LEYBONOL Mineral Oils

Application Data	LVO 100	LVO 120	LVO 130
Type of oil	Mineral oil, free of additives	Mineral oil with additives	Mineral oil with additives
Properties	Low vapor pressure,, low inclination to foaming, very good water separation	Extended oil change intervals, low inclination to foaming, very good water separation	Extended oil change intervals, low inclination to foaming, very good water separation
Application examples	Standard oil for low ultimate pressures. Pumping of air, chemically inert gases and water vapor	Standard oil for small SOGEVAC pumps [2)] Pumping of air, chemically inert gases and water vapor	Standard oil for large SOGEVAC pumps [2)] Pumping of air, chemically inert gases and water vapor
Elastomer compatibility FKM (FPM, Viton) NBR (Perbunan) [1)] EPDM	 Suited Conditionally suited Unsuitable	 Suited Conditionally suited Unsuitable	 Suited Conditionally suited Unsuitable
Used in the pumps of series	**TRIVAC, E + DK, RUVAC**	**SOGEVAC A-series (≤ SV 65) and B-series (≤ SV 25, ≤ SV 120 BI (FC))**	**SOGEVAC A-series (≥ SV 100) and B-series (≥ SV 40 B)**

Technical Data		LVO 100	LVO 120	LVO 130
ISO viscosity grade		ISO VG 100	ISO VG 32	ISO VG 68
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s mm^2/s	 95 10.5	 32 5.5	 68 9
Flash point	°C (°F)	> 255 (> 491)	244 (471)	248 (478)
Density at 15 °C (59 °F)	kg/m^3	880	875	885
Pour point	°C (°F)	< -9 (< +16)	-27 (-17)	-21 (-6)

Ordering Information	LVO 100	LVO 120	LVO 130
	Part No.	**Part No.**	**Part No.**
0.5 liters	**–**	**L 120 00**	**–**
1 liters	**L 100 01**	**L 120 01**	**L 130 01**
2 liters	**–**	**L 120 02**	**L 130 02**
5 liters	**L 100 05**	**L 120 05**	**L 130 05**
20 liters	**L 100 20**	**L 120 20**	**L 130 20**
208 liters	**L 100 99**	**–**	**L 130 99**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1)] Resistance is dependent on the level of the acrylonitrile content in the NBR

[1)] LVO 120 is suited for the SOGEVAC SV 25 B and smaller pumps where the lower viscosity assists the starting process.
LVO 130 is suited for the SOGEVAC SV 40 B and larger pumps where the higher viscosity assists attaining of lower pressures.
However, all SOGEVAC pumps can be operated with both types of oil and moreover, LVO 120 and LVO 130 can be mixed with each other.

Application Data	LVO 140	LVO 150	LVO 170
Type of oil	Mineral oil with additives	Mineral oil with additives	Mineral oil with detergent additives
Properties	Suitable for use in the food & packaging industry	Suitable for use in the food & packaging industry	High detergency, high thermal stability, low inclination of foaming
Application examples	Recommended for applications in the food industry	Recommended for applications in the food industry	Heat treatment, low pressure carburizing process and other processes creating tar or soot
Elastomer compatibility			
FKM (FPM, Viton)	Suited	Suited	Suited
NBR (Perbunan) [1)]	Conditionally suited	Conditionally suited	Conditionally suited
EPDM	Unsuitable	Unsuitable	Unsuitable
Used in the pumps of series	**SOGEVAC A-series (≤ SV 65) and B-series (≤ SV 25 B)**	**SOGEVAC A-series (≥ SV 100) and B-series (≥ SV 40 B)**	**SOGEVAC A-series (≥ SV 100) and B-series (≥ SV 40 B)**

Technical Data		LVO 140	LVO 150	LVO 170
ISO viscosity grade		ISO VG 32	ISO VG 68	ISO VG 100
Viscosity				
at 40 °C (104 °F)	**mm^2/s**	30	63	95.6
at 100 °C (212 °F)	**mm^2/s**	5	8	11
Flash point	**°C (°F)**	225 (437)	253 (487)	> 110 (230)
Density at 15 °C (59 °F)	**kg/m^3**	860	870	0.889
Pour point	**°C (°F)**	-18 (-0.4)	-18 (-0.4)	-24 (-11.2)

Ordering Information	LVO 140	LVO 150	LVO 170
	Part No.	**Part No.**	**Part No.**
1 liter	**L 140 01**	**L 150 01**	**–**
20 liters	**–**	**L 150 20**	**L 170 20**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected.
The technical data stated here do not entail any warranted characteristics

[1)] Resistance is dependent on the level of the acrylonitrile content in the NBR

LEYBONOL Ester Oils

Application Data	LVO 200	LVO 210
Type of oil	Synthetic oil (ester oil with additives)	Synthetic oil (ester oil with additives)
Properties	Very high thermal, oxidative and chemical stability, good deterging/dispersion characteristics, excellent wear protection	Very high thermal, oxidative and chemical stability, good deterging/dispersion characteristics, excellent wear protection
Application examples	Application at increased temperatures Starting of the pump between 0 and +12 °C (32 and 64 °F) Pumping of air, inert gases, carbon dioxide (dry), carbon monoxide, organic solvent vapours, resin vapours	Application at increased temperatures Pumping of air, inert gases, carbon dioxide (dry), carbon monoxide, organic solvent vapours, resin vapours
Remarks	Not for pumping of inorganic acids, free halogens or alkaline media	Not for pumping of inorganic acids, free halogens or alkaline media
Elastomer compatibility FKM (FPM, Viton) NBR (Perbunan) [1] EPDM	 Suited Conditionally suited Unsuitable	 Suited Conditionally suited Unsuitable
Used in the pumps of series	**SOGEVAC A-series (≤ SV 65 A) and BI-series (≤ SV 120 BI (FC))**	**TRIVAC B, SP-Line, E + DK, RUVAC, DRYVAC SOGEVAC (≥ SV 100, ≥ SV 40 B) SV 40 Cat. 1 (i)/2 (o) IIB + H2 and SV 40 B to 630 B Cat. 2 (i)/2 (o) and 3 (i)/3 (o)**

Technical Data		LVO 200	LVO 210
ISO Viscosity grade		ISO VG 32	ISO VG 100
Viscosity at 40 °C at 100 °C	 mm^2/s mm^2/s	 28 5.5	 97 9
Flash pointt	°C (°F)	258 (496)	250 (482)
Density at 15 °C	kg/m^3	918	960
Pour point	°C (°F)	< -45 (< -49)	-33 (-27)

Ordering Information	LVO 200	LVO 210
	Part No.	**Part No.**
1 liter	**L 200 01**	**L 210 01**
2 liters	**L 200 02**	**L 210 02**
5 liters	**L 200 05**	**L 210 05**
20 liters	**L 200 20**	**L 210 20**
208 liters	**–**	**L 210 99**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

Application Data	LVO 220	LVO 240
Type of oil	Synthetic oil (ester oil with additives)	Synthetic oil (special ester oil)
Properties	Very high thermal, oxidative and chemical stability, good deterging and dispersion characteristics, excellent wear protection	Excellent solubility for polymers
Application examples	Application in RUVAC WSLF for operation with gas lasers	Pumping of process media which have a tendency to polymerise (styrene and butadiene)
Remarks		Do not use any chemical oil filters Strictly avoid any mixing with any other type of oil Not for pumping inorganic acids
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Suited
NBR (Perbunan) [1]	Conditionally suited	Unsuitable
EPDM	Unsuitable	Unsuitable
Used in the pumps of series	**RUVAC (WSLF)**	**TRIVAC B**

Technical Data		LVO 220	LVO 240
ISO Viscosity grade		ISO VG 100	Not classified
Viscosity			
at 40 °C	mm^2/s	94	38
at 100 °C	mm^2/s	13	5
Flash pointt	°C (°F)	265 (509)	225 (437)
Density at 15 °C	kg/m^3	915	1055 [2]
Pour point	°C (°F)	-35 (-31)	-32 (-26)

Ordering Information	LVO 220	LVO 240
	Part No.	**Part No.**
1 Liter	**L 220 01**	**–**
20 liters	**–**	**L 240 20**
208 liters	**–**	**L 240 99**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] At 20 °C (68 °F)

Application Data	LVO 250	LVO 260
Type of oil	Synthetic oil (ester oil with additives)	Synthetic oil (special ester oil)
Properties	High thermal and oxidative stability	Very high thermal and oxidative stability
Application examples	Bearing lubricant for turboradial blowers	Bearing lubricant for turboradial blowers
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Suited
NBR (Perbunan) [1]	Conditionally suited	Conditionally suited
EPDM	Unsuitable	Unsuitable
Used in the pumps of series	TURBOSTREAM	TURBOSTREAM

Technical Data		LVO 250	LVO 260
ISO Viscosity grade		Not classified	Not classified
Viscosity			
at 40 °C	mm^2/s	13	24
at 100 °C	mm^2/s	3.5	5
Flash pointt	°C (°F)	> 185 (> 365)	245 (473)
Density at 15 °C	kg/m^3	925	980 [2]
Pour point	°C (°F)	< -57 (< -71	-60 (-76)

Ordering Information	LVO 250	LVO 260
	Part No.	Part No.
0.3 liters	L 250 00	L 260 00
300 ml Set (for TURBOSTREAM D 2500)	896 101	–
600 ml Set (for TURBOSTREAM D 2500 / S 3500)	–	896 112

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] At 20 °C (68 °F)

LEYBONOL PAO Oils

Application Data	LVO 300	LVO 310	LVO 320
Type of oil	Synthetic oil (PAO with additives)	Synthetic oil (PAO with additives)	Synthetic oil (PAO with additives)
Properties	High thermal and oxidative stability H1 registration by NSF. Constituents approved by the FDA under CFR 178-3570. In acc. with USDA - H1	High thermal and oxidative stability	High thermal and oxidative stability
Application examples	Recommended for applications in the food industry Backing pumps for mass spectrometers Cleaning systems	Cold starting at low temperatures is possible Pumping of air, chemically inert gases, water vapor and small quantities of refrigerant R 717 (ammonia)	Pumping of air, chemically inert gases and water vapor
Elastomer compatibility FKM (FPM, Viton) NBR (Perbunan) [1] EPDM	 Suited Conditionally suited Unsuitable	 Suited Conditionally suited Unsuitable	 Suited- Conditionally suited Unsuitable-
Used in the pumps of series	**TRIVAC, only D 25 B SOGEVAC A-series (≥ SV 100) und B-series (≥ SV 40 B)**	**TRIVAC, up to D 16 B**	**VACUBE**

Technical Data		LVO 300	LVO 310	LVO 320
ISO viscosity grade		ISO VG 100	ISO VG 32	ISO VG 46
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s mm^2/s	 99 13.5	 29 5.5	 45.4 7.2
Flash point	°C (°F)	270 (518)	230 (446)	252 (485.6)
Density at 15 °C (59 °F)	kg/m^3	840	820	828
Pour point	°C (°F)	-54 (-65)	< -54 (< -65)	-51 (-59.8)

Ordering Information	LVO 300	LVO 310	LVO 320
	Part No.	**Part No.**	**Part No.**
0.5 liters	**L 300 00**	**–**	**–**
1 liter	**L 300 01**	**L 310 01**	**–**
20 liters	**L 300 20**	**–**	**L 320 20**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

LEYBONOL PFPE Oils

Application Data	LVO 400	LVO 410
Type of oil	Synthetic oil (perfluoropolyether PFPE, free of additives)	Synthetic oil (perfluoropolyether PFPE, free of additives)
Properties	Chemically inert Highest thermal stability	Chemically inert Highest thermal stability
Application examples	Pumping of strong oxidants like oxygen, ozone or nitrous oxides, as well as reactive substances like halogens, hydrogen halides and conditionally Lewis acids	Pumping of strong oxidants like oxygen, ozone or nitrous oxides, as well as reactive substances like halogens, hydrogen halides and conditionally Lewis acids
Remarks	Use only in pumps modified for PFPE Mixing with any type of other oil must be strictly avoided Avoid pumping of water vapor, in particular in connection with corrosive media (see above) The use of a chemical oil filter CF/CFS is strongly recommended **When used in RUVAC:** For use with PFPE we exclusively recommend pump types with a canned motor	Use only in pumps modified for PFPE Mixing with any type of other oil must be strictly avoided Avoid pumping of water vapor, in particular in connection with corrosive media (see above) The use of a chemical oil filter CF/CFS is strongly recommended **When used in RUVAC:** For use with PFPE we exclusively recommend pump types with a canned motor
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Suited
NBR (Perbunan) [1]	Suited	Suited
EPDM	Suited	Suited
Used in the pumps of series	**TRIVAC BCS, SOGEVAC, E + DK, RUVAC**	**RUVAC, E + DK, DRYVAC ECODRY Plus, LEYVAC**

Technical Data		LVO 400	LVO 410
ISO Viscosity grade		Not classified	Not classified
Viscosity			
at 40 °C	mm^2/s	49	89
at 100 °C	mm^2/s	7	11
Flash pointt	°C (°F)	– [2]	– [2]
Density at 15 °C	kg/m^3	1890	1900
Pour point	°C (°F)	-45 (-49)	-35 (-31)

Ordering Information	LVO 400	LVO 410
	Part No.	**Part No.**
0.60 liters	**–**	**L 410 00**
0.75 liters	**L 400 00**	**–**
1 liter	**L 400 01**	**L 410 01**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected.
The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] **Caution:** in the case of thermal decomposition > 290 °C (> 554 °F) toxic and corrosive gases are released. When handling PFPE keep away from open fires. Do not smoke in the work area

Application Data

	LVO 420
Type of oil	Synthetic oil (perfluoropolyether PFPE, free of additives)
Properties	Chemically inert Highest thermal stability
Application examples	Pumping of strong oxidants like oxygen, ozone or nitrous oxides, as well as reactive substances like halogens, hydrogen halides and conditionally Lewis acids
Remarks	Use only in pumps modified for PFPE Mixing with any type of other oil must be strictly avoided Avoid pumping of water vapor, in particular in connection with corrosive media (see above) The use of a chemical oil filter CF/CFS is strongly recommended
Elastomer compatibility	
FKM (FPM, Viton)	Suited
NBR (Perbunan) [1]	Suited
EPDM	Suited
Used in the pumps of series	**SOGEVAC BI-series with 1 ph motors ≤ SV 40 BI**

Technical Data

		LVO 400
ISO Viscosity grade		Not classified
Viscosity		
at 40 °C	**mm²/s**	25
at 100 °C	**mm²/s**	4.5
Flash point	**°C (°F)**	– [2]
Density at 15 °C	**kg/m³**	1880
Pour point	**°C (°F)**	-50 (-58)

Ordering Information

	LVO 400
	Part No.
1 liter	**L 420 01**
2 liters	**L 420 02**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected.
The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] **Caution:** in the case of thermal decomposition > 290 °C (> 554 °F) toxic and corrosive gases are released. When handling PFPE keep away from open fires. Do not smoke in the work area

LEYBONOL Diffusion Pump Oils

Application Data	LVO 500 (DIFFELEN normal)	LVO 510	LVO 520	LVO 540
Type of oil	White oil, free of additives	Mineral oil, free of additives	Silicone oil (tetramethyl-tetraphenyltrisiloxane)	Pump fluid based on hydrocarbons
Properties	Good thermal stability	High thermal stability	Very high thermal stability and highly resistant against oxidation and decomposition	High thermal stability and excellent resistance against oxidation and decomposition
Application examples	LVO 500 is the most frequently used pump fluid for applications in a high vacuum. The attainable ultimate total pressure is below 10^{-7} mbar	For applications in a high vacuum	For high vacuum and ultra-high vacuum applications	For oil vapor jet pumps
Elastomer compatibility				
FKM (FPM, Viton)	Suited	Suited	Suited	Suited
NBR (Perbunan) [1]	Conditionally suited	Conditionally suited	Suited	Suited
EPDM	Unsuitable	Unsuitable	Suited	Unsuitable
Used in the pumps of series	DIP, LEYBOJET 630	DIP, LEYBOJET 630	DIP, LEYBOJET 630	OB

Technical Data	LVO 500 (DIFFELEN normal)	LVO 510	LVO 520	LVO 540
Vapor pressure at 20 °C (68 °F) mbar	4×10^{-9}	1×10^{-7}	7×10^{-9} [2]	6×10^{-6}
Viscosity at 40 °C (104 °F) mm^2/s	100	60	21	22
Flash point °C	> 250 (> 482)	> 230 (> 446)	221 (430)	196 (385)
Density at 20 °C (68 °F) kg/m^3	868	850	1070 [2]	885

Ordering Information	LVO 500 (DIFFELEN normal)	LVO 510	LVO 520	LVO 540
	Part No.	Part No.	Part No.	Part No.
1 liter	L 500 01	L 510 01	L 520 01	-
5 liters	L 500 05	L 510 05	L 520 05	-
20 liters	L 500 20	-	-	L 540 20
200 liters	-	-	-	L 540 99

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics.

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] At 25 °C (77 °F)

LEYBONOL Special Lubricants

Application Data	LVO 700	DOT 4
Type of oil	Synthetic cyclic hydrocarbon	Brake fluid
Properties	H1 registration by NSF. Very high thermal stability and highly resistant against oxidation and decomposition. Very long lifetime.	High-quality brake fluid based on glycol ethers. Corresponds to FMVSS DOT 4
Application examples	Chemically inert to gases of acidic nature. For long service intervals	Only for filling of brake fluid circuits in the automotive industry.
Remarks	–	Use only in pumps modified specifically for DOT 4. Mixing with any other type of oil must be strictly avoided
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Unsuitable
NBR (Perbunan) [1]	Conditionally suited	Unsuitable
EPDM [2]	Unsuitable	Conditionally suited
Used in the pumps of series	SOGEVAC BI-series ≤ SV 120 BI (FC)	TRIVAC, SOGEVAC

Technical Data		LVO 700	DOT 4
ISO viscosity grade		32	Not classified)
Viscosity			
at 40 °C (104 °F)	mm^2/s	31	Not applicable
at 100 °C (212 °F)	mm^2/s	5	> 1.5
Flash point	°C (°F)	> 210 (> 410)	> 120 (248)
Density at 15 °C	kg/m^3	904	1070
Pour point	°C (°F)	< -42 (< -44)	< -50 (< -58)

Ordering Information	LVO 700	DOT 4
	Part No.	Part No.
1 liter	L 700 01	200 10 037

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] Not all EPDM materials are suited for contact with DOT 4

LEYBONOL Greases

Application Data	LVO 810 (LITHELEN)	LVO 870 (GLEITLEN)
Base oil type	Mineral oil	Special vaseline types
Thickener	Lithium soap	Natural rubber
Properties	Wide application range (0 to +150 °C / 32 to 302 °F), atmospheric pressure to 10^{-8} mbar	Usable down to 10^{-2} mbar
Application examples	Lubrication of ground joints, taps and O-rings at low pressures and high operating temperatures	Lubrication of stirrer shafts (KPG-stirrer)
Remarks	Owing high vacuum processing, LVO 810 does not contain any shares exhibiting higher vapor pressures [1]	–
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Suited
NBR (Perbunan) [2]	Conditionally suited	Conditionally suited
EPDM	Unsuitable	Unsuitable

Technical Data		LVO 810 (LITHELEN)	LVO 870 (GLEITLEN)
Vapor pressure at 20 °C (68 °F)	**mbar**	10^{-10}	10^{-4}
Dropping point	**°C (°F)**	> 210 (> 441)	> 50 (> 122)
Max. operating temperature	**°C (°F)**	150 (302)	30 (86)

Ordering Information	LVO 810 (LITHELEN)	LVO 870 (GLEITLEN)
	Part No.	**Part No.**
Tube 50 g	**L 810 05**	**–**
Tin 50 g	**–**	**L 870 05**
Bucket 2 kg	**L 810 99**	**L 870 99**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] The product contains silicon dioxide

[2] Resistance is dependent on the level of the acrylonitrile content in the NBR

Application Data

	LVO 871	LVO 872
Base oil type	Special vaseline types	Special vaseline types
Thickener	Natural rubber	Natural rubber
Properties	Usable down to 10^{-2} mbar	Usable down to 10^{-2} mbar
Application examples	Lubrication of ground joints	Lubrication of taps
Elastomer compatibility		
FKM (FPM, Viton)	Suited	Suited
NBR (Perbunan) [1]	Conditionally suited	Conditionally suited
EPDM	Unsuitable	Unsuitable

Technical Data

		LVO 871	LVO 872
Vapor pressure at 20 °C (68 °F)	**mbar**	10^{-4}	10^{-4}
Dropping point	**°C (°F)**	> 56 (> 133)	> 56 (> 133)
Max. operating temperature	**°C (°F)**	30 (86)	30 (86)

Ordering Information

	LVO 871	LVO 872
	Part No.	**Part No.**
Tin 50 g	**L 871 05**	**L 872 05**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

Application Data — High Vacuum Grease

Base oil type	Silicone oil
Thickener	Inorganic
Properties	Low vapor pressure, high water and chemicals resistance
Application examples	Lubrication of ground joints, taps and O-rings at low pressures and high operating temperatures
Remarks	Wide operating range (-40 to +200 °C / -40 to +392 °F) atmospheric pressure down to 10^{-6} mbar [2]
Elastomer compatibility	
FKM (FPM, Viton)	Suited
NBR (Perbunan) [1]	Suited
EPDM	Suited

Technical Data — High Vacuum Grease

Vapor pressure at 20 °C (68 °F)	**mbar**	10^{-7}
Dropping point	**°C (°F)**	None [3]
Max. operating temperature	**°C (°F)**	200 (392)

Ordering Information — High Vacuum Grease

	Part No.
Tube 50 g	**E 210 502**

Please note that the technical data stated are typical characteristics only. Slight variations from batch to batch must be expected. The technical data stated here do not entail any warranted characteristics

[1] Resistance is dependent on the level of the acrylonitrile content in the NBR

[2] This product is unsuitable if also hot-cathode ionization vacuum gauges e.g. IONIVAC ITR 90/200 are installed in the process

[3] Above 200 °C (392 °F) polymerisation of the silicone greases discharges gas