Oils, Fluids, Sealants and Greases

We strongly recommend that you use only the recommended grades and qualities of fluids and sealants, to maintain the high performance of Edwards products. If you use inferior materials, this can lead to a reduction in the pump or system efficiency, partial or complete failure of the equipment, and excessive outgassing. We think it is a false economy to use cheaper fluids and sealants which are untried for many demanding applications.

All our fluids and sealants are tested under formal laboratory conditions. In addition, we have gained considerable on-site experience through our own use of these materials and by maintaining close contact with users who have specific problems. As many cases of suspected equipment under-performance are eventually traced to the use of unsuitable or unsatisfactory fluids and sealants, we are pleased to advise on the correct selection of fluids and sealants for your application.

Mineral Based Materials

These materials include rotary pump oils, Diffstak and diffusion pump oils and greases. They are available with or without various additives for different applications.

Silicone Based Materials

These materials are used for Diffstak and diffusion pump fluids and greases. They comprise either di-methyl siloxanes or phenyl methyl siloxanes.

Synthetic-Organic Compounds

These include various hindered esters, phenyl ethers and napthalene based compounds. They are offered for use in Diffstak and diffusion pumps, but they can also be used as a rotary pump oils in certain unique applications. Edwards can advise on the matching of the fluids to particular applications.

Fluorinated Materials (PFPE)

These are perfluoropolyethers. Perfluoropolyether is a fully fluorinated material free from other halogens and from hydrogen, and so is of particular value where freedom from hydrocarbons is important. It is inert to most reactive chemicals such as UF_6, F_2, O_2, O_3, and so on, and it does not polymerise when exposed to electron and most ion bombardment.

Perfluoropolyether fluid is available in grades suitable for use in rotary pumps. A low vapour pressure Fomblin® grease (AR555) is available which combines good lubrication properties with superior vacuum properties.

PFPE for Semiconductor Applications

The major growth in the use of perfluoropolyether (PFPE) compounds has been in applications where hostile process conditions quickly destroy normal hydrocarbon pump oils. This applies particularly in semiconductor processing. The corrosion resistant properties and chemical inertness of PFPE result in greatly increased operation times between oil changes and pump maintenance, and this provides a cost effective solution to many difficult pumping applications.

These are the basic properties of PFPE and the advantages for use in vacuum systems:

- **Chemically Inert** Ideal for pumping aggressive materials, particularly in semiconductor processes.
- **High Oxidation Resistance** Fluid is not damaged by repeated exposure to air at operating temperatures.
- **Non-Inflammable** No fire risk.
- **High Thermal Resistance** No residual tar compounds formed by overheating. Eventually reduced to gaseous products.
- **Oxygen Compatible** Allows absolutely safe pumping of oxygen (NASA approved for liquid oxygen systems). Maximum recommended operation temperature and pressure for 100% oxygen is 250 °C and 91.4 kg cm^{-2} and 60 °C, 175.75 kg cm^{-2}.
- **Non-Polymerization** Does not polymerise on exposure to energetic particle bombardment (except hydrogen ions). This reduces the impact of backstreamed vapours, and is an important property where polymers cannot be tolerated (for example, in electron microscopes).
- **Miscible with Most Common Solvents** Allows pumping of solvent even without gas ballast.

Before charging with PFPE, thoroughly clean the pumps to achieve maximum advantage. If you do not have skilled technicians available, we recommend that you return the pumps to a Edwards Service Center to be cleaned and filled. Some models of high vacuum rotary pumps and mechanical booster pumps adapted for use with PFPE are available as standard and can be found in the appropriate sections of this catalogue: these pumps are assembled and tested with PFPE.

Safety note Perfluoropolyether is a fluorinated compound and will give-off toxic vapours if exposed to temperatures above 280 °C. Do not expose PFPE to naked flames and prohibit smoking in work areas.

Mechanical Pump Oils

Edwards supplies the widest range of oils of different viscosities and specifications to enable customers to obtain the best performance from mechanical pumps under different application conditions. Mineral oils are manufactured by a hydro treatment process to reduce carcinogenic risk. All are specially prepared for high vacuum use, having low vapour pressures even at high temperatures. The particular mechanical pump specification should be consulted to find which oil to use.

Ultragrade® Mineral Oils

Edwards offers a range of new oils, Ultragrade® 15, 19, 20 and 70, which result from a new process. Most manufacturers use a solvent refining process, whereas these oils are produced by a unique hydrotreating process. This process eliminates nitrogen, sulphur and oxygen and the aromatic hydrocarbons, leaving a clear base stock essentially free of impurities.

When combined with additives, the Ultragrade® oils give improved vacuum performance, thermal and oxidation stability and rust inhibition. The anti-oxidants included in the oils enable the pump to withstand high operating temperatures without oil degradation, so extending intervals between oil changes.

The properties of the oils allow them to be used in a wide range of applications. New Ultragrade® 70 oils are the best choice for large pumps used in heavy-duty, cycling applications. Contact Edwards or your local supplier for detailed recommendations.

Ultragrade Oil	Use In	Replaces
Ultragrade 15	E2M0.7, E2M1.5. Also suitable for cold start applications.	Edwards 8A
Ultragrade 19	RV pumps, E2M18	Supergrade A, Edwards 17 and 20
Ultragrade 70	E2M40 to E2M275	–
Ultragrade 20	EH boosters	Edwards 16 and 18

Ordering Information

Product Description		Order No.
Ultragrade 15	1 litre	H11026015
	12 × 1 litre	H11026012
	4 litre	H11026013
	4 × 4 litre	H11026011
	205 litre	H11026010
Ultragrade 19	1 litre	H11025015
	12 × 1 litre	H11025012
	4 litre	H11025013
	4 × 4 litre	H11025011
	205 litre	H11025010
Ultragrade 20	1 litre	H11024015
	12 × 1 litre	H11024012
	4 litre	H11024013
	4 × 4 litre	H11024011
	205 litre	H11024010
Ultragrade 70	4 litre	H11028013
	4 × 4 litre	H11028011
	205 litre	H11028010

Edwards TW has been developed for applications where rotary pump oils are likely to be exposed to reactive or corrosive gases. The oil is distilled hydrocarbon containing no additives, but unsaturates and aromatic links have been removed. The result is that the oil will last up to 20 times longer, depending on process, than refined mineral oils. Longer oil life significantly extends the intervals between oil changes.

Ordering Information

Product Description		Order No.	
		Europe	N. America
Edwards TW mineral oil	1 litre	H11012015	H02100001TW
	4 litre	H11012013	H02100002TW
	20 litre	H11012026	H02100003TW
	205 litre (55 US gal)	N/A	H02100004TW

Edwards 45 Oil

Edwards 45 is a hydrocarbon synthetic polymer whose molecular structure offers chemical inertness, high temperature stability and low vapour pressure ($<10^{-7}$ mbar at 25 °C). It is commonly used in mass spectrometry applications because of its well defined peaks. Edwards 45 oil is non-toxic, non-corrosive and reclaimable.

Ordering Information

Product Description	Order No.	
	Europe	N. America
Edwards 45 oil		
1 litre	H11022015	H01800001
4 litre	H11022013	H01800003
12 x 1 litre	N/A	H01800005

V-Lube

The V-Lube range of oils offer good thermal stability and oxidation resistance and have been selected for use with the Stokes range of vacuum pumps. Choose from the following:

V-Lube Oil	Application
V-Lube CD	Chemical Dry and Chemical Dry Eagle pumps
V-Lube F	Microvac piston pumps
V-Lube G	Hot Microvac, 912H, 612MB

Ordering Information

Product Description	Order No.
V-Lube CD oil	
3.8 litres (1 US gal)	254-539-004
19 litres (5 US gal)	254-539-003
208 litres (55 US gal)	085-048-764
V-Lube G oil	
19 litres (5 US gal)	262-461-003
208 litres (55 US gal)	421-793-001
V-Lube H oil	
3.8 litres (1 US gal)	424-051-001
19 litres (5 US gal)	419-699-001
208 litres (55 US gal)	419-698-001
V-Lube F oil	
5 litres (1.3 US gal)	H11030001
25 litres (6.6 US gal)	H11030002
205 litres (54 US gal)	H11030003
3.8 litres (1 US gal) North America only	254-117-002
19 litres (5 US gal) North America only	254-539-002
208 litres (55 US gal) North America only	254-780-001

Mechanical Pump Oil Selection Chart

			Ultragrade 15	Ultragrade 19	Ultragrade 20	Ultragrade 70	Edwards TW	Fomblin® 06/6	Krytox® 1506	Fomblin® 16/6	Krytox® 1514	Fomblin® 25/6	Krytox® 1525
Application	Mass spectrometers		•	•	•	•							
	Electron microscopes		•	•		•							
	Thin film sputtering		•	•		•							
	Surface studies		•	•		•							
	UHV systems		•	•		•							
	Leak detection		•	•	•	•							
	TV tubes			•	•	•							
	Power valves			•	•	•							
	Distillation			•	•	•	•						
	Space studies			•		•							
	Furnaces			•	•	•							
	EB welders			•		•							
	Semiconductors						•	•	•			•	•
	Impregnation			•	•	•							
	Chemical pumping			•	•	•	•	•	•			•	•
	Oxygen pumping							•	•			•	•
	Radioactive							•	•			•	•
	Packaging			•	•	•							
	Mechanical booster				•					•	•		
	Metallisation			•		•		•					
Technical Data	vapour pressure mbar	20 °C	5.8×10^{-6}	1×10^{-8}	2.1×10^{-7}	2.1×10^{-7}	1.3×10^{-6}†	4×10^{-6}	5.2×10^{-7}	3×10^{-6}	2.6×10^{-7}	4×10^{-8}	1.3×10^{-7}
		100 °C	3.0×10^{-2}	1.0×10^{-3}	3.0×10^{-3}	3×10^{-3}	–	5×10^{-3}	1.3×10^{-3}	1×10^{-3}	1.3×10^{-4}	6×10^{-5}	3.9×10^{-5}
	Molecular weight		385	420	500	600	430	1900	2400	2700	3500	3300	4600
	Specific gravity at 15 °C		0.86	0.86	0.86	0.86	0.860	1.88	1.88	1.89	1.89	1.9	1.9
	Viscosity cSt	at 20 °C	104.2	143.7	352	222	155	64	70	168	140	276	250
		at 40 °C	38.1	48.6	103	70	65	25	22	48	48	80	80
	Pour point °C		-18	-16	-12	-12	-12	-50	-45	-45	-40	-35	-35
	Flash point °C		220	230	260	230	243	none*	none*	none*	none*	none*	none*
	Auto ignition point °C		355	355	365	360	270	none*	none*	none*	none*	none*	none*
	Sulphur content% mass/mass		0	0	0	0	0	0	0	0	0	0	0
Properties	Energetic particle impact		Conducting polymers formed					No polymers formed (except with H_2 ions)					
	Thermal stability		good	good	good	good	poor	Excellent – decomposes to gas only above 300 °C*					
	Oxidation resistance		good	good	good	good	poor to fair	Excellent					
	Chemical resistance		fair	fair	fair	fair	poor to good	Excellent					
	Radiation resistance		fair	fair	fair	fair	fair	Good – but reacts with electro-positive metals (for example, sodium)					

* WARNING – Perfluoropolyether is a fluorinated compound which will give off toxic vapours if exposed to temperatures above 280 °C. The fluid should not be exposed to naked flames and smoking should be prohibited in the working area.
• Suitable for this application.
† Vapour pressure at 25 °C.

Krytox® is a registered trademark of Dupont Dow Elastomers

Perfluoropolyether Oils

Edwards now offers an extended range of Fomblin® and Krytox®, perfluoropolyether oils for use in rotary vacuum pumps. Fomblin® YVAC 06/6 and Krytox® 1506 are recommended for Edwards oil sealed rotary pumps and are practically a direct replacement for mineral oil in terms of viscosity and vapour pressure. Krytox® 1525 is suitable for use in rotary pumps requiring a viscosity equivalent to Fomblin® Y25 fluid. Fomblin® Y16/6 and Krytox® 1514 are recommended for use in perfluoropolyether adapted mechanical booster pumps.

Edwards, in conjunction with Ausimont UK, has developed Drynert fluid which contains anti-rust and anti-wear additives soluble in Fomblin®. These additives cover metallic surfaces with a protective, corrosion resistant film.

Ordering Information

Product Description		Order No.	
		Europe	N. America
Fomblin® YVAC 06/6	100 ml	N/A	H026004001
	240 ml	N/A	H026004002
	0.5 kg	N/A	H026004003
	1 kg (532 ml)	H11301019	H11301019
	2 kg	N/A	H026004005
	5 kg	H11301020	H11301020
	8 kg	N/A	H026004006
Krytox® 1506 fluid	0.5 kg	N/A	H11307017
	1 kg (532 ml)	H11307018	H11307018
	5 kg (2660 ml)	H11307020	H11307020
Krytox® 1525 fluid	0.5 kg	N/A	H11309017
	1 kg (526 ml)	H11309018	H11309018
	5 kg	H11309020	H11309020
Fomblin® Y16/6 fluid	0.5 kg	N/A	H026001003
	1 kg (529 ml)	H11306019	H11306019
	2 kg	N/A	H026001005
	5 kg	H11306020	H11306020
	8 kg	N/A	H026001006
Krytox® 1514 fluid	0.5 kg	N/A	H11308017
	1 kg (529 ml)	H11308018	H11308018
	5 kg (2646 ml)	H11308020	H11308020
Fomblin® 25/6 fluid	100 ml	N/A	H026008001
	0.5 kg	N/A	H026008003
	1 kg (529 ml)	H11312019	H11312019
	2 kg	N/A	H026008005
	8 kg	N/A	H026008006
	50 kg	N/A	H026008007
Drynert 25/6 fluid	1 kg (529 ml)	H11312021	H11312021
	5 kg (2646 ml)	H11312025	H11312025

Single Stage and Rough Pump Oil Selection Chart

			LOWVAC 60	V-Lube CD	V-Lube F	V-Lube G	V-lube H
Technical Data	Vapour pressure mbar	20 °C	7.5×10^{-5}	<1.3	<1.3	<1.3	<1.3
		100 °C	3.9×10^{-2}	<1.3	<1.3	<1.3	<1.3
	Molecular weight		485	350-500	350-500	350-500	350-500
	Specific gravity at 20 °C		0.80	0.87-0.89	0.86-0.88	0.88-0.89	0.88-0.91
	Viscosity cSt at 40 °C	0	59.1	68	95.5-100	183-191	208-220
	Pour point °C		-45	-31	-36	-30	-25
	Flash point °C		209	210	223	216	220
	Auto ignition point °C		360	343	TBC	343	343
	Sulphur content% mass/mass		0	0	0.281	0	0
Properties	Energetic particle impact		Conducting polymers formed				
	Thermal stability		good	good	good	good	good
	Oxidation resistance		good	good	good	good	good
	Chemical resistance		fair	fair	fair	fair	fair
	Radiation resistance		fair	fair	fair	fair	fair

Vapour Pump Fluids

Edwards supplies a range of fluids of different vapour pressures and physical properties. From this range, you can choose the optimum fluid for your applications.

In general, the more volatile fluids are used with vapour booster pumps and for vapour diffusion pumps used on industrial processes (for example, decorative coating and vacuum furnaces) where high gas loads are encountered and high critical backing pressure is advantageous. The less volatile fluids are used for processes or experiments requiring more exacting high vacuum conditions. The least volatile fluids are used for clean or ultra high vacuum applications (mass spectrometry, electron probe apparatus, surface studies, and so forth). Fluid selection depends also on the particular physical and chemical characteristics of the fluids (apart from vapour pressure).

Edwards has a long history of co-operation with various fluid manufacturers in the development of new pumping fluids and is well placed to advise in cases of uncertainty.

AP201 Vapour Booster Pump Fluid

Apiezon® AP201 is a hydrocarbon fluid prepared by molecular distillation and protected against oxidation by a thermally stable additive of matched vapour pressure. It has an auto ignition temperature of 305 °C.

It exhibits a fair degree of resistance to chemical degradation (so that high throughputs of air and water vapour can be pumped without damage to the fluid) and it can withstand limited accidental admission of atmospheric air at operating temperature. The fluid has low viscosity which permits easy filling and draining. It does not attack synthetic rubbers used for seals and gaskets in vacuum systems. It is non-irritant, non-toxic and environmentally non-polluting.

Ordering Information

Product Description	Order No.
AP201 vapour booster pump fluid	
4 litres	H02601054
20 litres	H02601052
200 litres	H02601050

Silicone DC702, DC704EU and DC705 Diffusion Pump Fluids

These synthetic fluids are organo-silicon oxide polymers and have exceptional chemical stability both at high temperature and when in contact with most gases and vapours. They provide a range of general purpose fluids for ultimate vacuum from about 10^{-5} to 10^{-9} mbar, and are particularly useful in industrial processing applications due to their exceptional ruggedness. High throughputs of air, water vapour and corrosive gases can be pumped without fluid degradation. The fluids can withstand repeated admission of atmospheric air while at operating temperature and are widely used in valveless quick-cycle pumping processes. They have low toxicity and good resistance to gamma radiation.

Fluid breakdown products (due to bombardment and so on) tend to be electrically insulating and so we do not recommend these fluids for physical electronic applications such as mass spectrometers and surface analysis systems. The fluids are indifferent lubricants. Their decomposition is catalysed by traces of alkali metals (for example, caesium) and their use should be avoided where possible.

Ordering Information

Product Description	Order No.	
	Europe	N. America
Silicone 702		
500 ml	H02400007	H02400007
1 US gal	N/A	H02400008
5 kg (4673 ml)	H02400038	N/A
Silicone 704EU		
500 ml	H11201040	H02400043
1 US gal	N/A	H02400011
5 kg (4673 ml)	H11201041	N/A
Silicone 705		
500 ml	H02400027	H02400027

Santovac® 5 Diffusion Pump Fluid

This synthetic fluid is a polyphenyl ether developed from fluids originally produced as lubricants for space vehicles. It has exceptionally low vapour pressure, exceptional thermal stability and a tendency to wet surfaces less readily and "creep" to a lesser extent than is common with most fluids. The fluid is employed for the cleanest high vacuum and ultra high vacuum applications down to less than 10^{-9} mbar (for example, electron microscopes, mass spectrometers and surface physics studies) where its excellent high vacuum performance and low tendency to migrate into the pump system particularly recommend it. The fluid is chemically stable, non-corrosive, safe and non-toxic at normal operating temperatures. Fluid breakdown products (due to bombardment and so forth) tend to be electrically conducting. Lubricating qualities are good and the fluid finds application to lubricate mechanisms in vacuum systems.

Ordering Information

Product Description	Order No.	
	Europe	N. America
Santovac® 5 fluid		
100 ml	H11401001	H02300045
500 ml	H11401002	H02300046

Edwards L9 Diffusion Pump Fluid

Edwards L9 fluid has been developed for use in Diffstak and diffusion pumps. It is a naphthalene based synthetic material which is ideal for use in applications where silicones (which form insulating films) cannot be tolerated.

L9 fluid is rugged, has a very good vacuum performance and gives an ultimate pressure of typically 5×10^{-9} mbar (at 20 °C).

In addition, the fluid is chemically stable and is resistant to acids, alkalis, halogens and oxides of nitrogen. It does not react with common engineering metals or elastomers. It is immiscible to the common solvents alcohol, acetone and trichlorotrifluoroethane. The toxicity level of L9 is very low.

Safety note: When changing to this fluid the pump should be cleaned using a proprietary fluid. The pump should then be rinsed in acetone and dried prior to re-charging.

Ordering Information

Product Description	Order No.
Edwards L9 fluid 1 litre	H11501015

Vapour Pump Fluid Selection Chart

		Silicone			Santovac® 5	L9
Apiezon®	**AP201**	**702**	**704EU**	**705**		
Mass Spectrometers	•				•	•
Electron Microscopes					•	•
Thin Film Sputtering					•	
Surface Studies					•	
UHV Systems				•	•	
Leak Detection					•	
TV Tubes		•	•			
Power Valves					•	•
Spaces Studies					•	
Furnaces	•					
Radioactive					•	
Vapour Booster	•					
Metallisation		•	•			
Typical ultimate vacuum achievable at 20 °C (mbar)	6.5×10^{-5}	6.5×10^{-6}	6.5×10^{-8}	1.3×10^{-9}	1.3×10^{-9}	5×10^{-9}
Vapour pressure (mbar) at 20 °C	5×10^{-6}	6.5×10^{-7}	1.3×10^{-8}	2.6×10^{-10}	2.6×10^{-10}	7.8×10^{-10}
at 100 °C	2.4×10^{-2}	1.3×10^{-3}	2.6×10^{-4}	1.3×10^{-5}	6.5×10^{-6}	2.6×10^{-5}
at 150 °C	6.5×10^{-1}	$< 10^{-1}$	1.3×10^{-2}	$< 10^{-3}$	4×10^{-4}	2.3×10^{-3}
Boiling temperature at 1.3 mbar (°C) (approximate)	160	185	223	254	295	251
Molecular weight (average)	310	530	484	546	446	407
Viscosity cSt at 20 °C	34	55	47	240	2400	71.3
100 °C	5.0	4.9	4.3	7.9	12	5.6
150 °C	2.7	2.4	2.2	3.3	4.5	1.2
Pour point (°C) (approximate)	-30	< -20	< -20	-10	+5	-5
Flash point (°C)	196	193	221	243	288	241
Fire point (°C) (approximate)	204	275	275	275	350	281
Auto ignition point (°C) (approximate)	305	500	500	500	590	370
Specific heat (cal/g/°C)	0.46	0.42	0.41	0.42	–	0.46
Latent heat (cal/g)	69	40.9	52.7	51.6	49.2	42
Specific gravity at 25 °C	0.862	1.07	1.07	1.09	1.195	0.901
Coefficient of expansion per deg C	0.0007 (10 – 30 °C)	0.0008 (25 – 50 °C)	0.0008 (25 – 50 °C)	0.0006 (25 – 50 °C)	0.0008 (25 – 50 °C)	0.00042 (25 – 50 °C)
Refractive index at room temperature	1.476	1.516	1.557	1.579	1.6306 (25 °C)	1.5154 (25 °C)
Energetic Particle Bombardment	conducting polymers formed	insulating polymers formed			conducting polymers formed	
Thermal Stability	poor	very good			excellent	good
Oxidation Resistance	Poor to fair	excellent			very good	good
Chemical Resistance	poor	very good but decomposed by alkali metal			good	very good
Radiation Resistance	fair	good			very good	fair

• Recommended for this application

Silicone Grease

A high vacuum grade grease, which is for use at system pressures lower than 10^{-6} mbar.

Ordering Information

Product Description	Order No.
Silicone, high vacuum grease, tube 50 g	H02400036
Silicone, high vacuum grease, pack 5 kg	H11251015

Fomblin® Grease

This grease is an excellent lubricant for sliding elastomer seals, and exhibits the chemical inertness typical of the Fomblin® range.

It has a very low vapour pressure and is suitable for use in the presence of gaseous and liquid oxygen under severe conditions.

The general purpose AR555 grease offered by Edwards has the basic properties of Fomblin®, but the vapour pressure is not specifically controlled. The vapour pressure is $<10^{-7}$ mbar at 20 °C.

Ordering Information

Product Description	Order No.
Fomblin® vacuum grease AR555 grade, syringe 100 g	H11350013

Krytox® Grease

DuPont Krytox® fluorinated greases are a family of multipurpose lubricants intended for use in speciality applications at elevated temperatures or in aggressive environments.

Ordering Information

Product Description	Order No. N. America
Krytox® 240AD, tube (57 g, 2 oz)	U30002525
Krytox® 240AD, tube (226 g, 8 oz)	U30002206
Krytox® 240AB, tube (57 g, 2 oz)	U30002536
Krytox® 240AB, tube (226 g, 8 oz)	U30002535
Krytox® 240AC, tube (57 g, 2 oz)	U30002538
Krytox® 240AC, tube (226 g, 8 oz)	U30002537
Krytox® LVP, tube (57 g, 2 oz)	U30002075
Krytox® LVP, tube (226 g, 8 oz)	U30002539

Waxes and Sealing Compounds (Mineral Based)

Apiezon® wax W is a low vapour pressure wax for sealing joints in high vacuum systems. This wax softens at 80-90 °C and has a vapour pressure at 80 °C of 10^{-3} mbar and at 20 °C of 10^{-8} mbar.

Apiezon® wax W40 is similar to type W, but has a lower softening point which makes it very suitable for flow sealing in or around vacuum joints. It is not recommended for use at temperatures above 30 °C. It has a vapour pressure at 20 °C of 10^{-7} mbar.

Apiezon® sealing compound Q remains firm for temperatures up to 30 °C, but is sufficiently pliable to permit easy moulding into position. It is an excellent material for shielding or blanking off sections of apparatus. The compound is easily applied and can be readily removed. It has a vapour pressure at 20 °C of 10^{-4} mbar.

Ordering Information

Product Description		Order No.
Apiezon® W wax	20 x 25 g	H02301014
Apiezon® W wax	pack 1 kg	H11176007
Apiezon® W40 wax	pack 250 g	H02301015
Apiezon® Q sealing compound	tin 1 kg	H02300012

Apiezon® Greases

A range of Apiezon® greases is offered for use on high vacuum systems and for many general applications in the laboratory. These high purity greases are non-toxic, easy to apply, easy to clean off and have long shelf lives.

Applications include:

- Lubrication of glass and metal taps in vacuum systems
- Sealing polymer joints in vacuum systems
- Leak detection
- Protecting metal contacts in vacuum-encapsulated relays
- Sealing polished and ground glass/metal surfaces
- Optical surfaces in vacuum systems and laser systems – does not cause clouding (L and M greases only)
- Non vacuum uses include lubrication of glass and metal taps in laboratory, medical and industrial applications
- Good “gettering" qualities (absorbs grease and chemical impurities) – ideal for electronics industry

Choice of grease depends largely on operating temperature (see below).

Anti Seize Greases

	AP100	AP101
Melting point	47 °C	>200 °C
Radiation resistant	No	No
Vapour pressure at 20 °C (mbar)	$<10^{-10}$	$<10^{-5}$
Approvals	Marconi Radar	Marconi Radar, NATO
Comments	High vacuum; good lubrication, resists alkali, acid and corrosive gas; easily removed by most solvents. Particularly good for polished/ ground glass joints.	Medium vacuum, heavy duty grease; wide temperature base, ideal for laboratory work.

Lubricant (unmodified)

	L	M
Melting point	47 °C	44 °C
Radiation resistant	Yes	Yes
Vapour pressure at 20 °C (mbar)	$<10^{-10}$	$<10^{-10}$
Approvals	ESA, MatraMarconi, NASA, NATO	NATO
Comments	High vacuum, low temperature; nuclear, space industries; liquid gas chromatography	Similar to L grease, but stiffer; good gettering properties

Lubricant (polymers added)

	N	T	H
Melting point	43 °C	125 °C	N/A*
Radiation resistant	No	No	No
Vapour pressure at 20 °C (mbar)	$<10^{-9}$	$<10^{-8}$	$<10^{-7}$
Approvals	NASA, US Navy	NATO, US Navy	British Aerospace, ESA, Matra, Marconi, NASA
Comments	Rubbery, tenacious; cushions glass mating surfaces, ideal for burette taps. Cryogenic.	As N grease, but higher temperature; glass and general lubrication	Very high temperature; becomes stiffer as temperature increases

* Grease H can withstand temperatures up to 250 °C without melting

Ordering Information

Product Description	Order No.	
	Europe	N. America
Apiezon® L grease (50 g)	H02301041	H02301041
Apiezon® L grease (25 g)	N/A	H02301042
Apiezon® M grease (100 g)	H02301040	H02301040
Apiezon® M grease (25 g)	N/A	H11151002
Apiezon® N grease (25 g)	H02301011	H02301011
Apiezon® T grease (25 g)	H02301018	H02301018
Apiezon® AP100 grease (50 g)	H02300043	H02300043
Apiezon® AP101 grease (50 g)	H02301044	H02301044
Apiezon® AP101 grease (4 kg)	H02301045	H02301045
Apiezon® H grease (25 g)	H11150001	H11150001
Apiezon® J 500 ml	H11103016	H11103016
Apiezon® K 500 ml	H11104016	H11104016