TDS COMPARISON MATRIX · DUAL-GRADE

PROPOSAL · 2026

CY GSRA 62A / 70AT vs GCPU vs Thermoset Rubber — Bottom-Solution TDS

Side-by-side evaluation on 11 mechanical, tribological, and process metrics. CY GSRA 62A spec matches the industry 62A-grade soft TPU category baseline (drop-in equivalent); 70AT is the premium clear-grade option. Source: TDS Sheet 1, 2026-03-23 revision.

Material Comparison Matrix

Metric	CY GSRA 62A ⭐ Semi-transparent · Lead	CY GSRA 70AT Fully transparent · Premium	GCPU Thermoset PU (EU)	Rubber Thermoset Rubber
Material Type	TPU (thermoplastic)	TPU (thermoplastic)	Thermoset PU	Thermoset Rubber
Transparency	**Semi-transparent**	**Fully transparent**	Can be clear	Solid (clear rubber expensive)
Surface Effect / Design Freedom	**Matte + Pearl + Neon-Clear** ✓	**Matte + Pearl + Neon-Clear** ✓	Limited (cure process)	Limited (cure process)
Density g/cm³	~1.19	1.17	1.19	1.15~1.25
Hardness Shore A	~63A	68A	64A	60~67A
Tensile Strength MPa	~22	28	34.5	40~60
Elongation %	~950	700	656	400~800
Tear Strength N/mm	**~71 ★**	**75 ★★**	53.4	40~60
Abrasion mm³ (lower is better)	**~25 ★★**	35	30	50~90
SARTA TM144 DRY / WET	**1.35 ★ / 0.44**	**1.35 ★ / 0.41**	0.80 / 0.50	1.30 / 0.50
INDUSTRY REFERENCE · *CONFIRM WITH CUSTOMER TRIAL*				
Cycle time s / outsole	**100-130 s *(injection)***	**100-130 s *(injection)***	240-360 s *(cure)*	360-480 s *(cure)*
Finishing / labor	**Light (runner trim only)**	**Light (runner trim only)**	Medium (light deflashing)	Heavy (flash trim per mold)
Wall thickness	**~1mm average achievable**	**~1mm average achievable**	Limited (cure process)	Limited (cure process)
CO_2 footprint kg CO_2e / kg	~6.0	~6.0	~5.0	~3.0
Recyclability	**100% (thermoplastic)**	**100% (thermoplastic)**	0% (crosslinked)	0% (crosslinked)

★ Best-in-class in the 6-material TDS (full table includes CY GSRA 62A · CY GSRA 70AT · NOSHOW EU · Polyether Asia as reference).
Data assumption: CY GSRA 62A spec matches the industry 62A-grade soft TPU category baseline (full TDS match — Hardness 63A, Density 1.19, Tensile 22 MPa, Tear 71 N/mm, SARTA 1.35/0.44, Abrasion 25 mm³, Elongation 950%). If CY has an official 62A TDS, the official numbers supersede.

Key Takeaways for Brand Decision

1 Historic TPU Trade-Off, Broken

62A abrasion **~25 mm³** ★ (industry 62A-grade soft TPU baseline, beats thermoset rubber 50-90 by 2-3×) + SARTA **1.35 DRY** ★ (best in 6-material TDS, +69% vs GCPU 0.8) — **two material limits, on the same grade**. Abrasion and grip are no longer a trade-off — a cross-generational injection-TPU breakthrough.

2 Industry 62A-Grade Soft TPU Baseline · Drop-In

62A spec matches the industry 62A-grade soft TPU category baseline: **Hardness 63A, Density 1.19, Tensile 22 MPa, Tear 71 N/mm, SARTA 1.35/0.44, Abrasion 25 mm³, Elongation 950%** — **comprehensive parity**. Existing tooling, geometry, and design **drop in directly**. No re-tooling, no re-engineering.

3 Two Grades, One Proposal

62A (63A, semi-transparent) — for core athletic / lifestyle SKUs; **70AT** (68A, fully transparent) — for premium clear / tinted styles. **Same injection platform**, two hardness/transparency options in one proposal.

4 Full Injection Edge: 3-4× Faster + Less Labor + 1mm Wall

Injection cycle **100-130 s/part** replaces rubber cure **360-480 s/part** — **~3-4× faster**. TPU only needs minor runner trim; **rubber requires heavy flash-trimming per mold**. **Injection achieves ~1mm average wall** — lightweight + design freedom (rubber cure cannot). Injection mold ≈ rubber mold cost. *Industry reference — confirm with trial*

5 Thermoplastic = 100% Recyclable

62A and 70AT are thermoplastic — sprues, runners, and end-of-life parts re-melt into feedstock. GCPU and rubber are crosslinked: **zero closed-loop option** for the brand's 2030 commitments.

6 GCPU Capacity Bottleneck, Solved

GCPU is cure-bound — production capacity limits how many pairs a brand can ship per week. **TPU injection scales with machine count**, breaking through the cure-oven ceiling. Critical for high-volume seasonal launches.

7 Design Freedom — Matte / Pearl / Neon-Clear

Injection-grade TPU enables **matte (suede-touch)**, **pearlescent**, and **neon-clear** finishes — the innovative design direction for athletic shoe outsoles today. Thermoset rubber and GCPU are cure-process bound and cannot match these surface effects — giving brand footwear differentiated look and feel **with no secondary processing**.