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.
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 \( t_{\text{vis}} \) tolerance range). The following are examples of the darkening effect to be expected after 100 h UV radiation (CEN requirement):

<table>
<thead>
<tr>
<th>Protective rating to DIN EN 169</th>
<th>Starting value</th>
<th>( t_{\text{vis}} ) after 100 h UV Radiation</th>
<th>Requirement</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>48.5</td>
<td>42.7</td>
<td>43.2 - 58.1</td>
<td>failed</td>
</tr>
<tr>
<td>3</td>
<td>9.0</td>
<td>8.5</td>
<td>8.5 - 17.8</td>
<td>Borderline</td>
</tr>
<tr>
<td>8</td>
<td>0.78</td>
<td>0.72</td>
<td>0.44 - 1.2</td>
<td>good</td>
</tr>
<tr>
<td>12</td>
<td>0.00166</td>
<td>0.00144</td>
<td>0.0012 - 0.0032</td>
<td>good</td>
</tr>
</tbody>
</table>

**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 \( t_{\text{vis}} \) 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 \( t_{\text{vis}} \) 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.
1. Suggested formulations for Makrolon® protective welding lenses at 2 mm thickness

<table>
<thead>
<tr>
<th>Protective ratings to DIN EN 169</th>
<th>Grade</th>
<th>Makrolon®</th>
<th>Colors</th>
<th>Mixtures</th>
<th>Component A</th>
<th>Component B</th>
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<tbody>
<tr>
<td>1.2</td>
<td>2407</td>
<td>550115</td>
<td>100</td>
<td></td>
<td>0.08</td>
<td>0.12</td>
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<td>1.4</td>
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<td>550115</td>
<td>100</td>
<td></td>
<td>0.16</td>
<td>0.24</td>
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<tr>
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<td>2407</td>
<td>550115</td>
<td>100</td>
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<td>0.32</td>
<td>0.48</td>
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<tr>
<td>2</td>
<td>2407</td>
<td>550115</td>
<td>80</td>
<td>20</td>
<td>0.314</td>
<td>0.47</td>
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<tr>
<td>2.5</td>
<td>2407</td>
<td>550115</td>
<td>50</td>
<td>50</td>
<td>0.304</td>
<td>0.456</td>
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<tr>
<td>3</td>
<td>2407</td>
<td>750611</td>
<td>100</td>
<td></td>
<td>0.288</td>
<td>0.432</td>
</tr>
<tr>
<td>4</td>
<td>2407</td>
<td>750611</td>
<td>80</td>
<td>20</td>
<td>0.336</td>
<td>0.504</td>
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<tr>
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<td>2407</td>
<td>750611</td>
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<td>50</td>
<td>0.408</td>
<td>0.612</td>
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<td>0.792</td>
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<td>750612</td>
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<td>750612</td>
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<td>100</td>
<td></td>
<td>1.536</td>
<td>2.304</td>
</tr>
</tbody>
</table>

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

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LANXESS Distribution GmbH / Katzbergstr. 1/ 40764 Langenfeld / www.lanxess-distribution.com
### 2. Suggested formulations for Makrolon® protective welding lenses at 3 mm thickness

<table>
<thead>
<tr>
<th>Protective ratings to EN 169</th>
<th>Grade</th>
<th>Makrolon®</th>
<th>Mixtures</th>
<th>IR Absorber 2052</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
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<td>% by weight</td>
<td>Component A</td>
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<tr>
<td></td>
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<td>550115</td>
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<td>0.851</td>
</tr>
</tbody>
</table>

*Also applies for International standards, e.g. ANSI Z 87.1, AS 1330.*

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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
Contains
N,N'-cyclohexa-2,5-diene-1,4-diyldenedbis[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.