

IR Absorber 2052 Components A and B

Properties

IR Absorber 2052 has been developed for special applications of Polycarbonate, such as filters and lenses to provide protection for welders or against laser beams. In view of the thermal sensitivity of the IR absorber, Polycarbonate with IR absorber is not produced as a ready-made compound. The IR absorber 2052 (comprising components A and B) is mixed in with the Polycarbonate granules by the processor prior to injection molding or extrusion.

Processing

The basic Polycarbonate colors are mixed according to the protection rating required (see suggested formulations), and a maximum of 0.1 % wetting agent (dioctyl phthalate or paraffin oil) is added. After approximately 5 minutes pre-mixing in a mixer, components A and B of the IR absorber are added, and mixing is continued for roughly another 5 minutes. The made-up mixtures containing IR absorber can be kept for up to 4 weeks under standard conditions. Prior to processing, the mixture must be pre-dried (vacuum) for 4 hours at approximately 110 °C. Longer drying times or higher temperatures would damage the IR absorber. Processing on injection molding machines/extruders must be performed without undue thermal stressing (short residence time in the cylinder/barrel, melt temperature < 265 °C). Care must be taken to ensure that the homogenization satisfies the optical requirements (no flaws/streaks).

When Polycarbonate is processed under the recommended processing conditions it is possible for small quantities of breakdown products to be emitted. In accordance with the Safety Data Sheet, compliance with the specified exposure limits at the workplace must be guaranteed through adequate extraction and ventilation at the workplace, so as not to impair the health and well-being of the machine operators.

The specified processing temperatures must not be exceeded by any significant extent in order to prevent greater partial decomposition of the polymer and the splitting off of volatile breakdown products. Since excessive temperatures are generally attributable to operating errors or to malfunctions in the heating system, particular care and monitoring is called for here.

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Polycarbonate/IR lenses darken when exposed to UV light. Freshly injected lenses more so than stored lenses, and this must be borne in mind when developing formulations for welding filters (adjust to medium t_{vis} tolerance range). The following are examples of the darkening effect to be expected after 100 h UV radiation (CEN requirement):

Protective rating to DIN EN 169	t_{vis}			Comments
	Starting value	after 100 h UV Radiation	Requirement	
		%		
1.7	48.5	42.7	43.2 - 58.1	failed
3	9.0	8.5	8.5 - 17.8	Borderline
6	0.78	0.72	0.44 - 1.2	good
12	0.00166	0.00144	0.0012 - 0.0032	good

Comments

It is the responsibility of the processor to ensure that the transmission factors for the required protective ratings are observed. The basic colors are supplied within a tolerance band. When working out mixing ratios, the processor must conduct preliminary tests in order to establish whether there are any fluctuations in transmission. The transmission factors t_{vis} of individual basic color batches can be measured and made available on request (thickness: 2 mm).

The mixing ratios indicated in the suggested formulations must be checked after each batch change. It is important for t_{vis} to be located in the middle of the tolerance band specified in the standard, since lenses containing IR absorber darken during the prescribed "UV resistance test". There is then a risk that they will no longer fall within the tolerance band.

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1. Suggested formulations for Makrolon® protective welding lenses at <u>2 mm</u> thickness ²⁾					
Protective ratings to DIN EN 169 ²⁾	Makrolon®			IR Absorber 2052	
	Grade	Colors	Mixtures % by weight	Component A	Component B
				g/kg Makrolon®	
1.2	2407	550115	100	0.08	0.12
1.4	2407	550115	100	0.16	0.24
1.7	2407	550115	100	0.32	0.48
2	2407	550115 750611	80 20	0.314	0.47
2.5	2407	550115 750611	50 50	0.304	0.456
3	2407	750611	100	0.288	0.432
4	2407	750611 750612	80 20	0.336	0.504
5	2407	750611 750612	50 50	0.408	0.612
6	2407	750612	100	0.528	0.792
7	2407	750612 750613	97 3	0.578	0.868
8	2407	750612 750613	95 5	0.578	0.868
9	2407	750612 750613	90 10	0.679	1.019
10	2407	750612 750613	85 15	0.679	1.019
11	2407	750612 750613	75 25	0.748	1.122
12	2407	750612 750613	65 35	0.881	1.321
13	2407	750612 750613	57 43	0.982	1.472
14	2407	750612 750613	45 55	1.082	1.624
15	2407	750612 750613	25 75	1.284	1.926
16	2407	750613	100	1.536	2.304

²⁾ Also applies for international standards, e.g. ANSI Z 87.1, AS 1338

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2. Suggested formulations for Makrolon® protective welding lenses at <u>3 mm</u> thickness ²⁾					
Protective ratings to EN 169 ²⁾	Makrolon®			IR Absorber 2052	
	Grade	Colors	Mixtures % by weight	Component A g/kg Makrolon®	Component B g/kg Makrolon®
1.4	2407	550115	100	0.16	0.24
1.7	2407	550115	100	0.24	0.36
2	2407	550115	100	0.32	0.48
2.5	2407	550115 750611	80 20	0.314	0.47
3	2407	550115 750611	60 40	0.307	0.461
4	2407	550115 750611	20 80	0.294	0.442
5	2407	750611 750612	90 10	0.312	0.468
6	2407	750611 750612	65 35	0.372	0.558
7	2407	750611 750612	40 60	0.432	0.648
8	2407	750611 750612	15 85	0.492	0.738
9	2407	750612	100	0.528	0.792
10	2407	750612 750613	98 2	0.54	0.81
11	2407	750612 750613	96 4	0.659	0.987
12	2407	750612 750613	95 5	0.579	0.867
13	2407	750612 750613	88 12	0.851	1.276
14	2407	750612 750613	82 18	0.709	1.064

²⁾ Also applies for International standards, e.g. ANSI Z 87.1, AS 1338

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Transport, toxicity and hazards

Please refer to our safety data sheet.

Labeling

IR-Absorber Comp A

EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

Industrial applications.

Hazard symbol or symbols :



Irritant

Contains

N,N,N',N'-tetrakis[4-(dibutylamino)phenyl]benzene-1,4-diamine

Risk phrases : R36/38- Irritating to eyes and skin.

Safety phrases : S37/39- Wear suitable gloves and eye/face protection.

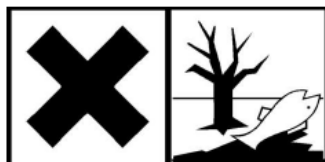
IR-Absorber Comp B

EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

Industrial applications.

Hazard symbol or symbols :



Harmful, Dangerous for the environment

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Contains

N,N'-cyclohexa-2,5-diene-1,4-diylidenebis[4-(dibutylamino)-N-[4-(dibutylamino)phenyl]anilinium] bis[hexafluoroantimonate(1-)]

Risk phrases

- : R20/22- Harmful by inhalation and if swallowed.
- R36/38- Irritating to eyes and skin.
- R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

- : S37/39- Wear suitable gloves and eye/face protection.
- S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

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