6.3 Gearbox oil

For all gases **and** oxygen	Fomblin LOX 120*
For all gases **except** oxygen	SHELL Tellus 32**

Caution
Because of explosion risk, do not use normal, commercially mineraloil-based lubricants for oxygen service.

***For safety reasons, every Cryostar centrifugal pump is delivered with Fomblin Lox 120.**

** On specific request only. In this case a label **"Pump must not be used in oxygen"** must be fitted on it.

Note : If the user wants to change for Shell Tellus 32, he must carefully clean the gearbox before, and fit the above mentioned label.

6.4 Oil characteristics

Fomblin LOX 120		
Type	Method	
Cryostar ref.		730001184
Pour point	ASTM D 97	-41°C
Kin. viscosity	ASTM D 445	120 cSt
Volatility (% Mass loss / 22 hours at 120°C)	ASTM D 972	7
Ignition temperature (corresponding oxygen pressure is 110 kg/cm^2)	BAM test (1)	365°C
Spec. gravity	ASTM D 891/A	1.89 g/cm^3
Surface tension	ASTM D 1331	21 dynes/cm
Refractive index	ASTM D 1747	1.296 n^{20}
Average numerical molecular weight	MAN PF 29/24(2)	2400

(1) Bundesanstalt für Materialprüfung
(2) Bundesanstalt für Materialprüfung

Shell Tellus 32		
Type	Method	
Cryostar ref.		783000980
Density at 15°C	NF T 60 101	877 kg/m^3
Viscosity at 40°C	NF T 60 100	32 cSt
Viscosity at 100°C	NF T 60 100	5.6 cSt
Viscosity index	NF T 60 136	98
Pour point	NF T 60 105	-30°C
Flashpoint	NF T 60 118	218°C
Aniline point	NF M 07 021	-41°C

orginal LOX pump

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Fomblin PFPE: Specialty Lubricants

Product Data Sheet

Fomblin LC Lubricants for Oxygen Service

The continual development of chemical and metallurgical processes along with satellite communication and the electronics industries have led to the use of pure oxygen and other highly reactive chemicals. The difficulty of finding a lubricant perfectly compatible with oxygen, and other chemicals, has led to developing new technological solutions. Oxygen producers and users in chemical and metallurgical industries have been using Fomblin for years with excellent technical and economic results as well as a substantial improvement in safety conditions. These benefits are spreading to a wider range of applications where safety, compatibility and stability of the lubricant allow researchers to focus on other problems.

Fomblin LC grades are special fluids for oxygen handling and lubrication of oxygen pumps and compressor. Five grades of Fomblin LC with different viscosities (LC08, LC55, LC80, LC200, and LC250) are currently available. However the flexibility of Ausimont' s production process enables us to supply custom–made grades to suit specific requirements.

Fomblin LC perfluoropolyether fluids have the following unique features:

- *Excellent wear characteristics*
- *Very good low temperature properties*
- *Cost effective*
- *Outstanding for applications requiring low viscosity*

Properties	*Fomblin LC Lubricant Grades*				
	LC 08	**LC 55**	**LC 80**	**LC 200**	**LC 250**
Approximate ISO grade	10	22	32	68	100
Molecular weight (AMU)	800	1,700	2,000	2,900	3,200
Kinematic viscosity (ASTM D445)					
20°C (cSt)	8.0	53.0	80.0	190.0	260.0
40°C (cSt)	3.5	21.5	30.2	65.6	89.0
100°C (cSt)	0.9	4.2	5.4	9.4	12.0
Viscosity index (ASTM D2270)	—	92	119	122	130
Pour point (°C) (ASTM D97)	–70	–56	–49	–40	–35
Evaporation weight loss (ASTM 2595)					
60°C, 22 hr (5)	11.6	2.5	2.4	1.7	—
120°C, 22 hr (5)	—	40.0	27.0	17.0	0.1
Density (ASTM D891)					
20°C (g/cm^3)	1.83	1.87	1.88	1.89	1.90
Four ball E.P. wear tests (IP 239) (D2783 mod., 1460 RPM/10 sec.)					
Welding load (kg)	250	250	400	400	400
Mean hertz load (kg)	50	100	100	105	120
Four ball wear test (ASTM D4172 B 75°C, 1 hr, 1200 RPM, 40 kg)					
Avg. scar diameter (mm)	0.6	0.6	0.6	0.7	0.7
Oxygen Impact (BAM) 100°C					
Impact Pressure (efm)	130	160	150	180	190

Fomblin®

For information contact your Solvay Solexis representative or:

Europe
Solvay Solexis S.p.A. (Italy)
Tel: +39-02-3835-1
Fax: +39-02-3835-2129
Email: solvaysolexis.ita@solvay.com

North America
Solvay Solexis, Inc.
Tel: +1-856-853-8119
Fax: +1-856-853-6405
Email: solvaysolexisinfo@solvay.com

Solvay Solexis

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Fomblin PFPE: Specialty Lubricants

Product Data Sheet

Fomblin Y–LOX 120 for Liquid Compressor Vacuum Applications

Fomblin Y–LOX 120 perfluoropolyether is a high performance lubricant designed specifically for liquid compressor and vacuum applications. The characteristics of Y–LOX 120 include outstanding chemical stability, thermal stability and lubrication properties. These characteristics make Fomblin Y–LOX 120 especially suitable as a base oil lubricant for high performance mechanical lubrication applications in harsh environmental conditions.

Properties	Typical Values
Kinematic viscosity (cSt) @ 20°C @ 40°C @ 100°C	 120 42 6.8
Viscosity Index	120
Pour point (°C)	–46
Surface tension (dyne/cm) @ 20°C	 21
Vapor pressure, (Torr) @ 20°C @ 100°C	 $2x10^{-4}$ $5x10^{-2}$
Specific gravity @ 20°C	1.89
Evaporative Loss (g/100g) @ 120°C/22 hours	 <10
Appearance	Clear and colorless

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For information contact your Solvay Solexis representative or:

Europe
Solvay Solexis S.p.A. (Italy)
Tel: +39-02-3835-1
Fax: +39-02-3835-2129
Email: solvaysolexis.ita@solvay.com

North America
Solvay Solexis, Inc.
Tel: +1-856-853-8119
Fax: +1-856-853-6405
Email: solvaysolexisinfo@solvay.com