

Polymaker

PolyMax PLA

Black

Material Engineering Report
MaterialID MAT0109

3DPiceland Engineering Platform
3DPiceland Labs

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RELIABILITY - Bug Fixes and Workflow Reliability
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Public-data contract: This static report contains only allowlisted material identity, public links, canonical MSRP and existing Verified Material Summary / governed score outputs. It excludes raw specimen rows and non-public operational data.

TEST COVERAGE

Complete

ENGINEERING AXES

6/6

PUBLIC MSRP

\$52.12 USD/kg

Material identity

MaterialID	MAT0109
Material	Polymaker PolyMax PLA Black
Manufacturer	Polymaker
Product line	PolyMax
Base material	PLA
Category	Standard
Variant / finish	—
Reinforcement	—
Color	Black

Governed engineering profile

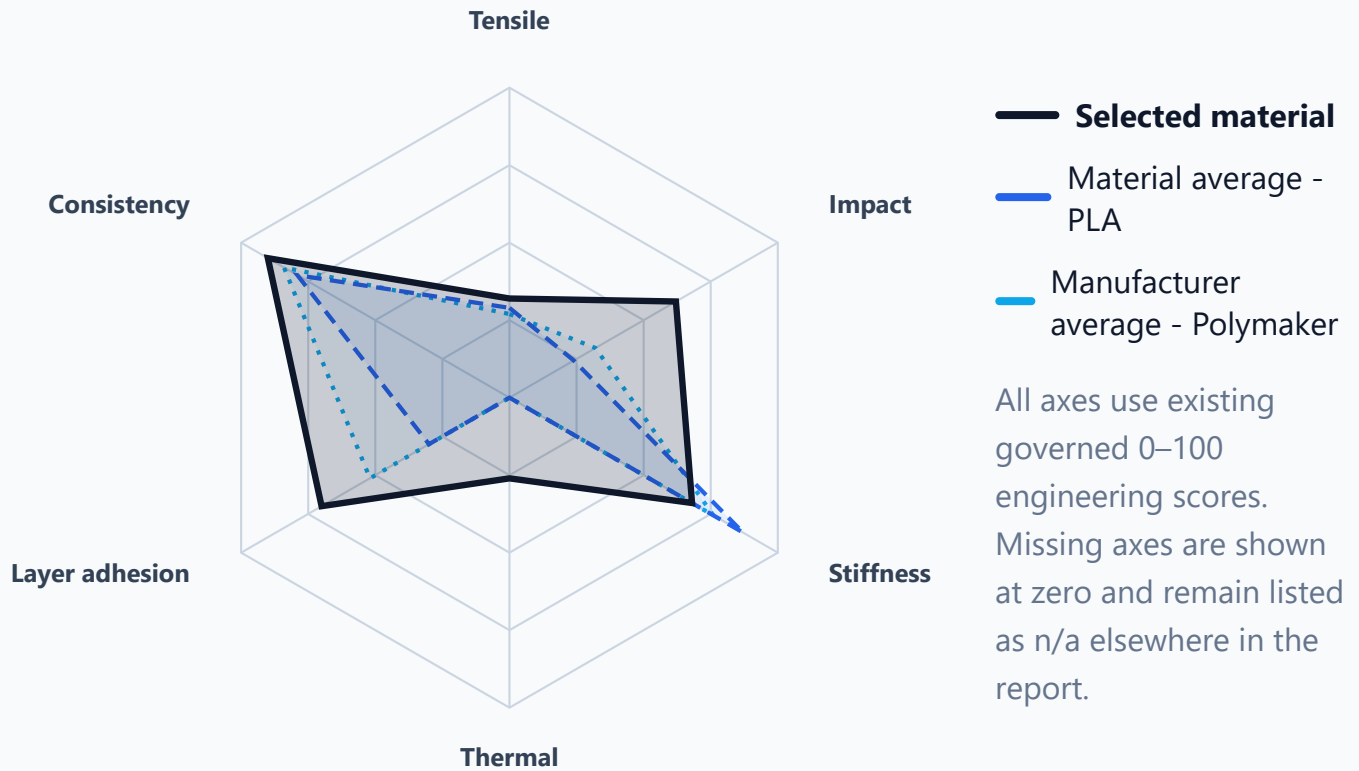
Overall	64/100
Tensile	32/100

Impact	62/100
Stiffness	68/100
Consistency	90/100
Layer adhesion	70/100
Thermal	26/100
Best available axis	consistency

Engineering score profile



Engineering radar



Fixture thermal result

51 °C · score 26/100 · method 3dp-thermal-deflection-fixture-v1

Nearby BlueDOT probe-indicated fixture temperature from a non-standard comparative 3DPlceland method; not ASTM D648, ISO 75, specimen temperature, certified HDT or a manufacturer limit.

Material and manufacturer context

Metric	Selected material	Material average	Manufacturer average
Overall	64/100	50/100	54/100
Tensile	32/100	29/100	27/100
Impact	62/100	24/100	32/100
Stiffness	68/100	87/100	76/100
Consistency	90/100	79/100	84/100
Layer adhesion	70/100	30/100	52/100
Thermal	26/100	—	—

Verified measurement results

Existing Verified Material Summary outputs. The public renderer does not read raw specimen rows or recalculate these values.

Measurement	Average	Std. deviation	CV	Samples	Confidence
Tensile upright	20.964 MPa	3.725 MPa	17.8%	10	10/10
Tensile flat	30.1 MPa	1.725 MPa	5.7%	10	10/10
Impact upright	188.753 kJ/m ²	17.659 kJ/m ²	9.4%	10	10/10
Impact flat	1041.591 kJ/m ²	73.193 kJ/m ²	7%	10	10/10
Stiffness modulus	2027.607 MPa	—	—	—	—
Stiffness deflection	2.676 mm	—	—	—	—

Measurement provenance

Canonical per-module measured dates from SQLite, shown in unambiguous ISO format. Missing dates are not inferred.

Module	Measured date
Tensile	Not recorded
Impact	Not recorded
Stiffness	Not recorded
Thermal	Not recorded

Engineering interpretation

Summary: Polymaker PolyMax PLA Black has a balanced mid-range engineering profile. It is above its material-family average by 14 points and above its manufacturer average by 10 points. Its strongest measured axis is Consistency, while the weakest axis is Tensile.

Data-driven review: Polymaker PolyMax PLA Black is best understood as a balanced material for general functional prototypes. Compared with the current verified dataset, it ranks better than 99% overall, is above the material-family average by 14 points, and is above the manufacturer average by 10 points. Its strongest engineering signal is Consistency, while Tensile is the main limitation to consider before using it for demanding applications.

BEST FEATURE

Consistency

MAIN LIMITATION

Tensile

DATASET POSITION

Better than 99%
4 / 234

Strengths

- Layer adhesion: 70/100. Z-axis bonding is better than the material-family context.
- Consistency: 90/100. Repeatability is one of the stronger signals in this material profile.
- Impact: 62/100. Impact behavior is competitive against the material-family context.

Limitations

- Tensile: 32/100. Avoid using this as the primary choice for tensile-loaded parts.
- Stiffness: 68/100. Expect less shape stability than the stronger materials in the same family.

Engineering trade-offs

- Good repeatability does not compensate for low tensile capability in load-bearing designs.

Recommended applications

- Impact-aware parts where toughness matters
- Parts where Z-axis bonding is important
- Repeatable print jobs and production-style batches
- Cosmetic parts, concept models or low-load prototypes
- Avoid high tensile load applications

Metric rankings and percentiles

Metric	Score	Rank	Percentile
Overall	64/100	4 / 234	Better than 99%
Tensile	32/100	77 / 226	Better than 66%
Impact	62/100	4 / 226	Better than 99%
Stiffness	68/100	157 / 223	Better than 30%
Consistency	90/100	3 / 231	Better than 99%
Layer adhesion	70/100	4 / 226	Better than 99%
Thermal	26/100	176 / 209	Better than 16%

Decision guidance

- Use this material for moderate requirements after checking the weakest axis.
- Review the listed alternatives if the application needs stronger overall performance.
- Do not choose it as a tensile-strength benchmark material.

Better alternatives

MaterialID	Material	Manufacturer	Overall	Tensile	Impact
MAT0069	ProtoPasta HTPLA Blood of My Enemies PLA Red	ProtoPasta	100/100	—	—

Peer context

Highest-scoring same-base-material peers from the current governed dataset. This context is descriptive and is not recalculated by the public renderer.

MaterialID	Material	Manufacturer	Overall	Tensile	Impact
MAT0069	ProtoPasta HTPLA Blood of My Enemies PLA Red	ProtoPasta	100/100	—	—
MAT0079	Polymaker PolyLight PLA Pro Black	Polymaker	65/100	35/100	52/100
MAT0080	Polymaker PolySonic PLA Pro Blue	Polymaker	64/100	30/100	58/100

MaterialID	Material	Manufacturer	Overall	Tensile	Impact
MAT0076	BambuLab Tough+ PLA Tough+ Black	BambuLab	63/100	26/100	59/100
MAT0108	Polymaker PolyLight PLA Black	Polymaker	61/100	33/100	14/100
MAT0074	Winkle Matte PLA Matte Red	Winkle	60/100	34/100	—
MAT0122	Add:North Enhanced PLA Clear	Add:North	59/100	40/100	10/100
MAT0096	Prima Creator PrimaValue Light Gray PLA Plus Gray	Prima Creator	58/100	33/100	58/100

Public links

[Manufacturer website](#) [Video review](#) [Download PDF](#)

Methodology and limitations

Results are comparative 3DPIceland measurements from home-built test equipment. Thermal is a nearby BlueDOT probe-indicated fixture temperature, not ASTM D648, ISO 75 or specimen temperature. Missing evidence remains n/a. Scores and test results are not recalculated by this publishing layer and do not replace certified manufacturer datasheets or accredited laboratory testing.

- [Testing methodology](#)
- [Engineering methodology whitepaper](#)