

## *Dow Corning*<sup>®</sup> 40-001 Additive

### **FEATURES & BENEFITS**

- Anti-drip additive or synergist
- Flame retardant
- Thinner clear polycarbonate applications
- 100% non-halogenated silicone polymer
- Active at low use level

In polycarbonate compounds:

- Reaches UL 94 V-0 rating at 1 mm with synergists
- Reaches UL 94 V-0 at 1.5 mm
- Efficiency at low loading
- Keeps transparency of polycarbonate
- Haze at 2%
- No impact on Young's modulus and tensile maximum force at traction.

### **COMPOSITION**

- Organo-functional liquid siloxane
- 100% active

Organo-functional siloxane

### **APPLICATIONS**

- Plastics additive used as flame retardant for polycarbonate where high transparency is required.
- Consumer electronics: General LED lighting
- Automotive: Lens covers for next-generation electric vehicles
- Outdoor lighting: Electrical components and insulation

### **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
	Physical form	NA	transparent liquid
CTM 0006-A	Flash point Cleveland open cup	°C	> 110

\*CTM = Corporate Test Method

### **DESCRIPTION**

*Dow Corning*<sup>®</sup> 40-001 Additive is a liquid organo-functional siloxane recommended as additive for polycarbonate. This product has an excellent miscibility with polycarbonate matrix. Benefits includes improvement of flame retardancy performances (anti-dripping and flaming time reduction) while maintaining transparency with low haziness of the final polycarbonate compound. *Dow Corning* 40-001 Additive is suitable for use under the processing windows of polycarbonate.

### **HOW TO USE**

Typical recommended usage levels of *Dow Corning* 40-001 Additive ranges from 1.5 up to 4 wt% based on total formulation. Test performed on typical extrusion polycarbonate grade (MFI 11) demonstrate at a 2 wt% loading following benefits:

- UL 94 V-0 rating at 1.5 mm
- UL 94 V-0 rating possible at 1 mm when used with synergists
- Total transmittance kept at 87% (against 89% for neat PC)
- Haze at 2%
- No impact on Young-Modulus and maximum tensile strength

It is recommended to process *Dow Corning* 40-001 Additive through twin screws extrusion melt blending. The additive can rather be introduced through an adsorption on PC pellets and more recommended through a direct liquid injection in the molten polymer right after the melting zone.

It is recommended to perform some preliminary tests to determine the optimum loading and mixing conditions to reach desired performances.

**Table 1: Formulation\*:**

	<i>Dow Corning</i> <sup>®</sup> 40-001 additive	KSS	PTFE
<b>Form 1</b>	0	0	0
<b>Form 2</b>	2	0	0
<b>Form 3</b>	2	0.6	0
<b>Form 4</b>	4	0	0
<b>Form 5</b>	4	0.6	0
<b>Form 6</b>	0	0.6	0.3

**Table 2: Processing conditions:**

Temperature (°C)	285	280	275	260	260
Screw speed (rpm)	200				
Throughput (kg/h)	2,0				

\*All formulations were performed using clear polycarbonate, MFI 11 (300°C; 1.2 kg).

All formulations were performed using a TSE 20 mm diameter and L/D 40. Introduction of polycarbonate pellets made in 10D. *Dow Corning* 40-001 additivation through direct liquid injection in 20D.

Formulation 1 represent the neat PC, while form 6 represent a typical V-0 formulation using PTFE and KSS as FR package.

**Table 3: Test Results:**

Sample ID	UL 94 1.5 mm			UL 94 1 mm	Optical ASTM D-1003 (1.5 mm)		Mechanical ISO 527-2		
	Ranking	t1(s)	t2 (s)	Ranking	Tt (%)	Haze (%)	E-mod	F Max	Elongation @ break (%)
<b>Form 1</b>	V-2	10,0	11,4	-	89	0	2400	64	106
<b>Form 2</b>	V-0	3,0	1,4	-	87	2.4	2350	65	55
<b>Form 3</b>	V-0	2,4	4,4	V-1	87	2.8	2360	66	70
<b>Form 4</b>	V-0	3,2	2,4	HB	87	1.4	2390	67	71
<b>Form 5</b>	V-0	2,8	1,0	V-0	85	2.5	2410	68	46
<b>Form 6</b>	V-0	8.6	7	V-2	81	16	2320	63	76

Results showed the V-0 rating obtained on the formulations containing *Dow Corning* 40-001 Additive. Compared to PTFE/KSS formulation, the use of *Dow Corning* 40-001 Additive allowed maintaining initial optical performances with very limited impact. *Dow Corning* 40-001 Additive also demonstrate limited impact on the mechanical performances.

**Figure 1:** Demonstration of no influence of *Dow Corning* 40-001 Additive on polycarbonate optical properties, compared to KSS+PTFE formulation which showed strong haziness, typical for such formulations.

**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  
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FROM YOUR DOW CORNING  
SALES APPLICATION  
ENGINEER, OR DISTRIBUTOR,  
OR BY CALLING  
DOW CORNING CUSTOMER  
SERVICE.**

**USABLE LIFE AND  
STORAGE**

When stored in unopened original container at a maximum temperature of 30°C, *Dow Corning 40-001* Additive has a usable lifetime of 12 months.

**PACKAGING  
INFORMATION**

*Dow Corning 40-001* Additive is available in 18 kg pails or 225 kg drums.

**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](http://dowcorning.com) or consult your local Dow Corning representative.

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