

ELASTOSIL® LR 5471:

Non-postcuring, self-bonding LSR for sensitive applications

Reduce process complexity and boost manufacturing efficiency with a self-bonding LSR that eliminates postcuring in many applications. ELASTOSIL® LR 5471 delivers outstanding adhesion to common thermoplastics and metals, enabling reliable 2K parts while supporting high-throughput production for demanding sensitive applications.

Self-bonding LSR

Nowadays, plastic parts combining a hard and a soft component are widely used. In most cases, a rigid thermoplastic provides the strength for these hard / soft composites, while the job of the soft component is to act as a sealant, to dampen vibrations or to absorb sound. The latter can also improve the tactile properties of the molded part.

More and more often, the soft materials of choice are silicone elastomers, which are chemically and biologically inert, remain flexible even at low temperatures and resist weathering, heat and aging. Another advantage of silicones is that they are easy dyeable in a great many color shades thus providing the designer considerable freedom.

In general, good adhesion is a must for creating reliable hard / soft compounds. Ideally, the use of a self-bonding LSR enables safe bonding and cost-effective manufacturing without any pre-treatment of the substrate.

Higher productivity and improved safety without postcuring

To achieve the properties required for sensitive applications, cured materials made from conventional liquid silicone rubber must be post-cured (i.e. thermally post-treated) for several hours in most cases.

ELASTOSIL® LR 5471/40 shows excellent adhesion to common plastics, such as PET and PBT.



This treatment improves the mechanical properties and reduces the volatiles content to the required level.

On the one hand, this extra step costs time and energy. Even worse, it interrupts the highly automated production process, since the postcuring ovens are generally manually loaded and emptied. In addition, many thermoplastics would not survive the usual post-cure temperature of 200 °C, which makes the postcuring of 2K parts at least more time-consuming and complex or even almost impossible.

Processors would therefore highly welcome the opportunity to safely eliminate this complicated and cost-intensive procedure for parts made from self-bonding LSR as well.

Benefits

ELASTOSIL® LR 5471 is a new series of self-bonding liquid silicone rubber. It's suitable for sensitive applications and provides a novel combination of a specified low volatiles content and high tear resistance:

- Suitable for use under BfR recommendation "XV. Silicones" and FDA § 177.2600 in compliance with any given limitations on extractable and volatile substances
- Very low volatiles content, meeting the limit of < 0.5 % volatiles¹ even without postcuring or any other post-treatment like extraction with carbon dioxide
- Excellent tear strength

- Excellent adhesion to common plastics, like polyethylene terephthalate (PET), polybutene terephthalate (PBT), other polyesters as well as polyketones and some polyamides (PA)²
- Low level of sticking to the metal mold, easy demolding and low mold fouling
- Statements of analogy for biocompatibility available
- Translucent and easy to color in many color shades



¹ Spec limit: 0.4 % measured at 4 h / 200 °C according to the BfR method for test slabs having 2 mm thickness; for lower thicknesses, results may vary

² To be tested and verified for the individually used combination of materials and processing conditions

ELASTOSIL® LR 5471:

Improved mechanical properties

The ELASTOSIL® LR 5471 product series is currently available in hardness levels 40 and 50 ShA and provides great mechanical properties.

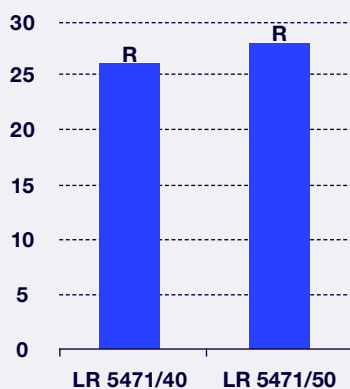
Independent of the hardness chosen, cured rubber products exhibit a great tear strength of approx. 38 Newtons per millimeter in the non-post-cured state (measured as per ASTM D 624 B). This is particularly important for manufacturing baby-care articles, such as bottle nipples and pacifiers or teething rings, but also for other thin-walled articles like CPAP masks. Compared to ELASTOSIL® LR 3071, that's a considerable improvement in terms of mechanical properties.

Volatiles content

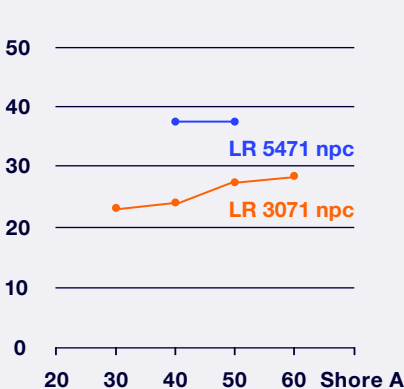
For sensitive applications, weight loss is often used as a measure of the volatiles content. Typical examples include the European Standard EN 14350-2 for children's drinking equipment and EN 1400 for pacifiers, recommendation "XV. Silicones" of the German Federal Institute for Risk Assessment (BfR), and legal requirements in other European countries.

During heat treatment (typically 4 h at 200 °C), the silicone article must show a weight loss of no more than 0.5%. Standard tests show that non-postcured parts made of ELASTOSIL® LR 5471 lie well below this limit. Depending on the geometry of the finished part and the processing conditions, however, non-conformities may arise – especially in parts with particularly thin walls, since the results of the test are somewhat dependent on the thickness of the test specimen. Compliance with all relevant standards therefore remains the responsibility of the party placing the part on the market.

Adhesion performance³ on PBT
acc. to ISO 813 / N/mm



Tear strength
acc. to ASTM D 624 B / N/mm



These figures are intended as a guide and should not be used in preparing specifications.

³Samples prepared via press molding on Ultradur® B 4300 G6 (curing conditions: 3 min/185 °C); R: Cohesive adhesion failure

Product table for ELASTOSIL® LR 5471 (preliminary)

ELASTOSIL®	LR 5471/40	LR 5471/50
Product data		
Appearance	Translucent	Translucent
Viscosity (D = 1 s ⁻¹) / mPa·s	1,100,000	1,000,000
Viscosity (D = 10 s ⁻¹) / mPa·s	300,000	300,000
Cure conditions: 5 min / 165 °C in press		
Density / g/cm ³	1.12	1.12
Durometer / ShA	40	50
Tensile strength / N/mm ²	8.5	8.4
Elongation at break / %	600	550
Tear strength ASTM D 624 B / N/mm	38	38

Volatiles ≤ 0.4% (BfR method, slabs of 2 mm thickness). Color pastes might contribute to the volatiles content, too; therefore, we recommend the use of our ELASTOSIL® Color Pastes FL

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The data presented in this medium are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this medium should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.