low VOC limits (TVOC), restrict heavy metals and listed SVHCs, ecolabel preferred			
Carbon benefit per unit of measure: Eu Ecolabeled paints and varnishes provides 20-50% less production emissions compared to conventional petrochemicals. Avoided 0.1 to 1.5 kg CO_2 emissions per square metres. Provides <1 g/m² VOC emissions per square metres of paint applied. for other hazardous chemicals this avoids 0.2-0.5 g/kg TiO2. This lowers the overall emissions/energy (15-23 GJ/t during the whole process)			
Block 5 — Procurement Action			
Environmental Requirements for the Technical Specification — Text for Tender Documentation			
The Supplier shall supply only paints, varnishes and coatings that comply with Directive 2004/42/EC (VOC limits per Annex II), EU GPP Core Criteria (SWD(2017) 484 final), REACH Regulation and CLP. Preference shall be given to EU Ecolabel products under Commission Decision (EU) 2025/2607; SDS and test reports shall be submitted for verification.			

Sources: [1],[2],[14],[15],[53],[54],[55],[56], [57],[58],[59],[60],[105],[106],[107], [146],[147],[276],[277],[278],[279], [280],[281],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION C — INTERIOR FINISHES | Material C.10 of 10

Adhesives, sealants, mastics

Adhesives, sealants & mastics

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EU GPP criteria for adhesives and sealants (DG Environment); EU Ecolabel (Regulation (EC) No 66/2010); EN 923 (adhesives — terms and definitions); EN 15651 series (sealants for non-structural use in joints in buildings and pedestrian walkways — Parts 1–5); REACH Regulation (EC) No 1907/2006 (substance restrictions for adhesive and sealant formulations); EN 15804 / ISO 14025 (EPD). [Optional third-party certifications — not EU harmonised standards: FEICA SPERCs (specific environmental release categories); SCS Global Services; CertiPUR-US; Level mark (BIFMA); Eurofins Indoor Air Comfort Gold; NSF/ANSI 336.]
Japan Standards	Eco Mark Eco Mark (Type I label); JIS K 6800 series
Asia Standards	China GB 18583-2020; JG/T 415-2013/Korea national ecolabels standards K-Reach (2025 amended)
Kazakhstan Equivalents (GOST / ST RK)	**1. Adhesives for Structural Wooden Constructions (Test Methods)** ST RK EN 302-1-2015 Adhesives for load-bearing timber structures. Test methods. Part 1: Determination of longitudinal tensile shear strength. ST RK EN 302-2-2015 Adhesives for load-bearing timber structures. Test methods. Part 2: Determination of resistance to delamination. ST RK EN 302-3-2015 Adhesives for load-bearing timber structures. Test methods. Part 3: Determination of the effect of acid damage to wood fibres by temperature and humidity cycling on the tensile shear strength. ST RK EN 302-4-2015 Adhesives for load-bearing timber structures. Test methods. Part 4: Determination of the effect of wood shrinkage on shear strength. ST RK EN 302-5-2015 Adhesives for load-bearing timber structures. Test methods. Part 5: Determination of maximum assembly time under referenced conditions. ST RK EN 302-6-2015 Adhesives for load-bearing timber structures. Test methods. Part 6: Determination of minimum pressing time under referenced conditions. ST RK EN 302-7-2016 Adhesives for load-bearing timber structures. Test methods. Part 7: Determination of the working life under referenced conditions. **2. Adhesives for Floor Coverings (Product Specification)** ST RK 3729-2021 Adhesives for floor coverings. General technical specifications. **3. Structural Adhesives for Metal (Product Specification)** ST RK EN 15275-2020 Structural adhesives. Characterization of anaerobic adhesives for coaxial metal assembly in building and civil engineering structures. **4. Sealants** GOST 25621-2023 Polymer sealants and caulking products for building construction. Classification and general technical requirements. **5. Mastics** GOST 30693-2000 Roofing and waterproofing mastics. General specifications

International standards with functional alignment to Kazakhstan/EAEU systems	EN 302-1 to EN 302-7 – Test methods for structural wood adhesives EN 301 – Phenolic and aminoplastic adhesives for load-bearing timber structures EN 15425 – One-component polyurethane (PUR) adhesives for load-bearing timber EN 14080 – Glued laminated timber (adhesive performance reference) EN 14259 – Adhesives for floor coverings – Requirements ISO 17178 – Adhesives for resilient, textile and laminate floor coverings
International standards with functional alignment to Kazakhstan/EAEU systems	EN 13999 (series) – Determination of adhesive properties (shear strength, peel) EN 15275 – Structural anaerobic adhesives for metal assemblies ISO 4587 – Adhesives – Lap-shear strength of bonded assemblies ISO 11003 (series) – Adhesives – Determination of shear behaviour
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's adhesives, sealants, and mastics industry reveals a balanced level of local capability aligned with global benchmarks, primarily through the implementation of ST RK EN 12004-2020 for ceramic tile adhesives and ST RK EN 15651 series for joint sealants, which outline criteria for tensile adhesion, elasticity, and weather resistance [282], [283]. Domestic manufacturers supply approximately 40-50% of the sector's needs, featuring firms like Selena Group and Sika Kazakhstan that produce silicone, polyurethane, and acrylic variants tested for durability in harsh continental climates [284], [285]. Key expansions include Selena's new facility in southern Kazakhstan, set to add 20,000 tonnes of annual output by mid-2026, and Sika's 2025 launch of integrated lines for high-strength sealants and bonding agents in eastern regions [286]. While basic construction-grade mastics and general-purpose adhesives are largely self-sufficient due to regional polymer resources, advanced fire-resistant and chemical-proof types continue to draw from foreign suppliers, though ongoing certification drives aim to enhance export potential [287].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Bitumen-Universal Mastic, cold application (MBU)	1. $1.10 – $1.80	1. $2.32–$2.55/kg	1. $2.24–$2.5/kg
2. Acrylic Sealant	2. $4.40 – $7.00	2. $2.39–$2.6/kg	2. $2.36–$2.5/kg
3. Polyurethane Sealant, one-component	3. $8.00 – $12.10	3. $8.79–$9.7/kg	3. $8.68–$9.6/kg
4. Universal Adhesive-Sealant pc. (290 ml)	4. $17.20 – $29.80	4. $2.15–$2.4/kg	4. $2.15–$2.4/kg

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

Low VOC; free from specified SVHCs; SDS and emissions data

Carbon benefit per unit of measure:

Bio-based adhesives/sealants (EU Ecolabel/REACH/EN 923 compliant; 60–70% biomass content) successfully reduce embodied carbon by 30–60% compared to conventional petrochemical equivalents, and avoid 0.4–2.0 kg CO_2 emissions per m² of adhesives, sealants and mastics applied (depending on product type, thickness, and coverage rate). Actual benefits must be verified through manufacturer EPDs compliant with EN 15804.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

The Supplier shall supply only adhesives, sealants and mastics that comply with REACH Regulation, CLP Regulation and very low VOC emission requirements (EMICODE® EC1 or equivalent). Preference shall be given to EMICODE (R) EC1 PLUS certified products; SDS and emission test reports shall be submitted for verification.

Sources: [1],[14].[15],[61],[62],[63],[64],[65], [66],[67],[68],[69],[70],[71],[72],[73], [74],[75], [105],[106],[107], [148],[149],[282],[283],[284],[285], [286],[287],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D

BUILDING SERVICES

8 positions

SECTION D — BUILDING SERVICES | Material D.1 of 8

HVAC (ventilation, air conditioning)

HVAC equipment (air handling units, chillers)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	Commission Regulation (EU) 2016/2281 (Ecodesign requirements for air heating products, cooling products and high-temperature process chillers); Regulation (EU) 2024/1781 (Ecodesign for Sustainable Products Regulation, ESPR); EN 16798-3 (energy performance of buildings — ventilation for non-residential buildings — performance requirements for ventilation and room-conditioning systems); EN 14825 (air conditioners, liquid chilling packages and heat pumps — testing and rating at part load conditions); EU Energy Labelling Regulation (EU) 2017/1369; EN 15804 / ISO 14025 (EPD).
Japan Standards	Top Runner program/JIS energy efficiency metrics; Eco Mark for equipment
Asia Standards	China energy efficiency standards; Korea energy labels
Kazakhstan Equivalents (GOST / ST RK)	1. Mandatory Technical Regulations: • EAEU TR 048/2019 “On energy efficiency of energy-consuming devices”: The primary law setting mandatory minimum energy efficiency classes and labeling for chillers, fans, and packaged units. • EAEU TR 037/2016 “On restriction of use of hazardous substances”: Restricts RoHS substances in electrical equipment. • TR “On the safety of buildings and structures” (Updated 2025): Sets general safety, fire safety, and energy efficiency requirements for building systems, including HVAC. 2. National Construction Norms & Rules : • SN RK 4.02-01-2011 & SP P\RK 4.02-101-2012 (“Heating, ventilation and air conditioning”): These are the fundamental, mandatory design codes for all HVAC systems in Kazakhstan. They define design parameters, safety factors, and system requirements. 3. National Standards: These define product performance, test methods, and terminology to support the above. • Terminology: GOST 22270-2018 (Terms and definitions for HVAC systems). • Air Ductwork: ST RK EN 12237-2018 (Leakage & strength of round ducts), ST RK EN 12236-2018 (Duct supports). • Ventilation Safety: GOST 12.4.021-75 (General safety requirements for ventilation systems).
International standards with functional alignment to Kazakhstan/EAEU systems	EN 1886 (AHU casing leakage/strength), EN 13053 (AHU ratings), EN 14511 (chiller/heat pump performance) Performance Certifications: Eurovent Certification (for performance, energy, and sound) and AHRI Certification are the global benchmarks accepted by specifiers. ISO Standards: ISO 5151 (non-ducted units), ISO 16890 (air filter testing). Safety & Electrical: IEC 60335-2-40 (heat pump safety), IEC 61000 (EMC) underpin CE marking.
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate

Kazakhstan Market Description	Kazakhstan's branch for air handling units and chillers exhibits a standard quality of vernacularism and indigenous internal capacity in coherence with global guidelines, backed by the application of ST RK EN 1886-2013, which establishes mechanical performance benchmarks for casings, filter bypass leakage, and thermal bridging in ventilation assemblies, plus ST RK EN 13053-2013 rating ventilation and air conditioning systems for airflow, heat recovery, and cooling efficiency [347]. Resident firms meet around 25-35% of needs for basic models, as seen with Ust-Kamenogorsk Heat Pump Plant under the Sundue brand, which assembles reversible chiller-integrated AHUs from 500 to 35,000 m³/h and chillers up to 5 MW, leveraging local engineering for residential and commercial uses [348]. Relevant progress involves Sundue's ongoing output of modular systems since 2007, aiding energy-efficient designs in harsh weather, while foreign entities like Trane and Carrier contribute through localized service for large-scale industrial setups [349], [350]. Basic water-cooled and air-cooled variants achieve partial self-reliance via regional component sourcing, yet high-capacity absorption chillers and variable refrigerant flow integrations lean on imports from Asia and Europe, with drives for tech localization to support infrastructure demands [351].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Flexible aluminium corrugated air duct, type VAGT, diameter 200 mm	1. $12.50 – $18.00 /m²	1. $2.93–$3.22/m²	1. $2.8–$3.16/m²
2. Noise silencer for ventilation units, round section, GTK 1-6, diameter 500 mm	2. $145.00 – $215.00/pc	2. $123.5–$135.9/pc	2. $121.7–$133.9/pc
3. Duct fan for round ducts, general purpose, 0.267 kW, max flow 2300 m³/h	3. $235.00 – $360.00/kit	3. $228.9–$251.8/kit	3. $224.3–$246/kit
4. Cassette fan coil unit, 4-way air distribution, 2-pipe, min flow 480 m³/h, cooling 3.7 kW, heating 5.1 kW	4. $520.00 – $780.00/kit	4. $782–$860/kit	4. $767–$843/kit
5. Multi-split outdoor unit (Daikin), cooling 5.0 kW, heating 5.6 kW, model 2MXM50A	5. $1450.00 – $1820.00/pc	5. $1555–$1710/pc	5. $1537–$1690/pc
6. Split-system outdoor unit (Daikin), cooling 5.0 kW, heating 5.8 kW, model RXM50R	6. $1180.00 – $1420.00/pc	6. $1456–$1600/pc	6. $1439–$1583/pc

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

HVAC Equipment (AHUs & Chillers) shall comply with Ecodesign Reg. (EU) 2016/2281, EN 1886/EN 13053 (AHUs), EN 14511 (Chillers); achieve AHU heat recovery ≥ 75%, chiller SEER ≥ 5.0 / COP ≥ 3.5, and EPD-verified net CO_2e avoidance ≥ 150-220 kg/m³ (AHU) / ≥ 35-42 kg/m³ (Chiller) via Module D (EN 15804+A2/ISO 14025), with refrigerant GWP ≤ 675.

Carbon benefit per unit of measure:

Types and quantities of HVAC Equipment: High-efficiency AHUs with rotary heat exchangers (e.g., Swegon GOLD RX 040 or FläktGroup eQ 023-032, EN 1886:2007/EN 13053:2019 compliant, Eurovent/Ecodesign certified) and air-cooled chillers/heat pumps with low-GWP refrigerant (e.g., Galletti VLS 254, EN 14511:2022 compliant) sized to building load (typically 1 AHU serves 500–2000 m² floor area; 1 chiller serves 200–1000 m² depending on cooling demand).

Avoidance of CO_2 emissions: AHU (Swegon GOLD RX 040, ~11.9 m³ volume): Avoid ~150-220 kg CO_2e/m³ over the complete lifecycle via Module D recycling credits.

Chiller (Galletti VLS 254, ~20 m³ approx. volume): Avoid ~38-50 kg CO_2e/m³ lifecycle via Module D. Please note that Operational savings from high COP/SEER add further avoidance.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

HVAC units must meet or exceed Energy Performance Class [insert], use refrigerants with GWP ≤ [insert], and include an end-of-life recycling and service plan.

Sources: [3],[4],[14],[15],[105],[106],[107], [169],[170],[171],[347],[348],[349], [350],[351],[450],[451],[452],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.2 of 8

LED lighting

Lighting fixtures & controls (LED)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EU Ecodesign & Energy Label; EN 60598 electrical standards; RoHS
Japan Standards	Top Runner energy standards; JIS; Eco Mark
Asia Standards	China energy label; Korea energy efficiency standards
Kazakhstan Equivalents (GOST / ST RK)	**1. Mandatory Technical Regulations (ТР ЕАЭС):** • EAEU TR 048/2019 “On energy efficiency”: Mandates energy labeling for lamps and luminaires, setting minimum efficiency and performance tiers. • EAEU TR 037/2016 “On restriction of hazardous substances”: Restricts lead, mercury, cadmium, etc. (RoHS). • EAEU TR 020/2011 “Electromagnetic compatibility”: Covers EMC requirements. • EAEU TR 004/2011 “On safety of low-voltage equipment”: Primary safety regulation. **2. National Standards (GOST / СТ РК): These provide detailed technical requirements and test methods.** • Safety & Construction: ГОСТ 14254-2015 (IEC 60529) – IP Code (Ingress Protection). • EMC: ГОСТ CISPR 15-2014 – Limits for radio disturbance (electromagnetic interference). • LED Lamp Performance: СТ РК ГОСТ Р 54815-2014 – Operational requirements for LED lamps with integrated control gear (>50V). This is a key product standard. • Photometry & Performance: ГОСТ R 54350-2011 (LED modules safety)
International standards with functional alignment to Kazakhstan/EAEU systems	The following international standards are accepted for testing, certification, and specification, often forming the basis for the GOSTs: • IEC Standards: IEC 60598-1 (luminaire safety), IEC 62031 (LED modules), IEC 62471 (photobiological safety), IEC 62386 (digital addressable lighting interface - DALI). • European Standards (EN): EN 12464-1 (lighting of workplaces), EN 15193 (energy performance of buildings - lighting). • Performance & Quality Certifications: DALI-2 & D4i certification, Zhaga interface standards, IES LM-79/LM-80 test reports (for lumen maintenance and lifetime). • Sustainability Labels: EU Ecolabel, TCO Certified, Energy Star.
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate

Kazakhstan Market Description	Kazakhstan's sector for LED-based lighting fixtures and controls exhibits an advancing local expertise in harmony with validated norms, fortified by the enforcement of ST RK 3056-2017, which prescribes parameters for LED luminaires of types of FL, SL, GL, UWL, and PL, covering aspects such as luminous efficacy, electrical safety, and compatibility with electromagnetic environments [352]. Indigenous suppliers handle roughly 30-40% of essentials for routine indoor and outdoor units, as demonstrated by firms like PROLUX LED LLP producing energy-saving systems for industrial, facade, street, and office uses with up to 80 product variants, alongside LED System Media Company operating a full-cycle facility for diodes and fixtures aimed at railways and greenhouses [353], [354]. Other participants encompass Kazakhstan Lighting Systems in Almaty assembling integrated solutions, Tsesna LED in Astana crafting lamps and modules, and Alageum Electric extending electrical gear to include LED options [355]. Crucial advancements feature policy-supported assembly expansions via special economic zones and energy conservation laws that ban inefficient bulbs over 25W, fostering smart IoT integrations amid urban and infrastructure upgrades [356], [357]. Although commonplace LED assemblies gain traction from component localization, intricate high-efficiency controls and specialized modules persist in drawing from foreign channels, primarily China and Russia, while incentives for innovation seek to amplify native output and quality assurance [355].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. LED luminaire (commercial lighting fixture)	$35 – $120/unit	$30 –$100/unit	$25 – $90/unit

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

LED lighting fixtures and controls shall comply with Ecodesign Regulation (EU) 2019/2020, Energy Labelling Regulation (EU) 2019/2015, EN 60598-1, EN 12464-1 and EN 15193. Luminaires shall achieve minimum luminous efficacy ≥120 lm/W, Lighting Power Density ≤8 W/m² and shall incorporate occupancy & daylight-linked controls. No mercury, dimmable/controls for energy savings. Products must be supplied with third-party verified EPDs.

Carbon benefit per unit of measure:

Types and quantities: High-efficiency LED luminaires with occupancy/daylight controls (e.g., Philips Metronomis LED or LEDVANCE LN COMP BATTEN, EN 60598-1 compliant, CE marked per CPR) at 0.1–0.2 fixtures/m² floor area (Lighting Power Density 4–8 W/m² to meet EN 12464-1 workplace lux levels and EN 15193 LENI energy performance).

Avoidance of CO_2 emissions: Philips Metronomis LED (EN 15804+A2 / ISO 14025 / ISO 21930 compliant): Avoid ~15-30 kg CO_2e per fixture over the complete lifecycle via Module D recycling/energy-recovery credits. Other emissions avoided: AP ~0.82 mol H^+ eq., EP-freshwater ~0.01 kg P eq., POCP ~0.46 kg NMVOC eq. (D credits).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Lighting fixtures must be LED with luminous efficacy ≥ 120 lm/W (interior) / ≥ 110 lm/W (exterior), comply with RoHS, and include dimming/controls to reduce energy use.

Sources: [3],[14],[15],[105],[106],[107],[172], [173],[352],[353],[354],[355],[356], [357],[453],[454],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.3 of 8

Cables and wiring

Electrical cabling & components

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 50525 (cables), RoHS; REACH implications for materials
Japan Standards	JIS electrical standards
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	GOST 31996-2012 (Power cables with plastic insulation). ST RK 1798-2008 (Electrical cables, Fire hazard indicators). TR TS 004/2011 (On the safety of low-voltage equipment).
International standards with functional alignment to Kazakhstan/EAEU systems	IEC 60502-1 (Power cables with extruded insulation). IEC 60332/60754/61034 Series (Fire condition, gas, and smoke tests). EN 50575 (CPR) (Reaction to fire classification for cables). CE Marking (EU conformity declaration).

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's electrical cabling and components sector has attained moderate domestic capacity for international standards, with national rules now incorporating EN 50525 for low-voltage energy cables and IEC 60502 series for power cables with extruded insulation, ensuring safety, fire performance, and electromagnetic compatibility [358], [359]. The country operates 47 dedicated cable and wire plants, many of which have modernized their extrusion and testing lines in recent years to produce a wide range of building wires, power cables, and fibre-optic products [360]. Output has grown steadily, with production volume reaching 1.53 million km in 2023 and continuing to expand through 2025, driven by demand from power grid modernization and residential wiring [361], [362]. Although specialized high-voltage and data-communication cables still require some imports from Russia, China, and Europe, the sector benefits from strong local raw-material processing and active export development, including new contracts for African markets [363].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Power cable, paper/lead, aluminium core, 4x95 mm²	1. $10.65 – $11.74/m	1. $10.11–$11.05/m	1. $9.96–$10.8/m
2. Power cable, VVGng, non-flammable, 1x1.5 mm²	2.$0.45 – $0.53/m	2. $0.27-0.29/m [5]	2. $0.26–$0.28/m

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Electrical cabling and components shall demonstrate PVC minimization in insulation and sheathing, maximum feasible recycled content, and full RoHS compliance.
Carbon benefit per unit of measure: Types and quantities: Low-voltage flexible/installation cables with high recycled copper content (e.g., RK 90 H07V2-K type, EN 50525-1/EN 50525-2-31 compliant, CE marked per CPR, RoHS compliant) at typical 5–15 linear metres per m² floor area (0.05–0.3 kg/m²) for power/lighting circuits. Avoidance of CO_2 emissions: RK 90 6 mm² cable (EN 50525 compliant): Avoid ~0.127 kg CO_2e per linear metre lifecycle via Module D recycling credits. Other emissions avoided: AP net −0.0205 mol H^+ eq./m, EP-freshwater net −0.000138 kg P eq./m, POCP net −0.00357 kg NMVOC eq./m.
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Cables and electrical components must comply with RoHS and minimize PVC use; suppliers to provide material declarations and recycling options.

Sources: [3],[14],[15],[105],[106],[107],[174], [175],[358],[359],[360],[361],[362], [363],[455],[456],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.4 of 8

Sanitary fittings

Plumbing fixtures (toilets, faucets)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	Water efficiency standards (local/National), EN standards for plumbing; Eco Label criteria
Japan Standards	JIS plumbing fixtures; Eco Mark
Asia Standards	China/Korea national standards; WaterSense (benchmark)
Kazakhstan Equivalents (GOST / ST RK)	GOST 30493-2017 Ceramic sanitary ware. General specifications.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 997 (WC pans and WC suites). ASME A112.19.2 (Ceramic plumbing fixtures). Water Efficiency: EPA WaterSense, EU Water Label, WELL Building Standard criteria. Performance: EN 200/EN 246 (Sanitary tapware flow rates & performance). Lead-Free: NSF/ANSI 61 (Drinking water system components).

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's plumbing fixtures sector, covering ceramic toilets and metal faucets, operates at a moderate level of domestic capacity for international standards. The foundation rests on GOST 30493-2017 for ceramic sanitary ware, now being harmonized with EN 997 for water closet performance and EN 200/EN 246 for tapware flow rates, pressure resistance, and backflow prevention [364], [365]. Until 2025, local output remained limited to basic assembly and low-volume ceramic pieces, leaving 85–90 % of premium and water-efficient products dependent on imports from Turkey, China, and Russia [366], [367]. A major shift is underway with the Roca Group's €70 million integrated plant in Kyzylorda, scheduled to begin operations in 2026 at 500 000 units per year, focusing on automated production of vitreous China toilets, concealed cisterns, and brassware that meet EU water-efficiency and lead-free criteria [368], [369]. This investment, combined with national water-saving regulations, is expected to raise self-sufficiency and support exports to Central Asia.

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Wall-hung washbasin, 550x420 mm	1. $75 – $135/pc	1. $42 – $58/pc	1. $22 – $38/pc
2. Toilet suite (pan + cistern)	2. $190 – $380/pc	2. $95 – $155/pc	2. $58 – $89/pc
3. Acrylic bathtub, 1500x700 mm	3. $235 – $440/pc	3. $145 – $210/pc	3. $98 – $135/pc

Block 4 — Environmental Criteria
▶️ Green Criteria (Mandatory)
Dual-flush toilets, low-flow faucets, lead-free components, fully complying with EU Ecolabel/GPP criteria to reduce water use by 20–40% and cut related CO_2 emissions from pumping, treatment and heating.
Carbon benefit per unit of measure: Types and quantities: For faucets/tapware at max 6–8 L/min of water flow (EN 200/EN 246) or toilets/urinals at dual-flush ≤6.0 L full / ≤3.0 L reduced / ≤3.5 L average (EN 997). The CO_2 emissions are not calculated in the GPP sources rather the control in water supply flow and waste water treatment usage impacts on the environment and natural water resource utilization. Use-phase water reduction (20–40% typical) avoids energy for pumping, treatment, and hot-water heating — the dominant impact (>95–99% of total GHG). Exact CO_2 saved depends on local energy mix and water source.
Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Plumbing fixtures shall meet specified flow/flush limits (e.g., toilets ≤4/6 L dual-flush) and be certified lead-free for potable water use.

Sources: [3],[14],[15],[105],[106],[107],[176], [177],[364],[365],[366],[367],[368], [369],[457],[458],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.5 of 8

Pumps and pipeline fittings

Pumps, valves & hydraulic equipment

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EU Ecodesign for circulators/pumps; EN standards
Japan Standards	JIS; Top Runner program for pumps
Asia Standards	China energy efficiency standards; Korea standards
Kazakhstan Equivalents (GOST / ST RK)	GOST 6134-2007 Dynamic pumps. General specifications. Mandatory Regulations: EAEU TR 010/2011 “On the Safety of Machinery and Equipment” for safety. EAEU TR 048/2019 for energy efficiency of motors.
International standards with functional alignment to Kazakhstan/EAEU systems	ISO 9906:1999 Rotodynamic pumps - Hydraulic performance acceptance tests - Grades 1 and 2 (MOD) ISO 5199 (Technical specifications for centrifugal pumps). ISO 5208 (Pressure testing of valves). EN 12266 (Testing of valves). Energy Efficiency: IE3/IE4 motor class (IEC 60034-30-1), Europump/Energy Label.
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan’s pumps, valves, and hydraulic equipment sector functions at a moderate level of domestic capacity for international standards, grounded in the adoption of ISO 9906 for acceptance testing of rotodynamic pumps and EN 12266 for industrial valve pressure testing and leakage assessment, now embedded in national technical regulations [370], [371]. Several specialized producers, led by the Ust-Kamenogorsk Valve Plant and Acton Flow in East Kazakhstan, manufacture shut-off, control, and safety valves for oil pipelines and water systems, meeting significant portion of internal requirements through modernized machining and pressure-testing lines [372], [373]. Strategic collaborations with global leaders, including KSB’s established service and assembly operations and Petrol Valves’ forthcoming local flow-control centre, are transferring expertise in high-pressure and corrosion-resistant technologies to local teams [374], [375]. Rising needs in water treatment modernization and mining hydraulics are prompting further capacity expansion, while advanced petrochemical pumps continue to arrive mainly from Europe and Russia [376].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Gate valve, flanged, parallel double-disc, rising stem, cast iron, for gas, DN 100 [4]	1. $210 – $380/pc	1. $110 – $165/pc	1. $55 – $85/pc
2. Plug valve, flanged, taper plug, cast iron, for water/oil, DN 50	2. $120 – $240/pc	2. $65 – $95/pc	2. $28 – $45/pc
3. Non-pressure cylindrical socket pipe (ТБС), cellulose-plastic, DN/ID 600, load group 1	3. $175 – $310/m	3. $90 – $140/m	3. $45 – $75/m

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

High efficiency (IE class equivalent), low leakage, maintainability MEI-compliant high-efficiency pumps + low-leakage valves per the above standards.

Carbon benefit per unit of measure:

Types and quantity: Pumps: Energy-efficient rotodynamic clean water pumps with Minimum Efficiency Index (MEI) ≥ 0.40 per Commission Regulation (EU) 547/2012; hydraulic performance tested to ISO 9906:2012.

Valves & hydraulic equipment: Low-leakage metallic valves tested to EN 12266 (industrial valves – testing of metallic valves); hydraulic fluids may meet EU Ecolabel for biodegradability where applicable (equipment itself not covered). It is noteworthy that pumps/valves are functional products measured by flow/power/leakage. Use-phase electricity consumption dominates (>95% of impacts). EU-wide savings from the water-pump Ecodesign regulation: 0.4 (million tonnes) Mt CO_2eq/a in 2030 (plus 3.7 (terra watt hours) TWh/a electricity).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Pumps and valves must meet minimum efficiency class [insert] and include maintenance and leak-reduction features.

Sources: [3],[14],[15],[105],[106],[107],[178], [179],[180],[370],[371],[372],[373], [374],[375],[376],[459],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.6 of 8

On-site water treatment

Water treatment & filtration media (site)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN standards for water treatment components; water quality directives
Japan Standards	JIS for water treatment materials; national guidelines
Asia Standards	China/Korea standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK GOST R 51232-2003 General Requirements for the Organization and Methods of Quality Control. GOST 2874-82 Drinking water. Hygienic requirements and quality control
International standards with functional alignment to Kazakhstan/EAEU systems	For performance and safety assurance, the following international standards and certifications are widely accepted: • NSF/ANSI Standards: NSF/ANSI 42 (Aesthetic effects), 53 (Health effects), 61 (Drinking water system components) - The global gold standard for material safety. • European Standards: EN 12915-1 (Granular activated carbon), EN 12902 (Inorganic filtering media). • Testing Standards: ASTM D3860 (Activated carbon), ISO 9001/14001 for manufacturer's QMS/EMS. • Certifications: Water Quality Association (WQA) Gold Seal, KIWA (Netherlands).
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's water treatment and filtration media for construction sites and building systems reflect moderate domestic capacity aligned with international standards. This rests on the national adoption of ST RK 3744-2021 geosynthetic drainage materials/ systems, which sets clear technical rules for granular filter materials covering grain size, purity, and hydraulic performance, together with ST RK ISO 5667 for water sampling and quality evaluation [421], [422]. Producers rely on rich local quartz sand deposits in the Akmola and Karaganda regions. Firms such as SandCo in Kokshetau reached a record 15 000 tonnes of high-purity output in 2024, supplying graded media for multi-layer filters used in site dewatering and runoff control [423]. Local gravel and basic activated carbon from domestic coal now meet roughly 55–60 % of demand for standard filtration in temporary treatment units [424]. Upgrades at processing plants have lifted compliance with performance criteria for effective size and uniformity, while targeted investments support cleaner water handling during construction phases [425]. Advanced polymeric membranes and precision resins remain largely imported, but the share is declining under the 2024–2028 Water Sector Development Plan, which promotes local certification and supply growth [426], [427].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Rectangular grease trap, 0.4 l/s	1. $310 – $580/pc	1. $165 – $240/pc	1. $155 – $185/pc
2. Rectangular sand trap Alta S-OS 7-500, 2 l/s	2. $2,400 – $4200/pc	2. $1115 – $1,450/pc	2. $1100 – $1400/pc
3. Natural zeolite	3. $320 – $550/ton	3. $190 – $220/ton	3. $180 – $200/ton

Block 4 — Environmental Criteria

▶️Green Criteria (Mandatory)

Non-toxic media, documented filtration efficiency, minimal leaching

Carbon benefit per unit of measure:

Types and quantities: Filtration media layer: 0.4–0.6 m depth → 0.4–0.6 m^3 per m^2 of filter surface (typical for bioretention systems; up to 1.0–1.5 m^3/m^2 in multi-layer constructed wetlands).

CO_2 emissions avoidance: Biogenic vs coal-based granular activated carbon (EN 12915-1 compliant) — LCA (Gu et al., 2018; extended in Kaetzl et al., 2025):

Coal-based GAC: ~18.3 kg CO_2eq/kg; biomass-based GAC: ~8.6 kg CO_2eq/kg.

Avoided: ≈9.7 kg CO_2eq/kg (or ≈2.4 t CO_2eq per tonne) by substituting coal-based with biogenic/reactivated GAC.

At typical bulk density 450 kg/m^3: ≈4 365 kg CO_2eq/m^3 avoided.

Inorganic filtering media (EN 12902-compliant sand/gravel): embodied GWP <0.02 kg CO_2eq/kg (cradle-to-gate).

At bulk density 1 600 kg/m^3: <32 kg CO_2eq/m^3 (vs GAC: >8 000 kg CO_2eq/m^3) → >99 % avoidance when inorganic media replace GAC in non-adsorptive filtration layers.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Filtration media and systems must demonstrate performance for intended contaminants and include data on potential leachates and lifecycle management.

Sources: [3],[14],[15],[105],[106],[107],[199], [200],[201],[421],[422],[423],[424], [425],[426],[427],[491],[492],[493],[94], [495],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.7 of 8

Fire protection

Fire protection systems & materials (sprays, boards)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN 13501; EN 1363 fire tests; product-specific EN standards
Japan Standards	JIS fire testing standards
Asia Standards	China/Korea national standards
Kazakhstan Equivalents (GOST / ST RK)	Technical Regulation “General Requirements to Fire Safety”; national fire hazard classes and material requirements ST RK ISO 9239-1-2020 (ISO 9239-1:2010 Reaction to fire tests for floorings - Part 1: Determination of the burning behaviour using a radiant heat source, IDT)
International standards with functional alignment to Kazakhstan/EAEU systems	EN 13501-1 (fire classification), ISO 9239-1:2010, EN 1365/1366 (fire resistance tests), NFPA codes, ISO fire safety guidance EN classes A1–F, NFPA fire resistance ratings
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan’s industry for fire protection systems and materials, encompassing sprays and boards, maintains a balanced level of local capability in meeting worldwide benchmarks. This foundation comes from the implementation of ST RK 3745-2021, outlining essential criteria for fire-resistant structures, including integrity, insulation, and load-bearing during exposure, alongside ST RK EN 13501 series that classifies reaction to fire for construction products [428] [429]. Facilities tap into regional gypsum resources across South Kazakhstan to produce fire-rated boards, where entities like Kaz Gypsum in Taraz with a brand name Kazupak Trade LLP output panels achieving EI 60 ratings suitable for partitions and ceilings in commercial structures [430]. Output from these operations addresses approximately 45-50% of internal needs for basic gypsum variants, bolstered by facility enhancements that incorporate fiber reinforcements for better durability [431]. Emerging local formulation of intumescent sprays occurs through partnerships in Almaty, yielding coatings that expand under heat to shield steel frameworks, with annual volumes hitting 5,000 tonnes by mid-2025 from joint ventures emphasizing cost-effective alternatives [432] [433]. Sprinkler assemblies see localized fabrication of pipes and panels in Astana-area plants, covering 40% of system components for industrial setups, aided by tech transfers that ensure compliance with pressure and activation thresholds [434]. While sophisticated solvent-based sprays and advanced composite boards depend on overseas sourcing for about 50% of supply, national drives under the 2025-2027 Industrial Plan foster certification upgrades and raw material processing to cut external reliance [435] [436]. Such advancements aid in safeguarding high-rise and energy projects against ignition risks, promoting consistent application in ongoing urban expansions

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market
1. Combined composition for fire protection of structures made of wood, plastic, and reinforced concrete	1. $16.00 – $28.00/kg	1. $6.0 – $12.50/kg	1. $5.80 – $7.20/kg
2. Dry Plaster Mixture Based on Expanded Vermiculite for Fire Protection of Steel and Reinforced Concrete Structures Unit	2. $2.80 – $4.50/kg	2. $1.4 – $1.65/kg	2. $1.3 – $1.55/kg
3. Dry composition for fire protection of wood inside industrial and residential buildings	3. $4.80 – $8.50/kg	3. $1.10 – $3.50/kg	3. $1.05 – $1.80/kg
[2]			

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Fire performance without halogenated FRs where alternatives exist; documented composition/SDS

Carbon benefit per unit of measure:

Types and quantities: Intumescent sprays / coatings (e.g., Firetex FX5000): 0.5–5 mm dry film thickness → 0.0005–0.005 m³/m² (0.6–7 kg/m²).

Cementitious / vermiculite sprays (e.g., CAFCO / FENDOLITE / BLAZE-SHIELD): 10–50 mm → 0.01–0.05 m³/m² (3–40 kg/m²).

Fire protection boards (gypsum / fibre-cement): 12.5–50 mm → 0.0125–0.05 m³/m² (1 m² per m² of protected surface).

CO_2 emissions avoidance: Avoidance mechanism: Water-based intumescent or gypsum-based systems typically deliver 20–60 % lower GWP than solvent-based or high-cement alternatives while fully complying with EN 13501/EN 1363 fire classes. All data are taken directly from the cited verified EPDs/LCAs 1.Firetex® FX5000 Series water-based intumescent spray — EPD (NSF International, ISO 14025 / ISO 21930; declared unit = 1 m² protected substrate for 60-year building life):

" LCA results for FX5000 Series GWP Inc Bio Carb (kg CO_2e) 3.28; GWP Exc Bio Carb (kg CO_2e) 3.28."
Note: 3.28 kg CO_2eq/m² (full life-cycle functional unit). 2.CAFCO® / FENDOLITE® / BLAZE-SHIELD® spray-applied fire-resistive materials — LCA report (ISO 14040/44, Smart EPD PCR; declared unit = 1 tonne): A1–A3 GWP ranges 357–1 200 kg CO_2eq/t (facility-dependent). At typical 20 mm application (≈ 20 kg/m²): 7–24 kg CO_2eq/m². 3.Gypsum fire boards (e.g., ToughRock® Fireguard X® 5/8" / 15.9 mm) — EPD (Georgia-Pacific, EN 15804 / ISO 14025): A1–A3 GWP ≈ 281 kg CO_2eq per standard panel quantity → ≈ 2.8 kg CO_2eq/m² (12.5–15.9 mm thickness).

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Fire protection materials must meet required fire performance tests and avoid halogenated flame retardants where suitable non-halogen alternatives exist.

Sources: [3],[14],[15],[105],[106],[107],[202],[203],[428],[429],[430],[431],[432],[433],[434],[435],[436],[496],[497],[498],[499],[500],[501],[502],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION D — BUILDING SERVICES | Material D.8 of 8

Firestop sealants and fillers

Sealants & firestop materials

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN 13501, EN 1366-3, EN 13501-2, EN 13501-1, EAD 350454-00-1104, EN ISO 11600, REACH (EC 1907/2006), UL-EU Mark; EPD
Japan Standards	JIS A 5758; JIS A 6909 for fire and sealant standards
Asia Standards	GB fire standards (China), KS F standards (Korea)
Kazakhstan Equivalents (GOST / ST RK)	GOST 25621-2023 – Polymer sealants and caulking products for building construction. Classification and general technical requirements GOST 14791-79 – Non-hardening construction sealing mastics ST RK EN 15651 series — Sealants for non-structural use in joints
International standards with functional alignment to Kazakhstan/EAEU systems	EN fire classification standards (EN 13501), ISO fire and sealing performance standards
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's sealants and firestop materials segment reflects an emerging local proficiency attuned to worldwide criteria, underpinned by the application of ST RK EN 15651 standards governing sealant performance in terms of movement capability, adhesion, and durability, alongside firestop protocols drawn from EN 1366 test methods for service penetrations [288], [289]. Resident enterprises address roughly 35–45% of consumption needs, highlighted by operations such as VMP Astana Plant's output of fire-retardant compounds and SAFEMENT's specialized systems for safeguarding heavy machinery against ignition risks [290], [291]. Significant progress includes Hilti's distribution of penetration seals and Sika's establishment of a manufacturing site in eastern Kazakhstan during 2025, enhancing the availability of fire-resistant formulations for building applications [292], [293]. Even as basic acrylic and silicone sealants achieve substantial self-reliance through access to regional raw inputs, intricate intumescent barriers and extreme-condition firestops necessitate continued external sourcing, although strategic initiatives promote enhanced indigenous development [294].

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. Silicone sealant, one-component, weather-resistant, fire-resistant, for interior and exterior use, temperature resistance from -40°C to +150°C, 600 ml	1. $12.50 – $22.00	1. $9.98–$11.05/pc	1. $9.96–$11.00/pc
2. Combined composition for fire protection of metal structures with anti-corrosion additives	2. $3.50 – $7.50	2. $6.92–$7.6/kg	2. $6.83–$7.5/kg
3. Dry plaster for fire protection of steel/reinforced concrete	3. $8.05 – $8.70/kg	3. $7.93 – $8.60/kg	3. $0.80 – $1.60/kg
Block 4 — Environmental Criteria			
▶️ Green Criteria (Mandatory)			
Non-toxic firestops preferred; avoid halogenated flame retardants where alternatives exist; document performance and composition			
Carbon benefit per unit of measure: Bio-based hybrid sealants (46-70% biomass, 0.05-1.5 kg/m² application) avoid 50-66% CO_2 emissions			
Block 5 — Procurement Action			
Environmental Requirements for the Technical Specification — Text for Tender Documentation			
Firestopping materials must meet specified fire performance, avoid halogenated FRs where possible, and include SDS and product declarations.			

Sources: [3],[14],[15],[76],[77],[77],[78],[79], [80],[81],[82,[83],[84],[85],[105], [106],[107],[150],[151],[288],[289], [290], [291],[292],[293],[294],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION E

RENEWABLE ENERGY

2 positions

SECTION E — RENEWABLE ENERGY | Material E.1 of 2

Photovoltaic modules

Photovoltaic modules & mounting systems

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	IEC 61215/61730 (PV module standards), EN 50583; EPDs for PV systems
Japan Standards	JIS C 8955 series (PV module testing); JIS standards
Asia Standards	China GB/T 9535; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK IEC 61215-1-2020 Crystalline silicon terrestrial PV module design qualification ST RK IEC 61730-1-2020 — Photovoltaic module safety qualification — Part 1: Requirements for construction
International standards with functional alignment to Kazakhstan/EAEU systems	IEC 61215 / 61730 Series (Design, safety, performance) UL 61730 (Standard for flat-plate PV modules) Certifications: TÜV Rheinland / TÜV Nord, CE Marking

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's photovoltaic modules and mounting systems sector stands at a moderate level of domestic capacity for international standards, with ST RK IEC 61215-1-2020 and ST RK IEC 61730-1-2020 establishing rigorous design qualification, safety testing, and performance benchmarks for crystalline silicon modules [377], [378]. While dedicated module manufacturing remains limited to small pilot lines, the country's rapid solar expansion, now exceeding 1.3 GW of installed capacity with a substantial number of new plants commissioned in 2025, has evolved a thriving ecosystem for local fabrication of mounting structures, where domestic steel producers supply fixed-tilt and single-axis tracker systems for utility-scale installations [379], [380]. International developers and Chinese partners routinely require full IEC compliance for imported panels, yet growing local expertise in structural design and corrosion protection is reducing reliance on complete overseas kits [381]. This amalgam of imported technology and home-grown engineering is in synchronization with the country's aim towards 15 % renewable energy share by 2030 [382].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. PV mounting structure (aluminium/steel)	1. $35 – $70/m²	1. $30 – $60/m²	1. $25 – $55/m²

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Efficiency, recycled content in framing, end-of-life recycling program

Carbon benefit per unit of measure:

Type of systems: High-efficiency photovoltaic modules certified to IEC 61215 (crystalline silicon performance & type approval), IEC 61730 (safety qualification) and EN 50583 (PV modules in buildings), plus low-carbon manufacturing and maximum feasible recycled content. Mounting systems shall use recycled aluminium/steel with minimal embodied impacts. CO_2 emissions avoidance: Each kWh of electricity produced by photovoltaic modules and mounting systems has a lifecycle carbon footprint of 10.8–44 g CO_2eq (JRC 2025 report, functional unit = g CO_2eq/kWh). This can significantly reduce lifecycle emissions relative to fossil-fuel-dominated grid electricity and avoids ~170–230 g CO_2eq net per kWh by displacing the current EU grid average (213–242 g CO_2/kWh in 2023–2024)

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

PV modules must meet IEC/EN testing standards, include a manufacturer take-back/recycling plan and provide performance warranty and EPD if available.

Sources: [4],[14],[15],[105],[106],[107],[181], [182],[183],[377],[378],[379],[380], [381],[382],[460],[461],[462],[463],[464],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION E — RENEWABLE ENERGY | Material E.2 of 2

Energy storage and batteries

Energy storage & batteries (on-site)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EU Battery Regulation (and EN/IEC safety standards); EPDs
Japan Standards	JIS battery safety standards; national recycling frameworks
Asia Standards	GB/T standards, KS standards.
Kazakhstan Equivalents (GOST / ST RK)	ST RK IEC 62040-1-2018 — Requirements for uninterruptible power supplies (UPS) used in storage systems. ST RK IEC 62133 — General safety requirements for portable and stationary lithium batteries. ST RK IEC 62660-2/3/4 — Reliability and safety test methods for large battery packs.
International standards with functional alignment to Kazakhstan/EAEU systems	IEC 62040-1:2017 + Amd.1(2021) + Amd.2(2022), Uninterruptible power systems (UPS) - Part 1: Safety requirements, IDT **IEC (IEC) — System and Battery Requirements:** IEC 62485-2: Essential Safety Requirements for Stationary Batteries. IEC 62933: A Series of Standards for Electrical Energy Storage Systems (ESS) Covering Safety, Performance Parameters, and Test Methods. IEC 62619: Safety Requirements for Lithium-Ion Batteries Used in Industrial Applications, Including Stationary Systems. IEC 62477-1: Safety Requirements for Power Electronic Systems. **UL — System Safety Standards:** UL 9540: Key International Standard for the Certification of Complete Energy Storage Systems. UL 1973: Safety Standard for Battery Units Used in Stationary Installations. **IEEE — Engineering Interface and Management:** IEEE 1547: Standard for the Integration of Distributed Energy Resources into Electric Power Grids. IEEE 2030: Guidelines for the Interoperability of Energy Storage Systems.

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's on-site energy storage and battery sector is building moderate domestic capacity for international standards, supported by the national adoption of ST RK IEC 62040-1 for uninterruptible power systems and ST RK IEC 62133 for lithium-ion battery safety, which set clear requirements for performance, thermal stability, and system integration [383]. Local capabilities are advancing through targeted manufacturing initiatives, including Envision Energy's new plant that will deliver 1 GWh of battery storage systems per year from 2026, alongside a $350 million BESS assembly facility developed with Clearbrook Energy Solutions and AG-Tech [384], [385]. These projects, combined with international partnerships such as the Masdar agreement for 2 GW of storage capacity, are helping to localize system design, testing, and deployment for renewable balancing and industrial applications [386], [387]. Although battery cell production remains limited and most advanced components are still imported, the rapid scaling of assembly and integration expertise is positioning the sector to support the country's growing renewable energy needs more effectively [388].

Block 3 — Price Dimension			
Sample / Type	**Under Int'l Std.**	**Under Nat'l Std.**	**Market***
1. Lithium-ion battery for stationary storage	1. $350 – $550/kWh	1. $320 – $480/kWh	1. $300 – $450/kWh
Block 4 — Environmental Criteria			
▶️Green Criteria (Mandatory)			
Lifecycle disclosure, recycling/take-back, safety and thermal management			
Carbon benefit per unit of measure: Suggested types: Stationary battery energy storage systems (classified as rechargeable industrial batteries >2 kWh capacity) complying with Regulation (EU) 2023/1542: carbon footprint declaration, recycled-content targets, performance & durability parameters, and specific safety requirements for stationary BESS. CO_2 emissions avoidance: EU grid intensity: 213 g CO_2eq/kWh (Ember European Electricity Review 2025, p. 4). Battery lifecycle footprint: 10–50 g CO_2eq per kWh delivered over service life (typical PEF/LCA values under Regulation (EU) 2023/1542, Article 7(1)). Net avoidance: 163–203 g CO_2eq avoided per kWh discharged (if charged from grid; higher if charged from renewables). Example case: If batteries discharge 500 MWh/day (realistic peak-shaving/renewable-shifting portion for such a large hospital), they avoid approximately 82–102 tonnes CO_2eq per day (or 3.4–4.3 tonnes CO_2eq per hour during a 24-hour average discharge profile).			
Block 5 — Procurement Action			
Environmental Requirements for the Technical Specification — Text for Tender Documentation			
Battery systems must comply with applicable battery regulations, include lifecycle/EPD data, and provide an end-of-life recycling and safety plan.			

Sources: [4],[14],[15],[105],[106],[107],[184], [185],[383],[384],[385],[386],[387], [388],[465],[466],[467],[468],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION F

SITE WORKS AND LANDSCAPING

4 positions

SECTION F — SITE WORKS AND LANDSCAPING | Material F.1 of 4

Geotextiles and geosynthetics

Geotextiles & geosynthetics

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN 13249/EN 13250 series for geotextiles and geosynthetics; EPD
Japan Standards	JIS geotextile standards
Asia Standards	China GB/T; Korea KS
Kazakhstan Equivalents (GOST / ST RK)	ST RK 2372-2013 Geotextile materials. Non-woven geotextile fabric. Specifications ST RK 2790-2015 Geosynthetic materials. Waterproofing polyethylene roll geomembranes. Technical conditions
International standards with functional alignment to Kazakhstan/EAEU systems	EN ISO 10319 – Tensile test of geotextiles EN ISO 12956 – Determination of characteristic opening size EN ISO 11058 – Water permeability normal to the plane EN ISO 12236 – Static puncture (CBR) test EN 13249 – Geotextiles for roads and other trafficked areas EN 13250 – Geotextiles for railways EN 13251 – Geotextiles for earthworks, foundations and retaining structures EN 13252 – Geotextiles for drainage systems
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's geotextiles and geosynthetics sector has established a moderate domestic capacity for international standards, centred on ST RK 2372-2013 for non-woven geotextile fabrics and ST RK 2790-2015 for polyethylene roll geomembranes, which directly reference essential test methods from EN ISO 10319 (tensile properties) and EN 13249–EN 13257 (road and hydraulic applications) [413], [414]. Several specialized plants in the Almaty, Pavlodar, and Karaganda regions now produce needle-punched and thermally bonded geotextiles as well as HDPE geomembranes, satisfying about 60 % of the country's requirements for road construction, tailings dams, and slope stabilization [415], [416]. The materials are increasingly specified in major transport corridors and mining reclamation works, where their separation, filtration, and reinforcement functions deliver measurable improvements in structural longevity and environmental protection [417]. Although premium geogrids and geocomposites for high-load applications continue to be sourced from Europe and China, local producers are investing in wider product ranges and in-house laboratory accreditation to meet stricter project specifications [418],[419]. KAZGEOBEL has been a trusted partners in agriculture for the supply of geosynthetic materials [420]

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Geomembrane (HDPE), smooth, thickness 0.5 mm	1. $1.65 – $2.30	1. $1.25 – $1.45	1. $0.65 – $0.95
2. Geotextile, needle-punched, density 300 g/m², tensile strength 8.8 kN/m	2. $1.35 – $1.85	2. $0.85 – $1.15	2. $0.75 - $1.05
3. Geogrid, biaxial, polyester, tensile strength 40/40 kN/m, backing 150 g/m²	3. $2.95 – $4.10	3. $0.55 – $0.75	3. $0.40 - $0.65
4. Geocomposite, 3-layer: 2× geotextile (250 g/m²) + geomembrane (0.25 mm)	4. $4.20 – $5.80	4. $2.80 – $3.60	4. $2.25 - $3.25

Block 4 — Environmental Criteria

▶ Green Criteria (Mandatory)

Durability, recyclability, avoidance of harmful additives, documented tensile/filtration performance

Carbon benefit per unit of measure:

Types and quantities: Geotextile / geosynthetic sheet: 1 m² per m² of application area.

Typical mass: 100–500 g/m² (0.1–0.5 kg/m²); thickness < 5 mm (not expressed per m³ as sheet products).

CO_2 emissions avoidance: Meltex Oy Geotextiles for filtration and separation (polypropylene non-woven, NorGeoSpec/VTT-GEO compliant, applicable to EN 13249/13250 functions) — verified EPD (EPD Hub, EN 15804+A2:2019 & ISO 14025). "GWP – fossil, A1–A3: 1.83 kg CO_2eq/kg; GWP – total, A1–A3: 1.81 kg CO_2eq/kg" (declared unit 1 kg geotextile, cradle-to-gate; variation <10 %). For a typical 200 g/m² product this equals ≈0.36–0.37 kg CO_2eq/m² (A1–A3). BTT Woven Geotextiles (Terralys series, EN 13249/13250-compliant applications) — verified Climate Declaration / EPD (ISO 14025, PCR 2019:14 UN CPC 369; full EPD).

"The information below shows the total global warming potential (GWP) in kilograms of carbon dioxide equivalent (kg CO_2 eq.) per m² geotextile including packaging material from cradle-to-grave (upstream – own production – downstream)."

Examples: Terralys LF 17/17 (92 g/m²) = 0.37 kg CO_2eq/m²; LF 17/17 C1 (167 g/m²) = 0.65 kg CO_2eq/m²; Terrabarrier BL365 C3 (365 g/m²) = 1.40 kg CO_2eq/m².

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Geotextiles and geosynthetics shall comply with the EN 13249/EN 13250 series (and EN 13251–EN 13265 as applicable to the function: separation, filtration, drainage, reinforcement or erosion control), bear CE marking and Declaration of Performance in accordance with Regulation (EU) No 305/2011.

Suppliers shall provide a third-party verified EPD compliant with EN 15804 and ISO 14025 stating cradle-to-gate GWP (A1–A3). Products with the lowest verified GWP per m² and/or incorporating recycled/secondary materials shall receive preferential evaluation.

Sources: [3],[14],[15],[105],[106],[107],[196], [197],[198],[413],[414],[415],[416], [417],[418],[419],[420],[485],[486],[487], [488],[489],[490], [520],[521]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION F — SITE WORKS AND LANDSCAPING | Material F.2 of 4

Recycled aggregates

Recycled aggregates & secondary materials (fill)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN 13242; national recycled aggregate standards; EPDs
Japan Standards	JIS equivalents; national guidance
Asia Standards	China/Korea standards for recycled aggregates
Kazakhstan Equivalents (GOST / ST RK)	GOST 32495-2013 Aggregates, Fines, and Mixtures Made from Recycled Reinforced and Non-Reinforced Concrete. Specifications Fill & road base: ST RK EN 13242 Unbound mixtures: ST RK EN 13285 Concrete aggregate use: ST RK EN 12620
International standards with functional alignment to Kazakhstan/EAEU systems	**Recycled Concrete Aggregates** GOST 32495-2013 Aggregates, fines and mixtures made from recycled reinforced and non-reinforced concrete. Specifications International equivalents permitted: → EN 12620 – Aggregates for concrete (incl. recycled aggregates) → EN 13242 – Aggregates for unbound and hydraulically bound materials (road base, fill) → EN 13139 – Aggregates for mortar (recycled fines) → EN 933 (series) – Tests for geometrical properties of aggregates → EN 1097 (series) – Tests for mechanical & physical properties **Secondary Aggregates for Road & Earthworks (Fill)** GOST 32495-2013 (mixtures & fines) International equivalents permitted: → EN 13285 – Unbound mixtures → EN 13286 (series) – Unbound and hydraulically bound mixtures – test methods **Bituminous Binders Used with Recycled Materials** ST RK 1226-2003 (DIN EN 1426:1999 MOD) Bitumen and bituminous binders – Determination of needle penetration International equivalents permitted: → EN 1426 – Bitumen and bituminous binders – Penetration test → EN 12591 – Paving grade bitumen → EN 13108 (series) – Bituminous mixtures (incl. recycled aggregates, RAP)

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate

Kazakhstan Market Description	Kazakhstan's recycled aggregates and secondary materials for fill applications have reached an emerging-to-moderate level of domestic capacity, anchored by GOST 32495-2013, which sets detailed technical requirements for aggregates, fines, and mixtures produced from crushed reinforced and non-reinforced concrete [401]. Modern recycling centres in Almaty, Astana, and several regional hubs now process construction and demolition waste with advanced sorting and crushing equipment, achieving recovery rates of 90–95 % for high-quality granular fill and road-base materials that meet both national and European performance criteria [402], [403]. The 2026–2030 Waste Management Concept, together with the national ban on landfilling untreated
Kazakhstan Market Description	construction waste, is accelerating the shift toward secondary resources, with new facilities already supplying recycled aggregates for major infrastructure and site preparation works [404], [405]. Although the overall share of recycled material in total fill applications is still modest, ongoing pilot projects and technical assistance from international partners are steadily expanding local expertise and supply chains [406].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
Recycled concrete aggregate (fill)	$18 – $30/ton	$15 – $25/ton	$12 – $22/ton

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

Minimum recycled content ≥ 25% (construction and demolition waste, per EU GPP benchmark for secondary aggregates; or ≥ 50% for secondary aggregate applications per project specification); contaminant testing per EN 12457 (leachate characterisation) or equivalent; geotechnical certification per applicable SP RK or EN 1997 (Eurocode 7).

Carbon benefit per unit of measure:

Recycled aggregates and secondary materials for fill applications shall demonstrate low embodied carbon through verified Environmental Product Declarations (EPDs) compliant with EN 15804 and ISO 14025.

Example EPD data (Greenstone recycled aggregate from black slag, compliant with EN 13242 and EN 12620):

Declared unit: 1 tonne

GWP (A1–A4): 49 kg CO_2eq/t

Core process (A3): 2.215 kg CO_2eq/t

Other impact indicators (per tonne): AP = 0.196 kg SO_2eq; EP = 0.0341 kg PO_4^{3-}eq; POCP = 0.007 kg C_2H_4eq.

For a typical 100 mm thick fill layer (bulk density 1,500 kg/m³ = 0.15 t/m²):

Embodied carbon ranges from 1.5 kg CO_2eq/m² (using typical low-impact recycled concrete aggregate at 10 kg CO_2eq/t) to 7.35 kg CO_2eq/m² (using the above EPD at 49 kg CO_2eq/t).

Across available EPDs and inventories, the range for recycled aggregates is generally 1–49 kg CO_2eq/t, resulting in 0.15–7.35 kg CO_2eq/m² for a 100 mm layer.

Environmental benefit: Use of recycled aggregates typically achieves 50–80% lower embodied carbon compared to virgin quarried aggregates, while also reducing quarry depletion and construction & demolition waste sent to landfill.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Aggregates used for fill shall contain ≥ [insert%] recycled content, pass contaminant/leachate tests, and include geotechnical test certificates.

Sources: [3],[14],[15],[105],[106],[107],[190], [191],[192],[401],[402],[403],[404], [405],[406],[475],[476],[477],[478],[479],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION F — SITE WORKS AND LANDSCAPING | Material F.3 of 4

Landscaping materials

Landscaping materials (pavers, aggregates, soil)

Block 1 — Regulatory Framework	
Standards Framework	**Applicable Regulatory Documents**
EU Standards	EN standards for aggregates (EN 13242); sustainability criteria for landscaping materials
Japan Standards	JIS standards for aggregates and soils
Asia Standards	China/Korea national standards
Kazakhstan Equivalents (GOST / ST RK)	ST RK 2959-2017 Artificial Stone Slabs and Tiles Based on Natural Quartz. Specifications (GOST R 56207-2014 Artificial Stone Slabs and Tiles Based on Natural Quartz. Specifications, MOD) GOST 27593-88 Soils. Terms and Definitions GOST 5686-2012 Soils. Field Test Methods by Piles
International standards with functional alignment to Kazakhstan/EAEU systems	EN 1338 – Concrete paving blocks EN 1339 – Concrete paving flags EN 1340 – Concrete kerbs EN 1341 – Natural stone paving slabs EN 1342 – Natural stone setts EN 1344 – Clay paving bricks ISO 13006 – Ceramic tiles (for external paving use)
Block 2 — Market Readiness	
Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's landscaping materials sector, which includes concrete and stone pavers, crushed aggregates, and engineered soils, has reached a moderate level of domestic capacity for international standards. The sector is guided by ST RK EN 1338 for concrete paving blocks, ST RK EN 1340 for kerbs, and ST RK EN 13242 for aggregates used in unbound and hydraulically bound layers, all now fully incorporated into national technical regulations [394], [395]. Local quarries in the Karaganda and East Kazakhstan regions supply more than 70 % of the crushed stone and sand required for paving bases and sub-bases, while concrete paver plants in Almaty and Atyrau have expanded output to meet growing demand for permeable and decorative surfaces in public spaces [396], [397]. Engineered soils and top-dressing mixes, produced using locally sourced peat, compost, and mineral additives, are increasingly used in urban parks and roadside landscaping to improve water retention and reduce irrigation needs [398]. Although premium natural stone pavers and specialized geotechnical aggregates are still partly imported, the sector's integration of recycled construction waste and native plant-compatible soils is advancing steadily through government-supported circular economy programmes [399],[400]

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Crushed stone, M200, fraction 5-20 mm[1]	1. $28 – $42/m³	1. $18 – $24/m³[1]	1. $12 – $16/m³
2. Expanded clay gravel, M350, fraction 5-10 mm	2. $88 – $125/m³	2. $55 – $78/m³	2. $38 – $52/m³
3. Vegetable soil	3. $30 – $48/m³	3. $16 – $25/m³[6]	3. $9 – $14/m³
[6]			

Block 4 — Environmental Criteria

▶️ Green Criteria (Mandatory)

Permeable pavers for stormwater management, maximum feasible recycled aggregate content, use of locally sourced or low-impact natural stone, and native or regionally adapted soils and plant species to reduce irrigation demand and support biodiversity.

Carbon benefit per unit of measure:

Landscaping materials shall demonstrate low embodied carbon through verified Environmental Product Declarations (EPDs) compliant with EN 15804 and ISO 14025 where available. Key focus areas include:

Concrete pavers, flags and kerbs (EN 1338, EN 1339, EN 1340):

Typical embodied carbon ranges from 85–140 kg CO_2eq/m³ for standard products. Use of recycled aggregates (≥ 30%) and low-carbon cement can reduce GWP by 25–45%. For an 80 mm thick paving block (approx. 0.08 m³/m²), this equates to 6.8–11.2 kg CO_2eq/m². Low-carbon variants can achieve below 6.0 kg CO_2eq/m².

Fired clay pavers and bricks (EN 1344):

Modern EPD values typically range between 0.18–0.28 kg CO_2eq/kg. At standard thickness (50–65 mm, approx. 95–120 kg/m²), this results in 17–32 kg CO_2eq/m². Selection of manufacturers using biomass or alternative fuels can reduce emissions by up to 30%.

Natural stone pavers and setts (EN 1341, EN 1342):

Among the lowest impact options with typical A1–A3 values of 18–35 kg CO_2eq/m² for 30–50 mm thick slabs/setts, depending on quarrying distance and processing.

Aggregates and engineered soils:

Use of recycled or locally sourced aggregates can reduce embodied carbon by 50–75% compared to virgin materials. Engineered topsoil mixes incorporating compost and local mineral amendments typically show very low embodied impacts (under 15 kg CO_2eq/m³).

Environmental benefit: Prioritizing permeable surfaces, recycled content, and local materials significantly reduces stormwater runoff, urban heat island effect, and embodied carbon while supporting circular economy goals and local biodiversity.

Block 5 — Procurement Action

Environmental Requirements for the Technical Specification — Text for Tender Documentation

Hardscape materials should prioritize permeable solutions and include minimum recycled aggregate content of [insert%]; landscaping must prioritize native species.

Sources: [3],[14],[15],[105],[106],[107],[188], [189],[394],[395],[396],[397],[398], [399],[400],[474],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

SECTION F — SITE WORKS AND LANDSCAPING | Material F.4 of 4

Formwork and scaffolding

Temporary works materials (formwork, scaffolding panels)

Block 1 — Regulatory Framework

Standards Framework	Applicable Regulatory Documents
EU Standards	EN standards for scaffolding (EN 12811 series) and formwork systems
Japan Standards	JIS standards; safety standards
Asia Standards	China/Korea standards
Kazakhstan Equivalents (GOST / ST RK)	SN RK 1.03-06-2007 General safety instructions and industrial sanitation rules for construction materials industry Product Standards: GOST R 52085-2003 Formwork. General specifications. GOST 24258-88 Scaffolding means. General specifications. GOST 27321-87 Frame scaffolding for construction works. Technical conditions.
International standards with functional alignment to Kazakhstan/EAEU systems	EN 12811-1 (Temporary works equipment - Scaffolding - Performance requirements and general design). EN 12812 (Falsework - Performance requirements and general design), EN 13377 (Prefabricated timber formwork beams). Relevant ISO standards and manufacturer's ETA (European Technical Assessment) for proprietary systems. BS 5975 (Code of practice for temporary works procedures) is a respected best-practice reference.

Block 2 — Market Readiness

Kazakhstan Market Assessment	Moderate
Kazakhstan Market Description	Kazakhstan's sector for temporary works materials, encompassing formwork and scaffolding panels, holds a reasonable level of local ability to align with worldwide criteria. This stems from the use of ST RK EN 12812, which details performance for falsework in terms of load capacity and stability, along with ST RK EN 12813 for equipment in temporary structures that covers assembly rules and material strength [437] [438]. Factories benefit from nearby steel supplies in Karaganda and aluminium in Pavlodar areas. Operations like Kazakhstan Formwork Center in Almaty make steel frame panels and plywood-based systems, fulfilling about 40% of needs for basic wall and slab formwork in housing developments [439] [440]. New additions feature Denholm Zholdas expanding scaffolding output in Atyrau to 5,000 tonnes yearly by 2025, providing supported and rolling panels for industrial sites with enhanced safety features [441]. In parallel, ULMA Construction in Astana rolled out aluminium modular formwork lines, targeting infrastructure with reuse cycles over 200 times [442]. Even as climbing formwork and specialized cantilever panels draw on foreign supplies for roughly half the volume—mainly from Russia and China—the push under Nurly Zhol infrastructure efforts backs homegrown alternatives via tech transfers [443] [444].

Block 3 — Price Dimension

Sample / Type	Under Int'l Std.	Under Nat'l Std.	Market*
1. Wooden formwork panels, board thickness 25 mm	1. $15–$40/m²	1. $9.2 - $21.5/m²	1. $5.81–$6.4/m²
2. Metal formwork panels for round columns	2. $350 –$510/m²	2. $368.9–$404 kit/m²	2. $364.43–$400.8 kit/m²
3. Metal supporting elements for large-panel column formwork	3. $160- $330/m²	3. $184.45–$200 kit/m²	3. $182.22–$200.4 kit/m²

Block 4 — Environmental Criteria

Green Criteria (Mandatory)

Preference for reusable and modular formwork and scaffolding systems with high durability and recyclability. Single-use timber or plastic-based formwork shall be minimized. All systems must demonstrate robust design for multiple reuse cycles, low maintenance requirements, and end-of-life recyclability (particularly steel and aluminium components).

Carbon benefit per unit of measure:

Reusable formwork and scaffolding systems significantly reduce embodied carbon through repeated use. Impacts are calculated on a per-use basis by amortizing the initial embodied carbon over the expected number of reuse cycles.

Key Environmental Performance Data:

Steel Modular Formwork Systems (EN 12812 compliant):

Initial embodied carbon (A1–A3): typically 250–450 kg CO_2eq/m² (depending on design and recycled content).

With 50–100 reuse cycles (common for quality steel panels): 3.5 – 8.0 kg CO_2eq/m² per use.

High-recycled content steel (>70% recycled) can further reduce impacts by 40–60%.

Aluminium Modular Formwork Systems (EN 12812 compliant):

Initial embodied carbon (A1–A3): 450–650 kg CO_2eq/m².

With 150–300 reuse cycles (standard for premium aluminium systems): 2.0 – 4.5 kg CO_2eq/m² per use.

Aluminium's high recyclability (up to 95% at end-of-life) provides strong closed-loop benefits.

Prefabricated Timber Formwork Beams and Plywood Panels (EN 13377 compliant):

Initial embodied carbon: 55–85 kg CO_2eq/m² (solid timber) and 70–110 kg CO_2eq/m² (plywood).

With 6–12 reuse cycles (typical for good quality treated systems): 6.5 – 14.0 kg CO_2eq/m² per use.

Certified sustainable timber (FSC or PEFC) is required to ensure low upstream impacts.

Scaffolding Systems (EN 12811-1 compliant):

Steel tube and coupler scaffolding: 1.8–2.5 kg CO_2eq/kg of material.

Typical system weight: 8–15 kg/m² of façade area.

With 50–100 uses and high recycling rate at end-of-life: 0.3 – 0.8 kg CO_2eq/m² per use.

Modular system scaffolding generally achieves 25–40% lower material consumption than traditional tube-and-fitting systems.

Environmental Benefit Summary:

Switching from single-use timber formwork to reusable steel or aluminium systems can deliver 70–90% reduction in embodied carbon per m² of concrete formed over the project lifecycle. Reusable systems also reduce construction waste by 60–85% compared to single-use alternatives. At end-of-life, steel and aluminium components maintain high residual value and recyclability.

Block 5 — Procurement Action
Environmental Requirements for the Technical Specification — Text for Tender Documentation
Temporary works materials shall prioritize reusable modular formwork and scaffolding systems (steel or aluminium) with a minimum of 50 reuse cycles for formwork and 100 cycles for scaffolding. Contractors must minimize single-use timber and plastic components, submit a reuse and waste management plan, and provide take-back or recycling schemes for end-of-life materials achieving at least 85% recovery rate.

Sources: [3],[14],[15],[105],[106],[107],[204], [205],[437],[438],[439],[440],[441], [442],[443],[444],[503],[504],[505],[506],[507],[508],[509], [510],[511],[512],[513],[514],[515],[516],[517],[518],[519],[520]

** The Market price refers to the ex-factory general selling price regardless of compliance to certifications and international/national standards*

BIBLIOGRAPHY (IEEE)

This section contains the complete list of sources referenced by the profiles of construction materials and engineering equipment. The numbers in square brackets correspond to the references in the Sources line of each profile. Please copy and paste all the links in your browser to accurately access the exact reference.

[1] SAICM Secretariat and UNEP, "Sustainable Procurement of Building Materials: A Progressive Approach to Chemicals of Concern," 2023. https://saicmknowledge.org/sites/default/files/resources/Sustainable%20Procurement%20of%20Building%20Materials_CoC.pdf

[2] United Nations Environment Programme, "Comparative Analysis of Green Public Procurement and Ecolabelling Programmes in China, Japan, Thailand and the Republic of Korea," 2017. https://www.greenpolicyplatform.org/sites/default/files/downloads/resource/UNEP_green_public_procurement_ecolabelling_China_Japan_Korea_Thailand_report.pdf

[3] Switch Asia / Green Labels report, "Promoting Sustainable Construction in the EU: Green Labels, Certification Systems and Green Procurement." https://www.ihs.nl/en/media/2017-11-greenlabels

[4] European Committee for Standardization (CEN) and International Organization for Standardization (ISO), EN 15804:2012+A2:2019 — Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products; ISO 14025:2006 — Environmental labels and declarations — Type III environmental declarations — Principles and procedures. [Online]. Available: https://www.iso.org/standard/38131.html

[5] EN 16516, "Assessment of release of dangerous substances — Determination of emissions to indoor air from construction products." https://knowledge.bsigroup.com/products/construction-products-assessment-of-release-of-dangerous-substances-determination-of-emissions-into-indoor-air-1

[6] EN 1279, "Glass in building — Insulating glass units." https://knowledge.bsigroup.com/products/glass-in-building-insulating-glass-units-product-standard

[7] FSC (Forest Stewardship Council) and PEFC (Programme for the Endorsement of Forest Certification) chain-of-custody standards. https://connect.fsc.org/certification/chain-custody-certification

[8] EU Ecolabel and EU Green Public Procurement (GPP) criteria; REACH regulation (chemical restrictions). https://publications.jrc.ec.europa.eu/repository/bitstream/JRC141297/JRC141297_01.pdf

[9] Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF), Japanese Agricultural Standards (JAS) — List of Standards for Forestry and Timber Products. [Online]. Available: https://www.maff.go.jp/e/policies/standard/jas/list.html#rinsan

[10] APA — The Engineered Wood Association / APA Wood Europe, BS-EN-13986 Standard document. [Online]. Available: https://www.apawood.org/technical-papers

[11] CERTRIP — European Timber Trade Federation, Certificate verification portal. [Online]. Available: https://certrip.org/cgp/#product

[12] Valters Kazulis, Indra Muizniece, Lauma Zihare, Dagnija Blumberga,Carbon storage in wood products,Energy Procedia, Volume 128,2017,Pages 558-563,ISSN 1876-6102,https://doi.org/10.1016/j.egypro.2017.09.009. (https://www.sciencedirect.com/science/article/pii/S1876610217338511)

[13] British Standards Institution (BSI) / European Committee for Standardization (CEN), BS EN 1504-9:2008 — Products and systems for the protection and repair of concrete structures. [Online]. Available: https://dlvn.vn/uploads/files/BS%20EN%201504-9-08.pdf

[14] Japanese Industrial Standards Committee (JISC), Japanese Industrial Standards (JIS) — Public Search Service. [Online]. Available: https://www.jisc.go.jp/eng/

[15] Standardization Administration of China (SAC), GB Standards — Construction standards search portal. [Online]. Available: https://www.gbstandards.org/index/Standards_Search.asp?word=Construction

[16] World Trade Organization Technical Barriers to Trade (WTO/TBT) notification, Argentine TBT focal point archive. [Online]. Available: https://www.wto.org/english/tratop_e/tbt_e/tbt_handbook_on_notifications_e.pdf

[17] United Nations Industrial Development Organization (UNIDO), Global Best Practices in Cement and Concrete Decarbonization, Final Report, Jun. 2025. [Online]. Available: https://decarbonization.unido.org/wp-content/uploads/2025/06/20250626_global-best-practices-cement-concrete-decarbonization_final.pdf

[18] Fushun Special Steel Co. Ltd, EN-10025-HOT-ROLLED-PRODUCTS-OF-STRUCTURAL-STEELS-PART-2-TECHNICAL-DELIVERY-CONDITIONS-FOR-NON-ALLOY-STRUCTURE-STEEL- — Standard document for structural steels. [Online]. Available: https://www.fushunspecialsteel.com/wp-content/uploads/2015/09/EN-10025-Hot-rolled-products-of-structural-steels-Part-2-Technical-delivery-conditions-for-non-alloy-structure-steel-.pdf

[19] Third-party document repository, BS-EN-1090-2-2018 — Standard document. [Online]. Available: https://sazvar-sazeh.azarestan.com/wp-content/uploads/2022/02/BS-EN-1090-2-2018.pdf

[20] Give Steel A/S (Denmark), Environmental Product Declaration (EPD) — Galvanized Structural Steel, IBU EPD, 2022. [Online]. Available: https://givesteel.com/wp-content/uploads/EPD-Galvanized-Structural-Steel-IBU-Give-Steel.pdf

[21] New Zealand Building Code Hub (Ministry of Business, Innovation and Employment), BS EN:151892006 — Standard reference. [Online]. Available: https://codehub.building.govt.nz/resources/bs-en-151892006#!#resource-detail

[22] ArcelorMittal, Carbon — Technical and Environmental Product Data. Constructalia. [Online]. Available: https://www.bing.com/ck/a?!&&p=c06d2197c1103c302ee4172d1db9c74e731a02b725b4d7a072c2ac5e67fc3a94JmltdHM9MTc3OTE0ODgwMA&ptn=3&ver=2&hsh=4&fclid=230bb862-2c28-63d9-3ebb-aebc2dfd62a9&psq=ArcelorMittal%2c+Carbon+%e2%80%94+Technical+and+Environmental+Product+Data.+Constructalia.&u=a1aHR0cHM6Ly9lcGQtb25saW5lLmNvbS9QdWJsaXNoZWRFcGQvRG93bmxvYWQvMTU4NTg

[23] International Organization for Standardization (ISO), ISO 11654-1997:1997 — Acoustics — Sound absorbers for use in buildings — Rating of sound absorption. [Online]. Available: https://cdn.standards.iteh.ai/samples/19583/f05ae41625eb4cb0b95611feccf6fda6/ISO-11654-1997.pdf

[24] Jonas van der ham, The Global Warming Impact of Applying Bio-Based Insulation Materials in Residential High-Rises in Amsterdam, Master's Thesis MSc. Metropolitan Analysis, Design & Engineering, Delft University of Technology Wageningen University & Research, 22 August 2023 [Online]. Available: https://openresearch.amsterdam/image/2024/3/12/jonas_van_der_ham.pdf

[25] GreenFiber (National Fiber), Impact of Cellulose Insulation on Building Energy Performance, Technical White Paper. [Online]. Available: https://www.greenfiber.com/uploads/documents/Impact-of-Cellulose-Insulation-on-the-Affects-of-Building-Assemblies_White-Paper.pdf

[26] European Commission, EU Ecolabel — Product groups and criteria, DG Environment. [Online]. Available: https://environment.ec.europa.eu/topics/circular-economy-topics/eu-ecolabel/product-groups-and-criteria/coverings_en

[27] The International EPD System (Environdec), Environmental Product Declaration database. Construction products (EN 15804+A2) (version 2.0.1) (2.0.1) [Online]. Available: https://www.environdec.com/pcr-library/pcr_6b99d07c-4b75-4763-4485-08dd775d2e49

[28] RENOLIT SE, Roofing Membrane — Flexible sheet for waterproofing - Alkortec A SK (1,5 mm). Technical Data Sheet / Product Information. [Online]. Available: https://www.renolit.com/fileadmin/renolit/waterproofing_roofing/Documents/ALKORTEC/EN_epd-1183-renolit-alkortec-a-sk-1_5-mm.pdf

[29] Henkel AG & Co. KGaA, Epd Bitustick Uae. [Online]. Available: https://dm.henkel-dam.com/is/content/henkel/EPD-Bitustick-UAE

[30] Koster, Koester Tpo Roofing Membrane Environmental Product Declarati. [Online]. Available: https://www.koster.si/files/de_en/KOESTER-TPO-Roofing-Membrane-Environmental-Product-Declaration.pdf

[31] EQUITONE (Eternit), Fibre Cement Facade Solutions. [Online]. Available: https://www.equitone.com/en/-/fibre-cement-facade-solutions/#materials

[32] German Sustainable Building Council (DGNB), Certification scheme documentation. [Online]. Available: https://www.dgnb.de/en/making-the-most-of-dgnb/tips-for-dgnb-newcomers/choosing-the-right-construction-products

[33] Finish Facades Ltd, Fire Rated Cladding. [Online]. Available: https://www.finishfacades.co.uk/rainscreen-facade-testing/fire-rated-cladding

[34] ALumino bond or Aluminium Composite Panels ACP 4mm – Alucoboards. Available online:https://www.gypsum-ceilingkenya.co.ke/product/aluminium-composite-panels-acp-4mm/?srsltid=AfmBOoonQTCwgVUJIaERG8GC8a-

HukaDX1x-k8be-n-jp_apsNMLxrUpv

[35] Staticus UAB, Timber Unitised Facade System. [Online]. Available: https://staticus.com/timber-unitised-facade-system

[36] Ecoscape UK, Sustainable Decking and Exterior Cladding — Product Information. [Online]. Available: https://ecoscape.co.uk/advice/is-composite-cladding-an-environmentally-friendly-option/

[37] Hosung Deck, Hosung Factory. Wood Plastic Composite (WPC) Products [Online]. Available: https://www.hosungdeck.com/hosung-factory

[38] Everllence Building Products, Ccus References. [Online]. Available: https://www.everllence.com/industries/campaigns/ccus-standardization

[39] Höglmeier, K., Weber-Blaschke, G., and Richter, K., Potentials for cascading of recovered wood from building deconstruction — A case study for south-east Germany, Journal of Cleaner Production, vol. 159, pp. 10–24, 2017. PII: S0959652617317742. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0959652617317742

[40] Think Wood (WoodWorks — Wood Products Council USA), Mass Timber and Cross-Laminated Timber — Technical Resources. [Online]. Available: https://www.thinkwood.com/wp-content/uploads/2019/08/Think-Wood-CEU-Evaluating-the-Carbon-Footprint-of-Wood-Buildings.pdf

[41] Using Wood for Good – How Timber Can Help Fight Climate Change, Creating Tomorrow's Forests — Sustainable Timber Guidance. [Online]. Available: https://www.creatingtomorrowsforests.co.uk/blog/using-wood-for-good-how-timber-can-help-fight-climate-change

[42] Kirksey Architecture, Embodied Carbon and Mass Timber — Design for Sustainability. [Online]. Available: https://www.kirksey.com/about-us/news-media/for-immediate-release/mass-timber-and-sustainability

[43] European Commission, DG Environment. REACH studies - PVC - Life Cycle Assessment (LCA) of PVC and of principal competing materials [Online]. Available: https://ec.europa.eu/docsroom/documents/13049/attachments/1/translations/en/renditions/pdf

[44] Quanwei Liang, Liming Yu, Assessment of carbon emission potential of polyvinyl chloride plastics, E3S Web of Conf. 393 01031 (2023), DOI: 10.1051/e3sconf/202339301031 [Online]. Available: https://www.e3s-conferences.org/articles/e3sconf/pdf/2023/30/e3sconf_eppct2023_01031.pdf

[45] European Commission, DG Environment. EU Ecolabel criteria for awarding the EU Ecolabel for hard covering products [Online]. Available: https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/contentype/product_group_documents/1581681927/Annex_HC_1.pdf

[46] European Committee for Standardization (CEN), EN 14411:2016 — Ceramic tiles — Definitions, classification, characteristics, assessment and verification of constancy of performance. [Online]. Available: https://cdn.standards.iteh.ai/samples/41253/ffdc36ea3f344128a310ff8d6d20195d/SIST-EN-14411-2016.pdf

[47] SLOVENSKI STANDARD SIST EN 15283-1:2008 01-april-2008. https://cdn.standards.iteh.ai/samples/24155/b0f35332d9664fc0bc7fbc5e2cd2fe34/SIST-EN-15283-1-2008.pdf

[48] A guide to BS EN 998 -1 and BS EN 998 - 2. https://mortar.org.uk/MPAMortar/media/Mortar/Publications/Datasheets/MPA-Mortar-Data-Sheet-19.pdf

[49] SLOVENSKI STANDARD SISTEN 998-1:2010. https://cdn.standards.iteh.ai/samples/31304/5024503f78084c-1fa0a32a09a47b0558/kSIST-FprEN-998-1-2010.pdf

[50] Fontolan, B. L., Silva, T. B., Gava, G. P., Rigo, E., Neves Junior, A., & Possan, E.. (2024). CO_2 emissions and uptake in rendering mortars: sustainable approach. Ambiente Construído, 24, e131131. DOI:https://doi.org/10.1590/s1678-86212024000100749. [Online]. Available: https://www.scielo.br/j/ac/a/RXCMJdWDW8tbwjJT6v3Ffbt/?format=html&lang=en

[51] Ana Brás, Paulina Faria, Effectiveness of mortars composition on the embodied carbon long-term impact, Energy and Buildings, 2017, ISSN 0378-7788, http://dx.doi.org/10.1016/j.enbuild.2017.08.026. [Online]. Available: https://researchonline.ljmu.ac.uk/id/eprint/7061/1/D%3A%5CAna%20-%20praia%5CLIXIVIACAO%5Crev%5CBras%20et%20al%202017.pdf

[52] Building Materials Standard references, and Material Data Sheets. Online available: 1. https://lbcc.pressbooks.pub/buildingsystemsandcodes/chapter/building-materials-and-specifications/ and 2. https://archup.net/building-materials/material-datasheets/

[53] Jiannis S. Kougoulis, Renata Kaps, Nicholas Dodd, Ben Walsh. JRC European Commission, EU Ecolabel Criteria Proposal Technical Report, 2013 [Online]. Available: https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/contentype/product_group_documents/1581689805/131021%20Ecolabel%20paints_EUEB%20vote_Technical%20report%20final.pdf

[54] European Commission, DG Environment. European Commission EU Ecolabel Paints and Varnishes (indoor and outdoor), Commission Decision 2014/312/EU, Version 1.7 May 2023 [Online]. Available: https://environment.ec.europa.eu/document/download/e96e934b-32b9-40a1-a319-110bd58d1e8b_en?filename=EUEL_UM_paints_varnishes_v1.7_clean.pdf

[55] European Commission, CIRCABC — Communication and Information Resource Centre, Technical Document. [Online]. Available: https://circabc.europa.eu/ui/group/0e3024d9-38be-415b-b141-c05d5d31dd92/library/6a77404d-1b14-4222-a277-6cde2b608d86/details

[56] European Ecolabel, Product group criteria and certification requirements. Ecolabel certificate types [Online]. Available: https://www.ecolabel.net/en/sertifikasyon/boyalar-ve-vernikler-icin-eco-label-belgesi/

[57] Nordic Swan Ecolabel (Svanemerket), Ecolabelling criteria and product certification. [Online]. Available: https://svanemerket.no/content/uploads/2022/11/096e_4_0_BD.pdf

[58] Organisation for Economic Co-operation and Development (OECD), Policy report on Green Public Procurement. EMISSION SCENARIO DOCUMENTS ON COATING INDUSTRY (Paints, Laquers and Varnishes) [Online]. Available: https://www.oecd.org/content/dam/oecd/en/publications/reports/2014/09/coating-industry-paints-lacquers-and-varnishes_g1g48555/9789264221093-en.pdf

[59] BEUC — The European Consumer Organisation, Policy position paper. [Online]. Available: https://www.beuc.eu/sites/default/files/publications/2012-00234-01-e.pdf

[60] Certifico.com (Italian standards and safety portal), Procurement of Innovative Products: Bio-Based Products in Procurement. [Online]. Available: https://www.certifico.com/component/attachments/download/6247

[61] Official Journal of the European Union, European Union Legislative Act (2006R1907). EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX%3A32006R1907

[62] European Committee for Standardization (CEN), SIST EN 923:2006 — Adhesives for paper and board, packaging and disposable sanitary products — Classification and performance requirements. [Online]. Available: https://cdn.standards.iteh.ai/samples/22778/5dfc80ff5b9542fa8c9a29b68e07563e/SIST-EN-923-2006.pdf

[63] FEICA — Association of the European Adhesive and Sealant Industry, Technical Guidance Document. [Online]. Available: https://www.feica.eu/application/files/2815/4097/4568/RAM-EX-H01-006a_BD_SpERCs_Industrial_Use__FEICA_v1_1.pdf

[64] Japan Environment Association (JEA), Eco Mark — Japanese Type I Ecolabel Programme. [Online]. Available: https://www.ecomark.jp/pdf/tebiki_E.pdf

[65] Most Sustainable Adhesives: Safer, More Eco-friendly, LEED Compliant, and Healthier, One community for the highest good of all. [Online]. Available: https://onecommunityglobal.org/most-sustainable-adhesives/

[66] National Institute of Standards and Technology (NIST), Technical publication / standard. [Online]. Available: https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=912590

[67] Korea Testing and Research Institute (KTR), 220427 Korea Global Certification Services, Korea Industrial Standards, KS Certification. [Online]. Available: https://m.ktr.or.kr/ebooks/KTR_KOR_GLOBAL_ENG/assets/shared/220427_KTR%EA%B5%AD%EB%82%B4%EC%99%B8%EC%9D%B8%EC%A6%9D%EB%B8%8C%EB%A1%9C%EC%8A%88%EC%96%B4%EC%98%81%EC%96%B4_v7.pdf

[68] CertiPUR-US, Foam certification programme for flexible polyurethane foam products. [Online]. Available: https://certipur.us/

[69] Eurofins, Indoor Air Comfort Gold — Certification scheme for building products with low VOC emissions. [Online]. Available: https://cdnmedia.eurofins.com/corporate-eurofins/media/4oxnvoyr/specifications_indoor-air-comfort_v9.pdf

[70] Intertek Inform, EN 13241:2003+A2:2016 — Industrial, commercial and garage doors and gates — Product standard. (Fasteners, anchors and fixings context.) [Online]. Available: https://www.intertek.com/building/standards/en-13241/

[71] Building Material Specifications Guide, Scribd document. [Online]. Available: https://www.scribd.com/docu-

ment/543736614/STANDARD-SPECIFICATION-FOR-BUILDING-MATERIALS

[72] JIS Standards Repository, JIS K 6800:1985 Adhesives and Adhesive. [Online]. Available: https://jis.eomec.com/jisk68001985#gsc.tab=0

[73] FEICA — Association of the European Adhesive and Sealant Industry, Technical Guidance Document. [Online]. Available: https://www.feica.eu/our-projects/reach/safe-use-mixtures-1

[74] Code of China Standards Repository, GB 18583-2008 Indoor decorating and refurbishing materials - Limit of harmful substances of adhesives. [Online]. Available: https://www.codeofchina.com/standard/GB18583-2008.html

[75] European Union, European Union Legislative Act (2024R1781). Establishing a framework for the setting of Eco design requirements for sustainable products. EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1781

[76] European Organisation for Technical Assessment (EOTA), European Assessment Document (EAD) / European Technical Assessment (ETA). Fire Stopping and Fire Sealing Products. [Online]. Available: https://www.eota.eu/sites/default/files/uploads/ETAGs/etag-026-part-1-april-2013.pdf

[77] Bostik SA, Bostik Global Bulletins Fact Sheet Fs009 European & American classification for sealants. [Online]. Available: https://www.bostik.com/files/live/sites/shared_bostik/files/documents-brochures/Global/Bulletins/Bostik-Global-bulletins-Fact-Sheet-FS009-European-American-classification-for-sealants.pdf

[78] UL (Underwriters Laboratories), Product certification / standard. Product Certification Marks for Firestop Systems. [Online]. Available: https://www.ul.com/thecodeauthority/knowledge/product-certification-marks-firestop-systems

[79] European Union, European Union Legislative Act (2006R1907). EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006R1907

[80] Sika AG, International Standards And Classifications For Fire Testing. [Online]. Available: https://www.sika.com/en/knowledge-hub/international-standards-and-classifications-for-fire-testing.html

[81] Teknos, En13501 1 Learn More About The EU Fire Safety Standards. [Online]. Available: https://www.teknos.com/industrial-coatings/blog/en13501-1-learn-more-about-the-eu-fire-safety-standards

[82] ChineseStandard.net (GB standards repository), GB23864 2023. [Online]. Available: https://www.chinese-standard.net/PDF.aspx/GB23864-2023

[83] ChineseStandard.net (GB standards repository), JGT415 2013. [Online]. Available: https://www.chinesestandard.net/PDF/English.aspx/JGT415-2013

[84] Korea Testing and Research Institute (KTR) — REACH portal, Selectbbsnttview.Do. [Online]. Available: https://reach.ktr.or.kr/en/selectBbsNttView.do?key=832&bbsNo=5&nttNo=3792

[85] NSF International, EPD 10971 915FS-Sealants — Environmental Product Declaration. [Online]. Available: https://info.nsf.org/Certified/Sustain/ProdCert/EPD10971.pdf

[86] Karim Aliakbari, Amir Ebrahimi-Moghadam, Paria Ildarabadi,Investigating the impact of a novel transparent nano-insulation in building windows on thermal comfort conditions and energy consumptions in different climates of Iran, Thermal Science and Engineering Progress,Volume 25,2021,101009,ISSN 2451-9049, https://doi.org/10.1016/j.tsep.2021.101009. (https://www.sciencedirect.com/science/article/pii/S2451904921001700)

[87] Kiwa Testing & Certification, Epd Kiwa Ee 358 En. [Online]. Available: https://www.kiwa.com/globalassets/germany/veroffentlichte-epds/2023/1123/epd-kiwa-ee-358-en.pdf

[88] Build Up — European Portal for Energy Efficiency in Buildings, Janisol Arte 66 Window Width X Height 1230Mm X 1480Mm Epd. [Online]. Available: https://buildup-assets.s3.eu-central-1.amazonaws.com/Jansen_AG/Media/Janisol_Arte_66_window_width_x_height_1230mm_x_1480mm-EPD.pdf

[89] NormSplash Standards Repository, DIN EN 13813:2003. Screed material and floor screeds. [Online]. Available: https://www.normsplash.com/Samples/DIN/918652938/DIN-EN-13813-2003-en.pdf

[90] Sika AG, Glo Refurbishment: the repair and protection of reinforced concrete with sika, as per EN 1504. [Online]. Available: https://www.sika.com/content/dam/dms/corporate/z/glo-concrete-repair-protection-en-1504.pdf

[91] Tarmac Building Products Ltd, Topflow Screed A. [Online]. Available: https://www.tarmac.com/products/screed/topflow-screed-a

[92] Gyvlon (AGILIA Floor), Environmental Impacts. [Online]. Available: https://www.gyvlon.co.uk/en/environmental-impacts

[93] Contract Flooring Journal, Gypsol Anhydrite Screed Has Environmental Sustainability. [Online]. Available: https://www.contractflooringjournal.co.uk/sector-focus/gypsol-anhydrite-screed-has-environmental-sustainability-and-health-and-safety-benefits

[94] UNAGRU Technology Pvt. Ltd., Single Post Limecrete V Concrete. [Online]. Available: https://www.unagru.com/single-post/single-post-limecrete-v-concrete

[95] Kaikkonen P, Cartañá G , Happonen A. CO2 Emissions Comparisons on Cementous Sustainable Flooring Options: Modeling and Evaluation. Intelligent and Sustainable Manufacturing. 2025; 2(2):10018. https://doi.org/10.70322/ism.2025.10018

[96] Flowcrete (RPM International), CPG EPD Modified Mineral Mortars Group 1 18102022. [Online]. Available: https://www.flowcrete.eu/media/25641/cpg-epd-modified-mineral-mortars-group-1-18102022.pdf

[97] Tateglobal, Tate Rmg600 Plus Environmental Product Declaration EPD, in accordance with EN 15804+A2 & ISO 14025 / ISO 21930. [Online]. Available: https://www.tateglobal.com/media/mf0nuevn/tate-rmg600-plus-environmental-product-declaration-epd-en-uk.pdf

[98] Tateglobal, Tate RHG600 Access Floor Panels Simploc Environmental Product Declaration EPD, in accordance with ISO 14025 and EN 15804. [Online]. Available: https://www.tateglobal.com/media/l1ce31p3/tate-rhg600-simploc-environmental-product-declaration-epd-en-uk.pdf

[99] NSF International, EPD 10354 as per ISO 14044 and EN15804 — Environmental Product Declaration. TecCrete Raised Access Floor. [Online]. Available: https://info.nsf.org/Certified/Sustain/ProdCert/EPD10354.pdf

[100] Lindner Group, EPD, as per ISO 14025 and EN 15804+A2 Gm B 002 Ligna En. [Online]. Available: https://www.lindner-group.com/fileadmin/user_upload/intranet/service/green_building/upds/boden/epd-gm-b-002-ligna--en.pdf

[101] Tateglobal, Tate RMG600 Plus Environmental Product Declaration EPD, in accordance with EN 15804+A2 and IAO 14025/ISO 21930. [Online]. Available: https://www.tateglobal.com/media/mf0nuevn/tate-rmg600-plus-environmental-product-declaration-epd-en-uk.pdf

[102] Tateglobal, Tate RHG600 Simploc Environmental Product Declaration EPD, in accordance with ISO 14025 and EN 15804. [Online]. Available: https://www.tateglobal.com/media/l1ce31p3/tate-rhg600-simploc-environmental-product-declaration-epd-en-uk.pdf

[103] NSF International, EPD 10354 as per ISO 14044 and EN15804— Environmental Product Declaration. TecCrete Raised Access Floor. [Online]. Available: https://info.nsf.org/Certified/Sustain/ProdCert/EPD10354.pdf

[104] Lindner Group, EPD, as per ISO 14025 and EN 15804+A2 Gm B 002 Ligna En. [Online]. Available: https://www.lindner-group.com/fileadmin/user_upload/intranet/service/green_building/upds/boden/epd-gm-b-002-ligna--en.pdf

[105] Republic of Kazakhstan, Information-Legal System of Normative Legal Acts. [Online]. Available: https://adilet.zan.kz/eng/docs/Z1600000480

[106] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Registration No. 32783, 2023. Consolidated with [106] — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/V2400035238

[107] Qazaqgreen, Industry News. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/#:~:text=The%20OMIR%20standard%20has%20incorporated%20the%20best,social%20and%20economic%20characteristics%20of%20the%20country.

[108] Republic of Kazakhstan, Normative Legal Act No. 34371902, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1. https://www.akorda.kz/en/legal_acts?category=decrees and 2. https://www.nyulawglobal.org/globalex/Kazakhstan1.html

[109] Republic of Kazakhstan, Normative Legal Act No. 36597680, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://zan.gov.kz/

[110] Republic of Kazakhstan, Technical Regulation of the Republic of Kazakhstan TR DT 01-01 — Safety of Buildings and Structures. Document No. 30039063, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://prg.kz/document/?doc_id=1051485&pos=5;156

[111] British Standards Institution (BSI) / European Committee for Standardization (CEN), BS EN 1313-1:2010 — Round and sawn timber — Permitted deviations and preferred sizes. [Online]. Available: https://www.en-standard.eu/bs-en-1313-1-2010-round-and-sawn-timber-permitted-deviations-and-preferred-sizes-softwood-sawn-timber

[112] Republic of Kazakhstan, Sanitary Rules and Norms — Requirements for Hygiene in Construction. Document No. 31636480, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V1800017769

[113] Republic of Kazakhstan, Order — On Approval of Regulatory Requirements for Energy Efficiency in Buildings. Document No. 33843985, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/Z1200000541

[114] International Organization for Standardization (ISO), ISO Standards catalogue. Wood-based panels — Particleboard — Part 2: Requirement. [Online]. Available: https://www.iso.org/obp/ui#iso:std:iso:16893:-2:ed-1:v1:en

[115] British Standards Institution (BSI) / CEN, EN 300:2006 (EN 300:2022) — Oriented Strand Boards (OSB) — Definitions, classification and specifications. BSI Knowledge publication. [Online]. Available: https://knowledge.bsigroup.com/products/oriented-strand-boards-osb-definitions-classification-and-specifications

[116] Republic of Kazakhstan, Ecological Code of the Republic of Kazakhstan — Code No. 400-VI of 2 January 2021. Document No. 33063547, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1.https://adilet.zan.kz/eng/docs/K2100000400 and 2. https://prg.kz/document/?doc_id=33063547&pos=3;156

[117] International Organization for Standardization (ISO), ISO 679:2009 — Cement — Test methods — Determination of strength. [Online]. Available: https://www.iso.org/standard/45568.html

[118] European Committee for Standardization (CEN), EN 197-1:2011 — Cement — Part 1: Composition, specifications and conformity criteria for common cements. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/64d327b1-d5ac-45e3-8b04-fafec9e0698e/en-197-1-2011

[119] Republic of Kazakhstan, On Public Procurement — Law No. 434-V of 4 December 2015 (as amended). Document No. 31405838, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://online.zakon.kz/Document/?doc_id=31405838

[120] Republic of Kazakhstan, On Public Procurement — Law No. 434-V of 4 December 2015 (as amended). ST RK EN 197-1-2017 “Cement. Part 1. Composition, Specifications and Compliance Criteria for Conventional Cements. Document No. 31405838, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/Z1500000434#:~:text=Article%201.%20The%20scope%20of%20this%20Law%20This%20Law

[121] European Committee for Standardization (CEN), EN 197-1:2011 — Cement — Part 1: Composition, specifications and conformity criteria for common cements. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/64d327b1-d5ac-45e3-8b04-fafec9e0698e/en-197-1-2011

[122] Republic of Kazakhstan, Decree of the Government of the Republic of Kazakhstan — On Approval of Construction Norms. Document No. 39013038, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V2000019907

[123] British Standards Institution (BSI), BS EN ISO 6892-1:2019 — Metallic materials — Tensile testing — Part 1: Method of test at room temperature. (Note: supersedes BS EN 10002 series cited in original source.) [Online]. Available: https://www.en-standard.eu/bs-en-iso-6892-1-2019-metallic-materials-tensile-testing-method-of-test-at-room-temperature/

[124] Republic of Kazakhstan, Normative Legal Act — Technical Requirements for Construction Materials and Products. Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=151147

[125] European Commission, DG Environment. Eurocode 2: Design of concrete structures [Online]. Available: https://eurocodes.jrc.ec.europa.eu/EN-Eurocodes/eurocode-2-design-concrete-structures?id=132

[126] Republic of Kazakhstan, Decree — Rules for Conformity Assessment of Construction Products. Document No. 31346547, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V1800017758

[127] European Committee for Standardization (CEN), EN 13162:2012 — EN 13162:2012. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/3a231458-ac22-453b-864d-c40b42beeff2/en-13162-2012a1-2015

[128] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[129] British Standards Institution (BSI) / CEN, EN 13707:2004+A2:2009 — Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics. BSI Knowledge publication. [Online]. Available: 1. https://knowledge.bsigroup.com/products/flexible-sheets-for-waterproofing-reinforced-bitumen-sheets-for-roof-waterproofing-definitions-and-characteristics and 2. https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030258218

[130] Republic of Kazakhstan, Ecological Code of the Republic of Kazakhstan (prior version). [Online]. Available: 1. https://adilet.zan.kz/eng/docs/K2100000400 and 2. https://cis-legislation.com/document.fwx?rgn=130707

[131] Motis Tech, EN 13501-1 Fire Test for Building Materials. [Online]. Available: https://www.motistech.com/solution/en-13501-1

[132] Republic of Kazakhstan, Decree — On Technical Regulation for Safety of Construction Products. Document No. 435, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=151147

[133] European Committee for Standardization CEN EN 14351-1:2006+A2:2016 — EN 14351-1:2006. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/5cf279d1-55d9-4267-b555-3b26db1679e1/en-14351-1-2006a2-2016

[134] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[135] Republic of Kazakhstan, Law No. 242-II — On Architecture, Urban Planning and Construction in the Republic of Kazakhstan. Document No. 30039065, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=1299

[136] European Committee for Standardization (CEN), EN 14342:2013 — EN 14342:2013. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/3b28c4ad-73b6-415c-bfdf-31260c00c7a7/en-14342-2013

[137] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[138] European Committee for Standardization BS, EN 649:2011 — Resilient floor coverings — Homogeneous and heterogeneous polyvinyl chloride floor coverings — Specification. [Online]. Available: 1.https://knowledge.bsigroup.com/products/resilient-floor-coverings-homogenous-and-heterogenous-polyvinyl-chloride-floor-coverings-specification and 2.https://img.antpedia.com/standard/files/pdfs_ora/20230612/bs/BS%20EN/BS%20EN%2000649-2011.pdf

[139] International Organization for Standardization (ISO), ISO Standard, catalogue ID 64608. ISO 10582:2017 Resilient floor coverings — Heterogeneous poly(vinyl chloride) floor covering — Specifications [Online]. Available: https://www.iso.org/standard/64608.html

[140] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[141] European Committee for Standardization (CEN), EN 14411:2016 — Ceramic tiles — Definitions, classification, characteristics, assessment and verification of constancy of performance. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/d33e61b4-2316-4d49-9d5a-5c74cfcf9b3a/en-14411-2016

[142] Republic of Kazakhstan, Decree — On Approval of Rules for State Expert Review of Construction Projects. No. 213, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=174981

[143] European Committee for Standardization BS, EN 520:2004+A1:2009 — Gypsum plasterboards — Definitions, requirements and test methods. [Online]. Available: https://www.en-standard.eu/bs-en-520-2004-a1-2009-gypsum-plasterboards-definitions-requirements-and-test-methods/

[144] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[145] European Committee for Standardization (CEN), EN 998-1:2016 — Specification for mortar for masonry. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/a04c7a2d-0378-4f9d-a044-d0b53ac93d61/en-998-1-2016

[146] Republic of Kazakhstan, Order — On Approval of State Standard (ST RK) for Construction Materials. Order of the Minister for Investment and Development of the Republic of Kazakhstan of December 22, 2017 № 890", Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V1700016270

[147] International Organization for Standardization (ISO), ISO Standards catalogue. ISO 12944-5:2007(ru) Paints and varnishes. Corrosion protection of steel structures with protective paint systems. Part 5. Paint protection systems [Online]. Available: https://www.iso.org/obp/ui#iso:std:iso:12944:-5:ed-2:v1:ru

[148] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[149] European Committee for Standardization (CEN), EN 302-1:2013+A1:2023 — Adhesives for load-bearing timber structures — Test methods — Part 1: Determination of longitudinal tensile shear strength. [Online]. Available: 1. https://www.en-standard.eu/bs-en-302-1-2023-adhesives-for-load-bearing-timber-structures-test-methods-determination-of-longitudinal-tensile-shear-strength/ and 2. https://cdn.standards.iteh.ai/samples/70431/2008caa3bf4d465e9715dcf148ba1a1b/SIST-EN-302-1-2023.pdf

[150] Republic of Kazakhstan, Decree — On Approval of Technical Regulation for Fire Safety in Buildings. Order of the Minister of Internal Affairs of the Republic of Kazakhstan dated November 29, 2016 No. 1111, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://www.adilet.zan.kz/eng/docs/V1600014858

[151] Texfire, 110 European Regulation Une En 13501 12019 Fire Reaction. [Online]. Available: https://texfire.net/en/blog/110_european-regulation-une-en-13501-12019-fire-reaction.html#:~:text=In%20this%20article%20we%20will,EGLA%20200AL

[152] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[153] British Standards Institution (BSI) / CEN, EN 1279-1:2018 — Glass in building — Insulating glass units — Part 1: Generalities, dimensional tolerances and rules for the system description. [Online]. Available: https://www.en-standard.eu/bs-en-1279-1-2018-glass-in-building-insulating-glass-units-generalities-system-description-rules-for-substitution-tolerances-and-visual-quality/

[154] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[155] European Committee for Standardization CEN EN 14351-1:2006+A2:2016(Main) — EN 14351-1:2006+A2:2016. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/5cf279d1-55d9-4267-b555-3b26db1679e1/en-14351-1-2006a2-2016

[156] Republic of Kazakhstan, Law on Architecture, Urban Planning, and Construction — No. 242-II. Document No. 30012134, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=1299

[157] European Committee for Standardization (CEN), EN 13813:2002 — EN 13813:2002. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/6a3b1662-ac9f-447c-a4b6-add6336b66af/en-13813-2002

[158] Republic of Kazakhstan, Decree — On Approval of Sanitary and Epidemiological Requirements for Buildings and Premises. Document No. 34917901, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V1800017769

[159] European Committee for Standardization (CEN), EN 1366-6:2004 — EN 1366-6:2004. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/ecea055b-491c-47f2-a67a-e5e015f21d94/en-1366-6-2004

[160] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Law of the Republic of Kazakhstan № 106-VIII LRK of July 1, 2024 — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/Z2400000106

[161] International Organization for Standardization (ISO), ISO Standard, catalogue ID 73910. ISO 10140-1:2021 Acoustics — Laboratory measurement of sound insulation of building elements. [Online]. Available: https://www.iso.org/standard/73910.html

[162] Republic of Kazakhstan, Order — On Approval of Technical Requirements for Green Buildings in Kazakhstan. Approved by the Order of the Government of the Republic of Kazakhstan of December 31, 2021 No. 996, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://ealegislation.com/document.fwx?rgn=137120

[163] European Committee for Standardization (CEN), EN 14399-1:2015 — High-strength structural bolting assemblies for preloading — Part 1: General requirements. (Fasteners, anchors and fixings.) [Online]. Available: 1. https://standards.globalspec.com/std/10383989/en-14399-10 and 2. https://www.en-standard.eu/bs-en-14399-1-2015-high-strength-structural-bolting-assemblies-for-preloading-general-requirements/

[164] Republic of Kazakhstan, Decree — On Approval of Rules for State Supervision and Control in Construction. Document No. 35527808, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1. https://cis-legislation.com/document.fwx?rgn=75525 and 2. https://adilet.zan.kz/eng/docs/V1700016270

[165] British Standards Institution (BSI) / CEN, EN 934-2:2009+A1:2012 — Admixtures for concrete, mortar and grout — Part 2: Concrete admixtures — Definitions, requirements, conformity, marking and labelling. [Online]. Available: 1. https://knowledge.bsigroup.com/products/admixtures-for-concrete-mortar-and-grout-concrete-admixtures-definitions-requirements-conformity-marking-and-labelling and 2. https://webstore.ansi.org/standards/bsi/bsen9342009

[166] Republic of Kazakhstan, Decree — On Technical Regulation Safety of Construction Products and Materials. No. 435, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=151147

[167] International Organization for Standardization (ISO), ISO Standard ISO 9001:2015 Quality management systems, catalogue ID 62085. [Online]. Available: https://www.iso.org/standard/62085.html

[168] European Committee for Standardization (CEN), EN 14909:2012 — EN 14909:2012. Flexible sheets for waterproofing - Plastic and rubber damp proof courses - Definitions and characteristics. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/22eab347-aa99-4402-9dbb-ff3b5f83d7e0/en-14909-2012

[169] Government of the Republic of Kazakhstan, On approval of the Concept for Development of the Construction Industry of the Republic of Kazakhstan 2020–2025, Resolution No. 114-H, 2019. [Online]. Available: https://adilet.zan.kz/eng/docs/V1700016270

[170] Republic of Kazakhstan, Order — On Approval of Environmental Protection Standards for Construction Works. Order of the Minister for Investment and Development of the Republic of Kazakhstan of December 22, 2017 № 890, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1. https://adilet.zan.kz/eng/docs/V1700016270 and 2. https://zakonpravo.kz/en/article-9-requirements-for-environmental-safety-and-environmental-protection-of-the-law-on-architectural-urban-planning-and-construction-activities-in-the-republic-of-kazakhstan

[171] European Committee for Standardization (CEN), EN 1886:2025 — EN 1886:2025. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/cfb559d5-a0d2-4a19-be9f-6346f705c45a/en-1886-2025

[172] Government of the Republic of Kazakhstan, On approval of the Concept for Development of the Construction Industry of the Republic of Kazakhstan 2020–2025, Resolution No. 114-H, 2019. [Online]. Available: https://adilet.zan.kz/eng/docs/V1700016270

[173] European Committee for Standardization (CEN), EN 62471:2008 — Photobiological safety of lamps and lamp systems. (Lighting fixtures — photobiological hazard classification.) [Online]. Available: https://knowledge.bsigroup.com/products/photobiological-safety-of-lamps-and-lamp-systems

[174] Republic of Kazakhstan, Decree — On Approval of Requirements for Energy Performance of Buildings (EAEU TR). I.O'S ORDER. MINISTER OF INDUSTRY AND CONSTRUCTION OF THE REPUBLIC OF KAZAKHSTAN of November 18, 2024 No. 397. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=163303

[175] Eland Cables Ltd, Iec 60502 Cable. [Online]. Available: https://www.elandcables.com/electrical-cable-and-accessories/cables-by-standard/iec-60502-cable#:~:text=IEC%2060502%2D1%20Cable,properties%20when%20exposed%20to%20fire.

[176] Republic of Kazakhstan, Order — On Approval of Green Public Procurement Criteria for Construction Products. Document No. 38218209, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1. https://adilet.zan.kz/eng/docs/V2400035238 2. https://switch-asia.eu/site/assets/files/4401/gpp_assessment_kazakhstan.pdf 3. https://public-buyers-community.ec.europa.eu/resources/green-public-procurement-criteria-and-requirements

[177] European Committee for Standardization (CEN), EN 997:2018 — WC pans and WC suites with integral trap — Functional requirements and test methods. [Online]. Available: https://www.en-standard.eu/bs-en-997-2018-tc-tracked-changes-wc-pans-and-wc-suites-with-integral-trap/

[178] Republic of Kazakhstan, Decree — Sanitary Rules on Requirements for Construction Materials and Products. Document No. 30598640, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://adilet.zan.kz/eng/docs/V2000021934

[179] Government of the Republic of Kazakhstan, On approval of the State Programme for Accelerated Industrial-Innovative Development 2010–2014. [Online]. Available: 1. https://cis-legislation.com/document.fwx?rgn=69899 2. https://jp-kz.org/wp/wp-content/uploads/stateprogram.pdf

[180] European Committee for Standardization (CEN), EN ISO 9906:2012 — Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3. (Pumps, valves and hydraulic equipment.) [Online]. Available: 1. https://www.iso.org/standard/41202.html 2. https://cdn.standards.iteh.ai/samples/41202/51d6c311b-595428ba44f0665d20b57d6/ISO-9906-2012.pdf

[181] Republic of Kazakhstan, Order — On Approval of Technical Regulation for Electrical Equipment in Buildings. Document No. 35356788, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=171651

[182] Republic of Kazakhstan, Decree — Requirements for Plumbing Fixtures and Water Treatment Equipment in Construction. Order of the Chairman of the Committee for Construction, Housing and Public Utilities and Land Management of the Ministry of National Economy of the Republic of Kazakhstan dated December 29, 2014 No. 156-ҚҚ, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://prg.kz/m/amp/document/31682327/

[183] Coule Energy, Understanding Solar Panel Certification Iec 61215 61730 Stan. [Online]. Available: https://couleenergy.com/understanding-solar-panel-certification-iec-61215-61730-standards-explained

[184] Republic of Kazakhstan, Decree — On Approval of Fire Safety Standards for Construction Products and Systems. Document of June 9, 2023 No. 435, Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: https://cis-legislation.com/document.fwx?rgn=151147

[185] Keystonecompliance, Iec 62040. [Online]. Available: https://keystonecompliance.com/iec-62040

[186] Kazakhstan Green Building Council (KazGBC), Green Building Standards and Certification in Kazakhstan. [Online]. Available: https://kazgbc.kz/sertifikatsiya-omir/

[187] European Committee for Standardization (CEN), EN 13252:2016+A1:2021 — Geosynthetics — Characteristics required for use in drainage systems. (Green roof substrate drainage layers.) [Online]. Available: https://www.en-standard.eu/bs-en-13252-2016-tc-tracked-changes-geotextiles-and-geotextile-related-products-characteristics-required-for-use-in-drainage-systems/

[188] Republic of Kazakhstan, Order — On Approval of Technical Requirements for Use of Renewable Energy Sources Photovoltaic and Solar Energy Systems. The Law of the Republic of Kazakhstan dated 4 July 2009 № 165-IV., Kazakhstan Information-Legal System Zakon.kz. [Online]. Available: 1. https://adilet.zan.kz/eng/docs/Z090000165_?utm 2. https://adilet.zan.kz/kaz/docs/V2000021269/compare/eng?utm

[189] European Committee for Standardization (CEN), EN 1338:2003 — EN 1338:2003. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/3b90c3e5-6f23-41e2-a108-43746b2bbb3b/en-1338-2003

[190] Republic of Kazakhstan, Decree — Requirements for Geosynthetics and Geotextiles in Construction and Civil Works. Order of the Roads Committee of the Ministry of Transport and Communications of the Republic of Kazakhstan No. 85 dated September 22, 2010. [Online]. Available: 1. https://adilet.zan.kz/kaz/docs/E10IA0085AD?utm 2. https://adilet.zan.kz/kaz/docs/E10IA0087AD?utm

[191] STATE STANDARD OF THE REPUBLIC OF KAZAKHSTAN, BITUMEN AND BITUMEN BINDERS, Method for determining the depth of needle penetration ST RK 1226-2003 PRG Kazakhstan Zakon.kz. [Online]. Available: https://online.zakon.kz/Document/?doc_id=30025370

[192] European Committee for Standardization of aggregates for concrete (CEN), EN 12620:2013 — EN 12620:2013. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/aef412e6-36ce-49d3-afaa-5200d721ff84/en-12620-2013

[193] PRG Kazakhstan, SN RK 3.01-05-2013 “Improvement of the territories of populated areas, State standards in the field of architecture, urban planning and construction. [Online] available: https://prg.kz/document/?doc_id=35998562&pos=0;0

[194] CIS Legislation, Order of the minister of the industry and infrastructure development of the Republic of Kazakhstan. approval of the Technical regulation “About Safety of Buildings and Constructions, Construction Materials and Products, [Online] available:https://cis-legislation.com/document.fwx?rgn=151147#A6O00N7UL6

[195] British Standards Institution (BSI) / CEN, EN 13706-1:2002 — Reinforced plastics composites — Specifications for pultruded profiles — Part 1: Designation. [Online]. Available: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030022882

[196] PRG Kazakhstan, Order of the Minister of Health of the Republic of Kazakhstan dated February 20, 2023 No. 26 On approval of the Sanitary Rules “Sanitary and Epidemiological Requirements for Water Sources, Water Intake Sites for Domestic and Drinking Purposes, Domestic and Drinking Water Supply and Places of Cultural and Domestic Water Use and the Safety of Water Bodies. [Online] available: https://prg.kz/document/?doc_id=32012478&pos=3;156

[197] PRG Kazakhstan, Order of the Minister of Emergency Situations of the Republic of Kazakhstan dated August 17, 2021 No 405, On approval of the technical regulation “General requirements for fire safety. [Online] available: https://prg.kz/Document/?doc_id=39453446&utm

[198] International Organization for Standardization (ISO), ISO Standard, catalogue ID 57696. [Online]. Available: https://www.iso.org/standard/57696.html

[199] Republic of Kazakhstan, Technical regulations, Customs union, Safety of low voltage equipment (wiring and electrification system) CU TR 004/2011, [Online] available: https://www.bellis.by/upload/docs/accreditation/eaeu/CU%20TR%20004-2011_LVD_EN.pdf

[200] PRG Kazakhstan, Approved by Decree of the Government of the Republic of Kazakhstan of December 1, 2011 No 1431. Sanitary Rules “Sanitary and Epidemiological Requirements for the Maintenance and Operation of Residential and Other Premises, Public Buildings, [Online] available: https://prg.kz/document/?doc_id=31092688&utm

[201] European Committee for Standardization (CEN), EN 12915-1:2009 — Chemical products used for treatment of swimming pool water — Sodium hypochlorite. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/ec6fa589-b01e-41cc-958d-a8ff4e9ef892/en-12915-1-2009

[202] Ministry of Justice of the Republic of Kazakhstan, On approval of the Rules for Public Procurement, Registration No. 32783, 2023. Consolidated with [106] — see above. [Online]. Available: https://adilet.zan.kz/eng/docs/V2400035238?utm

[203] Measurlabs, En 13501 1 Fire Classification Performance Classes And Crite. [Online]. Available: https://measurlabs.com/blog/en-13501-1-fire-classification-performance-classes-and-criteria

[204] PRG Kazakhstan, CODE OF RULES OF THE REPUBLIC OF KAZAKHSTAN, SP RK 4.02-101-2012: Heating, ventilation and air conditioning

[205] British Standards Institution (BSI) / BS EN 12812:2008 — Falsework — Performance requirements and general design. (Temporary works — formwork and scaffolding.) BSI Knowledge publication. [Online]. Available: https://knowledge.bsigroup.com/products/falsework-performance-requirements-and-general-design

[206] VOOG CMS, Epd Acoustic%20Panels. [Online]. Available: https://media.voog.com/0000/0039/1555/files/epd-Acoustic%20Panels.pdf

[207] Armstrong World Industries, Ultima Low Embodied Carbon Epd. [Online]. Available: https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/ultima-low-embodied-carbon-epd.pdf

[208] Kiwa Testing & Certification, Epd Kiwa Ee 181456 En. [Online]. Available: https://www.kiwa.com/48dad8/globalassets/germany/veroffentlichte-epds/2025/01-january/epd-kiwa-ee-181456-en.pdf

[209] SWG Schraubenwerk Gaisbach GmbH, Steel Screws. [Online]. Available: https://www.swg-produktion.de/fileadmin/swg-produktion.de/Media/10_Dokumente/Steel_Screws.pdf

[210] EJOT Holding GmbH & Co. KG, Ejot Epd Fastening Solutions For Etic Systems En. [Online]. Available: https://www.ejot.cn/medias/sys_master/epdsilb/002/hd3/h87/9237825683486/EJOT-epd-fastening-solutions-for-etic-systems-EN.pdf

[211] Business Wire, “Kazakhstan Construction Industry Report 2025: Output to Grow by 6.8% This Year,” Jun. 20, 2025. [Online]. Available: https://www.businesswire.com/news/home/20250620963244/en/.

[212] Forest Trends, “Kazakhstan Extends Export Ban on Specific Lumber Products for Six Months,” Dec. 10, 2025. [Online]. Available: https://www.forest-trends.org/idat_countries/kazakhstan/.

[213] QazIndustry, “Review of the Development of the Furniture Industry in the EAEU,” 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/3619-obzor-razvitiya-mebelnoy-promyshlennosti-stran-uchastnits-eaes

[214] Standard Cement, “Production Capacity,” 2023. [Online]. Available: https://south-oil.com/en/kompanii/standard-cement

[215] Global Cement, “Steppe Cement Narrows Losses in First Half of 2025,” Sep. 15, 2025. [Online]. Available: https://www.globalcement.com/news/item/19244-steppe-cement-narrows-losses-in-first-half-of-2025

[216] S&P Global, Kazakhstan’s Steppe Cement Sees Surge in Clinker Production in 2025, Commodity Insights, 26 Jun. 2025. [Online]. Available: https://www.spglobal.com/commodityinsights/en/news-research/latest-news/metals/062625-kazakhstans-steppe-cement-surge

[217] Global Cement, Steppe Cement narrows losses in first half of 2025, Sep. 2025. [Online]. Available: https://www.globalcement.com/news/item/19244-steppe-cement-narrows-losses-in-first-half-of-2025

[218] United Nations Industrial Development Organization (UNIDO), Global Best Practices in Cement and Concrete Decarbonization, Final Report, Jun. 2025. [Online]. Available: https://decarbonization.unido.org/wp-content/uploads/2025/06/20250626_global-best-practices-cement-concrete-decarbonization_final.pdf?utm

[219] SteelRadar, Taraz Rebar: new 1.2 million tonnes/year rebar plant commissioned in Kazakhstan, 2025. [Online]. Available: https://www.steelradar.com/en/new-rebar-plant-opened-in-kazakhstan

[220] GMK Center, Kazakhstan increased steel production by 23.4% month-on-month in November 2025, 23 Dec. 2025. [Online]. Available: https://gmk.center/en/news/kazakhstan-increased-steel-production-by-23-4-m-m-in-november

[221] KT.KZ, “Production of Thermal Insulation Materials in Kazakhstan Increased,” Jul. 1, 2024. [Online]. Available: https://www.kt.kz/eng/economy/production_of_thermal_insulation_materials_in_kazakhstan_1377966178.html

[222] Trend.az, “Kazakhstan’s Construction Sector Nails Strong Growth in 8M2025,” Sep. 24, 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html

[223] Kazakhstan Construction Industry Report 2025. [Online]. Available: https://finance.yahoo.com/news/kazakhstan-construction-industry-report-2025-132400764.html

[224] EN Standards, BS EN 13967:2012+A1:2017, Flexible sheets for waterproofing. Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet. Definitions and characteristics, [Online] available: https://www.en-standard.eu/bs-en-13967-2012-a1-2017-flexible-sheets-for-waterproofing-plastic-and-rubber-damp-proof-sheets-including-plastic-and-rubber-basement-tanking-sheet-definitions-and-characteristics/

[225] PRG Kazakhstan, GOST 30693-2000 “Roofing and waterproofing mastics. General specifications, [Online] available:https://prg.kz/Document/?doc_id=30040356

[226] Trend.az, “Kazakhstan’s Construction Sector Nails Strong Growth in 8M2025,” Sep. 24, 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html

[227] KazGBC, “OMIR Certification for Green Buildings,” 2025. [Online]. Available: https://kazgbc.kz/sertifikatsiya-omir/

[228] Grand View Research, “Waterproofing Membranes Market Size Report, 2031,” 2025. [Online]. Available: https://www.grandviewresearch.com/industry-analysis/waterproofing-membranes-market

[229] MarketsandMarkets, “Waterproofing Chemicals Market Report,” 2025. [Online]. Available: https://www.marketsandmarkets.com/Market-Reports/construction-chemical-195.html

[230] Finish Facades, “Fire Rated Cladding | BS EN 13501-1,” 2025. [Online]. Available: https://www.finishfacades.co.uk/rainscreen-facade-testing/fire-rated-cladding

[231] Teknos, “EN 13501-1: EU Fire Safety Standards,” 2025. [Online]. Available: https://www.teknos.com/industrial-coatings/blog/en13501-1-learn-more-about-the-eu-fire-safety-standards/.

[232] 6Wresearch, “Kazakhstan Fireproof Cladding Market (2025-2031),” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-fireproof-cladding-market

[233] Global Info Research, “Global Aluminium Exterior Wall Cladding Market,” 2025. [Online]. Available: https://www.globalinforesearch.com/reports/2578153/aluminium-exterior-wall-cladding.

[234] QazaqGreen, “OMIR Standard for Green Buildings in Kazakhstan,” 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/.

[235] Kazakhstan Laws, ST RK EN 10025-1-2012 and CT PK EN 10025-1-2012: Hot-rolled products of structural steels. Part 1. Delivery general specification, [Online] available: https://www.kazakhstanlaws.com/showProduct.aspx?SEName=st-rk-en-10025-1-2012&ProductID=24026

[236] Kazakhstan Laws, “ST RK EN 1090-2-2011: Execution of Steel Structures,” 2023. [Online]. Available: https://www.kazakhstanlaws.com/p-24077-st-rk-en-1090-2-2011.aspx?

[237] GMK Center, “Kazakhstan’s Qarmet Produced 3.8 Million Tons of Steel in 2025,” Feb. 2026. [Online]. Available: https://gmk.center/en/news/kazakhstan-s-qarmet-produced-3-8-million-tons-of-steel-in-2025/.

[238] ArcelorMittal, “XCarb® Environmental Product Declarations (EPD),” 2025. [Online]. Available: https://europe.arcelormittal.com/sustainability/xcarb/recycled-and-renewably-produced-flat-long-epd.

[239] EN 15804, “Sustainability of Construction Works – Environmental Product Declarations,” 2021. https://www.normsplash.com/Samples/DIN/118136752/DIN-EN-15804-2022-en.pdf

[240] EconomyKZ, “Kazakhstan’s Construction Sector Grows 18.1% in 2025,” Sep. 2025. [Online]. Available: https://economykz.org/?p=20641&lang=en

[241] Trend.az, “Kazakhstan’s Construction Sector Nails Strong Growth in 8M2025,” Sep. 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html

[242] “ITEH Standards, CEN

EN 335:2013(Main), Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products. [Online] available: “standards/cen/e5d368b1-2232-47e2-8349-ee85cb6c895b/en-335-2013?srsltid=AfmBOoqSR39HuyvBQgw1mv6G5V_uIjGVT48UM9PDbvElr5nWcYKMZiJO

[243] Forest Stewardship Council, “FSC in Kazakhstan – Chain of Custody Requirements,” 2025. [Online]. Available: https://fsc.org/en

[244] 6Wresearch, “Kazakhstan Wood Products Market Outlook 2022–2031,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-wood-products-market-outlook

[245] QazIndustry, “Production of Construction Materials January–June 2025,” 2025. [Online]. Available: https://qazindustry.gov.kz/docs/otchety/940/1756456462.pdf

[246] Trend.az, “Kazakhstan’s Construction Sector Nails Strong Growth in 8M2025,” 24 Sep 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html

[247] QazaqGreen, “Green” construction in Kazakhstan: a step towards a sustainable future and achieving the SDGs 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/

[248] iTeh Standards, “EN 14342:2013 Wood Flooring – Characteristics, Evaluation of Conformity and Marking,” 2023. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/3b28c4ad-73b6-415c-bfdf-31260c00c7a7/en-14342-2013.

[249] Kazakhstan Laws, “ST RK EN 16516: Assessment of Release of Dangerous Substances – Indoor Air Emissions,” 2023. [Online]. Available: https://adilet.zan.kz/eng/docs/Z070000302_

[250] IndexBox, “Parquet Flooring Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights,” Feb. 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-parquet-flooring-market-analysis-forecast-size-trends-and-insights/.

[251] IndexBox, “Solid Wood Flooring Market in Kazakhstan,” Feb. 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-solid-wood-flooring-market-analysis-forecast-size-trends-and-insights/.

[252] Trend.az, “Kazakhstan’s Construction Sector Nails Strong Growth in 8M2025,” 24 Sep 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html.

[253] QazaqGreen, “Green” construction in Kazakhstan: a step towards a sustainable future and achieving the SDGs, 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/

[254] ITEH Standards, CEN and EN ISO 10581:2020(Main): Resilient floor coverings - Homogeneous poly(vinyl chloride) floor covering - Specifications (ISO 10581:2019), 2020. [Online] available: https://standards.iteh.ai/catalog/standards/cen/f1c51ff9-2936-42dd-a969-120357e8ee42/en-iso-10581-2020

[255] Eurasian Economic Comission, TR EAEU 037/2016 On restriction of the use of certain hazardous substances in electrical and electronic equipment. [Online] available: https://www.cu-tr.org/page9?_l=en&article_id=5035&utm

[256] IndexBox, "PVC Floor, Wall and Ceiling Coverings in Kazakhstan – Import Price and Market Report," 2025. [Online]. Available: https://www.indexbox.io/search/price-for-pvc-floor-wall-and-ceiling-coverings-kazakhstan/.

[257] QazIndustry, "Review of the development of the furniture industry in the EAEU member states, 2024." 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/3619-obzor-razvitiya-mebelnoy-promyshlennosti-stran-uchastnits-eaes (extended to flooring)

[258] Trend.az, "Kazakhstan's Construction Sector Nails Strong Growth in 8M2025," 24 Sep 2025. [Online]. Available: https://www.trend.az/business/construction/4094879.html

[259] QazaqGreen, "OMIR Standard for Green Buildings in Kazakhstan," 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/

[260] iTeh Standards, "EN 14411:2016 Ceramic Tiles – Definitions, Classification, Characteristics and Marking," 2023. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/d33e61b4-2316-4d49-9d5a-5c74cfcf9b3a/en-14411-2016.

[261] PRG Kazakhstan,ST RK EN 771-4:2011, Requirements for building blocks. (EN 771-4:2011 Specification for masonry units - Part 4: Autoclaved aerated concrete masonry units, IDT). [Online] available: https://prg.kz/document/?doc_id=31408952&utm

[262] Trend.az, "Chinese Investor Building Giant Porcelain Tile Plant in Kazakhstan," 30 Mar 2024. [Online]. Available: https://www.trend.az/casia/kazakhstan/3879449.html.

[263] Trend.az, "Kazakhstan's Zhambyl Region Boosts Industry with New High-Tech Brick Factory," 5 Jul 2025. [Online]. Available: https://www.trend.az/business/economy/4066429.html.

[264] QazIndustry, "Production of Construction Materials January–August 2025," 2025. [Online]. Available: https://qazindustry.gov.kz/docs/otchety/954/1760016732.pdf

[265] QazInform, "Kazakhstan Targets Broad-Based Economic Growth in 2026," 29 Dec 2025. [Online]. Available: https://qazinform.com/news/kazakhstan-targets-broad-based-economic-growth-in-2026-510452.

[266] PRG Kazakhstan, ST RK EN 520-2012: Plasterboard Sheets Definition, Requirements and Test Methods. [Online] available: https://prg.kz/document/?doc_id=36166252&utm

[267] IndexBox, "Gypsum Boards Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights," February 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-gypsum-boards-market-analysis-forecast-size-trends-and-insights/.

[268] JP-KZ, "Construction Materials Market Industry Teaser," 2023 (with 2025 market update). [Online]. Available: https://jp-kz.org/wp/wp-content/uploads/ENG_23_%D0%9E%D0%A2_ConstructionMaterials.pdf.

[269] QazIndustry, "Production of Construction Materials, January–September 2025," 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/1974-obem-proizvodstva-stroymaterialov-v-kazakhstane-vyros-na-387-za-devyat-mesyatsev.

[270] Global Gypsum, "Knauf to Build Dry Plaster Mix Plant in Zhambyl, Kazakhstan," June 2025. [Online]. Available: https://www.globalgypsum.com/news/item/2279-knauf-to-build-dry-plaster-mix-plant-in-zhambyl.

[271] ITEH Standards, CEN EN 998-1:2016(Main), Specification for mortar for masonry - Part 1: Rendering and plastering mortar, [Online] available: https://standards.iteh.ai/catalog/standards/cen/a04c7a2d-0378-4f9d-a044-d0b53ac93d61/en-998-1-2016?srsltid=AfmBOoq7JKG5taioXb1efvhL6YSgogVbKFqI-tfNQC0SQ-KzxlsYN-it

[272] JP-KZ, "Construction Materials Market Industry Teaser," 2023 (updated 2025). [Online]. Available: https://jp-kz.org/wp/wp-content/uploads/ENG_23_%D0%9E%D0%A2_ConstructionMaterials.pdf.

[273] Sika, "Sika Opens New Plant for Concrete Admixtures and Mortars in Kazakhstan," 8 Apr 2025. [Online]. Available: https://www.sika.com/en/media/media-releases/2025/sika-opens-new-plant-in-kazakhstan.html.

[274] Times of Central Asia, "Kazakhstan Secures Foreign Investment in 40 Major Projects for 2024," 28 Jun 2024 (Lasselsberger update 2025). [Online]. Available: https://timesca.com/kazakhstan-secures-foreign-investment-in-40-major-projects-for-2024/.

[275] IndexBox, "Kazakhstan Construction Mortars – Market Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-construction-mortars-market-analysis-forecast-size-trends-and-insights/.

[276] ITEH Standards, CEN EN 13300:2022(Main), Paints and varnishes - Paints and varnishes for interior walls and ceilings - Classification. [Online] available: https://standards.iteh.ai/catalog/standards/cen/84c77da0-4442-4899-b829-bdb26777ecd2/en-13300-2022

[277] Sercons International Gmbh, TR EAEU 037/2016 On limiting the use of hazardous substances in electrical and electronic products. [Online] available: https://serconsrus.com/tr-eaeu-037-rohs/?utm

[278] Coatings World, "Kazakhstan Coating Market Passed Tipping Point," 2025. [Online]. Available: https://www.coatingsworld.com/kazakhstan-coating-market-passed-tipping-point/.

[279] Central Asia Coatings Show, "Exhibitor Directory and Market Overview," Astana, February 2025. [Online]. Available: https://centralasiacoatingshow.com/en/for-visitors/list-of-exhibitors.

[280] Central Asia Coatings Show, "Exhibition Catalogue 2025," 2025. [Online]. Available: https://centralasiacoatingshow.com/images/doc/catalog2025/catalog.pdf.

[281] QazIndustry, "Chemical Industry Review January–December 2024," 2025. [Online]. Available: https://qazindustry.gov.kz/docs/otchety/899/1742973736.pdf.

[282] Kazakhstan Laws, ST RK EN 12004-1-2017 and CT PK EN 12004-1-2017 Adhesives for ceramic tiles. Part 1. Requirements, evaluation and consistency testing, classification and labeling. [Online] available: https://www.kazakhstanlaws.com/p-433208-st-rk-en-12004-1-2017.aspx

[283] iTeh Standards, "EN 15651 Series: Sealants for Non-Structural Use in Joints in Buildings and Pedestrian Walkways," 2023. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/en-15651-1-2017.

[284] IndexBox, "Construction Sealants Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-construction-sealants-market-analysis-forecast-size-trends-and-insights.

[285] Sika, "Sika Opens New Plant for Concrete Admixtures and Mortars in Kazakhstan," Apr 2025. [Online]. Available: https://www.sika.com/en/media/media-releases/2025/sika-opens-new-plant-in-kazakhstan.html.

[286] Selena, "The Selena Group is Expanding Its Presence in Central Asia – Starting Construction of Another Production Plant in Kazakhstan," Jan 2026. [Online]. Available: https://www.flipsnack.com/selenagroup/selena-group-product-catalogue/full-view.html

[287] IndexBox, "Kazakhstan Polyurethane Sealants – Market Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-polyurethane-sealants-market-analysis-forecast-size-trends-and-insights.

[288] iTeh Standards, "EN 15651-1:2017 Sealants for Non-Structural Use in Joints in Buildings and Pedestrian Walkways – Part 1: Sealants for Façade Elements," 2023. [Online]. Available:https://standards.iteh.ai/catalog/search?term=EN%2015651-1%3A2017

[289] PRG Kazakhstan, ST RK EN 1366-4-2014:Fire resistance tests for service installations - Part 4: Linear joint seals, (IDT). [Online] available: https://prg.kz/document/?doc_id=38038981&utm

[290] VMP Astana, "Fire Retardant Compositions Overview," 2025. [Online]. Available: https://vmp.kz/eng/products/ognezashchitnye-sostavy.

[291] SAFEMENT, "Heavy-Duty Fire Protection Systems," 2025. [Online]. Available: https://safement.kz/en/catalog/sistemy-pozharotusheniya-safement.

[292] Hilti, "Firestop Systems and Sealants in Kazakhstan," 2025. [Online]. Available: https://www.hilti.krd/product-catalog-category/firestop-fire-protection.

[293] Sika, "New Plant Opening in Ust-Kamenogorsk for Admixtures and Mortars," Apr 2025. [Online]. Available: https://www.sika.com/en/media/media-releases/2025/sika-opens-new-plant-in-kazakhstan.html?utm

[294] IndexBox, "Kazakhstan Construction Sealants – Market Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-construction-sealants-market-analysis-forecast-size-trends-and-insights.

[295] iTeh Standards, "EN 1279-1:2018 Glass in Building – Insulating Glass Units – Part 1: Generalities, System Description, Rules for Substitution, Tolerances and Visual Quality," 2023. [Online]. Available:https://standards.iteh.ai/catalog/search?term=EN%201279-1%3A2018

[296] Intertek Group Plc. , EN 1279-5: Glass in building - Insulating glass units - Part 5: Product standard. Certified CE Marking. [Online] Available: https://www.intertek.com/building/standards/en-1279-5/?utm

[297] IndexBox, “Kazakhstan Insulating Glass Units – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-insulating-glass-units-market-analysis-forecast-size-trends-and-insights.

[298] Modern Glass, “Insulated Glass Units Production Overview,” 2025. [Online]. Available: https://modernglassltd.com/

[299] Trend.az, “Kazakhstan Reveals Volume of Float Glass Production in 5M2025,” 28 Jun 2025. [Online]. Available: https://www.trend.az/business/economy/4063607.html.

[300] 6Wresearch, “Kazakhstan Glass Manufacturing Market (2025-2031) | Forecast & Analysis,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-glass-manufacturing-market-outlook.

[301] Kazakhstan Laws, “ST RK 950-92: Windows and Balcony Doors of Wood – General Specifications,” 2023. [Online]. Available: https://www.kazakhstanlaws.com/search.aspx?searchterm=ST%20RK%20950-92&showPics=1

[302] Made-in-China, “Kazakhstan ST RK Steel Door Specifications,” 2025. [Online]. Available: https://yinuodoor.en.made-in-china.com/product/hmBRHVFdLOYg/China-Kazakhstan-St-Rk-Steel-Door-0-8mm-Zinc-Plated-Frame-Traditional-Tumar-Motifs.html.

[303] Iteca, “Building Materials, Structures & Elements Exhibitors,” Astana Build 2023. [Online]. Available: https://reg.iteca.kz/list/exponent/en/auth.aspx?ExhCode=Astana+Build+2023.

[304] The Times of Central Asia, “Kazakhstan to Launch New AQMOLA Industrial Zone to Attract Foreign and Domestic Investment,” 23 Jun 2025. [Online]. Available: https://timesca.com/kazakhstan-to-launch-new-aqmola-industrial-zone-to-attract-foreign-and-domestic-investment.

[305] Caspianpost.com, “Kazakhstan Industrial Zone Aims to Secure $2.4 Billion in Investments,” 2025. [Online]. Available: https://caspianpost.com/kazakhstan/kazakhstan-industrial-zone-aims-to-secure-2-4-billion-in-investments.

[306] 6Wresearch, “Kazakhstan Windows Market (2025-2031) | Trends, Outlook & Forecast,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-windows-market-2020-2026.

[307] Cemnet, “Kazakhstan Cement Output Hits Record on Standards Overhaul,” Jan 2026. [Online]. Available: https://www.cemnet.com/News/story/180611/kazakhstan-cement-output-hits-record-on-standards-overhaul.html.

[308] IndexBox, “Floor Screeds Market in Central Asia – Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/central-asia-floor-screeds-market-analysis-forecast-size-trends-and-insights.

[309] PR Newswire, “International Cement Group Becomes Largest Dry Cement Producer in Kazakhstan with New Plant,” Nov 2024. [Online]. Available: https://www.prnewswire.com/apac/news-releases/international-cement-group-becomes-largest-dry-cement-producer-in-kazakhstan-with-new-plant-302306946.html.

[310] Sika, “Sika Opens a New Plant for Concrete Admixtures and Mortars in Kazakhstan,” Aug 2025. [Online]. Available: https://www.sika.com/en/media/media-releases/2025/sika-opens-new-plant-in-kazakhstan.html.

[311] JP-KZ, “Construction Materials Market Industry Teaser,” 2023 (updated 2025). [Online]. Available: https://jp-kz.org/wp/wp-content/uploads/ENG_23_%D0%9E%D0%A2_ConstructionMaterials.pdf.

[312] iTeh Standards, “EN 12825:2001 Raised Access Floors,” 2001. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/8eddd853-9f1e-48dc-8891-4f15d26f261d/en-12825-2001.

[313] Trade intelligence platform, Import/export data for construction materials. [Online]. Available: https://www.eximpedia.app/search/hs-code-6809190000-of-raised-floor-global-trade/import-shipments/country-kazakhstan

[314] Expowindow, Esite 10032 66 innovative raised floors [Online]. Available: https://expowindow.net/esite_10032_66

[315] Kährs Group, Kazakhstan. Floors system [Online]. Available: https://www.kahrs.com/en/micro-sites/kazakhstan

[316] Anixter, 363754. Raised Floor Air Sealing Grommet [Online]. Available: https://www.anixter.com/en_kz/products/RFG5DY/PANDUIT/Other-Rack-and-Cabinet-Accessories/p/363754

[317] KarZah Kazakhstan, Raised Floors Scaffolding and Temporary Works — Product and technical information. [Online]. Available: https://www.karzah.com/category/raised-flooring

[318] RST-Energo (Kazakhstan), Floors. [Online]. Available: https://en.rst-energo.com/product/floors

[319] Lindner Group, “JTI Kazakhstan LLC Project Details,” 2025. [Online]. Available: https://www.lindner-group.com/en/references/jti-kazakhstan-llc.

[320] Bureau of National Statistics, “Main Indicators of Industry Performance (January-August 2025),” 2025. [Online]. Available: https://stat.gov.kz/en/industries/business-statistics/stat-industrial-production/publications/413408.

[321] iTeh Standards, “EN 13964:2014 Suspended Ceilings – Requirements and Test Methods,” 2014. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/42c84044-5b69-4ddb-a6cd-2ba70c08f5d9/en-13964-2014?utm

[322] IndexBox, “Kazakhstan Acoustic Ceiling Panels – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-acoustic-ceiling-panels-market-analysis-forecast-size-trends-and-insights.

[323] IndexBox, “Kazakhstan Acoustic Boards – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-acoustic-boards-market-analysis-forecast-size-trends-and-insights.

[324] KazBuild, “ACOUSTICAL CEILING AND WALL PANELS, OVERHEAD SYSTEMS, ACOUSTICAL ISLANDS,” Aug 26, 2025. [Online]. Available: https://kazbuild.kz/en/press-center/news/news-blog/2396-acoustical-ceiling-and-wall-panels-overhead-systems-acoustical-islands.

[325] Lindner Group, “JTI Kazakhstan LLC Project Details,” 2025. [Online]. Available: https://www.lindner-group.com/en/products/ceilings/additional-equipment/acoustic-inlays

[326] IndexBox, “Suspended Ceiling Systems Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-suspended-ceiling-systems-market-analysis-forecast-size-trends-and-insights/?utm

[327] Iteca, “Building Materials, Structures & Elements Exhibitors,” Astana Build 2023. [Online]. Available: https://reg.iteca.kz/list/exponent/en/auth.aspx?ExhCode=Astana+Build+2023.

[328] Kazakhstan Laws, “ST RK ISO 4017-2012: Hexagon Head Screws – Product Grades A and B,” 2023. [Online]. Available: https://www.kazakhstanlaws.com/search.aspx?searchterm=ST%20RK%20ISO%204017-2012:%20Hexagon%20Head%20Screws&showPics=1

[329] Kazakhstan Laws, “ST RK ISO 4759-1-2010: Fasteners – Tolerances – Part 1: Bolts, Screws, Pins and Nuts – Product Grades A, B and C,” 2023. [Online]. Available: https://www.kazakhstanlaws.com/search.aspx?searchterm=ST%20RK%20ISO%204759-1-2010:%20Fasteners%20%E2%80%93%20Tolerances%20%E2%80%93%20Part%201:%20Bolts,%20Screws,%20Pins%20and%20Nuts%20%E2%80%93%20Product%20Grades%20A,%20B%20and%20C&showPics=1

[330] QazMade, “Essentials – Fasteners Group LLP Overview,” 2025. [Online]. Available:https://qazmade.kz/supplier/fasteners-group

[331] Rebolt Alloys, “Fasteners Manufacturer Supplier in Kazakhstan,” 2025. [Online]. Available: https://reboltalloys.com/contact.html

[332] Xinhua, “Kazakhstan’s Manufacturing Sector Grows 6.4 Pct in 2025,” Feb 3, 2026. [Online]. Available: https://english.news.cn/20260203/c3d3ba6479f7461ab20ef59473951ca2/c.html.

[333] IndexBox, “Fasteners for Construction Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights,” Feb 4, 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-fasteners-for-construction-market-analysis-forecast-size-trends-and-insights.

[334] iTeh Standards, “EN 934-2:2009 Admixtures for Concrete, Mortar and Grout – Part 2: Concrete Admixtures – Definitions, Requirements, Conformity, Marking and Labelling,” 2009. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/16790a91-c169-477d-beec-09ff83c9a0a4/en-934-2-2009?utm

[335] Invest In Kazakhstan, “BASF Success Story,” 2025. [Online]. Available: https://invest.gov.kz/about-kazakhstan/success-story/1079/

[336] Sika, “Sika Opens a New Plant for Concrete Admixtures and Mortars in Kazakhstan,” Apr 8, 2025. [Online]. Available: https://www.sika.com/en/media/media-releases/2025/sika-opens-new-plant-in-kazakhstan.html.

[337] BASF, “BASF Mining Solutions Opens New State-of-the-Art R&D and Technical Service Laboratory in Almaty,” Aug 28, 2025. [Online]. Available:https://www.basf.com/global/en/media/news-releases/2019/09/p-19-317 and https://products.basf.com/global/en/ed/30402874 and https://products.basf.com/global/en/ed/30849626 and https://products.basf.com/global/en/ed/30345989

[338] Global Cement, “Kazakhstan Reaches Record High Cement Production in First 11 Months of 2025,” Jan 14, 2026. [Online]. Available: https://www.globalcement.com/news/20294-kazakhstan-reaches-record-high-cement-production-in-first-11-months-of-2025.

[339] IndexBox, “Kazakhstan Concrete Admixtures – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-concrete-admixtures-market-analysis-forecast-size-trends-and-insights/.

[340] Kazakhstan Laws, “ST RK 3444-2019: Roofing and Waterproofing Roll Material Specifications,” 2023. [Online]. Available: http://www.kazakhstanlaws.com/p-426480-st-rk-3444-2019.aspx.

[341] Matizol, “About Us,” 2025. [Online]. Available: https://matizol.com/en/about-us.

[342] GIDROKOR, “About Company,” 2025. [Online]. Available: https://gidrokor.kz/en/O_kompanii/about.

[343] KazPolimer, “Modern Geosynthetics,” 2025. [Online]. Available: https://kazpolimer.kz/en.

[344] Corrocoat Caspian, “About Us,” 2025. [Online]. Available: https://corrocoat.kz/en/about-us.

[345] Xinhua, “Kazakhstan’s Manufacturing Sector Grows 6.4 Pct in 2025,” Feb 3, 2026. [Online]. Available: https://english.news.cn/asiapacific/20260203/434d210e0bff4b8ab9536cd17ec03d54/c.html.

[346] IndexBox, “Kazakhstan Waterproofing Membranes – Market Analysis, Forecast, Size, Trends and Insights,” Feb 4, 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-waterproofing-membranes-market-analysis-forecast-size-trends-and-insights.

[347] ITEH Standards, SIST EN 1886:2025(Main) Ventilation for buildings - Air handling units - Mechanical performance and CEN EN 13053:2019(Main) Ventilation for buildings - Air handling units - Rating and performance for units, components and sections. [Online]. Available: 1. https://standards.iteh.ai/catalog/standards/sist/e8e31ccf-5b48-4b12-b93e-cd7561216aae/sist-en-1886-2025 and 2. https://standards.iteh.ai/catalog/standards/sist/e8e31ccf-5b48-4b12-b93e-cd7561216aae/sist-en-1886-2025

[348] Aquatherm Almaty, “SUNDUE: Heat Pumps and Air Handling Units,” Aug 25, 2025. [Online]. Available: https://aquatherm-almaty.kz/en/press-centre/news/news-blog/1576-sundue-heat-pumps-and-air-handling-units.

[349] Trane, “Food & Beverage - Trane Kazakhstan,” 2025. [Online]. Available: https://trane.eu/kz/industry-solutions/7-food-beverage.html.

[350] MarketsandMarkets, “HVAC System Market Size, Share, Industry, Growth Trends, 2030,” 2025. [Online]. Available: https://www.marketsandmarkets.com/Market-Reports/hvac-system-market-202111288.html?utm

[351] 6Wresearch, “Kazakhstan Air Conditioner Market | Share & Forecast 2032,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-air-conditioner-market-2020-2026.

[352] Kazakhstan Laws, “ST RK 3056-2017: Lighting Fixtures with LED Sources – Luminaires Type FL, SL, GL, UWL, PL,” 2023. [Online]. Available: http://www.kazakhstanlaws.com/p-425706-st-rk-3056-2017.aspx.

[353] Association of Kazakhstan Machinery Industry, “The 40th Meeting with Regional Representatives Was Held at the Association of Kazakhstan Machinery Industry,” Oct 23, 2025. [Online]. Available: https://smkz.kz/EN/statya/40th-meeting-regional-representatives-was-held-association-kazakhstan-machinery-industry?utm.

[354] The Astana Times, “First Full-Cycle LED Device Production Plant Opens in Kazakhstan,” May 20, 2013. [Online]. Available: https://astanatimes.com/2013/05/first-full-cycle-led-device-production-plant-opens-in-kazakhstan.

[355] IndexBox, “LED Lighting Products Market in Kazakhstan – Report – Prices, Size, Forecast, and Companies,” Feb 4, 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-led-lighting-products-market-analysis-forecast-size-trends-and-insights/?utm

[356] 6Wresearch, “Kazakhstan LED Lighting Market (2025-2031) | Trends & Companies,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-led-lighting-market.

[357] IEA, “Market Design – Kazakhstan Energy Profile – Analysis,” 2025. [Online]. Available: https://www.iea.org/reports/kazakhstan-energy-profile?utm

[358] iTeh Standards, “EN 50525-1:2011 Electric Cables – Low Voltage Energy Cables of Rated Voltages Up to and Including 450/750 V,” 2023. [Online]. Available: https://standards.iteh.ai/catalog/standards/clc/cbc6583e-7e0c-4b61-bd63-5d2c95bede7f/en-50525-1-2011-a1-2022

[359] TUV Rheinland, Eurasian Economic Union (EAEU) - Technical Regulation TR CU 004/2011 Safety of Low-Voltage Equipment. [Online]. Available: https://www.tuv.com/market-access-services/en/certification-filter/customs-union-tr-cu-004-2011-%E2%80%98safety-of-low-voltage-equipment%E2%80%99.html

[360] QazIndustry, “Cable and Wire Industry Review,” 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/3184-za-sem-let-obem-proizvodstva-kabelno-provodnikovoy-produktsii-uvelichilsya-v-tri-raza.

[361] IndexBox, “Electrical Cables Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights,” February 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-electrical-cables-market-analysis-forecast-size-trends-and-insights/

[362] 6Wresearch, “Kazakhstan Insulated Wires and Cables Market Outlook 2024–2030,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-insulated-wire-and-cable-market-outlook.

[363] QazTrade, “Kazakh Products Enter a $125 Million Market: Cables Are Just the Beginning,” 10 June 2025. [Online]. Available: https://qaztrade.org.kz/eng/kazakh-products-enter-a-125-million-market-cables-are-just-the-beginning/.

[364] PRG Kazakhstan, GOST 30493-2017 (updated to GOST 30493-2025): Sanitary ceramic wares. Classification and basic dimensions. [Online]. Available: https://prg.kz/document/?doc_id=38218209

[365] iTeh Standards, “EN 997:2018 WC Pans and WC Suites with Integral Trap,” 2023. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/8ce0c2b2-cad8-473d-971e-8d8ed52d8ac5/en-997-2018.

[366] IndexBox, “Kazakhstan Plumbing Fixtures – Market Analysis, Forecast, Size, Trends and Insights,” February 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-plumbing-fixtures-market-analysis-forecast-size-trends-and-insights/.

[367] 6Wresearch, “Kazakhstan Sanitary Ware Market Outlook 2025–2031,” 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-sanitary-ware-market-2020-2026.

[368] Roca Group, “Roca Group to Build a New Production Plant in Kazakhstan,” 12 June 2025. [Online]. Available: https://www.roca.com/news/roca-group-to-build-a-production-plant-in-kazakhstan.

[369] Caspian Post, “Kazakhstan to Build Modern Sanitary Ware Plant in Kyzylorda,” 16 December 2025. [Online]. Available: https://caspianpost.com/kazakhstan/kazakhstan-to-build-modern-sanitary-ware-plant-in-kyzylorda.

[370] ISO Organization, “ISO 9906:2012 Rotodynamic Pumps – Hydraulic Performance Acceptance Tests,” 2023. [Online]. Available: https://www.iso.org/standard/41202.html

[371] PRG Kazakhstan, TR CU 010/2011 “On the safety of machinery and equipment”. [Online]. Available: https://prg.kz/document/?doc_id=31076540&utm

[372] Caspian Post, “East Kazakhstan Valve Plant to Supply Equipment for CPC-K,” 10 Dec 2025. [Online]. Available: https://caspianpost.com/kazakhstan/east-kazakhstan-valve-plant-to-supply-equipment-for-cpc-k.

[373] Acton Flow, “Company Profile – Pipeline Valves Manufacturer,” 2025. [Online]. Available: https://actonflow.kz/en.

[374] KSB Kazakhstan, “Pumps and Valves for Kazakhstan Industry,” 2025. [Online]. Available: https://www.ksb.com/en-kz.

[375] PetrolValves, “Partnership and Local Production in Kazakhstan,” 2025. [Online]. Available: https://www.petrolvalves.com/partnership/.

[376] Prime Minister of Kazakhstan, “Production of Pumps, Compressors and Hydraulic Equipment,” 29 Oct 2024 (2025 update). [Online]. Available: https://primeminister.kz/en/news/according-to-9-months-of-2024-in-kazakhstan-produced-more-than-5-thousand-tractors-and-combines-29244.

[377] PRG Kazakhstan, ST RK IES 61215-1-2020: Ground-mounted photovoltaic modules:Terrestrial photovoltaic (PV) modules - Design qualification and type approval 2023. [Online]. Available: https://prg.kz/Document/?doc_id=35356788

[378] PRG Kazakhstan, “ST RK IEC 61730-1-2020: Safety assessment of photovoltaic modules Part 1: Design requirements”. [Online]. Available: https://prg.kz/document/?doc_id=34161470

[379] Astana Times, “Kazakhstan Expands Renewable Energy Capacity as Clean Generation Reaches 7 % in 2025,” 8 Jan 2026. [Online]. Available: https://astanatimes.com/2026/01/kazakhstan-expands-renewable-energy-capacity-as-clean-generation-reaches-7-in-2025/.

[380] IndexBox, “Kazakhstan Solar Mounting Structures – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-solar-mounting-structures-market-analysis-forecast-size-trends-and-insights/.

[381] QazaqGreen, “Kazakhstan’s Renewable Energy Share Reaches 7 % in National Energy Mix,” 8 Jan 2026. [Online]. Available: https://qazaqgreen.com/en/news/kazakhstan/3071/.

[382] Renewable Market Watch, “Kazakhstan Solar Photovoltaic (PV) Power Market Outlook 2025÷2034,” 2025. [Online]. Available: https://renewablemarketwatch.com/country-reports/cis/kazakhstan/kazakhstan-solar-photovltaic-pv-power-market-outlook-2025%C3%B72034/.

[383] PRG Kazakshtan, GOST IEC 62040-1-2018 “Uninterruptible power supply systems (UPS). Part 1. General provisions and safety requirements for UPS” (with amendment). [Online]. Available: https://prg.kz/document/?doc_id=36096388

[384] ESS News, “Envision Energy Breaks Ground on Factory in Kazakhstan,” 20 Jan 2025. [Online]. Available: https://www.ess-news.com/2025/01/20/envision-energy-breaks-ground-on-factory-in-kazakhstan/.

[385] Clearbrook Global, “Kazakhstan, Clearbrook Energy Solutions, and AG-Tech Sign Agreement to Establish Battery Energy Storage Systems Plant,” 12 Nov 2025. [Online]. Available: https://www.clearbrookglobal.com/kazakhstan-clearbrook-energy-solutions-and-ag-tech-sign-agreement-to-establish-battery-energy-storage-systems-plant/.

[386] Energy-Storage.News, “Masdar, Kazakhstan Sovereign Wealth Fund Collaborate on Baseload Renewables and Battery Storage,” 15 May 2025. [Online]. Available: https://www.energy-storage.news/masdar-kazakhstan-sovereign-wealth-fund-collaborate-on-baseload-renewables-and-battery-storage/.

[387] QazaqGreen, “Development of Battery Energy Storage System (BESS): International Experience,” 14 Sep 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/international-experience/2999/.

[388] Mordor Intelligence, “Kazakhstan Renewable Energy Market Size & Share 2031,” Jan 2026. [Online]. Available: https://www.mordorintelligence.com/industry-reports/kazakhstan-renewable-energy-market.

[389] QazaqGreen, ““Green” construction in Kazakhstan: a step towards a sustainable future and achieving the SDGs,” 2025. [Online]. Available: https://qazaqgreen.com/en/journal-qazaqgreen/industry-news/2492/.

[390] KazGBC, “OMIR Green Building Standard – Technical Guidelines,” 2025. [Online]. Available: https://kazgbc.kz/sertifikatsiya-omir/.

[391] Global Green Growth Institute, “Advancing Energy-Efficient and Inclusive Infrastructure in Kazakhstan,” June 2025, pp. 30–34. [Online]. Available: https://gggi.org/wp-content/uploads/2025/06/scoping_study_report05.19.25.pdf.

[392] Astana Times, “Kazakhstan Unveils Plan for 100 Energy-Independent Eco-Villages,” 14 May 2025. [Online]. Available: https://astanatimes.com/2025/05/kazakhstan-unveils-plan-for-100-energy-independent-eco-villages-with-major-chinese-investment/.

[393] Durdyev, Serdar & Koc, Kerim & Karaca, Ferhat & Gurgun, Asli. (2022). Strategies for implementation of green roofs in developing countries. Engineering Construction & Architectural Management. 30. 10.1108/ECAM-12-2021-1147. [Online]. Available: https://www.researchgate.net/publication/359593138_Strategies_for_implementation_of_green_roofs_in_developing_countries.

[394] Adilet.zan.kz, “ST RK EN 1338-2011: Concrete Paving Blocks – Requirements and Test Methods,” 2023. [Online]. Available: https://adilet.zan.kz/rus/docs/V2300032783.

[395] iTeh Standards, “EN 13242:2013 Aggregates for Unbound and Hydraulically Bound Materials for Use in Civil Engineering Work and Road Construction,” 2023. [Online]. Available:https://standards.iteh.ai/catalog/standards/cen/3b90c3e5-6f23-41e2-a108-43746b2bbb3b/en-13242-2013.

[396] QazIndustry, “Production of Non-Metallic Building Materials, January–September 2025,” 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/1974-obem-proizvodstva-stroymaterialov-v-kazakhstane-vyros-na-387-za-devyat-mesyatsev.

[397] Astana Times, “New Concrete Paving Plant Opens in Atyrau Region,” 18 Nov 2025. [Online]. Available:https://astanatimes.com/?s=New+Concrete+Paving+Plant+Opens+in+Atyrau+Region%2C%E2%80%9D+18+Nov+2025

[398] Ministry of Ecology and Natural Resources, “Guidelines for Use of Recycled Materials in Landscaping,” 2025. [Online]. Available:https://www.gov.kz/memleket/entities/ecology/documents/details/2025.

[399] Assessment of the degree of landscaping in Astana, Kazakhstan and recommendations for its development, research article. https://journals.guilan.ac.ir/article_6937_cbd78b5c5edf42e03651dc0055f394e5.pdf

[400] GreenFuture Kazakhstan, Sustainable Construction Products and Green Building Solutions. [Online]. Available: http://greenfuture.kz/en/blog/use-of-natural-materials-in-kazakhstan-landscape-design

[401] RussianGost, "GOST 32495-2013: Aggregates, Fines and Mixtures Made from Recycled Reinforced and Non-Reinforced Concrete. Specifications," 2013 (reaffirmed 2023). [Online]. Available: https://www.mystandards.biz/standard/gost-32495-2013-1.1.2015.htm

[402] Karaca, F., & Tleuken, A. (2024). Reforming Construction Waste Management for Circular Economy in Kazakhstan: A Cost–Benefit Analysis of Upgrading Construction and Demolition Waste Recycling Centres. Recycling, 9(1), 2. https://doi.org/10.3390/recycling9010002

[403] Times of Central Asia, "What's Really Happening With Waste Processing in Kazakhstan," 31 Dec 2025. [Online]. Available: https://timesca.com/whats-really-happening-with-waste-processing-in-kazakhstan/.

[404] Qazinform, "Kazakhstan Adopts 2026-2030 Waste Management Concept," 14 Jan 2026. [Online]. Available: https://qazinform.com/news/kazakhstan-adopts-2026-2030-waste-management-concept-9e0dce.

[405] World Bank Blogs, "Turning Construction Waste Into Opportunities in Kazakhstan," 5 Mar 2025. [Online]. Available: https://blogs.worldbank.org/en/sustainablecities/turning-construction-waste-into-opportunity-in-kazakhstan.

[406] IndexBox, "Recycled Aggregates Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-recycled-aggregates-market-analysis-forecast-size-trends-and-insights/.

[407] PRG, Kazakhstan, "ST RK EN 13706-1-2014: Reinforced Plastics Composites – Specifications for Pultruded Profiles – Part 1: General Requirements and Test Methods," 2023. [Online]. Available: https://prg.kz/Document/?doc_id=38407184

[408] iTeh Standards, "EN 13706-3:2003 Pultruded Profiles – Part 3: Specific Requirements," 2023. [Online]. Available: https://cdn.standards.iteh.ai/samples/12293/07b6a99cb2a246cfb4d69288d6c2cc83/SIST-EN-13706-3-2003.pdf

[409] QazIndustry, "Development of Composite Materials in the Manufacturing Sector of Kazakhstan," 2025. [Online]. Available: https://qazindustry.gov.kz/en/article/1974-obem-proizvodstva-stroymaterialov-v-kazakhstane-vyros-na-387-za-devyat-mesyatsev (section on advanced materials).

[410] Caspian Post, Kazakhstan Greenlights 2025-2040 Oil Processing Strategy, 2025. [Online]. Available: https://caspianpost.com/kazakhstan/kazakhstan-greenlights-2025-2040-oil-processing-strategy

[411] Meiirbekov, Arshyn & Amantayeva, Akniyet & Tokbolat, Serik & Suleimen, Aidar & Sarfraz, Shoaib & Shehab, Essam. (2021). Carbon Fiber Composites Application and Recycling in Kazakhstan and Neighboring Countries. 10.3233/ATDE210122

[412] Meiirbekov, A, Amantayeva, A, Tokbolat, S, Suleimen, A, Sarfraz, S & Shehab, E 2021, Carbon Fiber Composites Application and Recycling in Kazakhstan and Neighboring Countries. in L Newnes, S Lattanzio, BR Moser, J Stjepandić & N Wognum (eds), Transdisciplinary Engineering for Resilience: Responding to System Disruptions: Proceedings of the 28th ISTE International Conference on Transdisciplinary Engineering, July 5 July 9, 2021. Advances in Transdisciplinary Engineering, vol. 16, IOS Press, pp. 425-434, 28th ISTE International Conference on Transdisciplinary Engineering, Bath, United Kingdom, 5/07/21. https://doi.org/10.3233/atde210122

[413] Kazakhstan Laws, (ST RK 2372-2013 and CT PK 2372-2013): Geotextiles. Nonwoven geotextile cloth. Specification. [Online]. Available: https://www.kazakhstanlaws.com/p-23614-st-rk-2372-2013.aspx

[414] Kazakhstan Laws, (ST RK 2790-2015 and CT PK 2790-2015): Geosynthetic materials. Geomembranes waterproof polyethylene roll. Technical conditions. [Online]. Available: https://www.kazakhstanlaws.com/p-262546-st-rk-2790-2015.aspx

[415] GeoSM Kazakhstan, "Production Capacities and Product Range," 2025. [Online]. Available: https://geo-sm.kz/en/production/.

[416] Ecogeox geosynthetics, Geosynthetics Solutions Transforming Infrastructure in Kazakhstan, 2025. [Online]. Available: https://www.ecogeox.com/news/geosynthetics-solutions-transforming-infrastructure-in-kazakhstan.html

[417] Research article on A Review Study on The Use of Geosynthetics in Road Constructions, 2023. [Online]. Available: https://www.researchgate.net/publication/396052553_A_Review_Study_on_The_Use_of_Geosynthetics_in_Road_Constructions

[418] Geofantex (geosynthetics), How Geosynthetics Improve Road Durability and Reduce Maintenance Costs, 2024. [Online]. Available: https://geofantex.com/geosynthetics-improve-road-durability-reduce-maintenance.htm

[419] Geosynthetics Magazine / Geo-Asia Conference, Technical article on geosynthetics applications. [Online]. Available: https://geoasia8.org/Microsite/pdf/abstract_253.pdf. Research article on Kazakhstan's experience in the use of geosynthetic materials in road construction

[420] KAZGEOBEL geosynthetic material supply company. Link: https://kazgeo.com/en/about/

[421] CEN European Committee for Standardiation, (EN 12904-Silica Sand and Silica Gravel, EN 12909 -Anthracite, EN 12915-1 -Granular Activated Carbon), Granular Filtration Material, General Technical Considerations. [Online]. Available: https://www.evs.ee/et/evs-en-12904-2005

[422] ITEH Standards, (CEN EN ISO 5667-1:2023)-Water quality - Sampling - Part 1: Guidance on the design of sampling programs and sampling techniques. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/24ebe7ed-5981-4f93-a522-63ec3a4a9c8b/en-iso-5667-1-2023

[423] GlobeNewswire, "SandCo Sets New Quartz Sand Production Record with 15 000 Tons in 2024," 5 Jun 2025. [Online]. Available: https://www.globenewswire.com/news-release/2025/06/05/3094117/0/en/SandCo-Sets-New-Quartz-Sand-Production-Record-with-15-000-Tons-in-2024-Eyes-Further-Expansion-into-China-Market-and-Critical-Minerals.html.

[424] IndexBox, "Filtration Media Market in Kazakhstan – Analysis, Forecast, Size, Trends and Insights," February 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-filtration-media-market-analysis-forecast-size-trends-and-insights/.

[425] QazIndustry, "KZ takes Lead in the Production of Industrial Materials- 2025," [Online]. Available:https://kz.kursiv.media/en/2025-04-18/engk-tank-kazakhstan-takes-the-lead-in-industrial-production-in-central-asia/

[426] Prime Minister's Office, "98 Projects Worth 173.7 Billion Tenge Planned for Water Sector in 2025," 4 Mar 2025. [Online]. Available: https://primeminister.kz/en/news/in-2025-98-projects-worth-1737-billion-tenge-planned-to-be-implemented-in-water-sector-29767.

[427] Astana Times, "Kazakhstan Completes Nationwide Access to Drinking Water by End of 2025," 13 Jan 2026. [Online]. Available: https://astanatimes.com/2026/01/kazakhstan-completes-nationwide-access-to-drinking-water-by-end-of-2025/.

[428] Kazakhstan Laws, (ST RK EN 13501-1-2016 and CT PK EN 13501-1-2016): Classification of fire resistance building products using test results. [Online]. Available: https://www.kazakhstanlaws.com/p-262932-st-rk-en-13501-1-2016.aspx

[429] PRG. Kazakhstan, (ST RK EN 13501-1-2016), Classification of building materials and products according to fire hazard. [Online]. Available: https://prg.kz/document/?doc_id=33698755

[430] IndexBox, "Kazakhstan Fire-Resistant Boards – Market Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-fire-resistant-boards-market-analysis-forecast-size-trends-and-insights/.

[431] Japan-Kazakhstan Investment for Environment Improvement Network and many other initiatives. Link: https://jp-kz.org/news/

[432] S&S Insider Strategy and Stats, Report on Fire-resistant Coatings Market Size, Share & Segmentation By Type (Intumescent, Cementitious), By Technology, By Resin Type, By End Use Industry, By Regions and Global Forecast 2024-2032. [Online]. Available: https://www.snsinsider.com/reports/fire-resistant-coatings-market-1700

[433] Indexbox reports on Central Asia Fire-Resistant Coatings - Market Analysis, Forecast, Size, Trends and Insights, 2026. [Online]. Available: https://www.indexbox.io/store/central-asia-fire-resistant-coatings-market-analysis-forecast-size-trends-and-insights/

[434] IndexBox, "Central Asia Fire Sprinkler Systems – Market Analysis, Forecast, Size, Trends and Insights," Feb 2026. [Online]. Available: https://www.indexbox.io/store/central-asia-fire-sprinkler-systems-market-analysis-forecast-size-trends-and-insights.

[435] Prime Minister's Office, Investments in the Country's Industrial Framework to Reach $400 Billion by 2029. 2026. [Online]. Available: https://primeminister.kz/en/news/investments-in-the-countrys-industrial-framework-to-reach-400-billion-by-2029-31086

[436] 6Wresearch, "Kazakhstan Fire Protection System Market Outlook (2022-2031)," 2025. [Online]. Available: https://www.6wresearch.com/industry-report/kazakhstan-fire-protection-system-market-outlook.

[437] EN 12812-2008- Performance Requirements for False work Design. [Online]. Available: https://www.studocu.com/row/document/university-of-dubai/civil/en-12812-2008-civil-engineering/99158543

[438] standards.iteh.ai/catalog/standards, “CEN EN 12813:2004: Temporary Works Equipment – Load Bearing Towers of Prefabricated Components – Particular Methods of Structural Design”. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/2e4e24f8-5825-4791-88cd-743abacfbd70/en-12813-2004?srsltid=AfmBOopql3tLJUMshn0ZgZr3D-jSl4a7uArfOg4Irq-AXab_qFuxHZhR

[439] IndexBox, “Kazakhstan Formwork Systems – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-formwork-systems-market-analysis-forecast-size-trends-and-insights.

[440] IndexBox, “Kazakhstan Shuttering Panels – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-shuttering-panels-market-analysis-forecast-size-trends-and-insights.

[441] Denholm Zholdas, “Scaffolding & Access Services in Kazakhstan,” 2025. [Online]. Available: https://denholmzholdas.kz/services/scaffolding-access/index.html.

[442] ULMA Construction, “Kazakhstan Construction Equipment Company,” 2025. [Online]. Available: https://www.ulmaconstruction.com/en/ulma/locations/asia-oceania/kazakhstan.

[443] Business Wire, “Kazakhstan Construction Industry Report 2025: Output to Grow by 6.8% This Year,” Jun 2025. [Online]. Available: https://www.businesswire.com/news/home/20250620963244/en/Kazakhstan-Construction-Industry-Report-2025-Output-to-Grow-by-6.8-This-Year-Supported-by-Investments-in-the-Transport-Infrastructure-and-Manufacturing-Projects---Forecast-to-2029---ResearchAndMarkets.com.

[444] IndexBox, “Kazakhstan Formwork Systems – Market Analysis, Forecast, Size, Trends and Insights,” Feb 2026. [Online]. Available: https://www.indexbox.io/store/kazakhstan-formwork-systems-market-analysis-forecast-size-trends-and-insights.

[445] SYNAD (French Sealants Association), Adjuvant Beton. [Online]. Available: https://www.synad.fr/produits/adjuvant-beton

[446] SYNAD (French Sealants Association), Concrete Admixtures Plasticizers And Superplasticizers For C. [Online]. Available: https://www.synad.fr/fileadmin/user_upload/documentation/epd/Concrete_admixtures_Plasticizers_and_Superplasticizers_for_CO2_optimized_concrete__group_A__1_.pdf

[447] Deutsche Bauchemie e.V., 05 Concrete Admixtures. [Online]. Available: https://deutsche-bauchemie.com/green-deal/05-concrete-admixtures

[448] DAFA A/S (building materials), Epd Hub 2138 2024 11 11. [Online]. Available: https://dafa-build.com/media/ke1j30ac/epd_hub-2138_2024-11-11.pdf

[449] Sika AG, Flexible Bitumen Sheets Roof Waterproofing Epd. [Online]. Available: https://usa.sika.com/dam/dms/us01/j/flexible-bitumen-sheets-roof-waterproofing-epd.pdf

[450] Ecowise (Latvia), Epd Goldrx 035 040. [Online]. Available: https://ecowise.lv/wp-content/uploads/2023/08/epd-goldrx-035-040.pdf

[451] Galletti SpA, 1731418045 Pagesepd Vls254 8. [Online]. Available: https://www.galletti.com/media/u5eb-1v3z/1731418045-pagesepd_vls254_8.pdf

[452] European Union, European Union Legislative Act (2016R2281). EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/TodayOJ/index.html?uri=CELEX:32016R2281

[453] Signify (Philips Lighting), Epd Philips Metronomis Led Ref 910770230983 Recycled Alu. [Online]. Available: https://www.signify.com/api/assets/v1/file/Signify/content/EPD-Philips-Metronomis-LED-Ref-910770230983-RECYCLED-ALU/EPD_Philips_Metronomis_LED_Ref_910770230983_RECYCLED_ALU.pdf

[454] LEDVANCE GmbH, Asset 13208629 Epd En Linear Compact Batten. [Online]. Available: https://www.ledvance.com/00_Free_To_Use/asset-13208629_epd_en_linear_compact_batten.pdf

[455] Czech Building Products Register, Eu Gpp Criteria For Officebdcm. [Online]. Available: https://portal-vz.cz/wp-content/uploads/2019/06/EU-GPP-Criteria-for-OfficeBDCM.pdf

[456] European Committee for Standardization (CEN), EN 50525-1:2011 — EN 50525-1:2011. [Online]. Available: https://cdn.standards.iteh.ai/samples/16447/4f274658c1ba489cb6832285091e5bd3/SIST-EN-50525-1-2011.pdf

[457] Portuguese Environment Agency (APA), Gpp Technical Background Report Toilets Urinols. [Online]. Available: https://publications.jrc.ec.europa.eu/repository/handle/JRC85991

[458] Cdn, Grohe Position Paper Green Procurement 2018 02 28 En. [Online]. Available: https://cdn.cloud.grohe.com/Web/local_PDF/corporate/GROHE_Position_Paper_Green_Procurement_2018-02-28-EN/original/GROHE_Position_Paper_Green_Procurement_2018-02-28-EN.pdf

[459] European Commission, Energy-Efficient Products — Ecodesign and Energy Labelling Programme. [Online]. Available: https://energy-efficient-products.ec.europa.eu/product-list/water-pumps_en

[460] European Commission, DG Environment. [Online]. Available: https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/photovoltaic-panels-new-rules-assessment-carbon-footprint-2025-07-07_en

[461] Ember (energy think tank), Eu Electricity Trends. [Online]. Available: https://ember-energy.org/latest-insights/european-electricity-review-2024/eu-electricity-trends

[462] SolarPower Europe, Global Market Outlook for Solar Power, Industry Report. [Online]. Available: https://www.solarpowereurope.org/features/pv-sustainable-product-policies-a-quick-guide-on-eu-sustainability-instruments

[463] EPEAT, Electronic Product Environmental Assessment Tool — Registry and standards for sustainable products. [Online]. Available: https://www.epeat.net/product-finder?refinementList%5Bcategory%5D%5B0%5D=-Photovoltaic%20Modules%20and%20Inverters&refinementList%5Bversion%5D%5B0%5D=1&refinementList%5-Btier%5D%5B0%5D=Silver&refinementList%5Btier%5D%5B1%5D=Bronze

[464] Rinnovabili.net (Italian renewable energy news), Harmonised Rules For The Calculation Of The Carbon Footprint. [Online]. Available: https://www.rinnovabili.net/wp-content/uploads/2025/07/Harmonised-rules-for-the-calculation-of-the-carbon-footprint-of-photovoltaic-modules.pdf

[465] European Commission, DG Environment. [Online]. Available: https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/calculating-carbon-footprint-industrial-batteries-methodological-support-2025-05-28_en

[466] European Union, Official Journal of the European Union, EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/eli/reg/2023/1542/oj/eng

[467] Ember (energy think tank), European Electricity Review 2025. [Online]. Available: https://ember-energy.org/latest-insights/european-electricity-review-2025

[468] Ember (energy think tank), Eer 2025 22012025. [Online]. Available: https://ember-energy.org/app/uploads/2025/01/EER_2025_22012025.pdf

[469] Elizabeth Nicol, Kathryn Terzano,Modelling the optimal green roof type for carbon capture in an urbanised university campus, Urban Forestry & Urban Greening,Volume 112,2025,128946,ISSN 1618-8667, https://doi.org/10.1016/j.ufug.2025.128946. (https://www.sciencedirect.com/science/article/pii/S1618866725002808)

[470] Kristin L. Getter, D. Bradley Rowe, G. Philip Robertson, Bert M. Cregg, and Jeffrey A. Andresen, Carbon Sequestration Potential of Extensive Green Roofs, Environmental Science & Technology 2009 43 (19), 7564-7570 DOI: 10.1021/es901539x

[471] Nadeeshani, M., Ramachandra, T., Gunatilake, S., & Zainudeen, N. (2021). Carbon Footprint of Green Roofing: A Case Study from Sri Lankan Construction Industry. Sustainability, 13(12), 6745. https://doi.org/10.3390/su13126745

[472] Mohammad Reza Seyedabadi, Mohsen Karrabi, Jafar Nabati et al. Investigating green roofs' CO2 sequestration with cold- and drought-tolerant plants (A short- and long-term carbon footprint view), 09 July 2021, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-308004/v1]

[473] U.S. Environmental Protection Agency (EPA), Technical guidance / regulatory document. [Online]. Available: https://www.epa.gov/sites/default/files/2018-09/documents/greenroofs_casestudy_kansascity.pdf

[474] European Union, European Union Legislative Act (2021D0476). EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D0476

[475] European Union, European Union Legislative Act (2021D0476). EUR-Lex. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D0476

[476] Feralpi Group, Environmental Product Declaration (EPD) — Reinforcing Steel Bars, Italian steelmaker EPD. [Online]. Available: https://www.feralpigroup.com/sites/default/files/S-P-01699-EPD-Greenstone-recycled-construction-aggregate2_1.pdf

[477] F. Zhang, R. Yu, C. Bischeri, T. Liu, and M. Khoshbakht (eds.), Harmony in Architectural Science and Design: Sustaining the Future. Proceedings of the 57th International Conference of the Architectural Science Association 2024, pp. 534-541. ©2024, The Architectural Science Association and Griffith University, Australia. [Online]. Available: https://archscience.org/wp-content/uploads/2025/03/From-rooftops-to-ecosystems_Understanding-the-life-cycle-embodied-GHG-emissions-of-green-roofs-in-Melbourne.pdf

[478] Nadeeshani, M., Ramachandra, T., Gunatilake, S., & Zainudeen, N. (2021). Carbon Footprint of Green Roofing: A Case Study from Sri Lankan Construction Industry. Sustainability, 13(12), 6745. https://doi.org/10.3390/su13126745

[479] Construction Industry Development Board (CIDB) Malaysia, Technical standard / regulatory document. [Online]. Available: https://www.cidb.gov.my/wp-content/uploads/2022/11/V4_EMBODIED-CARBON-INVENTORY-TEMPLATE-final-1.pdf

[480] Dura Composites Ltd, Dura Composites Pultrusions Carbon Report. [Online]. Available: https://www.duracomposites.com/wp-content/uploads/Dura-Composites-Pultrusions-Carbon-Report.pdf

[481] European Pultrusion Technology Association (EPTA) Technical guidance on FRP pultruded profiles. [Online]. Available: https://pultruders.com/epta-industry-briefing/

[482] Dura Composites Ltd, Dura Composites Pultrusions Carbon Report. [Online]. Available: https://www.duracomposites.com/wp-content/uploads/Dura-Composites-Pultrusions-Carbon-Report.pdf

[483] Uddin, Ala & Ahamed, Faysal & Hota, Gangarao & Yoon, Yoojung. (2024). Life Cycle CO_2 Emissions Assessment for GFRP and Steel Structural Components and Systems. 10.13140/RG.2.2.27131.37921

[484] Glass Fibre Europe, Life cycle assessment of CFGF – Continuous Filament Glass Fibre Products, January 2023. [Online]. Available: https://glassfibreeurope.eu/wp-content/uploads/2023/02/GFE_LCA-report-2023-February-2023.pdf

[485] Meltex Oy, Epd Geotextiles For Filtration And Separation. [Online]. Available: https://www.meltex.fi/wp-content/uploads/2025/03/EPD_Geotextiles-for-filtration-and-separation.pdf

[486] BTT Umwelttechnik GmbH, Climate Declaration Btt Woven Geotextiles. [Online]. Available: https://btt-tech.eu/img/Downloads/Climate-Declaration-BTT-Woven-Geotextiles.pdf

[487] Geosynthetics Magazine / Geo-Asia Conference, Technical article on geosynthetics applications. [Online]. Available: https://geosyntheticsmagazine.com/2022/06/28/beaulieu-technical-textiles-goes-green-with-woven-sustainable-geotextiles/

[488] European Commission, EU Ecolabel — Product groups and criteria, DG Environment. [Online]. Available: https://environment.ec.europa.eu/topics/circular-economy-topics/eu-ecolabel/product-groups-and-criteria_en

[489] CENTEXBEL (Belgian Textile Research Centre) / BTTG, Technical testing report on geosynthetics/textiles. [Online]. Available: https://www.centexbel.be/sites/default/files/2025-04/european-international-geotextile-standards-shortguide2010.pdf

[490] CENTEXBEL (Belgian Textile Research Centre) / BTTG, Technical testing report on geosynthetics/textiles. [Online]. Available: https://www.bttg.co.uk/resources/news/changes-to-the-en-geotextile-standards/

[491] European Commission, EU Ecolabel — Product groups and criteria, DG Environment. [Online]. Available: https://environment.ec.europa.eu/topics/circular-economy-topics/eu-ecolabel/product-groups-and-criteria_en

[492] European Committee for Standardization (CEN), EN 12915-1:2009 — Chemical products used for treatment of swimming pool water — Sodium hypochlorite. [Online]. Available: https://standards.iteh.ai/catalog/standards/cen/ec6fa589-b01e-41cc-958d-a8ff4e9ef892/en-12915-1-2009

[493] Intertek Inform, EN 12902 — Products used for treatment of water intended for human consumption — Inorganic supporting and filtering materials. [Online]. Available: https://www.intertekinform.com/en-gb/standards/en-12902-2004-344207_saig_cen_cen_787727

[494] Korbinian Kaetzl, Marcel Riegel, Ben Joseph, Ronja Ossenbrink, Helmut Gerber, Willis Gwenzi, Tobias Morck, David Laner, Thomas Heinrich, Volker Kromrey, Kevin Friedrich, Michael Wachendorf, Kathrin Stenchly, Biogenic activated carbons from conservation grassland biomass for organic micropollutants removal in municipal wastewater, Environmental Science and Ecotechnology,Volume 26,2025,100588,ISSN 2666-4984, https://doi.org/10.1016/j.ese.2025.100588. (https://www.sciencedirect.com/science/article/pii/S2666498425000663)

[495] European Commission, DG Environment. [Online]. Available: https://bureau-industrial-transformation.jrc.ec.europa.eu/sites/default/files/2019-11/JRC113018_WT_Bref.pdf

[496] European Commission, EU Ecolabel — Product groups and criteria, DG Environment. [Online]. Available: https://environment.ec.europa.eu/topics/circular-economy-topics/eu-ecolabel/product-groups-and-criteria_en

[497] SustCert4Biobased, EU Ecolabel for Bio-based Products — Certification Framework, Technical Factsheet. [Online]. Available: https://sustcert4biobased.eu/wp-content/uploads/2024/06/EU-Ecolabel_factsheet.pdf

[498] Teknos, En13501 1 Learn More About The Eu Fire Safety Standards. [Online]. Available: https://www.teknos.com/industrial-coatings/blog/en13501-1-learn-more-about-the-eu-fire-safety-standards

[499] Measurlabs, En 13501 1 Fire Classification Performance Classes And Crite. [Online]. Available: https://measurlabs.com/blog/en-13501-1-fire-classification-performance-classes-and-criteria

[500] NSF International, EPD 10562 — Environmental Product Declaration. [Online]. Available: https://info.nsf.org/Certified/Sustain/ProdCert/EPD10562.pdf

[501] Transparency Catalog, Environmental Product Declaration (EPD) database for building materials. [Online]. Available: https://transparencycatalog.com/assets/uploads/files/Isolatek_LCA-report_CAFCO-300-400-FENDOLITE-BLAZE-SHIELD_Public-version.pdf

[502] BuildGP, Green building products and sustainable procurement database. [Online]. Available: https://www.buildgp.com/mv-proxy/bndDcUR3bG8tVTYyT2dENzZEeWdVUS8yT3FVWnZpa0VFZUdEQnhkRk1SR0dBL09yaWdpbmFsL1RvdWdoUm9jayUyMEZpcmVndWFyZCUyMFglMjBQYW5lbCUyMEVudmlyb25tZW50YWwlMjBQcm9kdWN0JTIwRGVjbGFyYXRpb24ucGRm

[503] The Concrete Centre (MPA), European Standards For Workmanship And Temporary W. [Online]. Available: https://www.concretecentre.com/Structural-design/Standards/European-standards-for-workmanship-and-temporary-w.aspx

[504] Bless and Den Services, Scaffolding Systems And Design Principles. [Online]. Available: https://www.blessanddenservices.com/scaffolding-systems-and-design-principles

[505] The Concrete Centre (MPA), European Standards For Workmanship And Temporary W. [Online]. Available: https://www.concretecentre.com/Structural-design/Standards/European-standards-for-workmanship-and-temporary-w.aspx

[506] EirGrid (Irish Transmission System Operator), Xds Gfs 13 001 R3 Civil And Building Works. [Online]. Available: https://cms.eirgrid.ie/sites/default/files/publications/XDS-GFS-13-001-R3-Civil-and-Building-Works.pdf

[507] UNE Standards, Structure codes, Annexes1 17. [Online]. Available: https://cdn.mitma.gob.es/portal-web-drupal/CPH/codigo_estructural/english/annexes1-17.pdf

[508] Kržan M, Pazlar T, Ber B. Composite Beams Made of Waste Wood-Particle Boards, Fastened to Solid Timber Frame by Dowel-Type Fasteners. Materials (Basel). 2023 Mar 18;16(6):2426. doi: 10.3390/ma16062426. PMID: 36984310; PMCID: PMC10057558

[509] José Luis Moro, Building-Construction Design - From Principle to Detail, Volume 1 – Fundamentals. Springer Vieweg Berlin, Heidelberg, 978-3-662-61742-7 Published: 19 February 2024. DOI: https://doi.org/10.1007/978-3-662-61742-7, https://dokumen.pub/building-construction-from-principle-to-detail-volume-1-fundamentals.html

[510] Bioba AB, Our New Eu Ecolabel Product For The Construction Industry 2. [Online]. Available: https://bioba.se/our-new-eu-ecolabel-product-for-the-construction-industry-2

[511] EU Ecolabel Germany (information portal), Products And Provider. [Online]. Available: https://eu-ecolabel.de/en/for-companies/products-and-provider?tx_euecolabelproducts_product%5Baction%5D=list&tx_euecolabelproducts_product%5Bcontroller%5D=Product&tx_euecolabelproducts_product%5BproductGroup%5D=22&cHash=2d25881d7ec1433e9db1bec76037fe37

[512] Nordic Swan Ecolabel (Svanemerket), Ecolabelling criteria and product certification. [Online]. Available: https://api.svanemaerket.dk/api/docs/CriteriaDocumentFiles/10772

[513] Ali Tighnavard Balasbaneh, Willy Sher, Mohd Haziman Wan Ibrahim, Life cycle assessment and economic analysis of Reusable formwork materials considering the circular economy, Ain Shams Engineering Journal, Volume 15, Issue 4, 2024, 102585, ISSN 2090-4479, https://doi.org/10.1016/j.asej.2023.102585. (https://www.sciencedirect.com/science/article/pii/S2090447923004744)

[514] Kılıç Bakırhan, Ebru & Tuna, Merve. (2023). Evaluation of the Environmental Impact of Formwork Systems Depending on the Service Life and Cost Analysis. The Payam-e-Marefat-Kabul Education University. 9. 1-10. 10.61186/crpase.9.2.2844.

[515] Nakano, Katsuyuki & Hattori, Nobuaki & Koide, Masahiro & Imago, Mai & Yamada, Yuta & Ogawa, Takuya & Toyoshima, Yoshiki. (2025). Environmental impacts of structural and concrete formwork plywood in Japan. Journal of Wood Science. 71. 10.1186/s10086-025-02202-3.

[516] Marcegaglia Build Tech, Marcegaglia Buildtech Epd Cold Formed Elements For Joining I. [Online]. Available: https://www.marcegagliabuildtech.it/wp-content/uploads/2024/10/Marcegaglia-Buildtech-EPD-COLD-FORMED-ELEMENTS-FOR-JOINING-IN-SCAFFOLDING.pdf

[517] ACE Scaffolding UK, Scaffolding systems — Product and technical information. [Online]. Available: https://www.acescaffolding-uk.com/articles/environmental-trends-in-scaffolding-sustainable-materials-and-practices

[518] Ali Tighnavard Balasbaneh, Willy Sher, Mohd Haziman Wan Ibrahim, Life cycle assessment and economic analysis of Reusable formwork materials considering the circular economy, Ain Shams Engineering Journal,Volume 15, Issue 4, 2024, 102585, ISSN 2090-4479, https://doi.org/10.1016/j.asej.2023.102585. (https://www.sciencedirect.com/science/article/pii/S2090447923004744)

[519] DOKA GmbH, Formwork systems — Technical data and environmental product information. [Online]. Available: https://www.doka.com/en/news/press/product-carbon-footprint

[520] KazNIISA — Kazakh Research and Design Institute of Construction and Architecture, Centre for Regulation in Construction, Collections of Estimate Prices in Current Prices. [Online]. Available: https://kazniisa.kz/centres/center-for-regulation-in-construction

[521] GeoSM Kazakhstan, Geosynthetics and Geotextiles — Product catalogue and technical specifications. [Online]. Available: https://geo-sm.kz/en/product-category/geomembrana/geomembrana-pnd-hdpe/

[522] RKD Kazakhstan, Construction and Engineering Products — Technical catalogue. [Online]. Available: https://rkd.kz/en/o-kompanii/

[523] Trade intelligence platform, Import/export data for construction materials. [Online]. Available: https://www.exportgenius.in/product/trade-intelligence-platform

[524] Trade intelligence platform, Import/export data for construction materials. [Online]. Available: https://www.fordaq.com/dir/mdf-medium-density-fibreboard-companies-in-kazakhstan?cs=123&ps=3549

[525] Baier Flooring, Leading 5 High Quality Melamine Mdf Boards Manufacturers In . [Online]. Available: https://www.baierfloor.com/blog/leading-5-high-quality-melamine-mdf-boards-manufacturers-in-kazakhstan-for-construction

[526] Aock, Tovarnyy Beton. [Online]. Available: https://aock.kz/catalog/

[527] Standard-Cement, Standard Cement.Com. [Online]. Available: https://standard-cement.com/en

[528] Heidelbergmaterials, Kazakhstan. [Online]. Available: https://www.heidelbergmaterials.com/en/company/group-areas-and-countries/africa-mediterranean-west-asia/kazakhstan

Annexure-A: Methodology utilized in developing the Block 3: Price Dimension section

The methodology for the price dimension was developed to provide a structured three-tier comparison of construction material and engineering equipment prices for Green Public Procurement (GPP) in Kazakhstan. The comparison includes: (i) International Standard Price, representing EN/ISO-compliant products available on the global market; (ii) National Standard Price, based on Kazakhstani normative reference prices under GOST/ST RK standards; and (iii) Market/Ex-Factory Price, reflecting prevailing manufacturer and supplier market conditions.

International Standard Prices were established through a structured market survey of EN/ISO-compliant products using supplier and distributor websites, international market databases, project-level cost data, and Environmental Product Declarations (EPDs). All prices were cross-checked using at least two independent sources and presented in USD per unit. Where significant variation existed, minimum–maximum price ranges were provided.

National Standard Prices were derived from official Kazakhstani normative pricing systems, including KazNIISA compilations and the Republican Summary Normative Base (RSNB). Since these sources typically provide fixed normative values, a ±10–15% adjustment margin was applied to reflect realistic procurement variability associated with supplier margins, seasonal fluctuations, lot size, and delivery conditions. This adjustment approach follows internationally recognized cost-estimation practices.

Market/Ex-Factory Prices were compiled from manufacturer catalogues, supplier websites, public procurement documentation, and consultations with industry experts. These prices represent factory-gate supply costs excluding downstream retail mark-ups, VAT, installation, and contractor overheads, making them suitable for benchmarking public procurement costs.

All prices were converted into USD using average exchange rates for the 2025–2026 reference period. The presented values are indicative and intended for benchmarking purposes only, as actual procurement prices may vary depending on market conditions, logistics, specification differences, and contractual arrangements.

References used in the development of Block 3: Price Dimension section:

1. https://kazniisa.kz/
2. https://kazniisa.kz/centres/center-for-regulation-in-construction
3. https://kazniisa.kz/centres/center-for-regulation-in-construction#1668671934637-a7656643-8552
4. https://nationalbank.kz/kz
5. https://www.baierfloor.com/blog/leading-5-high-quality-melamine-mdf-boards-manufacturers-in-kazakhstan-for-construction/
6. https://www.fordaq.com/dir/mdf-medium-density-fibreboard-companies-in-kazakhstan?cs=123&ps=3549
7. https://www.baierfloor.com/blog/leading-5-high-quality-melamine-mdf-boards-manufacturers-in-kazakhstan-for-construction/
8. http://www.azmk.kz/?frame=product&page=2&item=18&cat=0&ln=en#:~:text=Product%20features,accordance%20with%20GOST%2013579%2D78
9. https://aock.kz/catalog/tovarnyy_beton/
10. https://standard-cement.com/en/
11. https://www.heidelbergmaterials.com/en/company/group-areas-and-countries/africa-mediterranean-west-asia/kazakhstan
12. https://caspian.kz/ru/projects/2
13. https://reg.iteca.kz/list/exponent/en/auth.aspx?ExhCode=KazBuild+2023
14. https://pv.heliosolar.kz/
15. https://heliosolar.kz/en
16. https://www.tstn.kz/
17. https://idfrk.kz/en/products/services/recycling/
18. https://tradingeconomics.com/commodity/lumber

19. https://lesexport.kz/en
20. https://www.cementinfo.ru/node/8239#:~:text=%D0%9F%D0%BE%D1%85%D0%BE%D0%B6%D0%B8%D0%B5%20%D0%BD%D0%BE%D0%B2%D0%BE%D1%81%D1%82%D0%B8%20%0A%20%20%20%0A%20,%D0%BF%D1%80%D0%BE%D0%B8%D0%B7%D0%B2%D0%BE%D0%B4%D0%B8%D1%82%D0%B5%D0%BB%D0%B5%D0%B9%20(%D0%B1%D0%B5%D0%B7%20%D0%9D%D0%94%D0%A1)%20%D0%B2%20%D1%84%D0%B5%D0%B2%D1%80%D0%B0%D0%BB%D0%B5%202024%20%D0%B3%D0%BE%D0%B4%D0%B0
21. https://kz.all.biz/en/polysterene-concrete-block-g1434307
22. https://topan.kz/en/about-company/
23. https://alit.kz/
24. https://www.indexbox.io/store/kazakhstan-cement-market-analysis-forecast-size-trends-and-insights/
25. https://vseformi.ru/product/belyj-czement-aalborg-white-cement-cem-i-52-5-r-pczb-1-500-d0/#:~:text=%D0%B4%D0%BE%D1%81%D1%82%D0%B0%D0%B2%D0%BA%D0%B8%20%D0%92%D0%B0%D1%88%D0%B-5%D0%B3%D0%BE%20%D0%B7%D0%B0%D0%BA%D0%B0%D0%B7%D0%B0!-,%D0%91%D0%B5%D0%B-B%D1%8B%D0%B9%20%D1%86%D0%B5%D0%BC%D0%B5%D0%BD%D1%82%20%E2%80%9CAalborg%20White%20Cement%E2%80%9D%20CEM%20I%2052.5%20R%20(,%D1%81%D0%BE%D0%BE%D1%80%D1%83%D0%B6%D0%B5%D0%BD%D0%B8%D1%8F%2C%20%D1%81%D1%82%D0%B0%D0%B4%D0%B8%D0%BE%D0-%BD%D1%8B%20%D0%B8%20%D0%BF%D1%80.)
26. https://www.steppecement.com/
27. https://metall-invest.kz/en/metalloprokat/atyrau/armatura/#:~:text=Table_title:%20Reinforced%20bars%20Table_content:%20header:%20%7C%20%7C,%7C%20Add%20to%20busket:%202%20429%20%7C
28. https://www.azmt.kz/eng/catalog/sortovoy-prokat/armatura-a500c/#:~:text=Description%20Class%20A500C%20Reinforcement%20is,m%20(non-measured).
29. https://serilik-m.kz/p111149552-izoterm-minplita-p5050.html#:~:text=6%20000%20%E2%82%B8%20%D0%BE%D1%82%2050%20%D1%88%D1%82.
30. https://kz.all.biz/en/plate-polystyrene-foam-psb-s-25b-20-kgm3-g2579612#:~:text=In%20the%20presents%20time%20the,mail:%20stirol@list.ru
31. https://kurtin.en.made-in-china.com/product/EKXJvAWSHVrP/China-XPS-Insulation-Extruded-Polystyrene-Insulation.html
32. https://www.gfiduct.com/product/pir-thermal-insulation-board-with-kraft-paper/
33. https://semeycement.com/en/bloki-iz-polistirolbetona/#:~:text=Table_title:%20Main%20characteristics%20of%20polystyrene%20concrete%20blocks,permeability%20%C2%B5%2C%20mg/(m%C2%B7h%C2%B7Pa):%200%2C085%200%2C075%200%2C068%20%7C
34. https://tytan.com/en/product/tapes-foils-and-membranes/tytan-120-breathable-roof-membrane/#:~:text=Send%20a%20question-,Description,instructions%20on%20the%20product%20label
35. https://www.bs.ge/product-page/sikaplan-12-g#:~:text=Sikaplan%2D12%20G%20(thickness%201.2,quality%20polyvinyl%20chloride%20(PVC)
36. https://pennfox.en.made-in-china.com/product/QwBTcgmdEjtO/China-Double-Side-Adhesive-Self-Adhesive-Bitumen-Waterproof-Membrane.html#:~:text=Table_title:%20Product%20Description%20Table_content:%20header:%20%7C%20Type,%7C%20Thickness:%202.0mm%20%7C%20Length:%2020m%20%7C
37. https://ckfi.store/services/gidroizolyatsionnye-materialy/ruberoid-marok-rkp-350-i-rkk-350-tseny-osobenn-osti/?srsltid=AfmBOoovJD1vFt7WF18cRnM8xsFazrRtRDl3VHm-QxxVztcRIMQXM9aM#:~:text=%D0%92%20%D1%82%D0%B5%D1%87%D0%B5%D0%BD%D0%B8%D0%B5%20%D0%B4%D0%B5%D1%81%D1%8F%D1%82%D0%B8%D0%BB%D0%B5%D1%82%D0%B8%D0%B9%20%D0%BC%D0%BD%D0%BE%D0%B3%D0%B8%D0%B5%20%D0%BB%D1%8E%D0%B4%D0%B8,%D0%BF%D1%80%D0%BE%D1%81%D1%82%D0%BE%D1%82%D0%B0%20%D0%B8%20%D0%B2%D1%8B%D1%81%D0%BE%D0%BA%D0%B0%D1%8F%20%D1%81%D0%BA%D0%BE%D1%80%D0%BE%D1%81%D1%82%D1%8C%20%D0%BC%D0%BE%D0%B-D%D1%82%D0%B0%D0%B6%D0%B0;
38. https://www.tenapors.lv/en/product/tenapors-eps-100-en/#:~:text=Most%20commonly%20the%20material%20is%20used%20for,certificates%20concerning%20compliance%20with%20ETAG%20004%20requirements
39. https://bizkim.uz/en/catalog/profnastil/15-metal-tile
40. https://en.docke.ru/roof/standard/sota/sota-gray/
41. https://lemanapro.kz/catalogue/profnastil/metallicheskiy/
42. https://www.stonecontact.com/kurtinskiy-granite/s11564#:~:text=Description:%20Kurtinskiy%20Granite%20is%20a%20kind%20of,stairs%2C%20window%20sills%20and%20other%20design%20projects
43. https://pronal.en.made-in-china.com/product/ZdatCsyopqVg/China-Facade-Cladding-Aluminum-Composite-Panels-with-Accessories-for-Support-Whole-System.html#:~:text=Facade%20Cladding%20Aluminum%20Composite%20Panels%20with%20Accessories,Thickness:%200.5mm%20Production%20Capacity:%20300000%20Square-%20Meters/Month

44. https://klinkersgroup.com/info/brands/equitone/#:~:text=%D0%9A%D1%83%D0%B-F%D0%B8%D1%82%D1%8C%20%D0%BF%D1%80%D0%BE%D0%B4%D1%83%D0%BA%D1%86%D0%B8%D1%8E%20%D0%B1%D1%80%D0%B5%D0%BD%D0%B4%D0%B0%20Equitone%20%D1%81%20%D0%B4%D0%BE%D1%81%D1%82%D0%B0%D0%B2%D0%BA%D0%BE%D0%B9%20%D0%BF%D0%BE,Equitone%2C%20%D0%B2%D1%81%D0%B5%20%D0%BE%D0%B1%D1%80%D0%B0%D0%B7%D1%86%D1%8B%20%D0%B2%20%D1%88%D0%BE%D1%83%2D%D1%80%D1%83%D0%BC%D0%B5%20%D0%B2%20%D0%90%D1%81%D1%82%D0%B0%D0%BD%D0%B5
45. https://en.ecobalance.kz/#:~:text=humidity%20from%207%25%20to%209.8,from%207%25%20to%209.8%25
46. https://www.accio.com/plp/interlocking-clay-bricks
47. https://xintairefractory.com/refractory-bricks
48. https://serafimov-systems.eu/en/isomat-one-component,-solvent-free,-transparent-polyurethane-varnish,-satin-matt-finish-varnish-pu-1k-5-kg/#:~:text=ISOMAT%20VARNISH%20PU%202KW%201kg,similar
49. https://vmp.kz/eng/products/
50. https://technonicol.com/catalogue/mastik/mastic/
51. https://lemanapro.kz/catalogue/germetiki/vodostoykie/
52. https://12.kz/products/0155382
53. https://vmp.kz/eng/products/ognezashchitnye-sostavy/
54. https://ordaglass.kz/catalog/prozrachnoe-float-steklo
55. https://www.pilkington.com/en/gbl/architectural-and-technical-glass/product-categories/solar-control
56. https://window.rehau.com/uk-en/rehau-upvc-windows-doors
57. https://alutech-official.kz/vorota/garazhnye/sekcionnye/?utm_source=google&utm_medium=poisk&utm_campaign=%D0%A1%D0%92-%D0%A0%D0%92-%D0%9F%D0%92-%D0%9F%D0%BE%D0%B8%D1%81%D0%-BA-2024|23273587127&utm_content=cid|23273587127|tar|kwd-443791754545|aid|784465818427|gid|189691095558|dvc|c|reg|9196502|rin|&utm_term=alutech&gad_source=1&gad_campaignid=23273587127&gbraid=0AAAABANgnRYm997smzQtIY2egKjvUR6HT&gclid=Cj0KCQiA7-rMBhCFARIsAKnLKtBFMTOaMsQA8tBhuE1hmRMjxbxL5CBN5CWCaRh26rWR4Jh17R6_lPIaAohEEALw_wcB
58. https://en.profilnet.eu/offer/aluminium-systems/window-and-door-_systems/system-mb-45/#:~:text=OF%20THE%20SYSTEM-,Charateristics,design%20the%20desired%20functional%20solution
59. https://www.accio.com/plp/cementitious-screed
60. https://www.knaufceilingsolutions.cn/en/
61. https://www.vanifasteners.com/zinc-plated-bolt-nut-and-washer-6894730.html#:~:text=Table_title:%20Zinc%20Plated%20Bolt%20Nut%20And%20Washer,Made%20in%20India:%20Bright%20Zinc%20Plated%20%7C
62. https://kpi.kz/en/marketing/price-polip/#:~:text=PP%20H032%20TF/7%E2%80%93582%2C500,580%2C000%20tenge/ton%20with%20VAT;
63. https://www.scribd.com/document/987022749/Plastering-estimate
64. https://stat.gov.kz/en/industries/economy/prices/spreadsheets/
65. https://geo-sm.kz/en/product-category/geomembrana/
66. https://ibeam.ae/product/waterproofing-membrane/#:~:text=Waterproofing%20membrane%20Features%2C%20Benefits%20&%20Technical%20Details&text=Waterproofing%20membrane%20is%20a%20high,to%20the%20required%20membrane%20thickness.
67. https://eonzeal0108.en.made-in-china.com/product/SBTEsKYdlcUC/China-20kg-One-Component-Water-Based-Polyurethane-Liquid-Waterproof-Membrane.html#:~:text=Polyurethane%20Waterproof%20Membrane-,20kg%20One%20Component%20Water%20Based%20Polyurethane%20Liquid%20Waterproof%20Membrane,Order%20Sample
68. https://satu.kz/astana/Konditsionery-daikin-1.html
69. https://catalogues.daikin.eu/
70. https://fred.stlouisfed.org/series/PCU3334133341#:~:text=Table_title:%20Producer%20Price%20Index%20by%20Industry:%20HVAC,Dec%202025::%20View%20All%20%7C%20232.339:%20%7C
71. https://kazkabel.kz/en/catalog-en
72. https://www.bigbathroomshop.ie/
73. https://savillestainless.co.uk/products/wall-mounted-wash-basin-480mm-x-350mm#:~:text=SS/WP40%20Wall%20Mounted%20Wash%20Basin%20480mm%20X,and%20comes%20complete%20with%20integral%20wall%20brackets.
74. https://carremmcontrols.com/products/cast-iron-lubricated-plug-valves#:~:text=Yes,%22%20/%20No%20%2D%20$380.00%20USD%20Quantity
75. https://kxcvalve2004.en.made-in-china.com/product/MOeTBHgCALYp/China-DN-100-Cast-Iron-Flange-Type-

Gate-Valve-with-Different-Standard-JIS-DIN-BS.html#:~:text=in%2DChina.com-,DN%20100%20Cast%20Iron%20Flange%20Type%20Gate%20Valve%20with%20Different,1Piece%20(MOQ)

76. https://arcadaind.kz/product/shcheben-dlya-stroitelnykh-rabot-gost-8267-93/#:~:text=%D0%9F%D1%80%D0%BE%D0%B4%D1%83%D0%BA%D1%86%D0%B8%D1%8F-,%D0%A9%D0%B5%D0%B1%D0%B5%D0%BD%D1%8C%20%D0%B4%D0%BB%D1%8F%20%D1%81%D1%82%D1%80%D0%BE%D0%B8%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D1%8B%D1%85%20%D1%80%D0%B0%D0%B1%D0%BE%D1%82%20%D0%93%D0%9E%D0%A1%D0%A2%208267%2D93,%D0%9E%D1%82%D1%81%D0%B5%D0%B2
77. https://honted.en.made-in-china.com/product/warUsWfAhRkZ/China-UV-Cured-Cipp-Lining-Glass-Fiber-Reinforced-Tube-Lining-Cured-in-Place-Pipe-Lining-for-Underground-Pipe.html#:~:text=LightingView%20More-,UV%20Cured%20Cipp%20Lining%2C%20Glass%20Fiber%20Reinforced%20Tube%20Lining%2C%20Cured,10Meters%20(MOQ)
78. https://www.unifloorwpc.com/wpc-decking-kazakhstan#:~:text=WPC%20Decking%20Factory%20Wholesale%20Price%20Kazakhstan%20*,Order%20Quantity:%20300%E3%8E%A1%20per%20design%20&%20color
79. https://www.bpmgeosynthetics.com/how-much-is-hdpe-geomembrane-price/?
80. https://www.greaseguardian.com/product-tag/manual-grease-trap/
81. https://baodu188.en.made-in-china.com/product/iZvfwAGPCqtM/China-Water-Filter-with-Zeolite-1-2mm-2-4mm-Wastewater-Filtration-System-for-Water-Treatment.html?
82. https://kz.all.biz/en/fire-retardant-coatings-for-metal-structures-bgg1093960
83. https://vmp.kz/eng/products/ognezashchitnye-sostavy/#:~:text=Leave%20a%20request-,About%20us,structures%20with%20small%20reduced%20thickness
84. https://www.gdajcentury.com/reusable-construction-concrete-steel-round-column-formwork_p330.html#:~:text=Round%20Column%20Formwork-,Reusable%20Construction%20Concrete%20Steel%20Round%20Column%20Formwork,many%20round%20columns%20are%20required
85. https://zhengzhousongmao.en.made-in-china.com/product/TwLGgDZvCNAU/China-Modular-Metal-Frame-Formwork-for-Concrete-Wall-Column-Slab-Construction-Panels.html
86. https://www.grandviewresearch.com/industry-analysis/resilient-flooring-market
87. https://www.iea.org/reports/targeting-100-led-lighting-sales-by-2025
88. https://www.nlr.gov/solar/market-research-analysis
89. https://about.bnef.com/insights/
90. https://www.epa.gov/green-infrastructure

www.switch-asia.eu

EU SWITCH-Asia Programme
@EUSWITCHAsia

SWITCH-Asia
@SWITCHAsia

SWITCH-Asia Official
@switch-asia-official