

Winkle Standard Tough PLA Tough Black

Material Engineering Report
MaterialID MAT0159

3DPiceland Engineering Platform

3DPiceland Labs

Generated with 3DPiceland Engineering Platform v60.0.6

WORKFLOW-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

\$39.96 USD/kg

Material identity

MaterialID	MAT0159
Material	Winkle Standard Tough PLA Tough Black
Manufacturer	Winkle
Product line	Standard
Base material	PLA
Category	Standard
Variant / finish	Tough
Reinforcement	—
Color	Black

Governed engineering profile

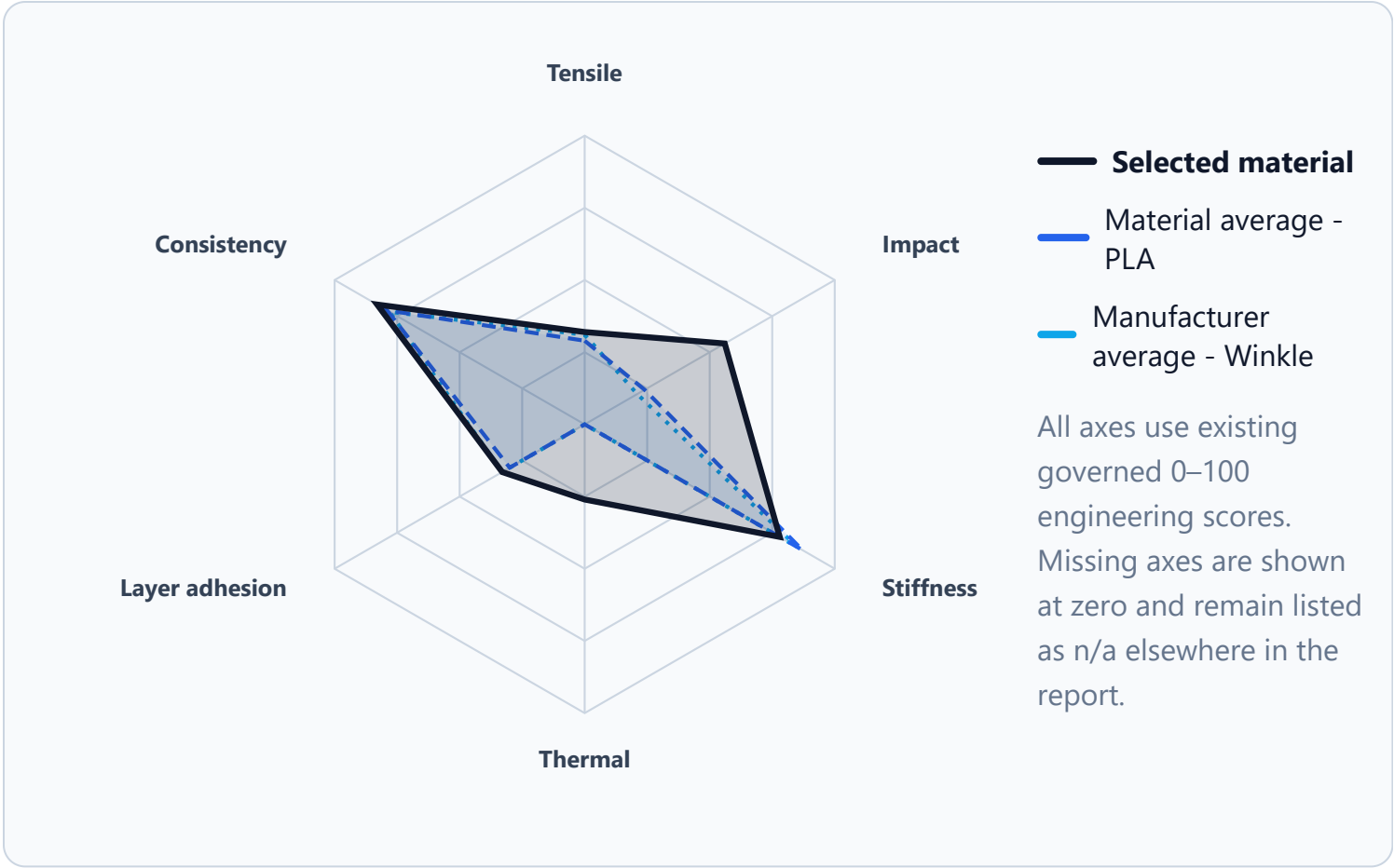
Overall	56/100
Tensile	32/100

Impact	56/100
Stiffness	78/100
Consistency	83/100
Layer adhesion	33/100
Thermal	26/100
Best available axis	consistency

Engineering score profile



Engineering radar



Fixture thermal result

52 °C · score 26/100 · method 3dp-thermal-deflection-fixture-v1

Nearby BlueDOT probe-indicated fixture temperature from a non-standard comparative 3DPIceland 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	56/100	50/100	49/100
Tensile	32/100	29/100	31/100
Impact	56/100	24/100	21/100
Stiffness	78/100	87/100	85/100
Consistency	83/100	79/100	78/100
Layer adhesion	33/100	30/100	33/100
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	12.535 MPa	5.249 MPa	41.9%	10	10/10
Tensile flat	38.144 MPa	5.611 MPa	14.7%	10	10/10
Impact upright	207.157 kJ/m ²	10.617 kJ/m ²	5.1%	9	9/10
Impact flat	922.58 kJ/m ²	35.389 kJ/m ²	3.8%	10	10/10
Stiffness modulus	2335.598 MPa	—	—	—	—
Stiffness deflection	2.323 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: Winkle Standard Tough PLA Tough Black has a balanced mid-range engineering profile. It is above its material-family average by 6,3 points and above its manufacturer average by 7,4 points. Its strongest measured axis is Consistency, while the weakest axis is Tensile.

Data-driven review: Winkle Standard Tough PLA Tough Black is best understood as a balanced material for general functional prototypes. Compared with the current verified dataset, it ranks better than 91% overall, is above the material-family average by 6,3 points, and is above the manufacturer average by 7,4 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 91%
22 / 234

Strengths

- Consistency: 83/100. Repeatability is one of the stronger signals in this material profile.
- Impact: 56/100. Impact behavior is competitive against the material-family context.
- Stiffness: 78/100. Stiffness is a relative advantage in this comparison group.

Limitations

- Tensile: 32/100. Avoid using this as the primary choice for tensile-loaded parts.
- Layer adhesion: 33/100. Z-axis performance should be treated with caution.

Engineering trade-offs

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

Recommended applications

- Rigid brackets, fixtures and shape-stable prototypes
- 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	56/100	22 / 234	Better than 91%

Metric	Score	Rank	Percentile
Tensile	32/100	83 / 226	Better than 64%
Impact	56/100	11 / 226	Better than 96%
Stiffness	78/100	119 / 223	Better than 47%
Consistency	83/100	41 / 231	Better than 83%
Layer adhesion	33/100	73 / 226	Better than 68%
Thermal	26/100	155 / 209	Better than 26%

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	—	—
MAT0079	Polymaker PolyLight PLA Pro Black	Polymaker	65/100	35/100	52/100
MAT0109	Polymaker PolyMax PLA Black	Polymaker	64/100	32/100	62/100

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

MaterialID	Material	Manufacturer	Overall	Tensile	Impact
MAT0109	Polymaker PolyMax PLA Black	Polymaker	64/100	32/100	62/100
MAT0080	Polymaker PolySonic PLA Pro Blue	Polymaker	64/100	30/100	58/100
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

Public links

[Manufacturer website](#) [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](#)