

Polyurethane Modular Screen Panel Technical Specification

Applicable to EA Series PU-300, PU-400, PU-500 and PU-600 Panel Families

Drawing No. EA-ENG-DRW-4281	Revision 3.1	Date 08 November 2025	Prepared By D. Waller — Head of Engineering	Checked By R. Briggs — Senior Engineer	Status ISSUED FOR USE
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1. DOCUMENT PURPOSE & SCOPE

This specification defines the material, dimensional, mechanical, and performance requirements for Elastomers Australia polyurethane (PU) modular screen panels. It applies to all standard panel grades within the EA PU-300, PU-400, PU-500 and PU-600 families, used in mining, quarrying, and mineral processing screening applications throughout Australia.

This document constitutes the manufacturing reference standard and the quality acceptance criteria for all PU panel production at the Dandenong South facility. All deviations from this specification require written approval from the Head of Engineering before manufacture or despatch.

!9 NOTE

This specification supersedes EA-ENG-DRW-4281 Rev. 3.0 (March 2024). Key changes: updated compound formulation reference for PU-500 grade; revised dimensional tolerances for 305×305mm and 610×305mm aperture sizes; new chemical resistance table added (Section 7).

2. PANEL FAMILY OVERVIEW

The EA PU panel range is manufactured from cast polyurethane elastomers compounded in-house using proprietary formulations developed over 40 years of operational refinement. Panels are moulded in a multi-cavity tooling system and post-cured to achieve final mechanical properties. The four product families are differentiated by hardness grade and application:

Series	Shore A Hardness	Primary Application	Max Feed Size	Typical Aperture Range	Temp. Range
PU-300	60–65A	Fine screening / dewatering	50 mm	0.5 – 6 mm	-10°C to +60°C
PU-400	70–75A	General purpose / medium duty	150 mm	4 – 25 mm	-15°C to +70°C
PU-500	80–85A	Heavy duty / high-impact	300 mm	10 – 50 mm	-20°C to +75°C
PU-600	88–92A	Extreme duty / abrasive feeds	400 mm	20 – 75 mm	-20°C to +80°C

3. DIMENSIONAL SPECIFICATIONS

3.1 Standard Panel Sizes

Standard modular panel sizes are designed to be interchangeable with major OEM screen frame systems (Sandvik, Metso, Haver & Boecker) and EA proprietary frame designs. All dimensions are nominal; refer to Table 3.1 for tolerances.

Part No. Suffix	Panel Length (mm)	Panel Width (mm)	Nominal Thickness (mm)	Weight (kg)	Min. Order Qty
305×305	305	305	50	4.2–4.8	12
610×305	610	305	50	8.4–9.6	6
305×305T	305	305	65	5.5–6.2	12

610x305T

305x305H

610x610

1000×305

3.2 Dimensional Tolerances

The following tolerances apply to finished panels post-cure. Panels outside these tolerances are non-conforming and must be quarantined for engineering disposition before release.

Dimension	Nominal	Tolerance	Measurement Method	Reference Standard
Panel length	Per Table 3.1	±1.5 mm	Vernier caliper — 3 points	AS 1145.1
Panel width	Per Table 3.1	±1.5 mm	Vernier caliper — 3 points	AS 1145.1
Thickness (centre)	Per Table 3.1	±2.0 mm	Ultrasonic gauge	EA-QC-007
Aperture opening	Drawing nominal	±0.3 mm (fine) / ±0.5 mm (coarse)	Go/no-go gauges	EA-QC-008
Peg height	22.0 mm	±0.5 mm	Vernier caliper	EA-QC-007
Peg pitch (centre-to-centre)	50.0 mm	±0.3 mm	Vernier caliper	EA-QC-007
Panel flatness	"d 3.0 mm deviation	Surface plate check	AS/NZS 1170.1	

4. MATERIAL & COMPOUND SPECIFICATIONS

4.1 Base Polyurethane System

All EA polyurethane panels are manufactured using a two-component MDI (methylene diphenyl diisocyanate) prepolymer system. The specific polyol and prepolymer formulations are proprietary to Elastomers Australia and are maintained under Compound Formulation Register EA-ENG-MAT-019. The following parameters define the accepted material system:

Parameter	Specification	Test Method	Frequency
Isocyanate type	MDI — 4,4'-diphenylmethane diisocyanate	Supplier COA	Per batch
NCO content (prepolymer)	18.5% ± 0.5%	ASTM D2572	Per batch
Polyol type	Polyether diol / triol blend (proprietary)	EA-MAT-019	Per formulation change
Stoichiometric ratio (NCO:OH)	1.05:1 ± 0.02	Gravimetric calculation	Per mix
Processing temperature — Part A	40°C ± 3°C	Thermocouple	Per pour
Processing temperature — Part B	35°C ± 3°C	Thermocouple	Per pour
Pot life at process temperature	3–8 min (grade-dependent)	Timed pour test	New formulation
Demould time	15–25 min (grade-dependent)	Shore A test	New mould setup
Post-cure cycle	100°C × 16 hrs (oven)	Thermocouple log	Each batch

4.2 Filler & Additive System

Panels may incorporate the following additives as specified in the compound formulation. Additive inclusion must be approved by the R&D team and recorded in EA-ENG-MAT-019. Unauthorised additive substitutions are prohibited.

- % Carbon black (N330 or N550 grade): 0–15 phr — improves UV stability and abrasion resistance
- % Silica (precipitated, Zeosil 165 or equivalent): 0–20 phr — reduces compression set in fine screening grades
- % Plasticiser (DINP or TXIB): 0–8 phr — extends low-temperature flexibility in cold-climate panels
- % Antioxidant (Irganox 1010 or 1076): 0.3–0.8 phr — mandatory for all grades, heat stability
- % UV stabiliser (Tinuvin 328): 0.2–0.5 phr — mandatory for panels used in open-air installations
- % Colour pigment: as specified per client order — does not affect mechanical properties

5. MECHANICAL PROPERTY REQUIREMENTS

The following mechanical properties are required for production acceptance. Properties are measured on test plaques processed under the same conditions as production panels and post-cured in the same batch. All testing per the referenced standard.

Property	PU-300	PU-400	PU-500	PU-600	Test Method
Hardness (Shore A)	60–65	70–75	80–85	88–92	AS 1774.5 / ASTM D2240
Tensile strength (MPa)	"e 22	"e 28	"e 35	"e 40	AS 1145.1 / ASTM D412
Elongation at break (%)	"e 450	"e 380	"e 320	"e 280	AS 1145.1 / ASTM D412
Tear strength (kN/m)	"e 70	"e 90	"e 115	"e 130	ASTM D624 Die C
Compression set (22h/70°C, %)	"d 20	"d 18	"d 15	"d 12	AS 1646 / ASTM D395
Abrasion resistance (mm³)	"d 120	"d 90	"d 65	"d 45	DIN 53516 (H22 wheel)
Split tear resistance (N/mm)	"e 8	"e 12	"e 16	"e 20	ASTM D1938

Resilience (Bayshore, %)

Specific gravity

1.10–1.18

PU-500 formulation (Rev. 3.1 update): NCO:OH ratio adjusted from 1.03:1 to 1.05:1 following abrasion test failures on Lot PU500-2025-0847. All stock produced under Rev. 3.0 prior to 01/10/2025 should be reviewed against updated abrasion spec before installation in high-impact applications. Refer EA-NCR-2025-0112.

6. APERTURE DESIGN & OPEN AREA

6.1 Standard Aperture Types

EA panels are manufactured in the following standard aperture geometries. Custom aperture profiles are available on request with minimum 6-week lead time for tooling manufacture. All aperture dimensions are measured at the panel face (narrow face for tapered apertures).

Aperture Type	Code	Description	Typical Open Area (%)	Best Application
Square	SQ	Equal length sides, sharp corners	32–38%	Aggregate, oversize control
Slotted	SL	Long axis perpendicular to flow	28–35%	Elongated particles, coal
Round	RD	Circular profile, no sharp edges	30–36%	Wet screening, sticky material
Trapezoidal (tapered)	TP	5–7° taper, self-cleaning	25–32%	Near-size, blinding resistance
Profile wire slot	PW	Slot aligned to material flow	35–42%	Dewatering, fine separation
Hexagonal	HX	Higher open area, structural advantage	38–45%	High-throughput, less critical spec

6.2 Open Area Calculation

Open area percentage (OA%) directly determines screening throughput capacity. The following formula applies to square and rectangular apertures:

$OA\% = (a^2 / (a + w)^2) \times 100$ where: a = aperture opening (mm), w = web thickness (mm)

For the standard EA 305×305mm panel with 25mm SQ aperture and 8mm web: $OA\% = (25^2 / (25+8)^2) \times 100 = 57.4\%$ Note: this is higher than typical rubber panel OA due to thinner web geometry enabled by PU strength characteristics.

7. CHEMICAL RESISTANCE

The chemical resistance ratings below apply to immersion conditions at 23°C unless otherwise noted. Ratings are: A = Excellent (no degradation), B = Good (minor swelling <5%), C = Limited (5–15% swelling, reduced service life), D = Not recommended. All ratings from 90-day soak test data unless marked *.

Chemical / Media	PU-300	PU-400	PU-500	PU-600	Notes
Fresh water	A	A	A	A	—
Seawater / brine	A	A	A	A	pH 6.5–8.5
Diesel fuel	C	C	B	B	Limit immersion to 48h
Hydraulic oil (mineral)	B	B	A	A	—
Engine oil	B	B	A	A	—
Sulphuric acid (5–10%)	B	B	B	B	pH > 4 only
Sulphuric acid (>10%)	D	D	C	C	Engineering review required
Sodium hydroxide (5–10%)	B	B	B	A	—
Sodium cyanide solution	A	A	A	A	Gold processing — validated
Flotation reagents (xanthate)	B	B	A	A	*30-day data
Iron ore slurry (pH 6–8)	A	A	A	A	BHP validated, 12-month field
Coal washery water	A	A	A	A	High-solids validated
Aromatic solvents	D	D	D	D	Do not use

MEK / ketones

D

Do not use

For applications involving chemical media not listed above, submit an application assessment request to engineering@elastomers.com.au with full process chemistry details. Lead time for immersion testing: 30–90 days depending on media. Do not install panels in untested chemical environments without written engineering clearance.

8. QUALITY INSPECTION & RELEASE CRITERIA

8.1 Production Inspection Points

- %, Post-demould: dimensional check (length, width, thickness $\pm 2\text{mm}$), visual for voids, tears, short shots
- %, Post-trim: aperture gauge check (SQ and SL apertures — 10% sample minimum), peg height check
- %, Post-cure: Shore A hardness (3 readings per panel, 10% of batch), visual re-inspection
- %, Pre-despatch: final visual, part number marking verification, quantity count

8.2 Non-Conformance Disposition

Panels failing any inspection criterion are tagged with a red "HOLD" label and segregated. Disposition options:

- %, Rework (scrap and recast): approved by QC Supervisor — panels must pass full re-inspection
- %, Concession (use-as-is): requires written approval from Head of Engineering and client sign-off
- %, Scrap: all scrapped panels are recorded in EA-NCR system before disposal

9. REVISION HISTORY

Rev	Date	Change Summary	Author
3.1	Nov 2025	PU-500 NCO:OH ratio update; chemical resistance table added; new tolerance for 305x305 aperture	D. Waller
3.0	Mar 2024	Full revision — new PU-600 series added; DIN abrasion test added to Section 5	D. Waller
2.3	Jun 2023	Shore A tolerance tightened for PU-300; seawater chemical rating updated	R. Briggs
2.2	Jan 2023	Post-cure cycle extended from 12h to 16h for all grades — field complaint investigation	D. Waller
2.1	Aug 2022	Additive system updated — Irganox 1076 substituted for Irganox 565	R. Briggs

