



AIRPORT RUNWAY AND PAVEMENT REPAIR MATERIAL

Type D Rapid and Type P Normal | 1 h/1.5 h early-strength control | High flexural strength | Strong bond | Low shrinkage | F150 freeze resistance | Low chloride

PRODUCT OVERVIEW

Polar Bear Airport Runway and Pavement Repair Material is a factory-produced cementitious dry premix formulated with anti-cracking rapid-hardening belite calcium sulphoaluminate cement, polymer, and water-reducing, set-regulating and defoaming additives, with graded dry sand. When mixed with the specified water, it develops rapid hardening, high early strength, high flexural performance, strong interface bond and controlled dimensional change.

It is used for rapid repair of potholes, spalls, broken corners and joint-edge damage on concrete runways, taxiways and aprons, and — with technical review — for localized repair of major roads, bridge decks, hydraulic facilities and concrete structures. Type D and Type P have different early-strength control ages and shall not be accepted interchangeably.

CORE SALES PROPOSITION

Feature	Project value
Type D: ≥40 MPa at 1 h	High early strength for very short closure windows — enables rapid, continuous airfield repair.
Type P: ≥40 MPa at 1.5 h	High early strength with a wider placement window for larger areas.
28 d: ≥70 MPa comp. / ≥12 MPa flex.	High ultimate strength for load, impact and edge integrity.
1.5 h bond: ≥1.5 MPa	Early interface bond that reduces debonding risk.
28 d shrinkage: ≤0.050%	Low shrinkage that limits early cracking and debonding.
F150, chloride ≤0.06%	Freeze resistance and low chloride for durable, reinforced-concrete repair.

Note: Strength values are material properties under specified test conditions. Actual return to service is determined by on-site verification and operating approval, and does not imply a fixed reopening time after placement.

CLASSIFICATION, DESIGNATION AND SELECTION

Category	Code	Early-strength age	Standard designation
Rapid	D	1 h	Airport Runway Repair Material Q/TBJX 36-D
Normal	P	1.5 h	Airport Runway Repair Material Q/TBJX 36-P

Factor	Type D Rapid	Type P Normal
Primary objective	Shortest early-strength window	Early strength with placement control
Control point	≥40 / ≥6 MPa at 1 h	≥40 / ≥6 MPa at 1.5 h
Best fit	Small areas, short closure, continuous work	Larger areas, complex edges, more finishing time
Main risk	Rapid flow loss or cold joints	Incorrect acceptance against Type D timing

Product	Positioning	Recommended situation
Q/TBJX 36-D	Flagship rapid grade	Short-window localized airfield repair
Q/TBJX 36-P	Core project grade	Larger repairs and complex logistics
Aggregate-extended	Special deep repair	Deep/crater repair (project design required)

Selection: Choose Type D only where the site supports rapid dosing, backup mixing, continuous placement, immediate curing and early-age verification. Prefer Type P where area, geometry, environment or testing logistics require a wider window. Final selection follows the defect mechanism, repair geometry, closure, environment and an approved trial.

GUARANTEED PERFORMANCE AND TEST METHODS

Property	Age	Type D	Type P
Initial setting	—	≥20 min	≥20 min
Compression	1 h	≥40.0 MPa	—
Compression	1.5 h	—	≥40.0 MPa
Compression	1 d / 28 d	≥60.0 / ≥70.0 MPa	≥60.0 / ≥70.0 MPa
Flexure	1 h / 1.5 h	≥6.0 MPa (1 h)	≥6.0 MPa (1.5 h)
Flexure	1 d / 28 d	≥10.0 / ≥12.0 MPa	≥10.0 / ≥12.0 MPa



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Bond to reference concrete	1.5 h / 1 d / 28 d	$\geq 1.5 / \geq 2.0 / \geq 2.0$ MPa	$\geq 1.5 / \geq 2.0 / \geq 2.0$ MPa
Drying shrinkage	28 d	$\leq 0.050\%$	$\leq 0.050\%$
Freeze resistance	Grade	$\geq F150$	$\geq F150$
Chloride (by binder mass)	—	$\leq 0.06\%$	$\leq 0.06\%$

Property	Primary basis
Setting and bond	JT/T 1211.1 and enterprise standard
Compression and flexure	GB/T 17671-2021 and Q/TBJX 36-2025
Shrinkage / chloride	JC/T 2381-2016 / GB/T 176-2025
Freeze resistance	JGJ/T 70 and project specification

Note: Values are guaranteed under Q/TBJX 36-2025; where a contract, current standard or approved document is stricter, the strictest requirement governs. International qualification data (e.g. ASTM C928, EN 1504-3) is available on request for target-market projects.

TYPICAL DATA AND CATEGORY BENCHMARK

Data set	Property	Age	Measured
Production trial	Compression	1 h / 1 d / 7 d	40.0 / 64.2 / 68.1 MPa
Production trial	Flexure	1 h / 1 d / 7 d	10.5 / 14.1 / 15.0 MPa
Production trial	Tensile bond	Reported age	2.62 MPa
30% aggregate crater	Comp./Flex.	1 h / 28 d	40.0 / 72.0 ; 4.7 / 7.6 MPa

Typical results come from different reports, mixes and specimens; they are not directly comparable and do not replace batch certificates. Aggregate-extended flexure is a separate system from the neat-mortar schedule.

Category benchmark: Comparable rapid patch repair mortars (ASTM/EN systems) typically publish early compressive strength of about 8–38 MPa within 1–3 h. Polar Bear Type D specifies ≥ 40 MPa at 1 h under the Chinese test method, together with early bond, low shrinkage, F150 freeze resistance and low chloride.

- Strength, shrinkage and bond from different specimens, curing regimes or ASTM/EN/Chinese methods cannot be directly ranked.
- Do not derive a fixed reopening time from laboratory strength alone.

APPLICATIONS, LIMITATIONS AND EXECUTION SUMMARY

Application	Model	Key verification
Runway pothole / spill	D; P for larger area	Strength, skid, level, FOD, approval
Taxiway / apron edge	D or P	Edge restraint, wheel load, joint, curing
Road / bridge rapid repair	D/P by closure	Standard, traffic, interface
Crater / deep repair facing	Aggregate extension	Backfill, grading, thickness, acceptance

Not directly suitable / requires specialist review: asphalt, steel, timber, weak or continuously leaking substrates; substrates with fuel, grease, rubber or chemical contamination that cannot be removed; active cracks, settlement, voiding or inadequate support; large overlays, feather edges or unknown-depth potholes; uncontrolled freezing, heat, wind, rain or airfield-contamination risk.

Execution & safety (summary): water/powder ≈ 0.11 , site flow 320–380 mm, normal ambient 5–35 °C, working time ≈ 15 min at standard temperature (shorter in heat/wind); forced mixing only — no hand mixing, retempering or unapproved additions; place continuously, de-air, finish and restore texture to avoid cold joints; cover and cure immediately, protecting from sun, wind, rapid cooling, rain and early freezing; do not reopen by clock time alone. Use dust mask, goggles and gloves; wet cementitious material is alkaline; enforce FOD control airside; do not discharge slurry to drains, water or soil.

Full construction, curing, acceptance and HSE procedures are given in the complete Product Manual and the product SDS.

PACKAGING, STORAGE AND SHELF LIFE

Supplied in moisture-resistant packaging complying with GB/T 9774-2020 or an approved equivalent; net content per JJF 1070 and the product label. Available in 25 kg moisture-resistant bags and 1,000 kg jumbo (bulk) bags; actual pack size is stated on the bag, contract and delivery documents. Transport and store protected from moisture, rain and bag damage; segregate models and batches with clear labels, kept dry and ventilated, off the floor and away from walls. Shelf life is 3 months under normal storage per Q/TBJX 36-2025; expired or damp product must be retested and pass before use.

EXPORT HIGHLIGHTS, CLAIM BOUNDARIES AND COMPANY INFORMATION

Sales message	Evidence basis	Boundary
Type D high strength at 1 h	$\geq 40 / \geq 6$ MPa at 1 h	Specified method; not fixed reopening



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Early strength plus bond	≥ 1.5 MPa bond at 1.5 h	Record substrate and failure mode
High final strength	≥ 70 / ≥ 12 MPa at 28 d	No cross-standard ranking
Low shrinkage, freeze, low Cl	$\leq 0.050\%$, F150, $\leq 0.06\%$	Not a substitute for those tests

PRODUCT POSITIONING AND TARGET CUSTOMERS

- Core focus: short-window rapid repair of airfield pavements, with emergency road/bridge repair and specialist deep/crater repair.
- Value focus: a controlled, verifiable solution for rapid repair with high early strength, strong bond, low shrinkage and freeze durability.
- Target customers: airport operators / pavement authorities (civil and, subject to special review, military airfields); airfield maintenance and emergency-repair contractors; road and bridge rapid-repair contractors; hydraulic and concrete-structure specialist repair units.

Claim boundaries: Guaranteed values apply only to the named model, approved water, method, age and curing; typical data, photos and case histories are not batch guarantees; aggregate extension requires separate qualification; do not claim conformity to ASTM C928 / EN 1504-3 R4 or superiority over competitors without same-method third-party reports; final airfield reopening is approved by the project technical and operating authorities.

Item	Information
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Enquiry checklist: (1) project and airport/road name, repair location; (2) defect type, photos, area, min/max depth, substrate strength and age; (3) date, environment, wind/rain, utilities and closure window; (4) design/acceptance for strength, bond, freeze, chloride, level and skid; (5) equipment, batch capacity, curing, early testing and FOD plan.