Technical Data Sheet

VERSALOID™ 2308 Flexible Acrylic Resin

Description

VERSALOID™ 2308 Flexible Acrylic Resin is a 100% acrylic thermoplastic co-polymer for use in transparent weatherable applications. End-use products based upon VERSALOID™ 2308 Flexible Acrylic Resin will exhibit a broad service temperature range, maintaining excellent tensile strength, tear resistance and other physical properties, while remaining flexible and ductile, even at sub-ambient temperatures.

Applications

VERSALOID™ 2308 Flexible Acrylic Resin may be formulated and compounded with other ingredients, e.g. UV absorbers, AOX packages, or lubricants, if desired. It can be either extruded or calendered into transparent, flexible, weatherable film or sheet, either from powder or compounded pellets. VERSALOID™ 2308 may also be formulated, compounded, and extruded into profile or injection-molded into articles.

Regional Product availability

- Global

Typical Properties

Property	VERSALOID™ 2308 Flexible Acrylic Resin
Physical appearance	White free-flowing powder
Bulk density aerated (g/cm^3)	0.3 - 0.5
Specific Gravity (g/cm^3)	1.1
Volatiles (% max)	<1%

[1] Typical properties, not necessarily specifications

Key attributes

- Flexible at ambient and sub-ambient temperatures
- Very high stress whitening resistance
- Excellent dead fold properties
- Good Clarity, as detailed below
- Excellent mechanical properties, as detailed below
- Excellent weatherability
- Printable and Paintable with both solvent or water-borne inks / paints
- Excellent adhesion to polar substrates for laminating, including metal, PS, ABS, PET, PU and PVC
- Miscibility with a variety of thermoplastics, including PMMA, PVC, ASA, PVDF, and PBT.

Typical VERSALOID™ 2308 Flexible Acrylic Resin Film Properties

Optical		
Film Thickness (µm)	200	
Total Light transmission (TT%)	> 92	ASTM D1003
Haze (%)	< 2%	ASTM D1003
Mechanical		
Tensile Strength @ break (PSI/MPa)	2100/14.5	ASTM D882
Tensile Elongation @ break (%)	230	ASTM D882
Tensile Modulus (PSI / MPa)	21000 / 144.8	ASTM D882
Shore A Hardness	90 - 95	ASTM D2240
Shore D Hardness	50 -55	ASTM D2240
Physical		
Vicat (°C) (1.0 kg weight)	55 to 60	ASTM D 1525
Melt Flow Rate (g/10 min) (230°C, 10kg weight)	~18	
Specific Gravity (g/ml)	1.1	

Film Tensile Properties versus Temperature

VERSALOID™ 2308 Flexible Acrylic Resin film products maintain excellent tensile strength and % strain at break over a broad temperature range.

VERSALOID™ 2308 Film Tensile Properties

Test Temperature	Strain at break (%)	Break stress (psi/mPa)	Elastic Modulus (psi/mPa)
0°C	52	2,769 / 19.1	91,995 / 634
23°C	172	1,862 / 12.8	37,093 / 256
40°C	184	1,517 / 10.5	26,370 / 182
60°C	209	1,021 / 7.0	14,477 / 100
80°C	237	609 / 4.2	7,253 / 50
100°C	233	315 / 2.2	1,871 / 13

Note: ASTM D882, rate: 500mm/min

Film Impact Properties

VERSALOID™ 2308 Flexible Acrylic Resin film also maintains ductility down to -20C.

VERSALOID™ 2308 Flexible Acrylic Resin Instrumented Dart Properties

Test Temperature	Total energy (in.lbf/J)	Failure Mode
-20°C	3.90/0.44	Ductile
0°C	4.21/0.48	Ductile
23°C	8.22/0.93	Ductile

Note: test velocity: 3.4m/s

Compounding Processing Conditions Example

VERSALOID™ 2308 Flexible Acrylic Resin may be processed over a range of processing conditions, as appropriate for the various conversion methods outlined earlier, directly from powder. However some users may desire to formulate and compound it into a pellet first, prior to further conversion. Below are the conditions used in lab-scale pelletization to provide initial pelletizing processing guidance. Full scale processing conditions will depend on the particular equipment and conversion method involved.

Extrusion compounding conditions:

Leistritz twin screw extruder with high shear screws, 25.4mm, L/D=28.	
Feed rate	12 lbs/hr
Screw speed	100 rpm
Load	35%
Die pressure	530 psi

Temperature Profile :

Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7
165ºC	180ºC	180ºC	180ºC	185ºC	190ºC	190ºC

Product Packaging

The standard package is either a unitized pallet of 15-20 kg bags or 400-900 kg super sacks/big bags/FIBC bags.

Please consult a Dow representative for specific package availability for this product.

Quality management system

The Dow Chemical Company (Dow) and its subsidiaries have implemented a comprehensive quality management system pursuant to Good Manufacturing Practices (GMP) and various quality management standards including ISO 9001. An overview of **The Dow Quality Management System Manual** can be obtained at the following Internet web site – http://www.dow.com/en-us/about-dow/our-company/beliefs-and-culture/quality-culture. As part of that system, the Dow Plastics Additives business maintain ISO 9001 registration for most of our manufacturing plants. A copy of these certificates available upon request.

Storage and handling precautions

Store unopened in original packaging at ambient temperature. If material is opened, it should not be left exposed and should be used within one month. When stored correctly in the original packaging, the shelf life is 3 years from date of manufacture.

Before using this product, consult the Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage. Contact Dow for copies of the SDS and for more information on this product. Information contained in a TDS document cannot substitute a SDS.

Disposal considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

Medical Applications Restrictions

Dow prohibits sale into certain medical applications. Please check with Dow if you believe your application could be in violation of this policy.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. The customer is solely responsible for determining the suitability of the Dow product for the uses contemplated by customer. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow and available online at www.dow.com.

Regulatory Information

If your application includes a sensitive application such as food contact or drinking water requirements or if you need other regulatory information, please contact your local Dow representative.

Contact information:

If you should have any questions regarding this notice, please contact your local Dow Representative or www.dow.com/contact