

E000000

Plastics for Additive Manufacturing
 Guide Information

Process Category: (AM Process Technology)

Company Name
 1000 Additive Lane, City, State, Country

Grade ABC
 Material Generic Type (Chemical Abbreviation), furnished form (Pellets, Powder, Liquid, etc.) for use with (AM Process Technology)

	Min. Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
Color	1.5	HB	0	0	50	50	50
NC	3.0	V-0	0	0	50	50	50

Inclined Plane Tracking (IPT) kV: 60 min at 1 kV
 Volume Resistivity (10x ohm-cm): 14
 Surface Resistivity (10x ohms/square): 13
 High Volt. Low Current Arc Resis (D495): 5

Comparative Tracking Index (CTI): 0
 Dielectric Strength (kV/mm): 10
 High-Voltage Arc Tracking Rate (HVTR): 0
 Dimensional Change(%): 1.0

UL RoHS 2011/65/EU & 2015/863 Compliant Material (color: NC) [view certificate](#)
 UL 746H Non-Halogenated Material (color: NC)

(f1) - Suitable for outdoor use with respect to exposure to Ultraviolet Light, Water Exposure, and Immersion in accordance with UL 746C.
 (f3) - Suitable for use with respect to exposure to detergent, in accordance with UL 749.
 (f4) - Suitable for use with respect to exposure to detergent, in accordance with UL 2157.
 "Grade ABC" contains an average of 30% post consumer recycled content

Processing Parameters
 Build Plane: Horizontal & Vertical

Post Processing Method: Any Required Post Processing
 For use with printer: Printer Make and Model Number

Limited properties and ratings assigned to samples produced by the Additive Manufacturing technique representing a specific set of printing parameters and build strategy.
 Other print parameters and build strategies may result in significantly different results.

Printing Process Designation Number: 2
 Layer Thickness (mm): 0.05

UL Solutions
 ALSO COMPLY TO
 IEC/ISO REQUIREMENTS

IEC/ISO small-scale test data does not pertain to building material, furnishings and related contents IEC/ISO small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

Report Date: 2020-01-01
 2020-01-01

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Guide to the UL Solutions Blue Card[®]

Understanding the Plastics for Additive Manufacturing Recognition Program



What is a UL Solutions Blue Card[®]?



The UL Blue Card Plastics for Additive Manufacturing Recognition Program is a globally recognized program that provides third-party certification of the quality, safety and performance of plastics for additives manufacturing.

The UL Solutions Blue Card (or Plastics for Additive Manufacturing Recognition Program) is a digital product information card that lists substantial safety and performance-related properties for plastic materials that are suitable for 3D printing. Specifically, it provides data to facilitate the preselection of 3D-printed materials and components that are used in a range of applications. A Blue Card is automatically issued when a material intended for 3D printing achieves a UL Recognized Component Mark.

The Blue Card serves as an extension of the Yellow Card Program (Plastics Recognition Program) by defining the additional requirements necessary to recognize plastics intended for 3D printing and 3D-printed components and products.

The additional UL Solutions White Card provides information with respect to testing performed to international standards (ISO, IEC).

Certified materials are added to the UL Product iQ[®] and UL Prospector[®] databases, which thousands of designers, engineers and suppliers use to find providers of recognized materials and components.

Benefits for material manufacturers

The Blue Card is the ideal recognition for manufacturers of materials or components to promote products and their tested properties to global markets and potential customers.

Benefits for material users

The Blue Card provides confidence that a material will continue to meet requirements for specific applications. Using UL Solutions-tested and certified components – identifiable through the UL Recognized Component Mark on the Blue Card – can also help you save time and money. By eliminating the need for further material testing, it can help shorten the path to certain certifications.



Datasheet view of a UL Solutions Blue Card on

iq.ULprospector.com



Reading the Blue Card[®]



Click a number to learn more

Plastics for Additive Manufacturing
Guide Information E12345

Company Name
1000 ADDITIVE LANE, CITY, STATE, COUNTRY

Grade ABC (f1)(f3)
Material Generic Type (Chemical Abbreviation), furnished form (Pellets, Powder, Liquid, etc.) for use with (AM Process Technology)

<u>Color</u>	<u>Min.Thk</u> <u>(mm)</u>	<u>Flame</u> <u>Class</u>	<u>HWI</u>	<u>HAI</u>	<u>RTI</u> <u>Elec</u>	<u>RTI</u> <u>Imp</u>	<u>RTI</u> <u>Str</u>
NC	1.5	HB	0	0	50	50	50
	3.0	V-0	0	0	50	50	50

Comparative Tracking Index (CTI): 0 Inclined Plane Tracking (IPT): 60 min at 1kV
Dielectric Strength (kV/mm): 10 Volume Resistivity (10x ohm-cm): 14
High-Voltage Arc Tracking Rate (HVTR): 0 Surface Resistivity (10x ohms/square): 13
Dimensional Stability (%): 1.0 High Volt, Low Current Arc Resis (D495): 5

(f1) - Suitable for outdoor use with respect to exposure to Ultraviolet Light, Water Exposure, and Immersion in accordance with UL 746C
(f3) - Suitable for use with respect to exposure to detergent, in accordance with UL 749.
(f4) - Suitable for use with respect to exposure to detergent, in accordance with UL 2157.olor: ALL
"Grade ABC" contains an average of 30% post-consumer recycled content [view SPOT@ certificate](#)

The Printer information, printer settings and any post processing are included and must be used to assure that the material performance is obtained.

Processing Parameters
Build Plane: Horizontal & Vertical
Post Processing Method: Any Required Post Processing
For use with printer: Printer Make and Model Number

Printing Process Designation Number:
Layer Thickness (mm): 0.05

limited properties and ratings assigned to samples produced by the Additive Manufacturing technique representing a specific set of printing parameters and build strategy.
Other print parameters and build strategies may result in significantly different results

Report Date: 2014-07-15
Last Revised: 2017-02-08

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 **UL**
ALSO CERTIFIED TO
IECISO REQUIREMENTS

Example Blue Card – other information and ratings may be shown.



Reading the White Card[®]

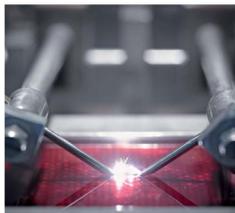
ISO/IEC/ASTM is an international standard that establishes and defines terms that are used in additive manufacturing (AM). In particular, this standard is used for additives that apply the additive shaping principle, therefore building physical 3D geometries.

To clarify further, AM is the general term for technologies that successively join material to create physical objects that have been developed using 3D model data. There are many applications for this technology, including engineering, medicine, education, architecture, cartography, toys and entertainment.

ISO/IEC/ASTM gives users a basic understanding of the fundamental principles for additive manufacturing, with clear definitions of relevant terms. Standardizing the terminology for AM makes it easier for people involved in this field to communicate across the world.



IEC glow-wire flammability/
IEC glow-wire ignition



IEC comparative tracking index



ISO tensile strength

IEC and ISO Test Methods

Test Name	Test Method	Units	Thk (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	0.4	V-0 (BK)
			0.75	V-0 (BK)
			1.5	V-0 (BK)
			3.0	V-0 (BK)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	°C	0.4	960
			0.75	960
			1.5	960
			3.0	960
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	°C	0.4	960
			0.75	960
			1.5	700
			3.0	700
IEC Comparative Tracking Index	IEC 60112	Volts (Max) Material Group	3.0	CT1600 I
IEC Ball Pressure	IEC 60695-10-2	°C	3.0	130
ISO Heat Deflection (1.80 MPa)	ISO 75-2	°C	3.0	124
ISO Tensile Strength	ISO 527-2	MPa	3.0	60
ISO Flexural Strength	ISO 178	MPa	3.0	55
ISO Tensile Impact	ISO 8256	kJ/m ²	3.0	40
ISO Izod Impact	ISO 180	kJ/m ²	3.0	70
ISO Charpy Impact	ISO 179-2	kJ/m ²	3.0	90



Overview of UL Standards



UL 94

Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

UL 746A

Standard for Polymeric Materials – Short Term Property Evaluations, including:

- HWI – hot wire ignition
- HAI – high arc ignition
- Short-term thickness-independent properties

UL 746B

Standard for Polymeric Materials – Long Term Property Evaluations, including:

RTI – relative thermal index

UL 746C

Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, including:

Outdoor-use suitability

UL 746D

Standard for Polymeric Materials – Fabricated Parts, including:

Evaluations of recycled materials

UL 746H

Outline of Investigation for Non-Halogenated Materials

UL 746R

Outline of Investigation for Restricted Use Substances in Polymeric Materials

RoHS

UL 2809

Environmental Claim Validation Procedure (ECVP) for Recycled Content

UL Solutions Follow-Up Services





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