

Hands On FEA Lab

Test your Simulation Intuition

SIM21006-L

Autodesk University 2016
November 15-17, 2016



Product Specifications



BODY: Polypropylene

LATCH: Polypropylene

O-RING: Polymer

PINS: Stainless Steel

FOAM: 1.3 lb Polyurethane

PURGE BODY: ABS

PURGE VENT: 3 Micron Hydrophobic Non-Woven

PURGE O-RING: 70 Shore Nitrile

LID DEPTH: 0.75" (1.9 cm)

BOTTOM DEPTH: 2.87" (7.3 cm)

TOTAL DEPTH: 3.62" (9.2 cm)

INT VOLUME: 0.1 ft³ (0.003 m³)

WEIGHT WITH FOAM: 1.75 lbs (0.8 kg)

WEIGHT WITHOUT FOAM: 1.61 lbs (0.7 kg)

BUOYANCY: 8.00 lbs (3.6 kg)

MINIMUM TEMPERATURE: -40° F (-40 ° C)

MAXIMUM TEMPERATURE: 210° F (99 ° C)

CERTIFICATIONS: IP67 / STANAG 4280 / Def Stan 81-41

Anticipated Use



- Planned Use

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- Predictable Abuse

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- Notes

Expected Failure Modes



- Top Housing

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- Bottom Housing

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- Pins

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- Handle

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- Latch

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- Notes

Material Properties

Huntsman P6M5B-015 Impact Copolymer Polypropylene

Subcategory: Polymer; Polypropylene; Thermoplastic

Material Notes:

Impact copolymer, UL certified, and FDA compliant.

Features: Nucleated, antistat, controlled rheology, and medium impact strength.

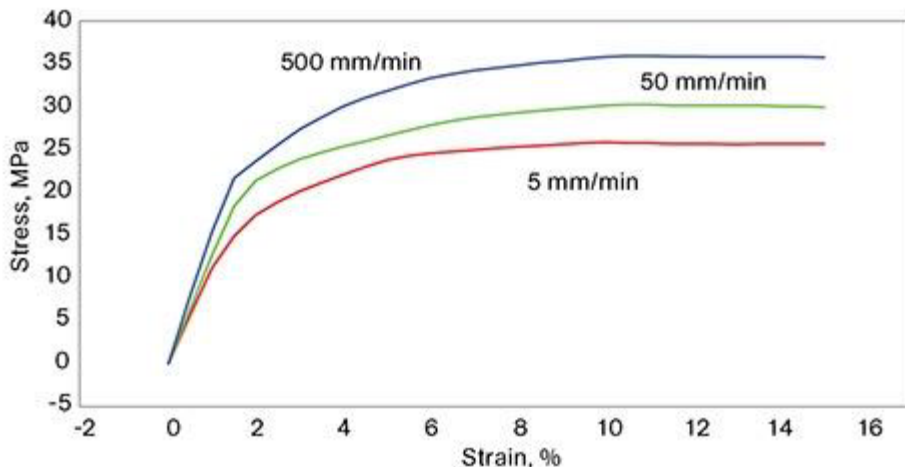
Applications: Injection molding: closures and general purpose.

Information provided by Huntsman Corporation

Physical Properties	Metric	English	Comments
Density	0.9 g/cc	0.0325 lb/in ³	ASTM D1505
Melt Flow	22 g/10 min	22 g/10 min	ASTM D1238

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell R	62	62	ASTM D785
Tensile Strength, Yield	26 MPa	3770 psi	ASTM D638
Elongation at Yield	8 %	8 %	ASTM D638
Flexural Modulus	1.05 GPa	152 ksi	Tangent; ASTM D790
Izod Impact, Notched	0.7 J/cm	1.31 ft-lb/in	23° C; ASTM D256
Low Temperature Gardner Impact	18 J	13.3 ft-lb	-30° C; ASTM D3029

Thermal Properties	Metric	English	Comments
Deflection Temperature at 0.46 MPa (66 psi)	94 °C	201 °F	ASTM D648



Stress-Strain Curve
For Unfilled
Polypropylene

Allowables



■ Top & Bottom Housing (H.I. PP Copolymer)

— Stress: _____ Displacement: _____

— Justification:

— Uncertainty Factors:

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■ Handle & Latch (PP)

— Stress: _____

— Displacement: _____(Handle) _____(Latch)

— Justification:

— Uncertainty Factors:

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■ Notes

Applicable Physics...



Simulation Physics

Why?

- Linear Static
- Nonlinear Static
- Frequency Response
- Natural Frequency
- Linear Buckling
- Nonlinear Buckling
- Transient Response
- Impact Analysis
- Fatigue
- Heat Transfer

Physical Interactions...

Handle



- Interaction:
- Idealization options:

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- Interaction:
- Idealization options:

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- Interaction:
- Idealization options:

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- Interaction:
- Idealization options:

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Gives & Takes... Handle



- Interaction:

- Idealization option:

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- Idealization option:

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- Idealization option:

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- Idealization option:

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Handle Studies

Study	(A) Displacement (in.)	(B) Notch Stress (psi.)	(C) Cut-Out Stress (psi.)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Delta			

Additional Notes:

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