Rigid White

Production Rigid

Production-grade opaque white material for same-day manufacturing of rigid parts —smooth, durable, stable, and biocompatible for functional use.

Save on Tooling Costs and Time with Direct Production Plastic Parts

Figure 4® Rigid White is a production-grade opaque white material engineered for durability and consistency.
It delivers long-term environmental stability, a clean white finish, and biocompatibility, making it ideal for medical, consumer, and industrial applications where both performance and appearance matter.
It exhibits thermoplastic-like behavior with controlled ductility. This material supports snap-fit designs and applications demanding flexibility and toughness.
With a 65°C heat deflection temperature, high elongation at break, and fast print speeds, it offers efficient production and smooth post-processing for reliable, high-quality output.

HANDLING & POST-PROCESSING GUIDELINES

This material requires proper mixing, cleaning, drying, and curing to achieve consistent mechanical and aesthetic performance.
Detailed post-processing instructions are provided at the end of this document.
Note: All reported properties are based on the standardized post-processing procedure. Any variation in process or parameters may lead to changes in material performance.

APPLICATIONS

- Ideal for medical handles, fixtures, and precision device parts requiring biocompatibility.
- Suitable for electronics enclosures, motor housings, covers, and functional jigs or fixtures.
- Perfect for low-volume production and prototype plastic components.

BENEFITS

- Maintains long-term mechanical stability under UV and humidity exposure
- Clean, durable opaque white finish suitable for end-use applications
- Fast part turnaround — no secondary thermal curing required
- High surface accuracy, repeatability, and consistent dimensional precision

FEATURES

- Thermoplastic behavior with ductile necking at break
- 65°C heat deflection temperature
- 20% elongation at break
- Flexural modulus: 2200 MPa
- Biocompatible-capable per ISO 10993-5
- UL94 HB flammability rating
- Print speed up to 47 mm/hr at 50 µm layer thickness
- Supports larger and thicker geometries in Premium Plus mode

MATERIAL PROPERTIES

The material's mechanical, thermal, and electrical properties are measured in accordance with relevant ASTM and ISO standards. Additional parameters, including flammability, dielectric performance, and 24-hour water absorption, support informed design decisions.

All test samples are conditioned as per ASTM guidelines, minimum 40 hours at 23°C and 50% RH ensuring consistent, reliable data.

Solid material properties were obtained from parts printed in the vertical (ZY) orientation. Since Figure 4 materials demonstrate uniform isotropic behavior, part orientation does not significantly impact mechanical performance.

LIQUID MATERIAL			
Property	**Test Method / Condition**	**Metric**	**Imperial**
Viscosity	Brookfield Viscometer @ 25 °C (77 °F)	270 cps	653 lb/ft-hr
Color		White	
Liquid Density	Kruss K11 Force Tensiometer @ 25 °C (77 °F)	1.09 g/cm ^{3}	0.036 lb/in ^{3}
Default Print Layer Thickness (Standard Mode)		50 µm	0.002 in
Speed - Standard Mode		47 mm/hr	1.85 in/hr
Speed - Draft Mode		54 mm/hr	2.13 in/hr
Package Volume		1 kg bottle 2.5 kg cartridge 9 kg container	

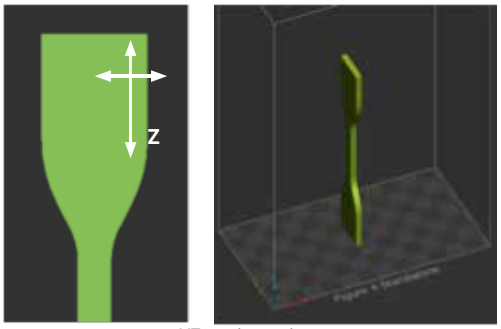
SOLID MATERIAL						
Property	**ASTM Method**	**Metric**	**Imperial**	**ISO Method**	**Metric**	**Imperial**
	PHYSICAL				**PHYSICAL**	
Solid Density 24 Hour	ASTM D792	1.16 g/cm3	0.042 lb/in3	ISO 1183	1.16 g/cm3	0.042 lb/in3
Water Absorption	ASTM D570	1.88%	1.88%	ISO 62	1.88%	1.88%
	MECHANICAL				**MECHANICAL**	
Tensile Strength Ultimate	ASTM D638 *	57 MPa	8200 psi	ISO 527 -1/2	58 MPa	8500 psi
Tensile Strength at Yield	ASTM D638	57 MPa	8200 psi	ISO 527 -1/2	58 MPa	8500 psi
Tensile Modulus	ASTM D638	2320 MPa	300 ksi	ISO 527 -1/2	2600 MPa	370 ksi
Elongation at Break	ASTM D638	20%	20%	ISO 527 -1/2	17.2%	17.2%
Elongation at Yield	ASTM D638	4.5%	4.5%	ISO 527 -1/2	4.2%	4.2%
Flex Strength	ASTM D790	84 MPa	12200 psi	ISO 178	90 MPa	13000 psi
Flex Modulus	ASTM D790	2200 MPa	320 ksi	ISO 178	2600 MPa	371 ksi
Izod Notched Impact	ASTM D256	21 J/m	0.4 ft-lb/in	ISO 180-A	3.1 J/m²	0.0015 ft-lb/in²
Izod Unnotched Impact	ASTM D4812	160 J/m	3 ft-lb/in	ISO 180-U		
Shore Hardness	ASTM D2240	81D	81D	ISO 7619	81D	81D
	THERMAL				**THERMAL**	
Tg (DMA, E")	ASTM E1640 (E"at 1C/min)	64 °C	148 °F	ISO 6721-1/1 (E"at 1C/min)	64 °C	148 °F
HDT @ 0.455 MPa/66 PSI	ASTM D648	65 °C	149 °F	ISO 75- 1/2 B	60 °C	143 °F
HDT @ 1.82 MPa/264 PSI	ASTM D648	55 °C	131 °F	ISO 75-1/2 A	54 °C	129 °F
CTE below Tg	ASTM E831	82 ppm/°C	46 ppm/°F	ISO 11359-2	82 ppm/°K	46 ppm/°F
CTE above Tg	ASTM E831	146 ppm/°C	81 ppm/°F	ISO 11359-2	146 ppm/°K	81 ppm/°F
UL Flammability	UL94	HB	HB			
	ELECTRICAL				**ELECTRICAL**	
Dielectric Strength (V/mil) @ 3.0 mm thickness	ASTM D149	15.1				
Dielectric Constant @ 1 MHz	ASTM D150	3.21				
Dissipation Factor @ 1 MHz	ASTM D150	0.019				
Volume Resistivity (ohm-cm)	ASTM D257	$6.8x10^{15}$				

ISOTROPIC PROPERTIES

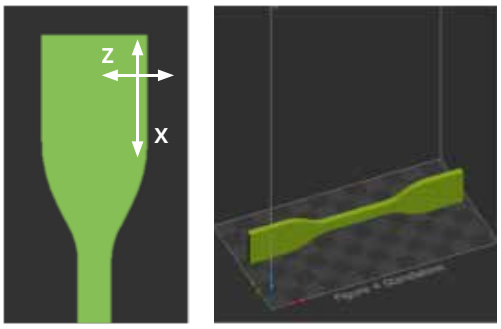
Parts printed using Figure 4 technology exhibit uniform mechanical performance across all axes (X, Y, and Z).
This isotropic behavior ensures consistent strength, flexibility, and dimensional stability—regardless of part orientation.

As a result, designers gain greater freedom in part placement and geometry, without compromising mechanical integrity or performance reliability.

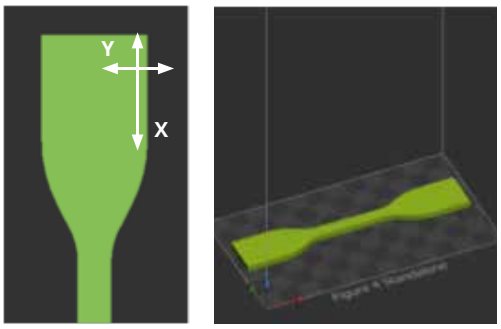
SOLID MATERIAL					
METRIC	METHOD	METRIC			
MECHANICAL					
METRIC	METHOD	ZY	XZ	XY	Z45
Tensile Strength Ultimate	ASTM D638 Type IV	57 MPa	62 MPa	61 MPa	59 MPa
Tensile Strength at Yield	ASTM D638 Type IV	57 MPa	62 MPa	61 MPa	59 MPa
Tensile Modulus	ASTM D638 Type IV	2100 MPa	2100 MPa	2100 MPa	2100 MPa
Elongation at Break	ASTM D638 Type IV	20%	20%	22%	23%
Elongation at Yield	ASTM D638 Type IV	4.5%	4.5%	4.8%	4.2%
Flex Strength	ASTM D790	84 MPa	93 MPa	88 MPa	82 MPa
Flex Modulus	ASTM D790	2200 MPa	2400 MPa	2200 MPa	2100 MPa
Izod Notched Impact	ASTM D256	21 J/m	26 J/m	24 J/m	24 J/m
Shore Hardness	ASTM D2240	81D	81D	81D	81D



YZ - orientation



XZ - orientation

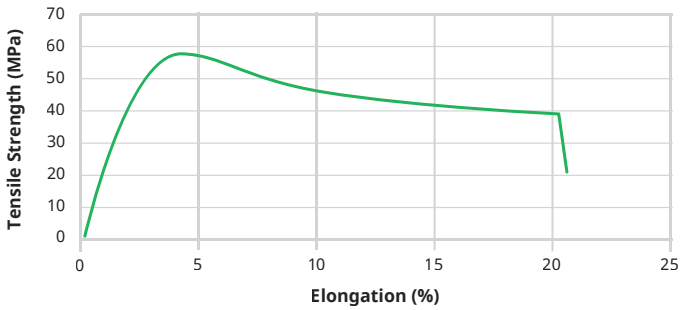


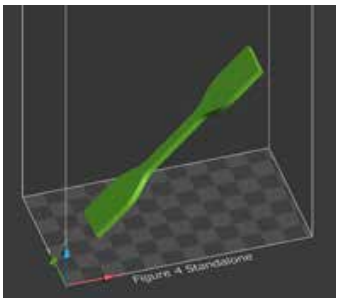
XY - orientation

ISOTROPIC PROPERTIES

Figure 4 Rigid White demonstrates thermoplastic behavior characterized by extended plastic deformation and ductile necking before fracture.
This property enhances the snap-fit and clip performance of printed parts, ensuring durability and reliable mechanical response under load.

Figure 4 Rigid White



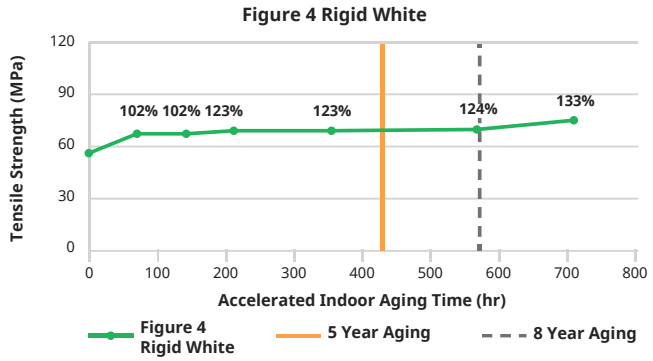

Z45-Degree - orientation

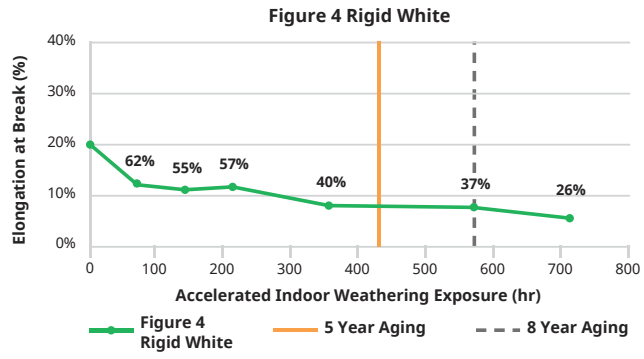
LONG TERM ENVIRONMENTAL STABILITY

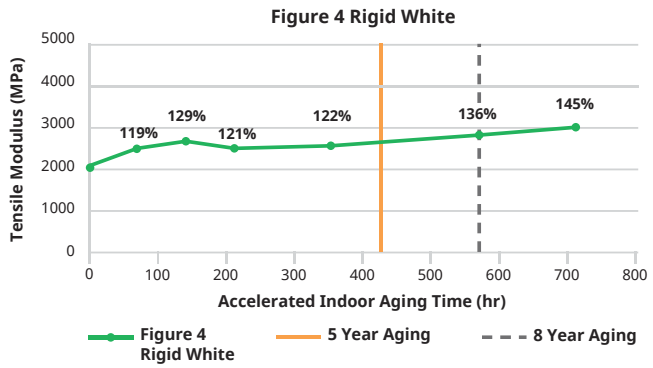
Figure 4 Rigid White is designed for durable performance under UV exposure and humidity. The material has been tested to maintain a high percentage of its original mechanical strength and stability over extended periods.
This ensures reliable, real-world performance and allows designers to make informed decisions when selecting materials for indoor or outdoor applications.

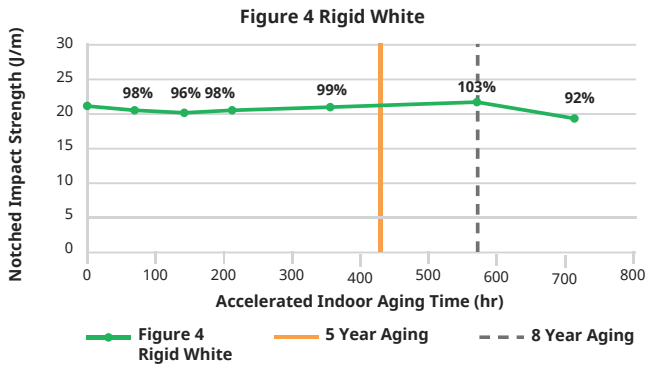
INDOOR STABILITY: Evaluated as per ASTM D4329 standard method to ensure resistance against prolonged UV and humidity exposure in controlled environments.

INDOOR STABILITY



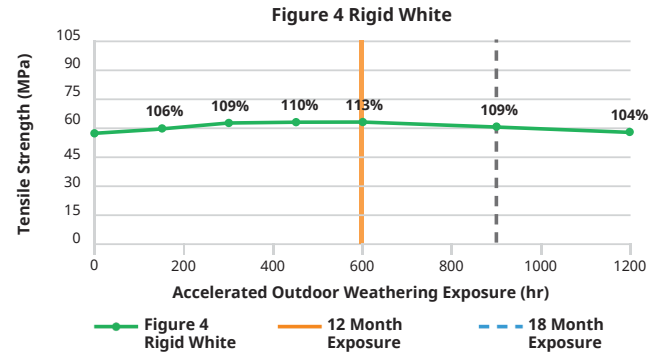


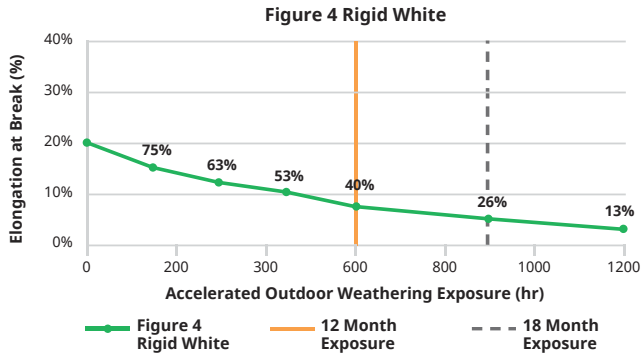


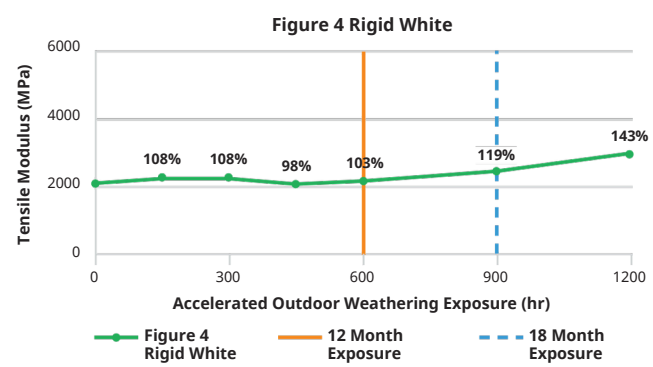


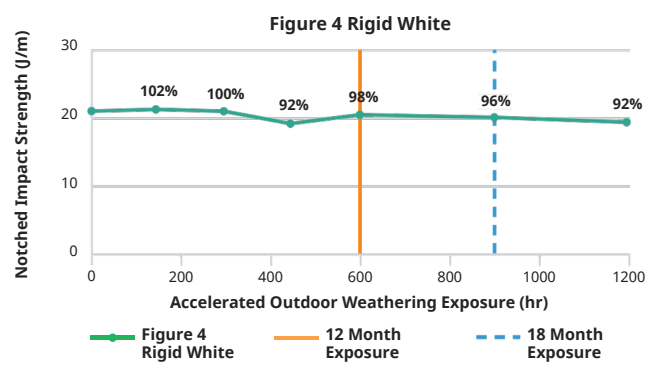
OUTDOOR STABILITY: Assessed as per ASTM G154 standard method to validate durability and mechanical integrity under simulated outdoor weathering conditions.

OUTDOOR STABILITY









AUTOMOTIVE FLUID COMPATIBILITY

Material compatibility with hydrocarbons and cleaning agents plays a key role in determining part performance.
Figure 4 Rigid White parts were tested under USCAR2 standard conditions for both sealed and surface contact exposure.

Testing was conducted in two stages:

- 7-Day Immersion: Parts were immersed for 7 days, followed by mechanical property evaluation.
- Short-Term Immersion: Parts were immersed for 30 minutes, removed, and tested again after 7 days for comparison.

These tests reflect the measured mechanical performance and stability of the material over the specified duration.

Fluid	Specification	Test Temp (°C)
Gasoline	ISO 1817, Liquid C	23 ± 5
Diesel Fuel 905	ISO 1817, Oil No. 3 + 10% p-xylene*	23 ± 5
Engine Oil	ISO 1817, Oil No. 2	50 ± 3
Ethanol	85% Ethanol + 15% ISO 1817, Liquid C*	23 ± 5
Power Steering Fluid	ISO 1817, Oil No. 3	50 ± 3
Automotive Transmission Fluid	Dexron VI (North American specific material)	50 ± 3
Engine Coolant	50% ethylene glycol + 50% distilled water*	50 ± 3
Brake Fluid	SAE RM66xx (latest available fluid for xx)	50 ± 3
Diesel Exhaust Fluid (DEF)	API certified per ISO 22241	23 ± 5

Figure 4 Rigid White

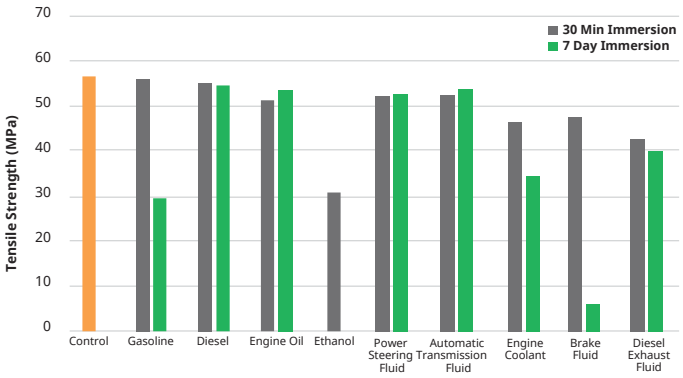


Figure 4 Rigid White

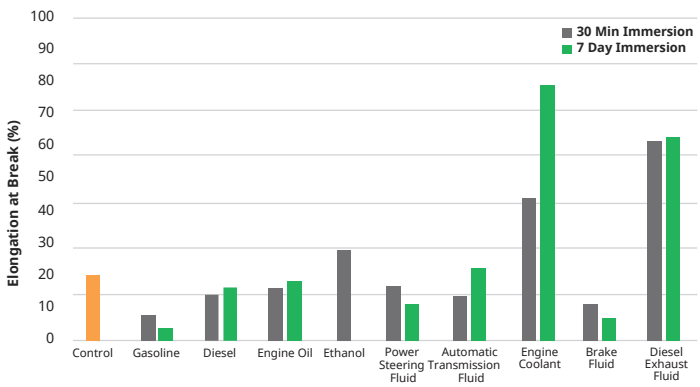


Figure 4 Rigid White

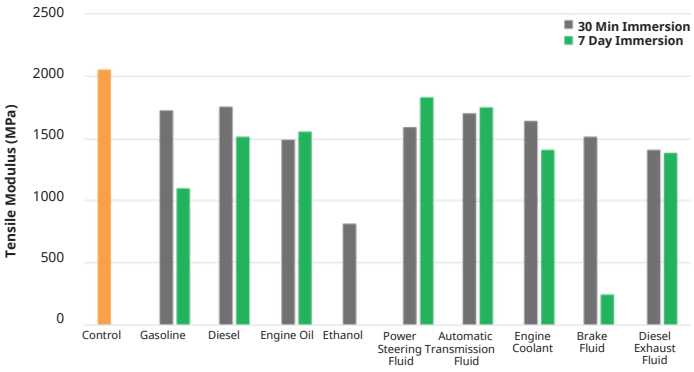
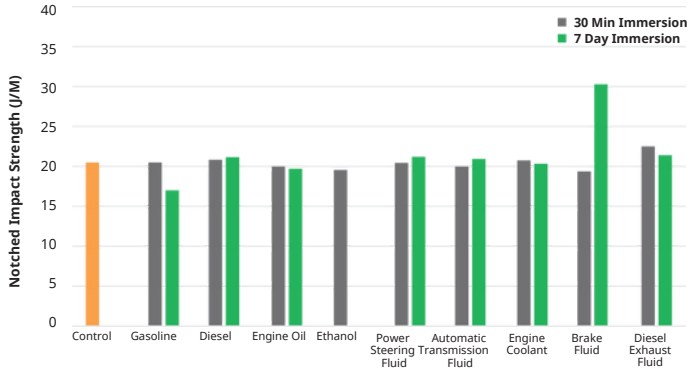


Figure 4 Rigid White



CHEMICAL COMPATIBILITY

Material compatibility with cleaning agents and industrial chemicals plays a vital role in determining long-term part reliability.
Figure 4 Rigid White samples were tested for sealed and surface contact compatibility as per ASTM D543 standard procedures.

The following test methods were applied:

- Extended Exposure: Samples were immersed for 7 days and then evaluated for changes in mechanical properties.
- Short-Term Exposure: Samples were immersed for 30 minutes, removed, and tested again after 7 days for comparison.

These results represent the measured mechanical performance of the material over the test duration.

Chemical Compatibility
6.3.3 Acetone
6.3.12 Detergent Solution, Heavy Duty
6.3.23 Hydrochloric Acid (10%)
6.3.38 Sodium Carbonate Solution (20%)
6.3.44 Sodium Hypochlorite Solution
6.3.46 Sulfuric Acid (30%)
6.3.42 Sodium Hydroxide Solution (10%)
Distilled Water

*Materials marked with an asterisk were not subjected to 7-day soak conditioning.

Figure 4 Rigid White

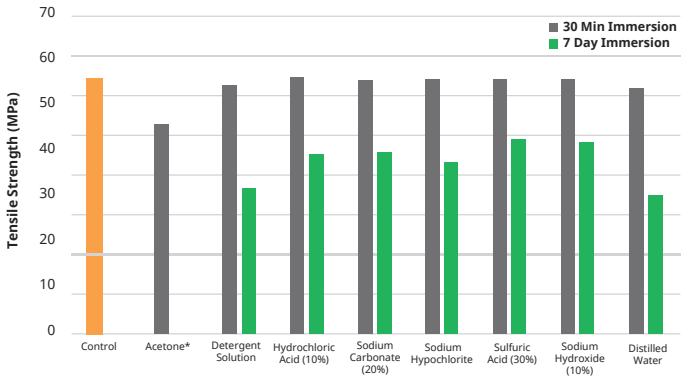
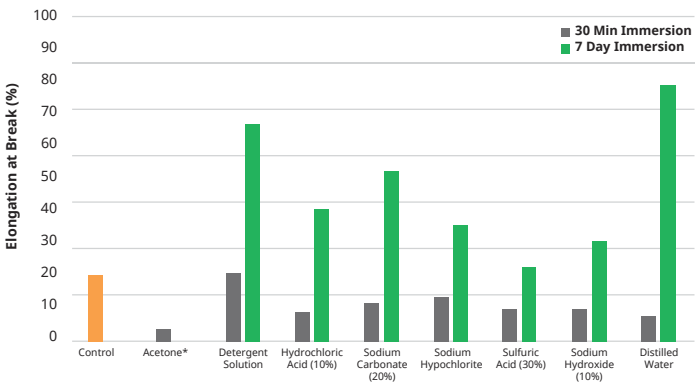


Figure 4 Rigid White



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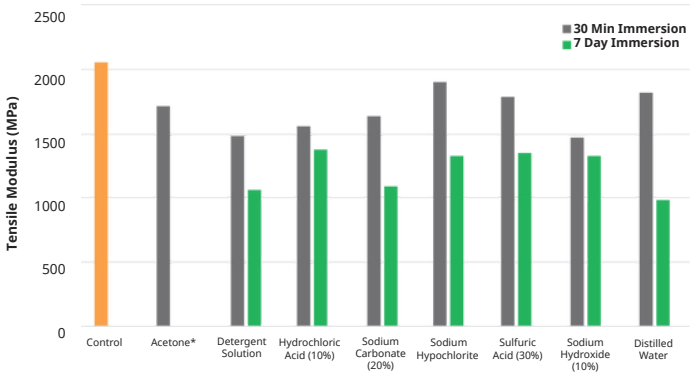

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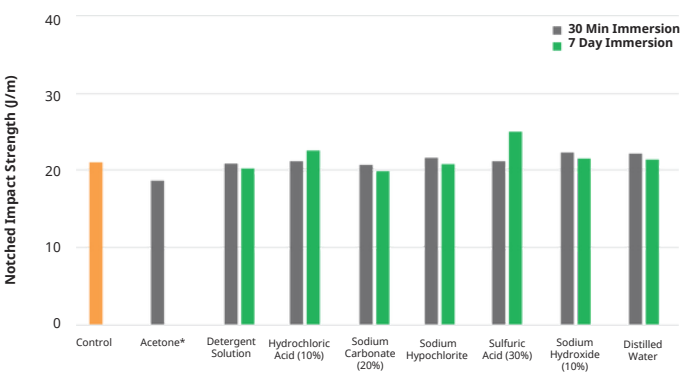

BIOCOMPATIBILITY

Test specimens of Figure 4® Rigid White, printed and processed as per the defined post-processing instructions, were evaluated by an independent biological testing laboratory. Testing was conducted in accordance with:

- ISO 10993-5 — Biological evaluation of medical devices: Tests for in vitro cytotoxicity
- ISO 10993-10 — Biological evaluation of medical devices: Tests for irritation and skin sensitization (GPMT)

The results confirm that Figure 4® Rigid White meets the biocompatibility requirements under the specified testing conditions.

Users are responsible for determining the suitability, safety, and compliance of this material for their specific applications. Mech Power recommends conducting independent validation before use.

Due to potential changes in regulations, material formulations, or test standards, Periodic verification of biocompatibility is recommended to ensure continued compliance.

POST-PROCESSING INSTRUCTIONS – REQUIRED TO MEET ISO 10993-5 AND ISO 10993-10

MIXING INSTRUCTIONS

This material contains pigments that may gradually settle over time. For best results, ensure thorough mixing before printing:

For 1 kg Bottle – Figure 4 Standalone:

- Roll for 1 hour before first use.
- Roll for 10 minutes before each subsequent use.

For 2.5 kg Cartridge – Figure 4 Modular:

- Shake vigorously for 2 minutes before installation.

Between print jobs: Stir resin in the tray for 30 seconds using the resin mixer.

MANUAL CLEANING INSTRUCTIONS

- Clean parts manually using two IPA containers: one for washing and one for rinsing.
- Wash: Agitate in "wash" IPA for 5 minutes.
- Rinse: Agitate in "clean" IPA for another 5 minutes.
- Avoid exceeding 10 minutes total IPA exposure to maintain mechanical integrity.
- Use gentle agitation or a soft brush to remove any residues.
- Replace IPA once it becomes cloudy or less effective.

DRYING INSTRUCTIONS

- Allow parts to air dry for at least 1 hour before UV curing.

UV CURE TIME

- Cure for 90 minutes in a suitable UV post-curing unit.