



PLA Rainbow

Polylactic Acid · gradient colour transition

1.75 mm ± 0.02

1 kg net

OEM / ODM

Document no.	WJ-TDS-PLARAINBOW-001
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Supersedes	None (first issue)

1. DESCRIPTION

WJ PLA Rainbow blends multiple colours along a single strand so the printed part transitions gradually between shades as it prints, without an AMS or multi-material setup. It prints and behaves like standard PLA, with a conventional satin finish rather than the glossy look of the silk range.

Typical applications display models, seasonal decor, gifts, and any single-spool print wanting a flowing multicolour gradient.

Processing summary processes like PLA Basic; no special tuning is needed. Colour transition length depends on model height and print speed.

- Drying before printing 50 °C for 8 h
- Nozzle size 0.4 mm and above
- Nozzle temperature 190 · 230 °C
- Build plate temperature 35 · 45 °C
- Part cooling fan High (80 · 100 %)
- Printing speed 60 · 200 mm/s

2. PRODUCT SPECIFICATION

typical, not a specification for acceptance

Parameter	Unit	Value
Filament diameter	mm	1.75
Diameter tolerance	mm	± 0.02
Net filament weight	kg	1
Spool material	·	ABS spool, Ø 200 × 65 mm, hub Ø 55 mm, 4 locating holes
Spool size (Ø × H)	mm	Ø 200 × 65 mm
Colour range	·	Stock colours as listed on the product page; RAL / Pantone matching and custom colour development on request

Values are typical for the grade and are subject to normal manufacturing tolerance. Colour masterbatch is not included in the base polymer content.

3. RECOMMENDED PRINTING PARAMETERS

starting point, not a guarantee

Parameter	Unit	Value
Drying before printing	°C / h	50 °C for 8 h
Printing and storage humidity	·	Dry storage; sealed with desiccant
Nozzle size	mm	at least 0.4
Nozzle type	·	Brass or hardened steel
Nozzle temperature	°C	190 · 230
Build plate type	·	Cool Plate, Engineering Plate or Textured PEI
Bed surface preparation	·	Clean; no adhesive typically needed
Bed temperature	°C	35 · 45

Parameter	Unit	Value
Part cooling fan	·	High (80 · 100 %)
Printing speed	mm/s	60 · 200
Enclosed chamber	·	Not required
Chamber temperature	°C	Ambient
Retraction length / speed	mm / mm/s	0.4 · 0.8 mm / 20 · 40 mm/s
Max overhang angle	°	~ 55
Max bridging length	mm	~ 30

4. MATERIAL PROPERTIES

specimens per section 5

Values are typical results from tests on specimens printed and conditioned as described in Section 5. They are not a guarantee of performance of any individual printed part.

4.1 Physical and thermal properties

Property	Test method	Unit	Typical value
Density	ISO 1183	g/cm ³	~ 1.24
Melt flow rate (MFR)	210 °C, 2.16 kg	g/10 min	~ 8 ± 1
Melting temperature	DSC	°C	~ 155
Glass transition temperature	DSC	°C	~ 58
Vicat softening temperature	ISO 306	°C	~ 58
Heat deflection temperature	ISO 75, 0.45 MPa	°C	~ 55
Heat deflection temperature	ISO 75, 1.8 MPa	°C	~ 48
Saturated water absorption	25 °C, 55 % RH	%	~ 0.5

4.2 Mechanical properties

Property	Test method	Unit	Typical value
Young's modulus (X·Y)	ISO 527 / GB/T 1040	MPa	~ 2350 ± 150
Young's modulus (Z)	ISO 527 / GB/T 1040	MPa	~ 2050 ± 150
Tensile strength (X·Y)	ISO 527 / GB/T 1040	MPa	~ 46 ± 4
Tensile strength (Z)	ISO 527 / GB/T 1040	MPa	~ 40 ± 4
Elongation at break (X·Y)	ISO 527 / GB/T 1040	%	~ 6
Elongation at break (Z)	ISO 527 / GB/T 1040	%	~ 3
Flexural modulus	ISO 178 / GB/T 9341	MPa	~ 2400 ± 140
Flexural strength	ISO 178 / GB/T 9341	MPa	~ 72 ± 5
Impact strength, notched	ISO 179 / GB/T 1043	kJ/m ²	~ 3
Impact strength, unnotched	ISO 179 / GB/T 1043	kJ/m ²	~ 10

4.3 Chemical and physical characteristics

Parameter	Value
Composition	Polylactic acid (PLA), gradient-pigmented
Odour	Mild, faintly sweet odour when printing
Skin hazard	No hazard in solid filament form
Chemical stability	Stable under normal storage and handling
Solubility	Insoluble in water; biodegradable under industrial composting
UV and weathering resistance	Poor · degrades and discolours with prolonged outdoor exposure
Acid resistance	Limited resistance
Alkali resistance	Limited resistance
Organic solvent resistance	Softened or dissolved by some solvents
Oil and grease resistance	Limited resistance
Flammability	Flammable
Combustion products	Carbon oxides

5. TEST CONDITIONS

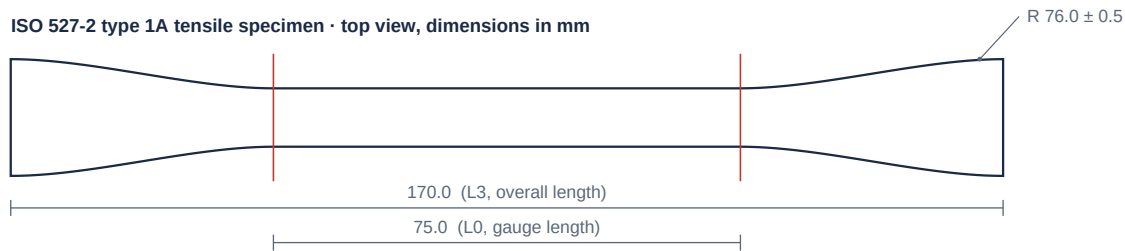
ISO 291, 23 / 50 class 2

5.1 Specimen printing and conditioning

Parameter	Unit	Value
Nozzle temperature	°C	210
Bed temperature	°C	40
Printing speed	mm/s	120
Infill density	%	100
Layer height	mm	0.2
Specimen conditioning / annealing	°C / h	23 °C / 50 % RH for 24 h (ISO 291)

5.2 Specimen geometry (dimensions in millimetres)

Fig. 1 ISO 527-2 type 1A tensile specimen · top view, dimensions in mm



Section widths: $b_1 = 10.00 \pm 0.20$ (narrow section) · $b_2 = 20.00 \pm 0.20$ (grip ends) · $h = 4.00 \pm 0.20$ (thickness) · gauge length $L_0 = 75.0$ mm

Fig. 2 ISO 178 flexural specimen $80 \times 10 \times 4$ mm · three-point bending, span 64 mm

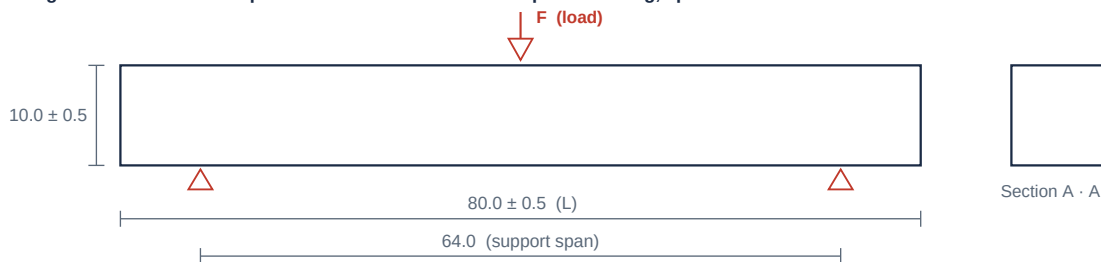


Fig. 3 ISO 179-1 Charpy notched specimen $80 \times 10 \times 4$ mm, 45° V-notch, depth 2.0 mm



6. STORAGE, HANDLING AND SAFETY

stewardship

Storage before use	Sealed bag, 15 · 25 °C, below 50 % RH, away from direct sunlight and UV, away from ignition sources. Shelf life 24 months.
Storage after opening	Reseal with the supplied desiccant. In humid climates print within 4 weeks of opening; the spool can be re-dried at 45 · 55 °C for 4 · 6 h.
Symptoms of moisture	Bubbling or popping sounds at the nozzle, rough surface, stringing, weak layer bonding, inconsistent extrusion. Dry the spool before changing settings.
Handling	PLA filament is brittle when overloaded. Keep the spool on its holder and avoid sharp bends at the extruder inlet, especially on direct-drive toolheads.
Ventilation	Printing releases trace lactide vapour with a faintly sweet odour. Print in a ventilated area and avoid breathing the fumes directly. Not for use in enclosed occupied spaces without extraction.
Fire and disposal	PLA is a combustible solid. Keep away from open flame and hot surfaces above 250 °C. Spool, bag and carton are recyclable; offcuts can go to industrial composting per EN 13432.
Personal protection	No special protection required for normal use. Wear gloves when handling hot parts and safety glasses when cutting filament.

7. ORDERING INFORMATION AND PACKAGING

commercial

Standard spool	1.00 kg net, Ø 200 mm, 68 mm hub bore, 4 locating holes. 0.25 / 0.50 / 3.00 kg spools on request.
Standard diameter	1.75 mm (2.85 mm on request). Tolerance per Section 2.
Export carton	10 rolls per carton, 5-ply corrugated. Carton net 10.0 kg, gross approx. 13.1 kg. Neutral print as standard.
Colour range	Stock colours as listed in Section 2. Custom colours matched to RAL, Pantone or a physical sample, subject to a minimum batch quantity.
OEM services	Spool label, shrink film print, spool material and colour, carton artwork and user manual. Artwork setup and MOQ are quoted per project.
Order confirmation	Every order is confirmed by a proforma invoice stating grade, colour, diameter, quantity, unit price, Incoterms and lead time.
Shipping and quality documents	Commercial invoice, packing list, bill of lading, certificate of origin and batch certificate of analysis as standard. RoHS / REACH declaration and safety data sheet on request.

Commercial terms shown here are indicative. The signed proforma invoice or sales contract prevails in case of any conflict.

8. DISCLAIMER AND REVISION CONTROL

The data in this document are typical values obtained from tests on standard specimens produced under the conditions described in Section 5. They are provided for material comparison and selection only and do not constitute a specification, warranty or guarantee of performance. Properties of an actual printed part depend on printer hardware, slicing parameters, part geometry, build orientation, ambient conditions and post-processing. WJ reserves the right to amend this document without notice. The buyer is responsible for verifying that the material is suitable for the intended application, including any regulatory or food-contact requirement.

8.1 How to read the data in this sheet

Typical, not minimum	The property tables describe specimens printed exactly as stated in Section 5. They describe the material, not a machined or moulded part.
Orientation matters	Values marked X·Y apply to specimens printed flat on the build plate. Z values are measured on parts printed standing up and are typically lower than X·Y. Design for the direction that carries the load.
Batch variation	Values carry a ± range where extrusion, pigment and ambient humidity vary between batches; colour masterbatch can shift impact strength noticeably. Where no deviation is given, the value is a single representative test.
Not a certificate	This sheet is not an inspection certificate, a Declaration of Conformity, or a certificate of analysis. Batch-specific CoA, RoHS / REACH declarations and safety data sheets are issued separately on request.

8.2 Revision history

Rev	Date	Description	Approved
V1.0	2026-08-01	First issue of PLA Rainbow technical data sheet.	QC / WJ

Prepared and released by

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Authorised signature and company stamp



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PLA Rainbow - Data disclosure addendum

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TYPICAL REFERENCE VALUES / NO THIRD-PARTY REPORT

This technical data sheet provides typical reference values for material comparison and selection only. It is not an independent third-party test report and does not constitute a product specification, warranty or guarantee of performance. Test methods and specimen conditions are stated in the corresponding sections. The user must verify suitability for the intended application.

DOCUMENT CONTROL

This addendum supplements Section 8 of the original TDS. Numerical property values and processing ranges are unchanged. The original revision history remains unchanged. This TDS is not a certificate of analysis or conformity.