Product Information
Plastics & Composites

DOW CORNING

Dow Corning® 31-441 Additive

FEATURES & BENEFITS

- Improves PA processability and injectability
- Reduces coefficient of friction at lower loadings than polytetrafluoroethylene (PTFE)
- Has minimal to no impact on mechanical performance

COMPOSITION

- Silicone polymer

Dow Corning® 31-441 Additive is an off-white, solid silicone polymer for use as an additive in polyamide (PA)-based composites. It is easy to use and apply in dry blending with pellets or powdery additives. It improves the extrusion process by decreasing screw torque and melt temperature, and has a dual effect on surface properties by reducing coefficient of friction (COF) and improving scratch resistance.

APPLICATIONS

- PA-based composite formulations and neat PA
- Processing scenarios where high productivity is important
- Applications where low COF is required
- Applications where improved surface scratch resistance is required

TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Test*	Property	Unit	Result
DSC	Glass transition	°C	65–75
TGA	Thermal stability	°C	350
DSC	Melting point	°C	85–105
CTM 0176 D	Appearance		White to off-white particles

*DSC: Differential Scanning Calorimetry, 25–250°C; 10°C/min – under N2 flow 45 ml/min.
TGA: Thermo Gravimetrical Analysis, 25–950°C; 10°C/min – under air low 100 ml/min.
CTM: Corporate Test Method, copies of CTM's are available on request.

DESCRIPTION

Dow Corning 31-441 Additive is a pure silicone polymer additive delivered in an off-white solid form. It has glass transition and melting temperature ranges of 65–75°C and 85–105°C, respectively. It is miscible with PA matrices.

HOW TO USE

Dow Corning 31-441 Additive can be added in direct blend with polymer pellets or together with powdery additives in standard extrusion equipment. A maximum of 5 wt% loading is applied with recommended addition levels around 1 to 2 wt% to deliver the best balance of COF and scratch resistance. Typical extrusion temperatures applied for PA6 composites range from 250°C to 260°C.

Table 1: Mechanical performance and processing of GF30-PA6 composites containing *Dow Corning* 31-441 Additive:

Mechanical	No additive	2 wt%	5 wt%
Young's Modulus (MPa) (ISO-527)	9000	9000	8900
Maximum force at traction (MPa) (ISO-527)	162	160	157
Impact Unotches Charpy (ISO-178)	85	92	85
Processing			
Machine Torque (Nm)	40	33	27

As presented in the table above, the addition of *Dow Corning* 31-441 Additive has minimal to no effect on mechanical performances up to a loading of 5 wt%.

Figure 1: Processing aid effects in 30wt% glass fibers reinforced polyamide-6:

	Torque	Melt Temperature (°C)	RelativeThroughputs* (%)	Relative Spiral Flow (%)
No Additive	36	340	100	100
PTFE 15 wt%	36	338	116	100
31-441 2 wt%	31	316	127	125

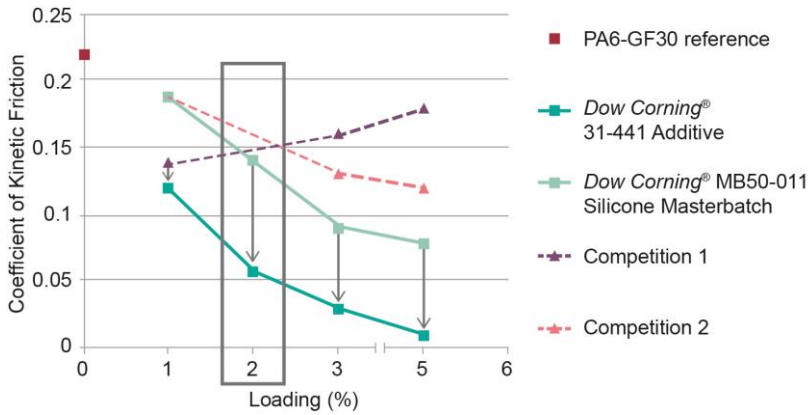
*relative comparisons to maintain a constant machine load

PA-GF 30%

PTFE 15wt%

Dow Corning 31-441 Additive 2wt%

Figure 2: Dynamic coefficient of friction of GF30-PA6 composites using *Dow Corning* 31-441 Additive (ASTM-D1894 [American Society for Testing and Materials.])



Dow Corning 31-441 Additive is tailored to deliver optimized COF reduction for PA resins and PA-based composites.

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW CORNING WEBSITE AT DOWCORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CORNING CUSTOMER SERVICE.

USABLE LIFE AND STORAGE

This product has a usable life of 24 months from date of production. No special storage conditions are recommended.

PACKAGING INFORMATION

This product is available in containers size of 500 ml-bottle, 90 kg-drum and 20 kg-box.

LIMITATIONS

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, dowcorning.com or consult your local Dow Corning representative.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

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2016, June 17
Form No. 26-2012B-01