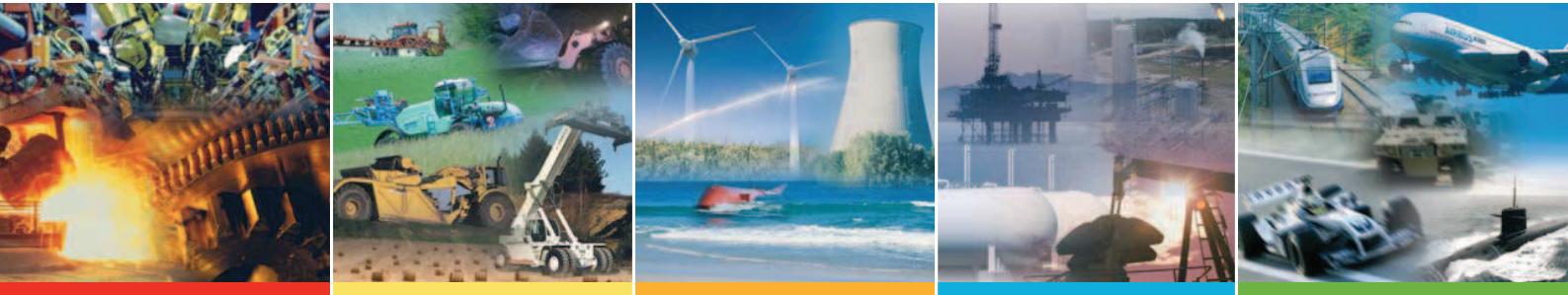




## Accumulator

High-pressure diaphragm accumulator  
conforming to EC regulations

### ELM Series



*The Professional Choice*



**Day to day, the agricultural, forestry, construction and public works sectors are faced with the fundamental question :**



## **How to enhance driver and vehicle comfort ?**

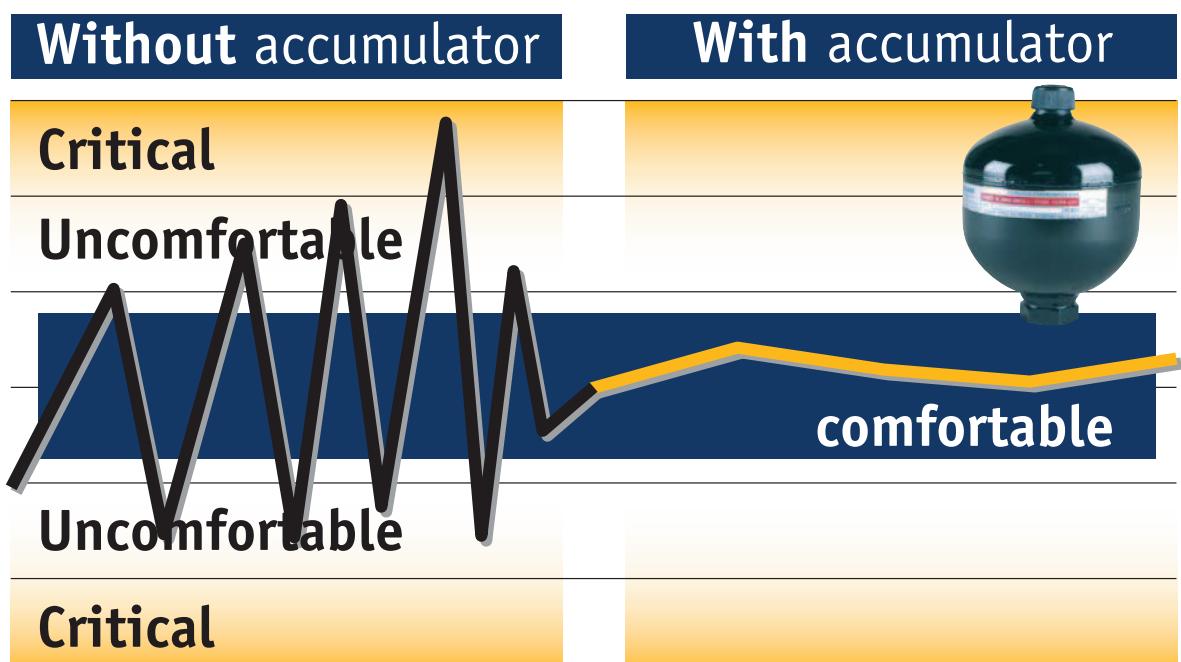
Thanks to our comprehensive range of diaphragm accumulators, we offer our customers flexibility of driving and record speeds while guaranteeing enhanced machinery longevity

The accumulator offers the possibility of extending the range of use of your machine and tools.

Don't wait any longer; you can be a winner by standardizing the EC regulation compliant diaphragm accumulator on your machines.

# Comparative cycle

## for a tractor and its accessories in working conditions



\*Study carried out in cooperation with one of the largest manufacturers of agricultural machinery



Speed 50 kph



Load variation on front axle from 3,5 à 100 %



### An eloquent example\*

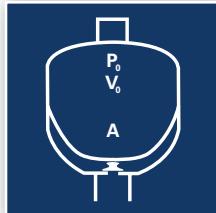
of application

Faced with difficult working conditions, a farm supervisor wants to increase his driving comfort and reduce breakage among his fleet of machines.

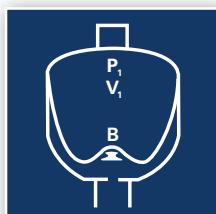


## OPERATING PRINCIPLE

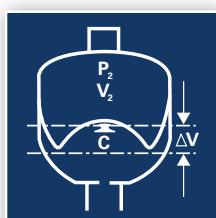
Due to the compressibility of the gas, nitrogen, the diaphragm accumulator enables to store, stock and return a liquid under pressure.



**A** - The diaphragm is in the precharge position, which means that it is only filled with nitrogen. The knob closes the hydraulic orifice and prevents the destruction of the diaphragm.



**B** - Position at the minimum operating pressure : there must be a certain amount of fluid between the diaphragm and the hydraulic orifice, such that the knob does not close the hydraulic orifice. Thus,  $P_0$  must always be  $< P_1$ .



**C** - Position at the maximum operating pressure: the volume change  $\Delta V$  between the minimum and maximum positions of the operating pressures represents the fluid quantity stored.

## THE BENEFITS FOR YOU

The adaptation of a hydraulic shock absorber made up of a diaphragm accumulator improves driver comfort and offers immediate response times when driving over obstacles and the same flexibility for variable operating conditions.  
 $0 < \text{speed} < 50 \text{ kph}$   
 $3.5 < \text{load variation} < 100\%$   
 Identical flexibility depending on your use.

The same EC regulation compliant accumulator can be used in over 35 destination countries, thus facilitating their free movement.

## TECHNICAL CHARACTERISTICS

The technical characteristics are as follows:

Minimum/maximum temperature allowable (° Celsius) : - 10/+80

Materials : steel casing, nitrile diaphragm or bladder depending on model, for other constructions : [consult OLAER](#).

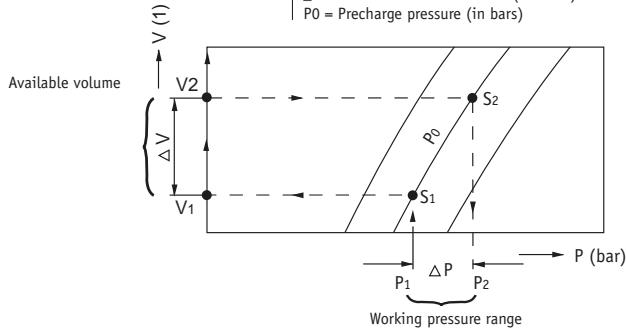


# Calculations

Olaer has developed highly advanced calculation software applications designed to simulate the operation of accumulators in terms of water hammer arresting, pulsation dampening, thermal expansion, and energy storage. These software applications are available on CD-ROM and on our website: [www.olaer.com](http://www.olaer.com).

## Using the abacus

$P_0$  = Maximum operating pressure (in bars)  
 $P_1$  = Minimum operating pressure (in bars)  
 $\Delta V$  = Volume restored or stored (in litres)  
 $P_0$  = Precharge pressure (in bars)



This abacus can be used, on the basis of the arrangement of the various parameters, to determine the volume of oil available, the size of the accumulator or the pressures. It does not take account of the correction for actual compressibility of the real gas, the actual adiabatic coefficient or the polytropic coefficient of the application. Depending on the conditions of use, these can have a significant effect and may entail the need for certain corrections.

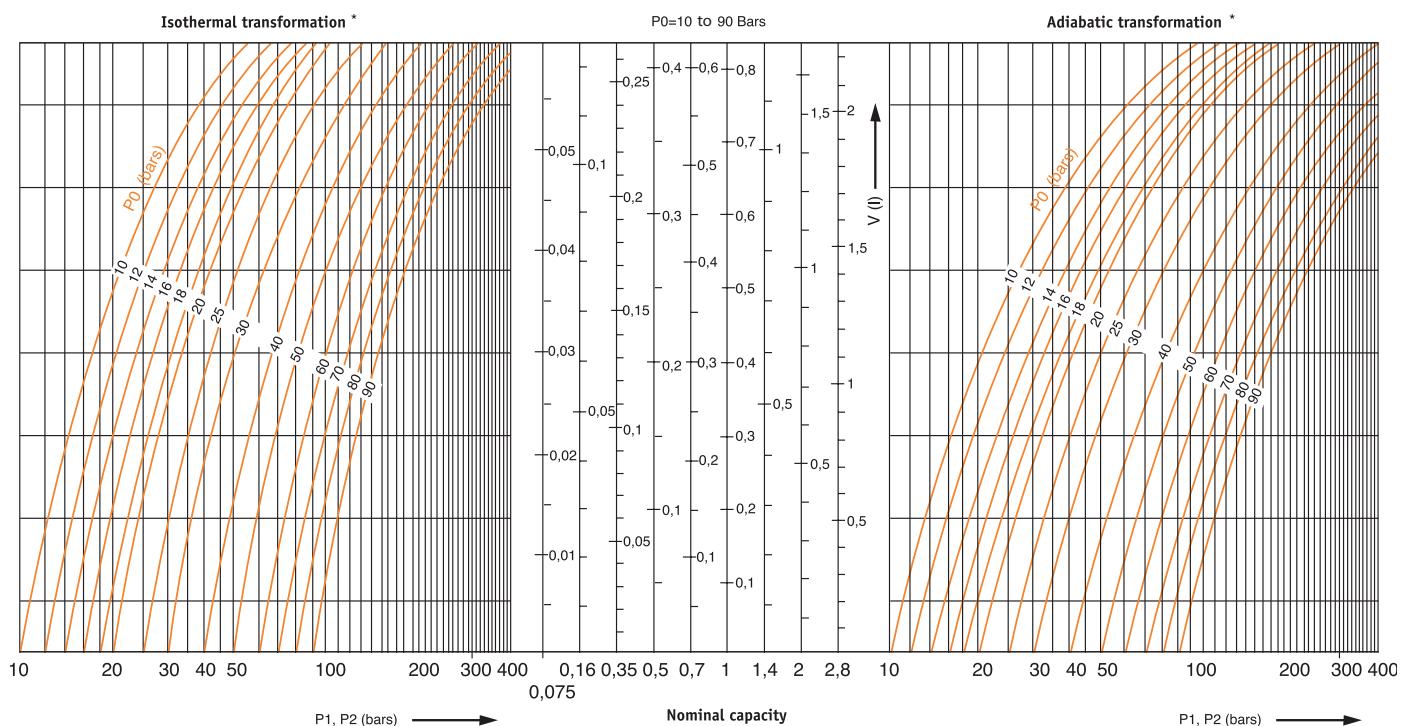
## We recommend

In load dampening configuration :  
 $P_0 = 0,6 \text{ à } 0,9 \text{ Pm}$   
 (Pm = average working pressure)  
 Pulsation dampening :  
 $P_0 = 0,6 \text{ à } 0,8 \text{ Pm}$   
 (Pm = average working pressure)  
 Energy storage :  
 $P_0 = 0,9 \text{ P1}$   
 (P1 = minimum working pressure)

## \*REMINDER

**Isothermal** : The conversion is referred to as isothermal when the compression or expansion of the gas occurs slowly to allow for heat exchange so as to maintain a constant temperature  
**Adiabatic** : The conversion is referred to as adiabatic when the compression or expansion occurs rapidly without exchange of heat with the ambient surroundings.

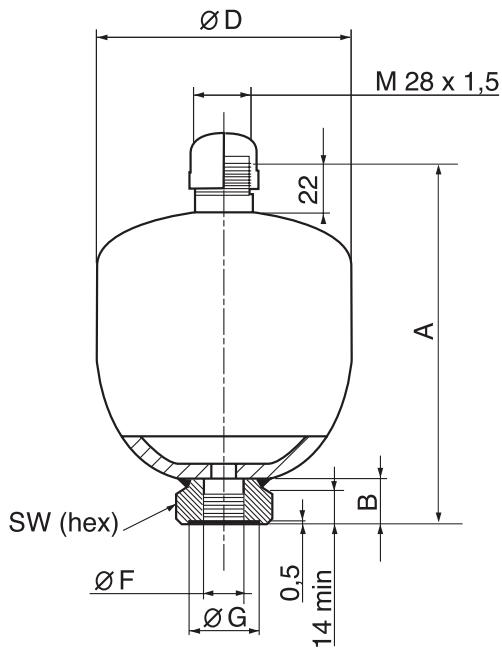
## ENERGY STORAGE CALCULATION ABACUS



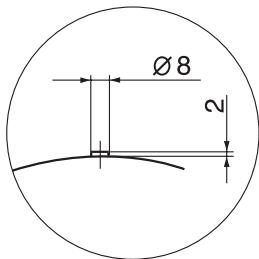
# Technical characteristics

Form A

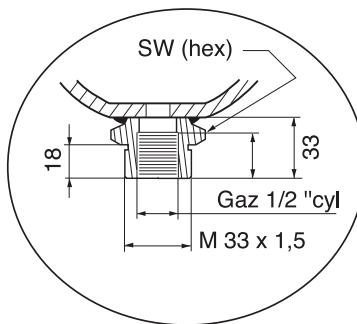
**Standart F execution**  
nitrogen rechargeable



**G execution at request**  
nitrogen pre-charged in factory



Form C



Other connection  
at request

Designation	Execution Form	Volume V0 in litres	Max pressure in bar	Max precharge pressure in bar	Compression ratio P max/P0	Pressure amplitude P max / P mini	Weight in kg	A	B	SW	D	G	F	H	Oilport	Clamp designation	Lock-nut designation
ELM 0.075-250/00/AF	AF	0,075	250	130	8	210	0,7	111	20	32	64	29	G 1/2	-	-	-	
ELM 0.16-250/00/AF	AF	0,16	250	130	6	210	1	120	20	32	75	29	G 1/2	-	-	-	
ELM 0.32-210/00/AF	AF	0,32	210	130	8	140	1,4	134	20	32	93	29	G 1/2	-	E95	-	
ELM 0.50-210/00/AF	AF	0,50	210	130	8	175	2	152	22	41	106	34	G 1/2	-	E106	-	
ELM 0.50-210/00/CF	CF	0,50	210	130	8	175	2	163	33	41	106	-	G 1/2	M33x1,5	E106	M33	
ELM 0.75-160/00/CF*	CF	0,75	160	130	8	120	2,6	176	33	41	121	-	G 1/2	-	E124	-	
ELM 0.75-210/00/AF	AF	0,75	210	130	8	175	2,6	166	22	41	122	34	G 1/2	-	E124	-	
ELM 0.75-210/00/CF	CF	0,75	210	130	8	175	2,6	177	33	41	122	-	G 1/2	M33x1,5	E124	M33	
ELM 0.75-350/00/AF	AF	0,75	350	130	8	150	4,4	168	18	41	133	34	G 1/2	-	E136	-	
ELM 0.75-350/00/CF	CF	0,75	350	130	8	150	4,5	189	18	41	133	-	G 1/2	M33x1,5	E136	M33	
ELM 1-210/00/AF	AF	1	210	130	8	170	3,5	180	22	41	136	34	G 1/2	-	E136	-	
ELM 1-210/00/CF	CF	1	210	130	8	170	3,5	191	33	41	136	-	G 1/2	M33x1,5	E136	M33	
ELM 1.4-210/90/AF	AF	1,4	210	130	8	120	4,2	191	22	41	148	34	G 1/2	-	E147	-	
ELM 1.4-210/90/CF	CF	1,4	210	130	8	120	4,2	202	33	41	148	-	G 1/2	M33x1,5	E147	M33	
ELM 1.4-350/90/AF	AF	1,4	350	130	8	150	7,4	199	20	41	160	34	G 1/2	-	-	-	
ELM 1.4-350/90/CF	CF	1,4	350	130	8	150	7,5	220	20	41	160	-	G 1/2	M33x1,5	-	M33	
ELM 2-100/90/AF	AF	2	100	100	8	80	3,5	240	22	41	144	34	G 1/2	-	E147	-	
ELM 2-250/90/AF	AF	2	250	130	8	140	7,5	251	22	41	155	33	G 3/4	-	E155	-	
ELM 2-350/90/AF	AF	2	350	130	8	200	11,3	219	22	55	180	34	G 3/4	-	E180	-	
ELM 2-350/90/CF	CF	2	350	130	8	200	11,5	240	22	55	180	-	G 3/4	M45x1,5	E180	M45	
ELM 2.8-250/90/AF	AF	2,8	250	130	6	140	10	268	21	41	174	34	G 3/4	-	E174	-	
ELM 2.8-350/90/AF	AF	2,8	350	130	6	200	14,3	264	21	55	180	34	G 3/4	-	E180	-	
ELM 2.8-350/90/CF	CF	2,8	350	130	6	200	14,5	285	21	55	180	-	G 3/4	M45x1,5	E180	M45	
ELM 3.5-250/90/AF	AF	3,5	250	130	4	140	11	307	21	41	174	33	G 3/4	-	E174	-	
ELM 3.5-350/90/AF	AF	3,5	350	130	4	200	16	304	21	55	180	34	G 3/4	-	E180	-	
ELM 3.5-350/90/CF	CF	3,5	350	130	4	200	16,5	325	21	55	180	-	G 3/4	M45x1,5	E180	M45	

Range conform to EC standart group 2

\* Stainless steel version

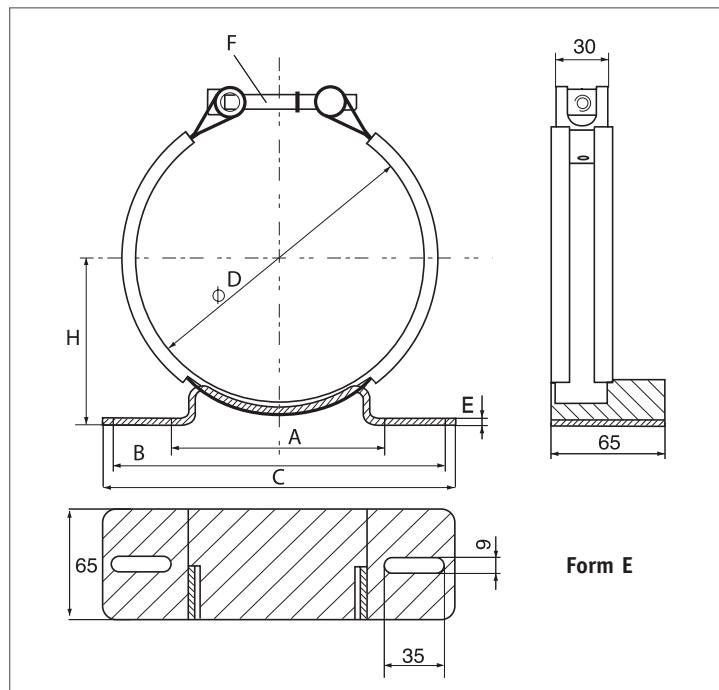
# Accessories

ELM

OLAER®

These accessories are designed so that the accumulator can be securely attached in all configurations.

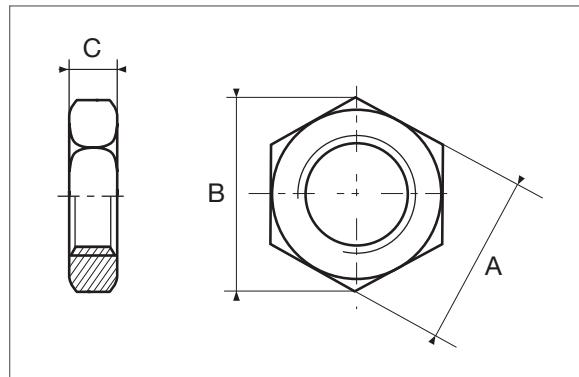
## Clamp



Designation	Holding diameter mini - maxi	A	B	C	D	E	H	MxL
E95	93 à 97	78	148	160	95	3	66,5	M10x65
E106	104 à 108	78	148	160	106	3	72	M10x65
E124	121 à 125	78	148	160	121	3	77,5	M10x65
E136	130 à 136	78	148	160	136	3	83,5	M10x80
E147	143 à 149	78	148	160	149	3	90	M10x80
E155	153 à 157	128	198	210	155	4	90,7	M10x80
E174	171 à 177	128	198	210	174	4	100,7	M10x100
E180	178 à 184	128	198	210	180	4	105	M10x80

Range conforms to EC standard group 2

## Lock-nut



Designation	Pitch	A	B	C
M 33	1,5	50	57,5	10
M 45	1,5	70	80,8	10

# Peripherals



## CHARGING AND GAUGING ASSEMBLY

Suitable for use with all accumulators, the charging and gauging assembly is designed to check, fill and bleed nitrogen. It is screwed onto the filling valve, and connected via a hose to the pressure regulator valve fitted onto the nitrogen source.

### VGU MODEL

The universal charging and gauging assembly (VGU) is designed for use with all accumulators on the market

### Technical characteristic

Maximum operating pressure :  
340 bars

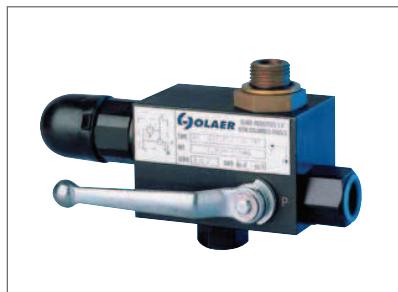
### How to order ?

#### Example:

VGU/F 25/250 7 TS2 3 25/250 =  
possible choice of pressure gauges  
depending on the pressure ranges  
6/10/25/60/100/160/250/400

### Optional, at request

Adapters for foreign nitrogen cylinders, specify the country  
Hoses of different lengths  
Connection for specific filling valve.



## ISOLATION AND DECOMPRESSION BLOCKS

These appliances are designed to bring together, on a single compact block, all the components necessary for the operation of a hydraulic installation fitted with hydro-pneumatic accumulators.

The functions they perform include manual and/or electric decompression, isolation, flow regulation and pressure limitation.

Various nominal passage diameters: 10 mm (DI 10 block), 16 mm (DI 16 block), 20 mm (DI 20 block), 24 mm (DI 24 block), 32 mm (DI 32 block).

Maximum operating pressure from 330 to 550 bars depending on the model. **Contact us at Olaer** for our documentation and selection program.



## FUNCTION BLOCKS

Olaer has a broad range of function blocks adapted to your specific use. Contact our technical department for further information.

## ORDERING ACCUMULATOR

**ELM 0,75 - 350/00/AF 01125 P0=90b**

**Accumulator series**

European range of ELM diaphragm accumulators

**Volume**

in litres

**Maximum operating pressure**

in bar

**Regulation code**

00 : EC regulations for volumes ranging from 0.075 to 1 l.

90 : EC regulations for volumes ranging from 1.4 to 3.5 l.

**Form**

A : internal tapped outlet

C : internal tapped end external threaded outlet

**Execution**

F : Standard (nitrogen rechargeable)

G : At request (precharged with nitrogen in factory)

**Construction**

Mineral oils, operating temperature from -10 to + 80 °C, construction 01125 (standard construction).

Other fluids and temperatures, **contact Olaer**

**Nitrogen precharge pressure**

in bar at 20° C

(See calculation abacus on page 5 or contact the Olaer Group technical departments)

## ORDERING ACCESSORIES AND PERIPHERALS

Indicate the designation of the accessories mentioned in the tables on page 7

and peripherals on page 8.



**Before installing the accumulator, it is essential to perform a visual inspection to detect any damage. For optimum operation, the accumulator should be placed as closely as possible to the operating device or to be protected. The ELM can be mounted vertically, feeling valve at the top, or horizontally.**

- Do not stand in front of the openings
- Keep an eye on the environmental conditions and, if need be, protect the accumulator from sources of heat, electrical fields, magnetic fields, lightning, humidity and the bad weather
- Leave a space of 200 mm above the filling valve for connecting it to the gauging and charging assembly
- Preserve accessibility with the bleed hole
- Ensure that the markings are visible
- Install it in a manner that ensures that the pipes directly or indirectly attached to it are not subject to any abnormal stress
- Place the body of the accumulator on a support or surround it by a guard capable of preventing it from moving or of limiting its movement.
- Connect the accumulator to the hydraulic circuit by means of the appropriate connecting devices, such as unions and flanges
- Make sure that the fluid is compatible with the equipment
- Make sure that the maximum allowable pressure of the accumulator is equal to or greater than that of the hydraulic circuit
- Ensure that the temperature and pressure limits are complied
- Fit the hydraulic circuit with a pressure limiting system
- If necessary, make provision for a rupture disk or relief valve to cover the risk of excess pressure linked to thermodynamic phenomena
- To envisage a filter on the hydraulic system and/or to carry out inspections intern as frequent as necessary in the employment case of an abrasive fluid.

## IT IS STRICTLY FORBIDDEN TO

- Weld, rivet or screw any part onto the accumulator
- Carry out any operation which could affect the mechanical properties of the accumulator
- Use the accumulator as a construction part: it should not support any constraint or load
- Modify the accumulator without the prior agreement of the manufacturer.

## COMMISSIONING

For commissioning, see the instructions delivered with the accumulator.

# EC regulation



## Extract from European legislation

Directive 97/23/ EC is applicable from 29-11-1999 and mandatory from 29-05-2002.

## WHAT YOU NEED TO KNOW

Decree 99-1046, which applies to new machinery and the ministerial order of 15-03-2000, which applies to the operation of all machinery, transposed the directive into French domestic legislation.

- Free movement of machinery within the European Union.
  - Group 2 fluid accumulators whose  $V \leq 1 \text{ L}$  and  $PS \leq 1000 \text{ bar}$  are not entitled to bear EC marking.
  - The EC marking should be accompanied by the identification number of the notified authority.

EC type accumulators are delivered with **instructions for operation** and a **declaration of conformity**.

Olaer designs and manufactures hydro-pneumatic accumulators for use in all countries and which comply with national regulations in force as ASME / selo...

# International Network

ELM

## Australia

Olaer Fawcett Christie PTY Limited  
13 Boola Place  
Cromer NSW 2099  
Australia  
Tel : + 61.2.9981.6888  
Fax : + 61.2.9981.6144  
E-mail : info@olaer.com.au  
www.olaer.com.au

## Austria

Olaer Austria GmbH  
Wachtelstraße 25  
A-4053 Haid  
Tel : + 43.7229.80306  
Fax : + 43.7229.80306-21  
E-mail : info@olaer.at  
www.olaer.at

## Belgium

S.A Olaer Benelux N.V.  
Z3, Doornveld 21  
B-1731 Zellik  
Tel : + 32 2 466 15 15  
Fax : + 32 2 466 16 24  
E-mail : info@olaer.be  
www.olaer.be

## China

Olaer Tianjin Hydraulic Manufacturing Company Ltd  
11-A Jimei Industrial Zone  
XIQING Economic Development Area  
Tianjin - 300 385  
CHINA  
Tel : + 86 22 2 3889096  
Fax : + 86 22 2 3889097  
E-mail : olaer@olaer.net.cn  
www.olaer.net.cn

## Czech Republic

Olaer CZ s.r.o.  
Videnská 125  
CZ – 61900 BRNO  
Tel : + 420 5 4712 5601  
Fax : + 420 5 4712 5600  
E-mail : info@olaer.cz  
www.olaer.cz

## Denmark

Oiltech DK  
Hestehoejvej 1  
DK – 9632 MØLDRUP  
Tel : +45.86.69.20.38  
Fax : +45.86.69.23.38  
E-mail : oiltech@oiltech-olaer.dk  
www.oiltech-olaer.dk

## Finland

Oiltech Hydraulics Oy  
Veneentekijäntie 2, PL 190  
FI-00211 Helsinki  
Tel: +35 8 9 4137 5500  
Fax: +35 8 9 4137 5550  
www.oiltech.fi  
E-mail : info@oiltech.fi

## France

Olaer Industries SA  
16 rue de Seine  
92704 Colombes Cedex  
Tel : + 33.01.41.19.17.00  
Fax : + 33.01.41.19.17.20  
E-mail : olaer@olaer.com  
www.olaer.com

## Germany

Olaer Industries GmbH  
Zum Guntlerstr 4  
D – 66440 Blieskastel  
Tel : +49.(0) 6842 92040  
Fax : +49.(0) 6842 9204-15  
E-mail : info@olaer.de  
www.olaer.de

## Holland

Olaer Nederland B.V.  
De Lind 10, Postbus 75  
NL-4841 AB Prinsenbeek  
Tel : + 31 76-5412453  
Fax : + 31 76-5411502  
E-mail : info@olaer.nl  
www.olaer.nl

## India

Fawcett Christie Hydraulics PVT Ltd  
C-30, Shankara Park  
Shankarpuram  
Bangalore 560 004  
KARNATAKA INDIA  
Tel : +91 51204205  
Fax : +91 080-26611716  
E-mail : fch@vsnl.com  
www.fchindia.com

## Italy

Olaer Italiana S.p.A.  
Strada Fantasia 83  
IT – 10040 Leini (Torino)  
Tel : + 39 011 991.85.11  
Fax : + 39 011 998.02.02  
E-mail : anna.cinque@olaer.it  
www.olaer.it

## Korea

Hyundai Olaer Hydraulic Co. Ltd  
3Ba 204-1 Siwha Industrial Complex  
Jeongwang-dong, Siheung-si  
Gyeonggi-do 429-450 KOREA  
Tel : + 82.31.499.0797  
Fax : + 82.31.499.2249  
E-mail : master@hyundaiolaer.co.kr  
www.hyundaiolaer.co.kr

## Norway

Oiltech AS  
Dynamitveien 23, PB 133  
NO-1401 Ski  
Tel : + 47 64 91 11 80  
Fax : + 47 64 91 11 81  
E-mail : oiltech@oiltech.no  
www.oiltech.no

## Poland

Oiltech Polska  
ul. Gen Bora Komorowskiego 22  
PL-03982 WARSZAWA  
Tel : + 48 22 6738162  
Fax : + 48 22 6738163  
www.oiltech.pl  
krysztof.klepka@oiltech.se

## Singapore

Olaer Singapore  
Blk 823, 25 Loyang Crescent  
Loyang Offshore Supply Base  
Singapore 508988  
Tel : + 65 65420278  
Fax : + 65 65421083

## Slovakia

OLAER  
Josef Mezaros  
Lotysska 22  
SK – 821 06 BRATISLAVA  
Slovensko  
Tel. +0421 2 4552 1154  
Fax : +0421 2 4552 1154  
E-mail : mesaros@olaer.sk  
www.olaer.sk

## South Africa

Rolton Products (Pty) Ltd  
43 Spokeshave Street  
Stormill Ext 2  
Po Box 43244  
Industria 2042  
1725 Roodeport – South Africa  
Tel : +27(0)11 474.3095/6  
Fax : +27(0)11.474.8384  
rolton@global.co.za  
www.rolton.edx.co.za

## Spain

Olaer Oiltech Iberica S.A.U.  
Travesia Industrial 29  
08907 L'Hospitalet de Llobregat  
(Barcelona)  
Tel : + 34.933.368.900  
Fax : + 34.933.357 186  
E-mail : olaer@olaer.es  
www.olaer.es

## Sweden

Oiltech AB  
Förärdsvägen 2  
SE- 181 41 Lidingö  
Tel : + 46 8 636 07 00  
Fax : + 46 8 767 97 56  
E-mail : info@oiltech.se  
www.oiltech.se

## Switzerland

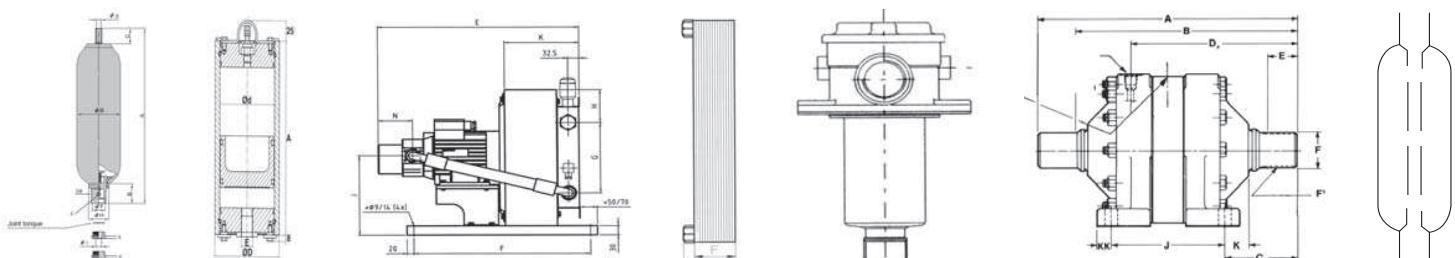
Olaer (Schweiz)AG  
Bonnstrasse 3  
CH-3186 Dübigen  
Tel : + 41 26 492 70 00  
Fax : + 41 26 492 70 70  
E-mail : info@olaer.ch  
www.olaer.ch

## United Kingdom

Fawcett Christie Hydraulics Ltd  
Glendale Avenue  
Sandycroft Industrial Estate  
Deeside  
Flintshire CH5 2QP  
North Wales U.K.  
Tel : + 44 1244 535515  
Fax : + 44 1244 533002  
E-mail : sales@fch.co.uk  
www. fch.co.uk

## United States

OilAir Hydraulics Inc.  
11505 West Little York  
Houston, Texas 77041  
Tel : + 1 713 937-8900  
Fax : + 1 713 937-0438  
E-mail : sales@oilairhydraulics.com  
www.fluidpower.com



**OLAER**

## France

Olaer Industries SA  
16, rue de Seine  
92704 Colombes Cedex  
Tél. : + 33 01 41 19 17 00  
Fax : + 33 01 41 19 17 20  
E-mail : olaer@olaer.com  
www.olaer.fr

**OLAER**

**OILTECH**

**OILAIR**

**FCH**