

# Arnitel® ID 2045

## TPC

>50% Renewable Content, 3D printing grade

Print Date: 2018-10-23

The mechanical data is tested on printed tensile bars, printed in two directions: 0°-90° and 45°-45°

The material passed the ISO irritation, ISO cytotox and the USP VI tests.

Properties	Typical Data	Unit	Test Method
<b>Thermal properties</b>			
	Value		
Melting temperature (10°C/min)	158	°C	ISO 11357-1/-3
Glass transition temperature (10°C/min)	-35	°C	ISO 11357-1/-2
Vicat softening temperature (50°C/h 10N)	90	°C	ISO 306
<b>Electrical properties</b>			
	Value		
Volume resistivity	>1E13	Ohm*m	IEC 60093
Electric strength	20	kV/mm	IEC 60243-1
<b>Other properties</b>			
	Value		
Humidity absorption	0.04	%	Sim. to ISO 62
Density	1100	kg/m <sup>3</sup>	ISO 1183
<b>Material specific properties</b>			
	Value		
Maximum tensile stress (3D printed tensile bars) 0°-90°	8	MPa	ISO 527-1/-2
Maximum tensile stress (3D printed tensile bars) 45°-45°	7.6	MPa	ISO 527-1/-2
Tensile modulus (3D printed tensile bars) 0°-90°	29	MPa	ISO 527-1/-2
Tensile modulus (3D printed tensile bars) 45°-45°	29	MPa	ISO 527-1/-2
Elongation at break (3D printed tensile bars) 0°-90°	350	%	ISO 527-1/-2
Elongation at break (3D printed tensile bars) 45°-45°	390	%	ISO 527-1/-2
Shore D Hardness (3s)	34	-	ISO 868

Akulon®, Arnite®, Arnitel®, EcoPaXX®, ForTii®, Novamid®, Stanyl® and Xytron™ are trademarks of DSM.

All information supplied by or on behalf of DSM in relation to its products, whether in the nature of data, recommendations or otherwise, is supported by research and, in good faith, believed reliable, but DSM assumes no liability and makes no warranties of any kind, express or implied, including, but not limited to, those of title, merchantability, fitness for a particular purpose or non-infringement or any warranty arising from a course of dealing, usage, or trade practice whatsoever in respect of application, processing or use made of the aforementioned information, or product. The user assumes all responsibility for the use of all information provided and shall verify quality and other properties or any consequences from the use of all such information.

Typical values are indicative only and are not to be construed as being binding specifications. This document replaces all previous versions relating to this subject.

Copyright © DSM 2018. All rights reserved. No part of the information may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of DSM.

# Arnitel® ID 2045

## TPC

### GRADE CODING

Arnitel® ID flexible 3D printing grade based on >50% renewable content.

### MATERIAL HANDLING

#### Storage

In order to prevent moisture pick up and contamination, supplied packaging should be kept closed and undamaged. For the same reason, partially used bags should be sealed before re-storage. Allow the material that has been stored elsewhere to adapt to the temperature in the processing room while keeping the bag closed.

#### Packaging

Arnitel® ID grades are supplied in airtight, moisture-proof packaging.

#### Moisture content as delivered

Arnitel® ID grades are packaged at a moisture level <0.1 w%.

#### Conditioning before printing

To prevent moisture condensing on filaments, bring cold filaments up to ambient temperature in the print shop while keeping the packaging close.

04.09.2018

All information supplied by or on behalf of DSM in relation to its products, whether in the nature of data, recommendations or otherwise, is supported by research and, in good faith, believed reliable, but DSM assumes no liability and makes no warranties of any kind, express or implied, including, but not limited to, those of title, merchantability, fitness for a particular purpose or non-infringement or any warranty arising from a course of dealing, usage, or trade practice whatsoever in respect of application, processing or use made of the aforementioned information or product. The user assumes all responsibility for the use of all information provided and shall verify quality and other properties or any consequence from the use of all such information. Typical values are indicative only and are not to be construed as being binding specifications.

## Recommendations for 3D printing

# Arnitel<sup>®</sup> ID 2045

### MACHINERY SETTINGS

Common fused filament fabrication (FFF) equipment should work with Arnitel<sup>®</sup> filaments. Due to its flexible nature direct drive extruders will be recommended. However, Bowden type extruders modified for use with flexible filaments are known to work as well. Typical settings for any slicing software (e.g. Slic3R, Cura, Simplify3D) are listed below. Note that for different nozzle diameters the settings should be changed accordingly.

Nozzle diameter: 0.4 mm  
Filament diameter: 2.85 mm, 1.75 mm

#### Print Speed:

20 -50 mm/s (obeying the maximal throughput of the extruder)

#### Extrusion width:

0.4 mm (or at least equal to nozzle diameter)

#### Layer Height:

Layer: 0.1-0.2 mm  
First layer: 100-150% of first layer thickness

#### Extrusion temperatures:

Extruder: 220 - 245°C / 428 - 473°F

Arnitel<sup>®</sup> ID can be used with a range of nozzle temperature (220-245 °C / 428-473°F). Preferred temperature to print your object is 230°C / 446°F. To generate a homogeneous melt, the melt temperature should always be above 200°C / 392°F. Optimal mechanical properties will be achieved at melt temperature in the given range.

#### Bed Temperature:

Build plate temperature setting: 40-60°C / 104-140°F

Note: Prior to removing the printed part from the bed, the bed temperature should be lowered to ambient to avoid severe deformation of the part.

04.09.2018

All information supplied by or on behalf of DSM in relation to its products, whether in the nature of data, recommendations or otherwise, is supported by research and, in good faith, believed reliable, but DSM assumes no liability and makes no warranties of any kind, express or implied, including, but not limited to, those of title, merchantability, fitness for a particular purpose or non-infringement or any warranty arising from a course of dealing, usage, or trade practice whatsoever in respect of application, processing or use made of the aforementioned information or product. The user assumes all responsibility for the use of all information provided and shall verify quality and other properties or any consequence from the use of all such information. Typical values are indicative only and are not to be construed as being binding specifications.

## Recommendations for 3D printing

# Arnitel<sup>®</sup> ID 2045

### GENERAL PROCESSING SETTINGS

#### Build plate adhesion

For the best adhesion with Arnitel<sup>®</sup> ID it is advised to use an adhesive promotor, e.g. glue-stick or 3D-Lac<sup>®</sup>. Alternatively, printing on bare glass can be used at elevated temperatures when using a large footprint, e.g. by using a large brim. Prior to applying an adhesive promotor or to printing on bare substrate, the surface must be free of dirt and grease. Therefore cleaning with ethanol or acetone is recommended. It is advised to add a brim of at least 5 mm to the print.

### SAFETY

For the safety properties of the material, we refer to our SDS which can be ordered at our sales offices. During practical operation wear personal safety protections for hand/eye/body.

### STARTUP/SHUT DOWN

Production has to be started with a clean machine. Starting the machine, extrude at least 50 mm of new filament through the nozzle. Remove the filament from the machine before shutting down your printer.

### PRODUCTION BREAKS

During production breaks longer than a few minutes, purge the nozzle adequately.

### TROUBLESHOOTING

#### Most common defects

- **Warping:** Corners of the print lift and detach from the platform. Advice is to increase the build plate temperature. Wait long enough to allow the heat to dissipate to the top surface of the substrate.
- **First layer not sticking / parts coming loose:** The first layer of your print does not seem to want to stick or your parts come loose partway through the print. Remedies: check bed levelling and first layer thickness, increase size of brim, raise bed temperature, add appropriate adhesion promotor e.g. 3D-Lac<sup>®</sup> or glue-stick the build plate or change to PEI bed substrate.
- **Filament grinding:** The feeder wheels have ground a groove into the filament. Remove the damaged filament and start again, reduce printing speed, disable retraction or reduce retraction speed and length
- **Stringing:** Unwanted strands of plastic span across the print. Lower nozzle temperature, increase travel speed of the print head.

04.09.2018

All information supplied by or on behalf of DSM in relation to its products, whether in the nature of data, recommendations or otherwise, is supported by research and, in good faith, believed reliable, but DSM assumes no liability and makes no warranties of any kind, express or implied, including, but not limited to, those of title, merchantability, fitness for a particular purpose or non-infringement or any warranty arising from a course of dealing, usage, or trade practice whatsoever in respect of application, processing or use made of the aforementioned information or product. The user assumes all responsibility for the use of all information provided and shall verify quality and other properties or any consequence from the use of all such information. Typical values are indicative only and are not to be construed as being binding specifications.