

# Accumulators

high pressure bladder type  
conform to CE regulations



**EHV Range**

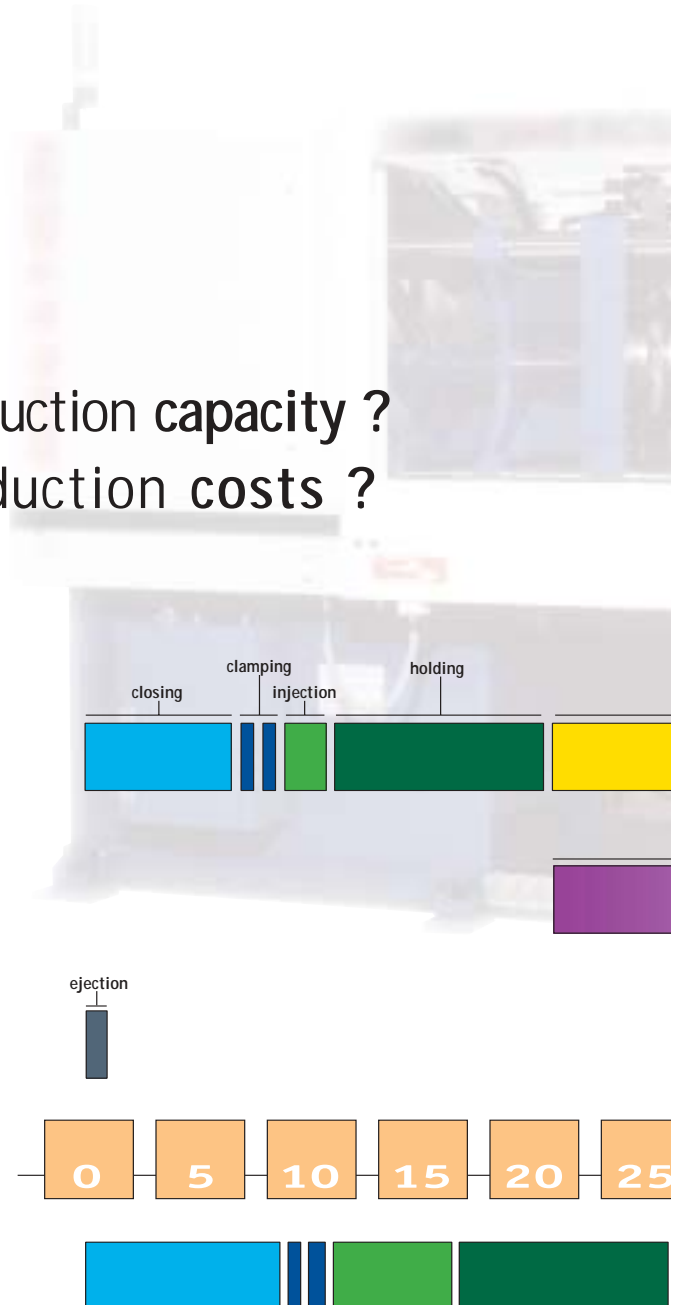


- On a daily basis, the industrial world is confronted with two fundamental questions:

# How

**to increase production capacity ?  
to reduce production costs ?**

- Some companies still disregard smart solutions, wrongly assuming that they can afford to ignore them.
- Thanks to our bladder accumulators, we can offer you record breaking outputs at a reduced cost as well as an extended service life for your hydraulic systems.
- From now on, be the winner. Rationalize your needs using CE approved accumulators.



injection moulding machine using the same installed power.

## EHV Range

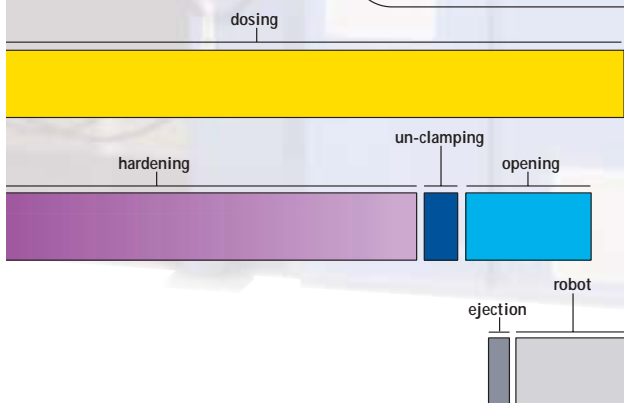
# One application<sup>\*</sup>

that speaks for itself

Faced with a sudden increase in demand a company specialising in producing plastic molded parts needed to **increase its production capacity** with minimal equipment modification **while** containing the overall energy consumption.

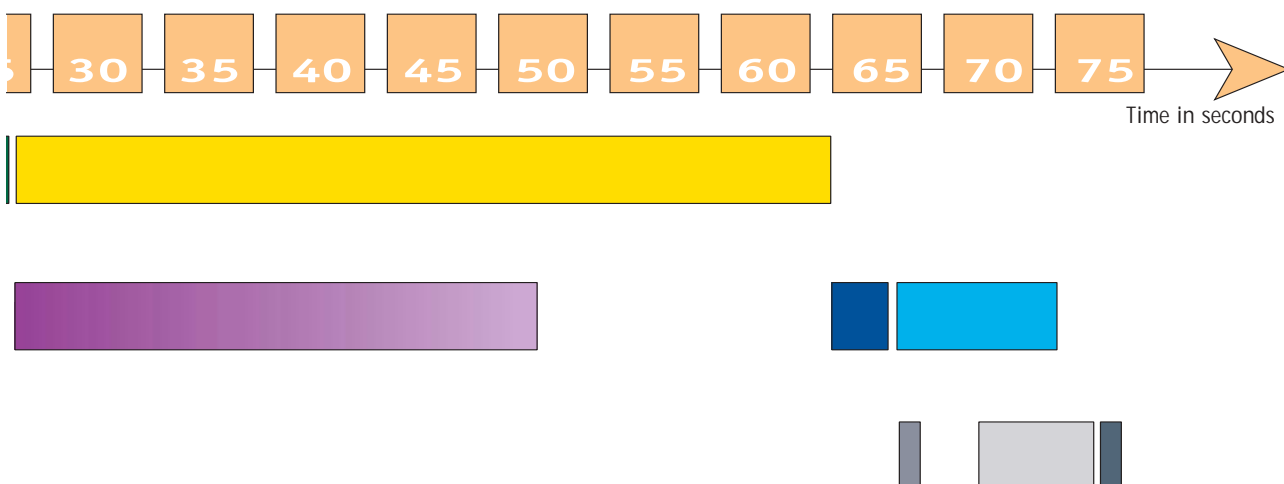
### With accumulator

60 items/hour  
energy cost 3,5 kW/item



### Without accumulator

40 items/hour  
energy cost 4,4 kW/item



<sup>\*</sup> This survey was run in collaboration with one of the largest press manufacturers, on a 2500T press.



## Main Features

### ● CONCEPT

This accumulator comprises a forged steel shell, a fluid port assembly and a rubber bladder compatible with a large number of fluids. Its special design allows the bladder (the strategic component) to compress and deform into 3 lobes in order for the accumulator to store, then to deliver the fluid under pressure, as required.

### ● YOUR BENEFITS

- To increase your production rates thanks to large instantaneous flow rates that only accumulators can provide.

- Some spare power available at any time.

Example : EHV 50-330/90

Average flow : 650 L/min.

Maximum pressure available : 320 bars

Minimum pressure available : 250 bars

Average power = Average flow x Average pressure/600 = 308 kW

- The accumulator's ability to run independently moderates its installation cost while reducing your equipment running cost.

- With a similar accumulator in compliance with the European standard, your OLAER accumulator is suitable for use in more than 35 countries making it boundary friendly.

### ● TECHNICAL CHARACTERISTICS

The following technical characteristics are common to all type of accumulators.

Test pressure (bar) : 500

Min./Max. working temperature acceptable (°Celsius) : - 20/+80

Min./Max. storage temperature (°Celsius) : - 40/+80

Shell material : Alloyed steel

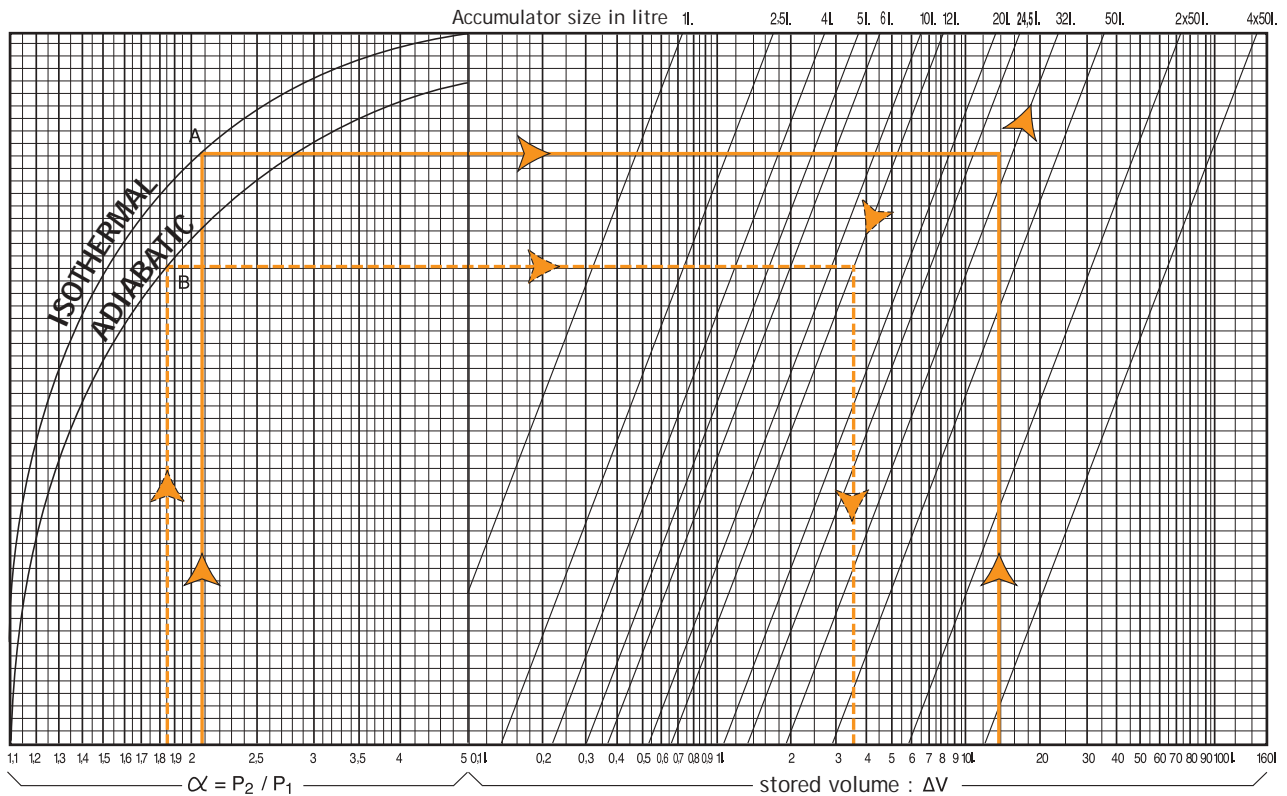
Rubber compound NBR, IIR, EPDM etc.

Protections : Bare metal, electro-chemical coating, epoxy resins, PTFE



Olaer has developed some very sophisticated software simulating the behaviour of accumulators used in applications such as pulsation dampening, surge alleviation, thermal expansion and energy storage. This software is available on CD-Rom and from our website : [www.olaer.com](http://www.olaer.com)

## BASIC SIZING CHART FOR ACCUMULATOR USED IN ENERGY STORAGE



The above graphic is used to estimate the size of an accumulator used to store or deliver a certain volume of liquid within a given pressure range. These curves are the graphic representation of an adiabatic\* cycle (fast cycling rate - N = 1.4) or isothermal\* cycle for an accumulator working at 20°C with a precharge  $P_0 = 0,9 P_1$

They do not take into consideration the real gas compression correction factor, the real adiabatic coefficient and the polytropic rate of the application. Depending on the application data, the influence of these factors may be significant, and require that some calculations adjustments be made.

**\*Reminder**

**Isothermal** : the transformation is said to be isothermal when the compression or expansion of the gas occurs at a rate slow enough to allow a good thermal exchange, allowing the gas to remain at constant temperature.

**Adiabatic** : the transformation is said to be adiabatic when the cycle is quick and does not allow a temperature exchange with the ambient media.

### Sizing of an accumulator

to be installed in the following conditions.

$P_2$  : Maximum available pressure : 210 bars

$P_1$  : Minimum working pressure : 100 bars

$P_0$  : Nitrogen precharge : 90 b

$\Delta V$  : Volume to be stored : 14 l

Condition : Isothermal (No temperature variation)

**A/ Compression ratio**  $\alpha = P_2/P_1 = 210/100 = 2,1$

**B/ From the value 2,1** on the  $\alpha$  axis, draw a vertical line that intersects the isothermal reference curve in A.

**C/ From the value 14** on the  $\Delta V$  axis, draw a vertical line. The intersection point of this line with the horizontal line meeting A indicates a required accumulator size of 32 L.

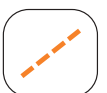
### Calculation of the volume drawn off from an accumulator

Accumulator size = 12 L

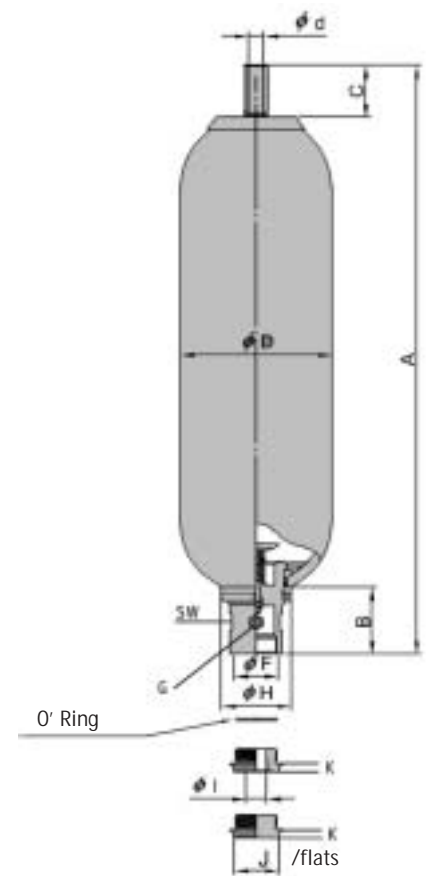
$P_2 = 185 \text{ b}$  ;  $P_1 = 100 \text{ b}$  ;  $P_0 = 90 \text{ b}$

Adiabatic condition  $\alpha = P_2/P_1 = 185/100 = 1,85$

$\Delta V = 3,5 \text{ litre}$ .



Part Number	EHV 1-690/90	EHV 2.5-690/90	EHV 5-690/90
Maximum pressure in bars	690	690	690
Nominal gas volume in litres	1.1	2.4	5
Maximum flow rate in l/min	360	360	360
Weight in kg	8.6	15	29
ø D max	122	122	122
A max height	376	551	900
Connection ø F	G 1" cyl.	G 1" cyl.	G 1" cyl.
ø I Connection with reducing bush	G 1/2" cyl.	G 1/2" cyl.	G 1/2" cyl.
J/flats	41	41	41
K	10	10	10
B	68	68	68
C	69	69	69
ø d	22.5	22.5	22.5
ø H	68	68	68
O' Ring + anti-extrusion Ring	Or 21.3 x 3.6		Ar 21.6 x 28 x 0.69
P/N clamps x (quantity)	B 121 x 1	B 121 x 2	B 121x 2
P/N support bracket	CE 89	CE 89	CE 89
P/N fixation assembly	-	-	-



Part Number	EHV 10-330/90	EHV 12-330/90	EHV 20-330/90	EHV 24.5-330/90	EHV32-330/90	EHV 50-330/90
Maximum pressure in bars	330	330	330	330	330	330
Nominal gas volume in litres	9.2	11	17.8	22.5	32	48.5
Maximum flow rate in l/min	900	900	900	900	900	900
Weight in kg	30	35	50	53	80	100
ø D max	222	222	222	222	222	222
A max height	583	683	893	1028	1418	1939
Connection ø F	G 2" cyl.	G 2" cyl.	G 2" cyl.	G 2" cyl.	G 2" cyl.	G 2" cyl.
ø I Connection with reducing bush	G 1" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.
O' Ring	65	65	65	65	65	65
K	13	13	13	13	13	13
B	103	103	103	103	103	103
C	65	65	65	65	65	70
ø d	22.5	22.5	22.5	22.5	22.5	51
ø H	101	101	101	101	101	101
SW on flats	70	70	70	70	70	70
G drain	6 hex 19 O/flats	6 hex 19 O/flats	6 hex 19 O/flats	6 hex 19 O/flats	6 hex 19 O/flats	6 hex 19 O/flats
O' Ring ø int x ø tore	54 x 3	54 x 3	54 x 3	54 x 3	54 x 3	54 x 3
P/N clamps x (quantity)	E 226 x 2	E 226 x 2	E 226 x 2	E 226 x 2	E 226 x 2	E 226 x 2
P/N support bracket	CE 159	CE 159	CE 159	CE 159	CE 159	CE 159
P/N fixation assembly	EF2	EF2	EF2	EF2	EF3	EF3

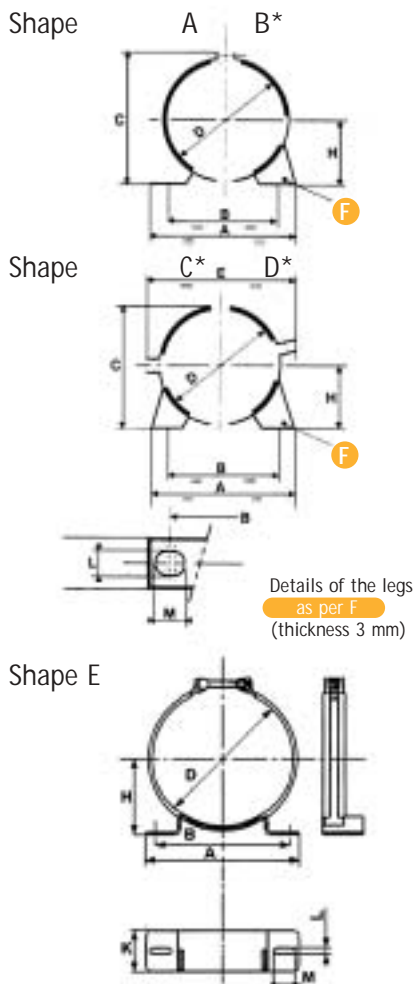
Part Number	EHV 0.2-350/00*	EHV 0.5-350/00*	EHV 1-350/90	EHV 1.6-350/90	EHV 2.5-350/90	EHV 5-350/90	EHV 4-350/90	EHV 6-350/90	EHV 10-350/90
Maximum pressure in bars	350	350	350	350	350	350	350	350	350
Nominal gas volume in litres	0.17	0.6	1	1.6	2.4	5	3.7	6	10
Maximum flow rate in l/min	120	240	240	240	450	450	450	450	450
Weight in kg	2.1	2.5	5	7	10	17	14	19	29
ø D max	58	90	115	115	115	115	170	170	170
A max height	266	258	326	396	546	895	431	557	822
Connection ø F	G 1/2" cyl.	G 3/4" cyl.	G 3/4" cyl.	G 3/4" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.	G 1" cyl.
ø I Connection with reducing bush	G 1/4" cyl.	G 3/8" cyl.	G 3/8" cyl.	G 3/8" cyl.	G 3/4" cyl.	G 3/4" cyl.	G 3/4" cyl.	G 3/4" cyl.	G 3/4" cyl.
O' Ring	27	32	32	32	50	50	50	50	50
K	8	8	8	8	10	10	10	10	10
B	38	54	54	54	66	66	65	65	65
C	28	27	27	27	65	65	65	65	65
ø d	16	16	22.5	22.5	22.5	22.5	22.5	22.5	22.5
ø H	38	50	50	50	68	68	68	68	68
SW on flats	24	32	32	32	50	50	50	50	50
O' Ring ø int x ø tore	18x2	21.3x2.4	21.3x2.4	21.3x2.4	36.2x3	36.2x3	36.2x3	36.2x3	36.2x3
P/N clamps x (quantity)	A 56x1	B90x1	E114x1	E114x1	E 114x2	E 114x2	E 168x1	E 168x1	E 168x2
P/N support bracket	-	-	CE 89	CE 89	CE 89	CE 89	CE 108	CE 108	CE 108
P/N fixation assembly	-	-	-	-	-	-	EF1	EF1	EF1

\* Complying to the CE regulations - # 3.3

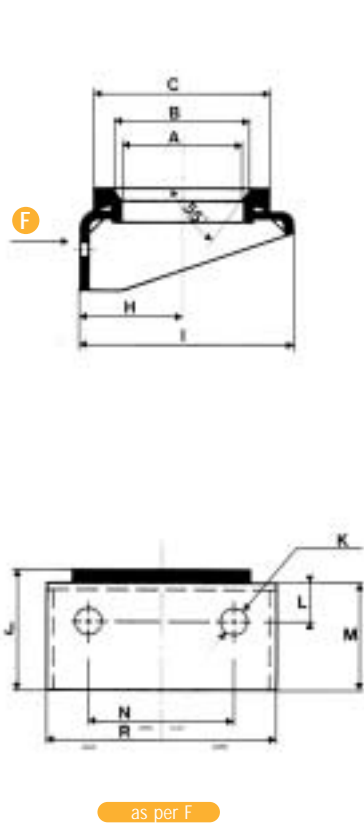
Above dimensions are in mm and are subject to manufacturing tolerances.

These accessories are designed to perfectly fit OLAER accumulators. They meet the latest regulations and are compliant with the CETOP standard.

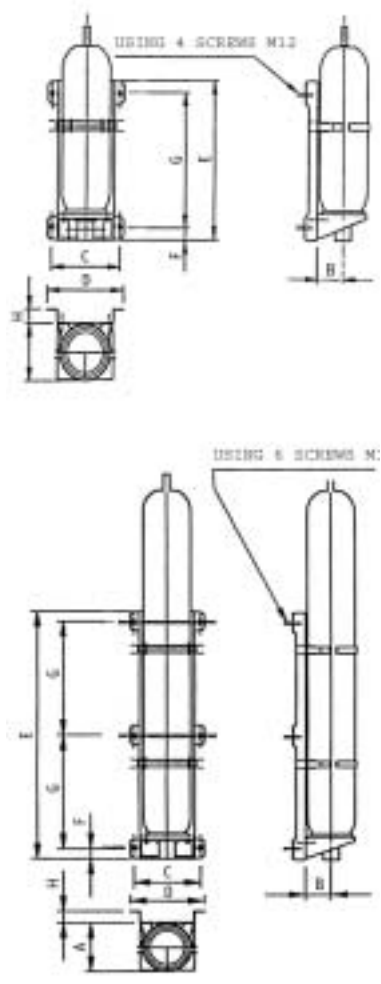
### Clamps



### Support brackets



### Mounting frames



### Dimensions clamps

P/N	Shape	D	H	A	B	C	E	K	L	M
A 56	A	56	36	134	97	92		30	9	14
B 90	B	90	53	134	97	127		30	9	14
B 114*	B	114	76	138	100	159		30	9	14
B 121*	B	121	73	138	100	164		30	9	14
C 168*	C	168	92	188	148	181	230	40	9	14
D 226*	D	226	123	270	216	241	290	40	15	21
E 114	E	114	73	160	100			65	9	35
E 168	E	168	92	210	148			65	9	35
E 226	E	226	123	246	216			65	9	35

\* Shapes B, C or D are recommended in case of strong vibrations and also for steel works applications.

### Dimensions mounting frames

P/N	A	B	C	D	E	F	G	H
EF1	181	92	320	355	670	55	570	60
EF2	250	123	320	355	670	55	570	60
EF3	250	123	320	355	1240	55	565	60

### Bank of accumulators

OLAER gas has developed modular compact assemblies. For any further queries, please contact our technical department.

### Dimensions Support brackets

P/N	A	B	C	H	I	J	K	L	M	N	R	Weight
CE 89	89	111	141	73	140	75	13	25	60	75	130	0,7
CE 108	108	120	150	92	175	95	17	25	80	160	210	1,5
CE 159	159	170	200	123	235	115	17	25	100	200	260	2,5

Above dimensions are in mm and are subject to manufacturing tolerances.

### CHARGING KITS

Charging kits are used to inflate, check, top-up or vent the nitrogen gas precharge in all accumulators. They are to be screwed to the gas valve and connected to the gas regulator that fits the Nitrogen bottles. They are supplied in a case that regroups the various accessories specific to models VG3 and VGU.

#### MODEL VG3

The VG3 charging kit is exclusively dedicated to fit OLAER accumulators.



#### TECHNICAL DATA

Maximum working pressure : 550 bars

#### ORDERING CODE

Example : VG3 250 1 TS2 1

250 = Gauge, available for pressure up to :  
6/10/25/60/100/160/250/400/600

TS 2 : Flexible hose for maximum pressure 400 bars  
TS 6 : Flexible hose for maximum pressure 550 bars

#### SAFETY BLOCKS



They are designed to incorporate in a single compact block the variety of functions necessary for the correct operation of an hydraulic system fitted with accumulators. This includes manual and/or electric drain, isolation, flow control and pressure relief. Channel cross section : 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 working pressure : 330 to 550 bars depending on models. A specific data sheet and software are both available on request. Please contact OLAER.

#### MODEL VGU

The universal VGU charging kit has been designed to fit any brand of accumulators on the market.



#### TECHNICAL DATA

Maximum working pressure : 340 bars

#### ORDERING CODE

Example : VGU/F 25/250 7 TS2 3

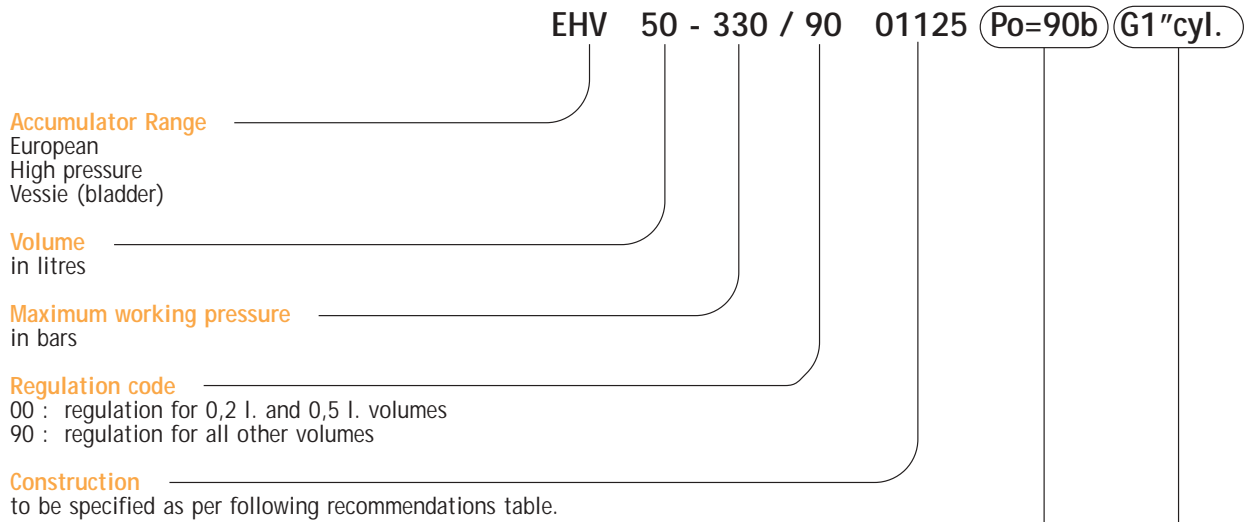
25/250 = Gauge, available for pressure up to :  
6/10/25/60/100/160/250/400 bars

#### Upon request :

- Bull nose adaptors available to fit various foreign gas bottles,
- Flexible hose in custom length
- Special gas valve adaptors



## Ordering an accumulator



Fluid	Working Temperature °C	Construction
Mineral oils	- 15 + 80	01125*
Water	0 + 50	01025
Water	0 + 80	01225
Ester phosphate	- 15 + 80	01140
Other fluids	Other temperatures	Contact Olaer

\* standard construction

**Nitrogen gas precharge** in bars at 20 °C (please refer to the predetermination curves table on page 5 or consult OLAER technical department)

**Adaptor to be specified** NP : with blank adaptor or without adaptor (refer to dimension I in table on page 6, and specify reduction size).

## Ordering accessories and peripheral materials

Please indicate designation for accessories as per tables on page 6 & 7, and for peripheral materials as per table on page 8.

## Installation

**Prior to any installation**, it is necessary to visually check the accumulator in order to detect any possible damage incurred during transport. For optimal operation, the accumulator needs to be located as close as possible to the "application". It may be installed vertically, gas valve facing up, or horizontally.

- Avoid standing in the alignment of the connections
- Consider the environmental conditions and if needed, protect the accumulator against heat sources, electrical and magnetic fields, lightning strikes, humidity and foul weather
- Keep 200 mm over the top of the gas valve free of encumbrance to allow the use of a charging head
- Allow free access to the oil drain
- Keep all markings visible
- Install in such a way so as to prevent any undue stress on the pipe work, either directly or indirectly.
- Clamp the accumulator tightly to a fixed support or alternatively guard it to limit its displacement in case of a connection failure to the hydraulic system.
- Connect the accumulator to the hydraulic system using the right connectors or flanges
- Check the compatibility of the fluid with the materials used
- Insure that the maximum design pressure of the accumulator exceeds the maximum system pressure
- Insure that pressure and temperature limits are not exceeded
- Equip the hydraulic system with a pressure relief device
- If necessary, add-on a burst disk to account for risks of overpressure associated with thermodynamics effects.
- Install an appropriate filtration unit and/or organise regular internal inspections as often as is necessary when dealing with abrasive fluids.

### It is strictly forbidden to :

- Weld, screw or rivet anything onto the accumulator body
- Operate in any way that may alter the mechanical properties of the accumulator.
- Use the accumulator for construction purposes.  
(No stress or loading)
- To modify the accumulator without prior approval from the manufacturer

### Commissioning :

Refer to commissioning instructions supplied with the accumulator.



Item	Spare parts
1	Bladder kit
2*	Bladder assembly
3*	Gas valve assembly
4	Gas valve cap
5	Fluid port assembly
6*	Anti extrusion ring
7*	Drain plug with seal (1)
8*	Seal kit

(1) For accumulators 10 to 50 litres

\* These parts are supplied as a kit with instructions.

### HOW TO ORDER THE BLADDER KIT

Example : For an accumulator EHV 50-330/90 01125

**KIT EHV 50-330/90 01125**

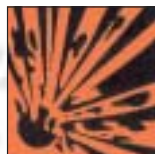
The Regulation 97/23/CE has been applicable on 29/11/99 a voluntary base, and will be totally applicable on 29/05/2002.

What you need to know

Free movement of products within the EC and concerning all the accumulators with a maximum allowable pressure greater than 0.5 bar.

Classification of fluids

New equipment



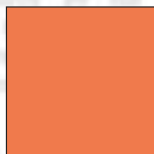
E EXPLOSIVE  
R2 - R3



F+ EXTREMELY  
FLAMMABLE R12



F- HIGHLY  
FLAMMABLE  
R11 - R15 - R17



FLAMMABLE  
R 10



T+ VERY TOXIC  
R 39/28/27/26

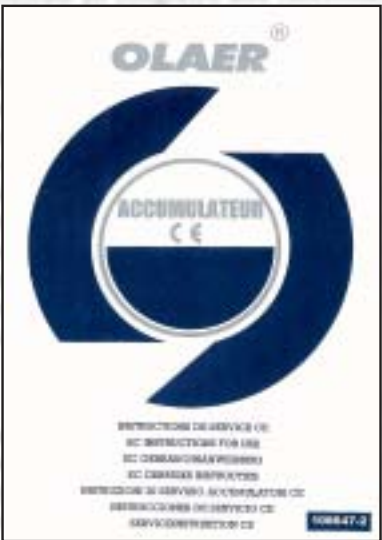


T TOXIC  
R 48/39/25/24/23



O OXYDIZING  
R7 - R8 - R9

The CE MARKET accumulators are delivered with installation and commissioning instruction as well as declaration of conformity.



Olaer designs and manufactures hydro pneumatic accumulators to other foreign standards allowing accumulators to be used in all countries.

For example ASME (USA), SQLO (CHINA), JIS (JAPAN), CRN (CANADA) We also provide DNV, LRS, ABS, USCG...

# RÉSEAU INTERNATIONAL

## South Africa

Fawcett Christie Hydraulics SA (PTY)  
 LTD  
 c/o Rolton Products CC  
 Po Box 43244  
 ZA Industria 2042  
 Roodeport – South Africa  
 Tel +27.11.474.30.38  
 Fax +27.11.474.83.84

## Spain

Olaer Oiltech Iberica S.A.  
 Travésia Industrial 29, nave 2  
 08907 L'Hospitalet de Llobregat  
 (Barcelona)  
 Tel + 34.933.368.900  
 Fax + 34.933.357.186  
 E-mail : olaer@olaer.es  
 www.olaer.es

## 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 : olacom@olaer.it  
 www.olaer.it

## Germany

Olaer Industries GmbH  
 Zum Gunterstal 4  
 DE – 66440 Blieskastel  
 Tel + 49.6842.92040  
 Fax + 49.6842.9204-15  
 E-mail : info@olaer.de  
 www.olaer.de

## United States

Oil Air Hydraulics Inc.  
 11505 West Little York Rd.  
 Houston, Texas 77041  
 Tel + 1 713 937-8900  
 Fax + 1 713 937-0438  
 E-mail : oilair1@pdq.net  
 www.fluidpower.com

## Norway

Oiltech AS  
 Dynamitveien 23, PB 133  
 NO-1401 Ski  
 Tel + 47 64 91 11 80  
 Fax + 47 64 87 43 21  
 E-mail : oiltech@oiltech.no  
 www.oiltech.no

## 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 : sales@olaer.com.au  
 www.olaer.com.au

## Poland

Oiltech Polska  
 ul. Grochowska 168  
 PL-04357 WARSZAWA  
 Tel + 48 22 612 04 73  
 Fax + 48 22 610 74 82

## Finland

Oiltech Hydraulics OY  
 Vattuniemenkatu, 8A PI 190  
 FI – 00211 Helsinki  
 Tel + 35 8 9 682 0422  
 Fax + 35 8 9 682 2376  
 www.oiltech-hydraulics.fi  
 E-mail : stig.soderstrom@oiltech-hydraulics.fi  
 Veneentekijäntie 2, PI 190  
 FI-00210 Helsinki  
 Tel + 358 9 4137 5500  
 Fax + 358 9 4137 5550

## Austria

Olaer Speicher-Technik GesmbH  
 Haider Straße 38  
 A-4052 Ansfelden  
 Tel + 43.7229.80306  
 Fax + 43.7229.80306-21  
 E-mail : info@olaer.at  
 www.olaer.at

## 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

## Agence Olaer

4 rue J.L Calderon  
 69120 Vaulx en Velin  
 Tel 04.72.04.68.05  
 Fax 04.72.04.62.32

## Slovakia

Ekotechnik s.r.o.  
 Jilemnického 8  
 SK-03601 Martin - Slovensko  
 Tel 00421 842 4239743  
 Fax 00421 842 4136773

## Belgium

Olaer Benelux N.V.  
 Doornveld 4  
 B-1731 Zellik  
 Tel + 32.2.466.15.15  
 Fax + 32.2.466.16.24  
 E-mail : info@olaer.be  
 www.olaer.be

## Sweden

Oiltech AB  
 Förrädsvägen 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

## China

Fenghua Olaer Hydraulics Co. Ltd  
 16 Xinfeng Road  
 Fenghua City, Zhejiang  
 Tel + 86.574.8922546  
 Fax + 86.574.8922885  
 E-mail : foyg@mail.nbptt.zj.cn  
 www.fholaerolaer.com

## United Kingdom

Fawcett Christie Hydraulics Ltd  
 Sandycroft Industrial Estate  
 Chester Road, Sandycroft  
 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

## Switzerland

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

## Korea

Hyundai Olaer Hydraulic Co. Ltd  
 3ba 204-1 Shiwha Industrial Complex  
 Jungwang-Dong  
 Shinheung-sil Kyungki-Do KOREA  
 Tel + 82.31.499.0797  
 Fax + 82.31.499.2249  
 E-mail : master@hyundaiolaer.co.kr  
 www.hyundaiolaer.co.kr

## Netherlands

Olaer Nederland B.V.  
 De Lind 10, Postbus 75  
 NL-4840 AB Prinsenbeek  
 Tel + 31 76-5412453  
 Fax + 31 76-5411502  
 E-mail : info@olaer.nl  
 www.olaer.nl

## Czech Republic

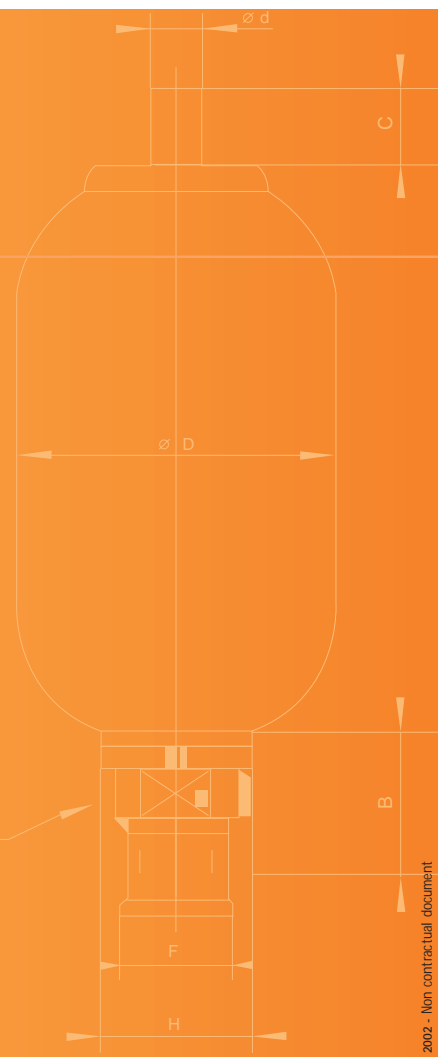
Olaer CZ s.r.o.  
 Videnská 125  
 CZ – 619 00 BRNO  
 Tel + 420 5 4712 5601  
 Fax + 420 5 4712 5600  
 E-mail : info@olaer.cz  
 www.olaer.cz

## Danemark

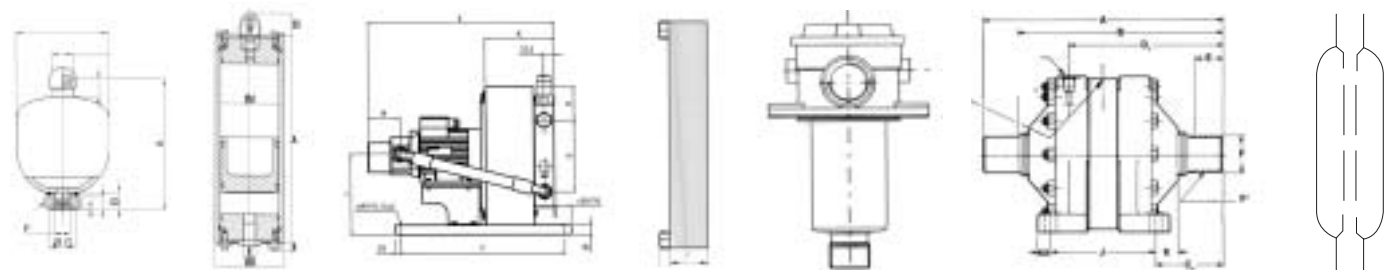
Oiltech AB  
 Møllebaekvej 14 Bjerregrav  
 DK – 9632 MØLDRUP  
 Tel + 45.86.69.20.38  
 Fax + 45.86.69.23.38  
 E-mail : oiltech@oiltech-olaer.dk  
 www.oiltech-olaer.dk

## India

Fawcett Christie Hydraulics PVT Ltd  
 C-30, Shankara Park  
 Shankarapuram  
 Bangalore 560 004  
 Tel + 91 80 6610508  
 Fax + 91 80 6611716  
 E-mail : ipe.bler@bgl.vsnl.net.in



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France  
 Olaer Industries SA  
 16 rue de Seine  
 92704 Colombes Cedex  
 Tel. : + 33.1.41.19.17.00  
 Fax : + 33.1.41.19.17.20  
 E-mail : olaer@olaer.com  
 www.olaer.com

