LOCTITE LIOFOL LA 2716 / LA 5500
Known as Liofol UR 2716 / UK 5500
March 2014

PRODUCT DESCRIPTION
LOCTITE LIOFOL LA 2716 / LA 5500 has the following product characteristics:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Polyurethane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Type</td>
<td>Laminating adhesive</td>
</tr>
<tr>
<td>Condition</td>
<td>Solvent-based</td>
</tr>
<tr>
<td>Components</td>
<td>Two component - requires mixing</td>
</tr>
<tr>
<td>Application</td>
<td>Film/Film and Film/Foil laminates</td>
</tr>
<tr>
<td>Performance</td>
<td>High Performance</td>
</tr>
<tr>
<td>Cure</td>
<td>Room temperature cure after mixing</td>
</tr>
<tr>
<td>Appearance Base</td>
<td>LOCTITE LIOFOL LA 2716</td>
</tr>
<tr>
<td>Appearance Hardener</td>
<td>LA 5500</td>
</tr>
<tr>
<td>Mix Ratio, by weight - Base : Hardener</td>
<td>10 : 1</td>
</tr>
</tbody>
</table>

Application Areas:
LOCTITE LIOFOL LA 2716 / LA 5500 is suitable for highly heat resistant laminates such as:
- electrical insulation laminates
- film/foil laminates for shielding films or capacitors

LOCTITE LIOFOL LA 2716 / LA 5500 shows a high initial tack and is therefore especially suitable for substrates with a high restoring force like thick pressboard.

Even absorbing materials like non-wovens and Nomex® can be laminated.

Due to the high heat resistance of LOCTITE LIOFOL LA 2716 / LA 5500 electrical insulation laminates can also be used in application areas which are subject to thermal class F (150 °C), e.g. motor and transformer industry.

Suitable Films:
- Polyester film PET, e.g. Hostaphan® (Kalle), Mylar® (DuPont), Skyrof® (SKC), Lumirror® (Toray), Terphane® (Rhone Poulenc)
- Polyester film PEN, e.g. Teonex® (DuPont)
- Pressboard
- Fleece PET, e.g. Viledon® (Freudenberg)
- Glass fleece
- Aramid-paper, e.g. Nomex® (DuPont)
- Metal foil, e.g. copper, aluminum, lead, tin

Product Properties:
The cured polyurethane film is brownish-transparent, odourless, elastic and age-resistant.

TECHNICAL DATA
LOCTITE LIOFOL LA 2716:
- Solid Content, %: 68 to 72
- Viscosity, Brookfield - LVT, 20 °C, mPas: 3,000 to 5,000
  - Spindle 2, speed 6 rpm
- Volumetric Density, g/cm³: 1.1
- Component: OH component
- Solvent: Ethylacetate

Hardener LA 5500:
- Solid Content, %: 48 to 52
- Viscosity, Ford/DIN cup, 2 mm, 20 °C, sec.: 38 to 52
- Volumetric Density, g/cm³: 0.99
- Component: NCO component
- Solvent: Ethylacetate

Ready-to-Use Mixture:
- Viscosity, Ford/DIN cup 4 mm, 20 °C, sec.: ~16
- Application solids, %: 40
- Solvent: MEK

DIRECTIONS OF USE
Preliminary Statement:
Prior to application it is necessary to read the Safety Data Sheet for information about precautionary measures and safety recommendations. Also, for chemical products exempt from compulsory labeling, the relevant precautions should always be observed. Please also refer to the local safety instructions and contact Henkel for analytical support.

Protective Measures:
As the adhesive contains polyisocyanates any contact with skin should be avoided. If skin gets in contact with LOCTITE LIOFOL LA 2716 / LA 5500 please remove the adhesive immediately. Safety regulations with regard to handling of isocyanates have to be followed as per the guide lines issued by the International Isocyanates Institute.

Dilution:
As suitable solvent we particularly recommend methyl-ethyl-ketone (MEK). Ethylacetate and acetone are also suitable. The water content should not exceed 300 ppm. Do not use aromatic or alcoholic solvents.
Dilution Table:
In order to obtain a certain solids content, the following quantities of solvent have to be added.
The Ford/DIN cup (4 mm/20 °C) viscosities are based on an average viscosity of LOCTITE LIOFOL LA 2716 / LA 5500.

<table>
<thead>
<tr>
<th>LOCTITE LIOFOL LA 2716</th>
<th>Hardener LA 5500</th>
<th>MEK</th>
<th>Solid Content</th>
<th>Viscosity (sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 kg</td>
<td>2.5 kg</td>
<td>10.00 kg</td>
<td>50 %</td>
<td>22 - 27</td>
</tr>
<tr>
<td>25 kg</td>
<td>2.5 kg</td>
<td>14.17 kg</td>
<td>45 %</td>
<td>17 - 22</td>
</tr>
<tr>
<td>25 kg</td>
<td>2.5 kg</td>
<td>19.38 kg</td>
<td>40 %</td>
<td>14 - 17</td>
</tr>
<tr>
<td>25 kg</td>
<td>2.5 kg</td>
<td>26.07 kg</td>
<td>35 %</td>
<td>12 - 14</td>
</tr>
</tbody>
</table>

Mixing:
LOCTITE LIOFOL LA 2716 has to be diluted under stirring with corresponding solvent to the desired application solids. Then the correct amount of Hardener LA 5500 has to be added under agitation.
We recommend a solid content of 40 \%.

Pot Life:
The Ready-for-use adhesive (40\%) in closed containers has a working time of about 12 hours without substantial viscosity increase. If the machine has not been in operation for more than 4 hours the remaining adhesive should be disposed of and has to be replaced by fresh adhesive. In order to avoid leftover adhesive, we recommend to prepare only small quantities of adhesive mixture.

Application:
LOCTITE LIOFOL LA 2716 / LA 5500 can be applied with all dry laminating units that have smooth rollers. Gravure rolls are also suitable in most cases provided that the gravure rolls allow the required application weight and that a consequent smooting unit is attached.

Application Weight:
The application weight may range from 5 to 15 g/m² dry depending on the film or foil combination and the intended use of the laminate.

Drying:
The temperature of the drying tunnel depends on the specific requirements of the materials. The nip roller should be heated up to 90 to 100 °C in order to improve wettability and bond strength. For thinner films a temperature of 60 to 70 °C is sufficient.

Curing:
The laminates may be slit after 3 days storage at room temperature. The final bond strength at room temperature will be achieved either after storage for 10 to 14 days at room temperature depending on the construction of substrates or after tempering for at least 48 hours at 60 °C. The tempering time depends upon the thickness of the reel.

STORAGE
When stored in a dry and cool place in the original unopened containers storage life is as follows. Once opened, containers have to be closed tightly again and the material should be consumed within a short period.

Shelf life:
- LOCTITE LIOFOL LA 2716, months: 12
- LOCTITE LIOFOL LA 5500, months: 9

Classification:
Please refer to the corresponding safety data sheets for details on:
Hazardous Information
Transport Regulations
Safety Regulations

ADDITIONAL INFORMATION
Film Requirements:
Film additives - particularly slip agent content in LDPE, MDPE and CPP films - packed goods, printing inks, pre-treatment and coating of films are of significant importance to the intended use of the laminates and may affect the performance properties either straight away or later. Therefore, practical laminating tests as well as checks on the laminates are necessary before going into full scale production. Further detailed information can be obtained from our "Technical Guide Line for Laminating with Liofol Laminating Adhesives".

Product Range:
Apart from LOCTITE LIOFOL LA 2716 / LA 5500 we can offer the following products for the manufacture of film/foil laminates:
- Solventbased, solventless and waterbased laminating adhesives for flexible packaging and special applications
- Coldseal Adhesives
- Heatseal Coatings
- Primer for Extrusion and PVDC-coating
- Adhesives for High Gloss Lamination
- Special Cleaning agents
To obtain product specifications please ask for the relevant technical datasheets.
Disclaimer

Note:
The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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Reference 0.1