

ELASTOSIL® LR 3822:

Oil-exuding, coolant-resistant LSR for e-mobility sealing

Battery coolant connectors face tough demands: water- and dust-proof sealing in permanent contact with glycol-water coolants, a low compression set, design flexibility for 2K solutions and resistance to heat as well as low temperatures. ELASTOSIL® LR 3822 is an oil-exuding liquid silicone rubber (LSR) developed for exactly these connector seals and sealing elements in traction-battery cooling circuits. The silicone oil released at its surface forms a lubricating film that eases machine assembly. ELASTOSIL® LR 3822 has a Shore A hardness of 60. Its low compression set, high resilience and coolant resistance make it ideal for elastic seals in e-mobility.

Sealings in EV traction battery cooling circuits face demanding challenges

Thermal management is key to the performance and service life of electric-vehicle traction batteries. The cooling circuits that keep the cells at their operating temperature are filled with glycol-water mixtures, and every connector and sealing element in this circuit has to stay tight over the entire life of the vehicle.

Silicone elastomers are the soft materials of choice here: they resist heat and aging and remain elastic even at low temperatures. Sealing elements in the cooling circuit must additionally withstand permanent contact with hot coolant without losing their mechanical properties.

In general, low compression set and high resilience are a must for reliable long-term sealing.

Ideally, one and the same silicone grade combines coolant resistance with low-temperature flexibility down to -45 °C.

Assembly: overcoming friction without external lubricants

Silicone seals and connectors are tacky by nature. During machine assembly, this friction makes it difficult to slide the parts into their seats reliably and at high speed. Lubrication is therefore needed, but externally applied lubricants add a process step and carry the risk of contamination.



An oil-exuding silicone solves this elegantly: the cured elastomer continuously releases silicone oil from its own surface, so the lubricating film is always present and is renewed during service. No separate lubricant has to be applied, stored or dosed, and the risk of contaminating the sealing surface is avoided.

Processors thus gain a faster and more reliable automated assembly of seals and connectors, without any additional process step.

Improved mechanical properties

ELASTOSIL® LR 3822 is the first oil-exuding liquid silicone rubber to combine self-lubrication with high coolant resistance. It comes in a Shore A hardness of 60.

- **Oil-exuding surface:** the cured elastomer releases a thin film of silicone oil, forming a lubricating film that greatly facilitates automated assembly of molded parts
- **High coolant resistance:** retains most mechanical properties after 1,000 h in glycol-water at 125 °C; compression set 44 %* under compression
- Even after coolant exposure, the cured rubber reaches an **elongation at break of 270 %** without cracks or damage, combined with **high tear resistance** and high resilience.
- Superior **low-temperature flexibility:** stays elastic down to -45 °C, and keeps the seals functional in cold conditions.
- **Low compression set** ensures reliable long-term sealing



* Compression set measured after 1,000 h storage in a glycol-water mixture at 125 °C under compression; values may vary with part geometry and processing conditions.

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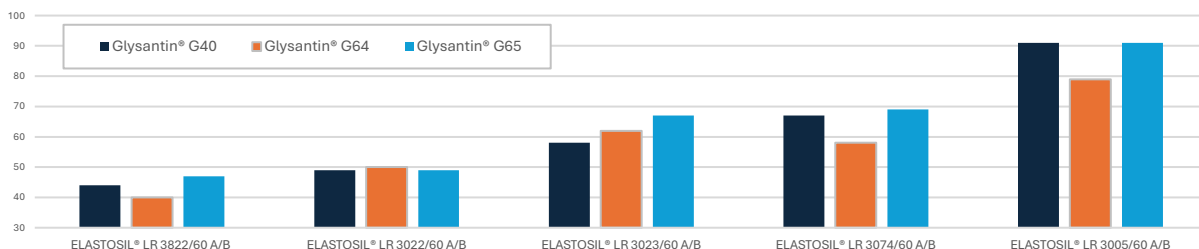
Coolant resistance

ELASTOSIL LR 3822 is designed for permanent contact with the coolants used in the thermal management of electric-vehicle traction batteries. In laboratory tests, samples were stored for 1,000 hours in a glycol-water mixture at 125 °C under high contact pressure. After this exposure, the material retains most of its mechanical properties, so the sealing function is maintained over the long term.

Compression set

Compression set describes the ability of a rubber part made of ELASTOSIL® LR 3822 to return to its original thickness after prolonged pressure. Under the conditions described above, this value was 44 %. The seal therefore continues to press reliably against the flanks of the seal groove, which ensures that the groove stays sufficiently leak-proof.

Compression set after 1,000 h in glycol/water at 125 °C / % *



Product Table ELASTOSIL® LR 3822 (preliminary)

ELASTOSIL®	LR 3822/60
Product Data	
Appearance	opaque
Viscosity (D = 1 s ⁻¹) / mPa·s	1,000,000
Viscosity (D = 10 s ⁻¹) / mPa·s	220,000
T60 (110 °C) / s	125
Cure conditions: 5 min / 165 °C in press	
Density / g/cm ³	1.14
Durometer / Sh A	60
Tensile Strength / N/mm ²	6.2
Elongation at break / %	270
Tear strength (ASTM D 624 B) / N/mm	13
100% Modulus / N/mm ²	2.1
Compression set (22 h / 175 °C) / %	7
After immersion 1000 h / 125 °C in coolant / distilled water 50:50	
Durometer / Sh A	59
Tensile Strength / N/mm ²	5.4
Elongation at break / %	240
Compression set (1,000 h / 125 °C, glycol-water) / %	44

* Compression set 44 % after 1,000 h – to test the sealing performance of ELASTOSIL® LR 3822, samples were stored in a glycol-water mixture at 125 °C under high contact pressure. This ensures that the seal groove is sufficiently leak-proof. (Source: WACKER)

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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.

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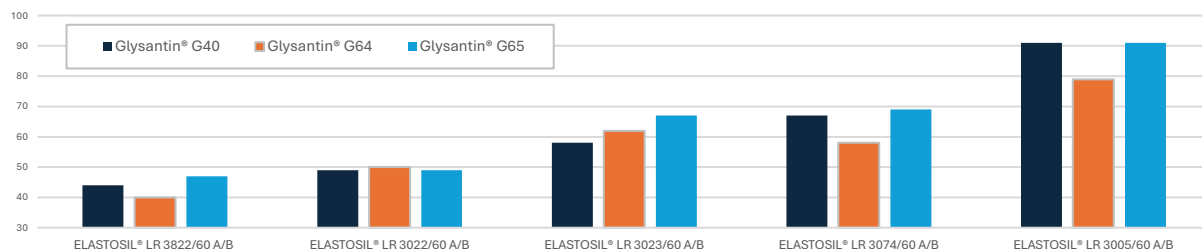
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