



HIDRACAR S.A.

Design, quality and experience since 1974

"We make liquids flow smoothly through pipes"

BLADDER, MEMBRANE & BELLOWS PULSATION DAMPENERS

**TO STABILIZE THE FLOW AND PRESSURE
IN CIRCUITS WITH VOLUMETRIC PUMPS**

- ✓ ALLOW PUMPS TO WORK WITHOUT SHOCKS, INCREASING ITS LIFE AND THE LIFE OF FILTERS, FLOWMETERS AND OTHER ACCESSORIES
- ✓ GIVE MORE ACCURACY TO PRESSURE GAUGES AND FLOWMETERS
- ✓ PREVENT LEAKAGE IN PIPE CONNECTIONS, CREATED BY PRESSURE PEAKS

**SIZES RANGE FROM 0.07 TO 35 LITRES
AND WORKING PRESSURES UP TO 1,000 bar**

MATERIALS:

**BODY: AISI 316L, POLYPROPYLENE, PVC, PVDF & OTHERS
SEPARATOR: NITRILE, EPDM, FKM, SILICONE, PTFE, STAINLESS STEEL & OTHERS**

**STANDARD
PLASTIC
DAMPENER
WITH BLADDER**



**VERY HIGH
TEMPERATURE
DAMPENER WITH
STAINLESS STEEL
BELLOWS**



**PTFE
BELLOWS
DAMPENER
FOR CORROSIVE
LIQUIDS**



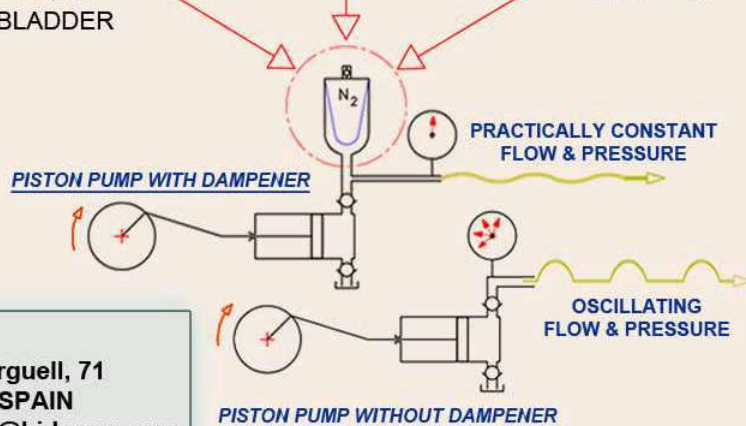
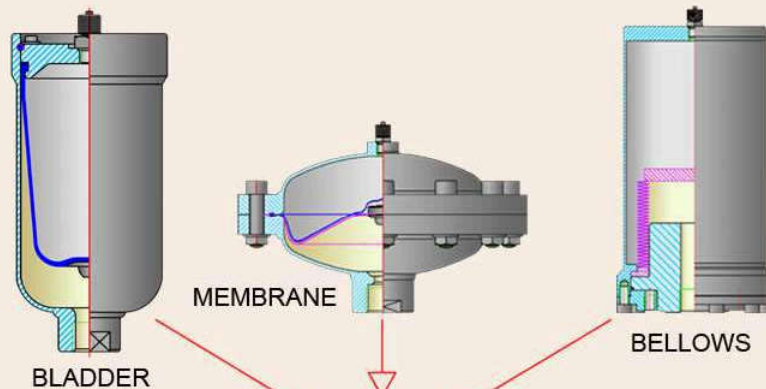
**TWO PORT
CONNECTION
BLADDER
DAMPENER**



**PTFE
MEMBRANE
DAMPENER** WITH ROD
INDICATOR
AND ANSI
FLANGE



**TWO PORT CONNECTION
BLADDER DAMPENER
FOR FOOD
APPLICATIONS**



HIDRACAR S.A.

Pol. Ind. Bufalvent - c/ Ramón Farguell, 71

08243 Manresa (Barcelona) - SPAIN

www.hidracar.com • E-mail: hidracar@hidracar.com

Tel.: +34 93 833 02 52 Fax: +34 93 833 19 50

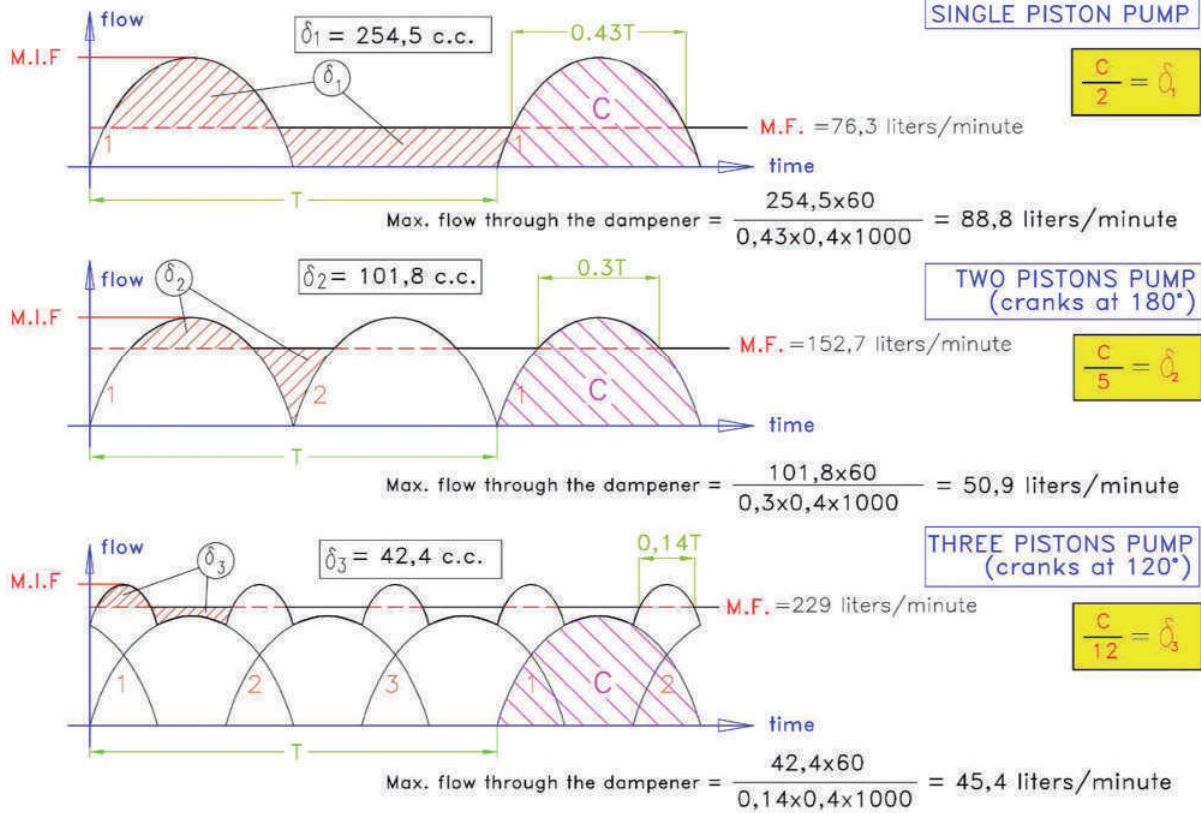
**FLOW GRAPHICS OF DIFFERENT PISTON PUMP TYPES WITH A PULSATION DAMPER INSTALLED.
THE LIQUID FLUCTUATION INSIDE THE DAMPENER IS REPRESENTED**

T = time employed by the crankshaft when turning one revolution (ex. 0,4 sec.=150 r.p.m.)

C = capacity of the piston head (ex. 509 c.c. for the three pump types)

δ = theoretically the amount of liquid going in and out of the dampener in each cycle

M.I.F. = maximum instantaneous flow M.F. = mean flow



**EASY DAMPENER SIZE SELECTION CHART ACCORDING TO THE CAPACITY
PER HEAD (*) AND THE ADMISIBLE RESIDUAL PULSATION (±%)**

DAMPER TYPES REF.			DAMPENER VOLUME (liters)			1 PISTON PUMP		2 PISTON PUMP		3 PISTON PUMP	
						ADMISIBLE RESIDUAL PULSATION (±%)					
						± 3%	± 6%	± 3%	± 6%	± 3%	± 6%
						(*) CAPACITY PER HEAD (in cc)					
U000			0,04			3	6	7	14	18	36
U001			0,09			7	14	16	32	40	80
U002	M002	F002	0,18	0,20	0,15	14	28	35	70	80	160
U003	M004	F003	0,36	0,40	0,30	25	50	60	120	150	300
U007	M008	F007	0,65	0,80	0,70	45	90	110	220	270	540
U010			0,95			70	140	175	350	420	840
U015	M012	F015	1,50	1,20	1,50	110	220	275	550	660	1320
U030	M030	F030	2,60	2,80	2,60	190	380	475	950	1140	2280
U040	M040	F040	3,80	4,00	3,80	280	560	700	1400	1680	3360
U060	M060	F060	5,60	5,60	5,60	430	860	1075	2150	2580	5160
U100	M100	F100	10,40	10,00	10,00	775	1550	1925	3850	4650	9300
U150		F150	15,00		15,00	1120	2240	2800	5600	6720	13440
U250			25,00			1850	3700	4625	9250	11100	22200

NOTE: THE TABLE VALUES ARE APPROXIMATE AND CORRESPOND TO A CONSTANT TEMPERATURE OF THE LIQUID AND ENVIRONMENT

WE CAN CHANGE THE DATA WITHOUT PREVIOUS NOTICE

FORMULA TO OBTAIN THE (*) CAPACITY PER HEAD

$$C = \frac{FLOW(l/h)}{n \times 60 \times s.p.m.}$$

l/h = liters/hour

n = n° of heads

s.p.m. = strokes per minute, crankshaft revolution per minute



THE AUTHENTIC AND EFFECTIVE "IN-LINE" PULSATION DAMPERS LOS AUTÉNTICOS Y EFECTIVOS AMORTIGUADORES DE PULSACIONES "EN LÍNEA"

FOR FOOD AND PHARMACEUTICAL PROCESSES / PARA PROCESOS ALIMENTARIOS Y FARMACÉUTICOS

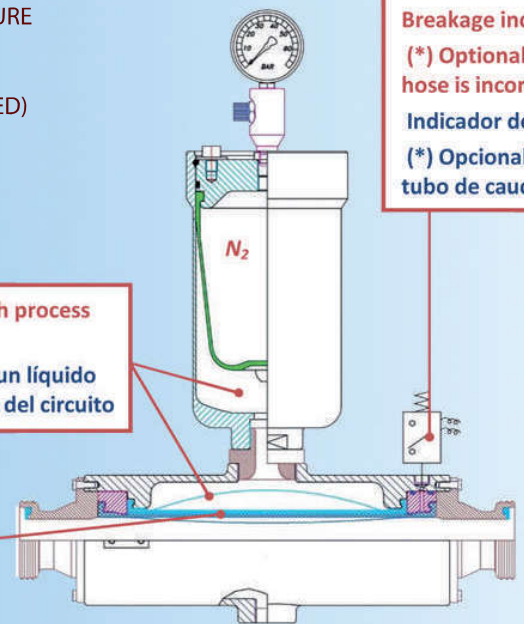
MAIN CHARACTERISTICS OF THE NEW IN-LINE DAMPER : / PRINCIPALES CARACTERÍSTICAS DEL NUEVO AMORTIGUADOR "EN LÍNEA":

- NO LIMITATION IN THE NITROGEN GAS CHARGING PRESSURE
SIN LIMITACIÓN EN LA PRESIÓN DE CARGA DE GAS
- HIGHER DAMPENING CAPACITY (MORE VOLUME ABSORBED)
MAYOR AMORTIGUACIÓN (MÁS VOLUMEN ABSORBIDO)
- WITHOUT CORNERS FOR AN EFFECTIVE CLEANING
SIN RINCONES PARA UNA LIMPIEZA EFECTIVA
- NO WATER HAMMER EFFECT
SIN EFECTO GOLPE DE ARIETE

Watertight chambers with process compatible liquid
Cámaras herméticas con un líquido compatible con el líquido del circuito

FDA rubber hose
(* Optional. Double hose)
Tubo de goma FDA
(* Opcional. Doble tubo)

Breakage indicator
(* Optional if double rubber hose is incorporated)
Indicador de rotura
(* Opcional si incorpora doble tubo de caucho.



FOR PROCESSES CONTAINING SOLID PARTICLES / PARA PROCESOS QUE CONTIENEN PÁRTICULAS SÓLIDAS
AND ALSO FOR SUCTION LINES / Y TAMBIÉN PARA LÍNEAS DE SUCCIÓN

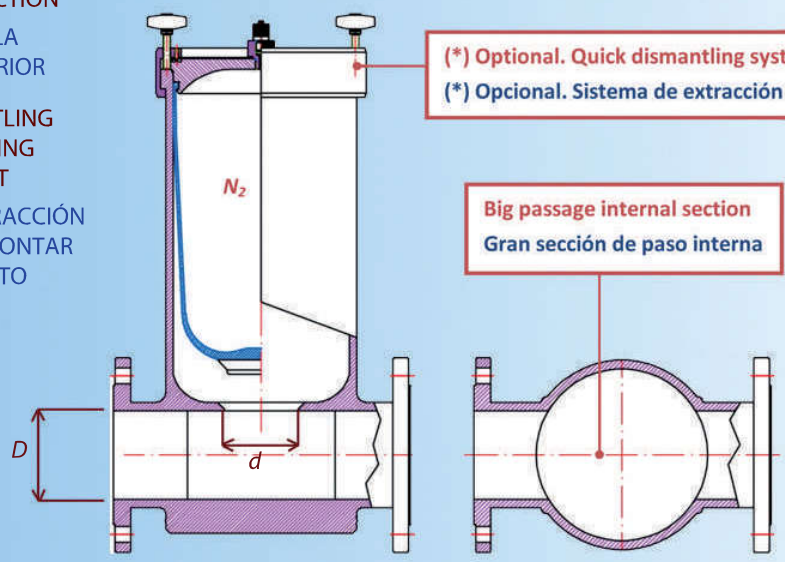
- THIS DESIGN HAS BEEN TESTED BY "GRUNDFOS". THE HIGH FREQUENCY (50 Hz) PEAKS OF PRESSURE HAS BEEN REDUCED 80%
EN ESTE DISEÑO ENSAYADO POR "GRUNDFOS". LOS PICOS DE PRESIÓN A ALTA FRECUENCIA (50 Hz) SE REDUJERON AL 80%

- HIGHER EFFICIENCY THANKS TO THE INTERNAL BIGGER PASSAGE SECTION
MAYOR EFICIENCIA GRÁCIAS A LA MAYOR SECCIÓN DE PASO INTERIOR

- (*) OPTIONAL. QUICK DISMANTLING SYSTEM WITHOUT DISASSEMBLING THE DAMPER FROM THE CIRCUIT
(*) OPCIONAL. SISTEMA DE EXTRACCIÓN RÁPIDA DE LA VEJIGA SIN DESMONTAR EL AMORTIGUADOR DEL CIRCUITO

(*) Optional. Quick dismantling system
(*) Opcional. Sistema de extracción rápido

Big passage internal section
Gran sección de paso interna



$D/d = 1,5 \text{ to } 1$





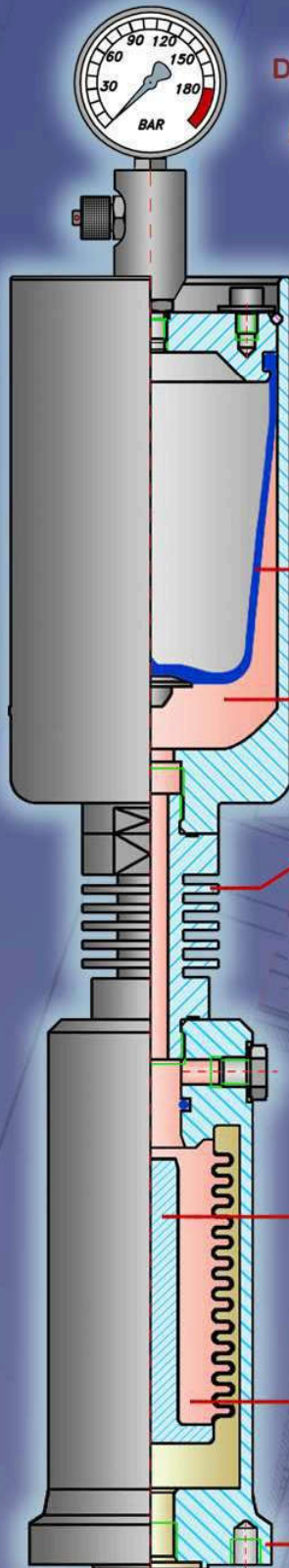
HIDRACAR S.A.

**STAINLESS STEEL BELLOWS
PULSATION DAMPENER**

**TWO SPECIAL MODELS OF
DAMPENER SUPPLIED TO SEVERAL
IMPORTANT GERMAN
PISTON PUMP MANUFACTURERS**

**LOW PRESSURE DESIGN DAMPENER WITH
HEATING JACKET FOR HIGH VISCOSITY
FLUIDS AT A HIGH TEMPERATURE**

**AMORTIGUADOR DE BAJA PRESIÓN DE
DISEÑO CON CAMISA CALEFACTORA
PARA FLUIDOS DE ALTA VISCOSIDAD
Y TEMPERATURA**



High temperature rubber bladder
Vejiga de caucho para alta temperatura

Thermal oil
Aceite térmico

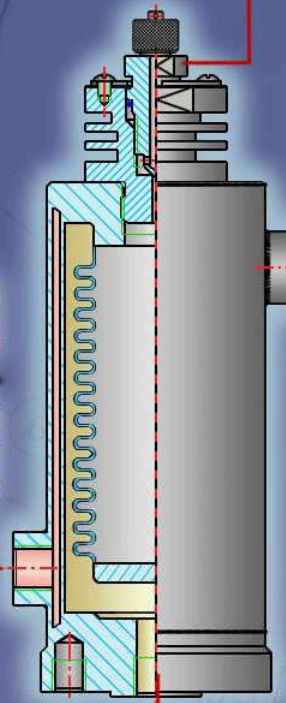
Cooling fins
Aletas de refrigeración

Pin to close the passage of the thermal oil to the top dampener to prevent the SS bellows from getting damaged by excessive compression.
Espiga de cierre del paso del aceite térmico al amortiguador superior para evitar la rotura del fuelle por el aumento de la presión del circuito.

Thermal oil
Aceite térmico

Circuit connection integrated flange
Brida integrada de conexión al circuito

1/4" BSP gas charging adaptor with mechanical seal
Adaptador de carga de 1/4" BSP con estanqueidad mecánica



Heating fluid outlet
Salida del fluido calefactor

Circuit connection integrated flange
Brida integrada de conexión al circuito

Heating fluid inlet
Entrada del fluido calefactor

**AMORTIGUADOR DE PULSACIONES
CON FUELLE DE ACERO INOXIDABLE**

**DOS MODELOS ESPECIALES DE AMORTIGUADORES
DE PULSACIONES SUMINISTRADOS A VARIOS
IMPORTANTES FABRICANTES ALEMANES DE
BOMBAS DE PISTONES**

**HIGH PRESSURE DAMPENER FOR WORKING AT A HIGH
TEMPERATURE AND HIGH VARIABLE PRESSURE (SEVERAL
CAN BE INSTALLED IN PARALLEL, WITH DIFFERENT GAS
CHARGE VALUES TO PROVIDE DAMPENING FOR A RANGE
OF VARIABLE CIRCUIT PRESSURES)**

**AMORTIGUADOR DE ALTA PRESIÓN PARA FUNCIONAMIENTO
A ALTA TEMPERATURA Y ALTA PRESIÓN VARIABLE (VARIOS
PUEDEN INSTALARSE EN PARALELO, CON DIFERENTE VALOR
DE CARGA DE GAS PARA PROVEER AMORTIGUACIÓN EN UN
RANGO DE PRESIONES DEL CIRCUITO VARIABLES)**





HIDRACAR S.A.

AMORTIGUADOR DE PULSACIONES DE ACERO INOXIDABLE CON CAMISA CALEFACTORA Y SISTEMA DE EXTRACCIÓN RÁPIDA DE LA VEJIGA

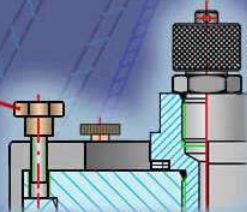
STAINLESS STEEL PULSATION DAMPENER WITH HEATING JACKET AND QUICK BLADDER EXTRACTION SYSTEM



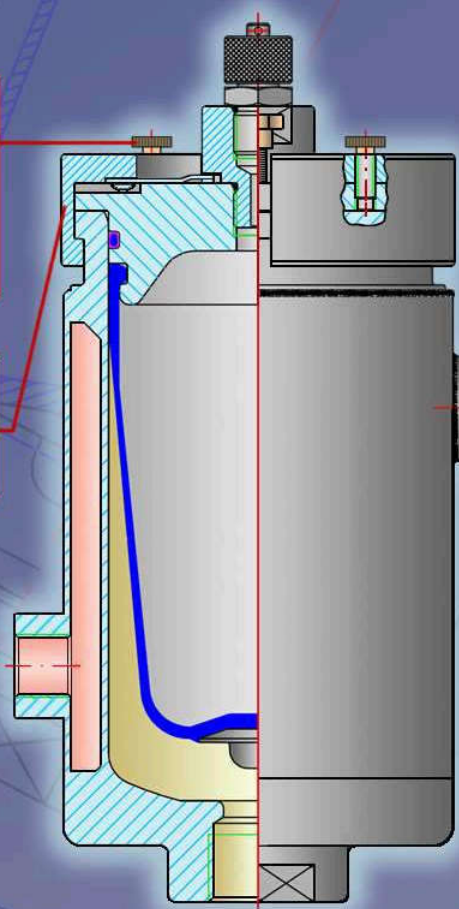
ACUMULADOR HIDROPIEUMÁTICO / HYDROPIEUMATIC
DAMPENADOR DE PULSACIONES / PULSATION DAMPENER
CARGAR ÚNICAMENTE CON NITRÓGENO SECO / RECHARGEZ UNIQUEMENTE EN NITROGÈNE SECC
FILL WITH DRY NITROGEN / FILLER MIT TROCKENSTICKSTOFF FÜLLER
PELIGRO: NO UTILIZAR OXÍGENO / DANGER: DO NOT USE OXYGEN
DANGER: OXYGEN INTERACTS / GEFÄHR: NICHT SAUERSTOFF BENUTZEN

HIDRACAR, S.A.
U007A05N1-ALICC
n 65 (L)
50 bar-g @ 20°C
Po: 2 bar-g
80 / -15 °C
92227
14/11/2012

Gas cover extracting bolts
Pernos de extracción de la tapa gas



Gas cover retaining ring fastening bolts
Tornillos de sujeción de los anillos de retención de la tapa gas



Gas cover retaining rings
Anillos de retención de la tapa gas

Heating fluid inlet
Entrada del fluido calefactor

Heating fluid outlet
Salida del fluido calefactor

Integrates both the circuit liquid heating function and the ease of extraction of the bladder without requiring any tool.

Integra la capacidad de calentamiento del líquido del circuito y la facilidad de extracción de la vejiga sin requerir ningún tipo de herramienta.

**They can be made in all our standard dampener volumes.
Pueden fabricarse para todos nuestros volúmenes estándar de amortiguadores.**



HIDRACAR ACCUMULATOR REFERENCE CODE IDENTIFICATION

This is the standard **HIDRACAR S.A.** accumulator reference code layout (without colour; here only for code section identification purposes):

X ### X## X# - XXXX / XX

- ◆ The first letter (**X**) indicates the type of accumulator:

U for bladder **M** for membrane **F** for bellows **P** for piston

- ◆ The following three digits (**###**) identify the volume of the accumulator:

U000 0.04 litres	M008 0.80 litres	M040 4.00 litres	M100 10.0 litres	U250 25.0 litres
U001 0.09 litres	U010 0.95 litres	F040 3.80 litres	F100 10.0 litres	P250 25.0 litres
P001 0.14 litres	P010 1.00 litres	F040i 3.80 litres	F100i 10.0 litres	P300 30.0 litres
U002 0.18 litres	M012 1.20 litres	P040 4.00 litres	P100 10.0 litres	U320 32.0 litres
M002 0.20 litres	U015 1.50 litres	P050 5.00 litres	P120 12.0 litres	U350 35.0 litres
F002 0.15 litres	F015 1.50 litres	U060 5.60 litres	U130 13.0 litres	P350 35.0 litres
P002 0.20 litres	F015i 1.50 litres	M060 5.60 litres	P140 14.0 litres	P400 40.0 litres
U003 0.36 litres	P015 1.50 litres	F060 5.60 litres	U150 15.0 litres	P500 50.0 litres
F003 0.30 litres	P020 2.00 litres	F060i 5.60 litres	M150 15.0 litres	P600 60.0 litres
P003 0.35 litres	P025 2.50 litres	P060 6.00 litres	F150 15.0 litres	P700 70.0 litres
M004 0.40 litres	U030 2.60 litres	U061 6.00 litres	F150i 15.0 litres	P800 80.0 litres
P005 0.50 litres	M030 2.80 litres	P070 7.00 litres	P150 15.0 litres	P900 90.0 litres
U007 0.65 litres	F030 2.60 litres	P080 8.00 litres	P160 16.0 litres	P990 99.0 litres
F007 0.70 litres	F030i 2.60 litres	P090 9.00 litres	U200 20.0 litres	
F007i 0.70 litres	P030 3.00 litres	U095 9.50 litres	P200 20.0 litres	
P007 0.70 litres	U040 3.80 litres	U100 10.4 litres	P220 22.0 litres	

- ◆ The second letter (**X**) refers to the type of gas charging valve: **A** for a ¼" BSP valve

- ◆ The second set of two digits (**##**) refers to the design pressure of the accumulator (number to be multiplied by 10 to give the actual pressure in bar units):

Examples:

02 (0)2 x 10 = 20 bar **18** 18 x 10 = 180 bar **41** 41 x 10 = 410 bar

- ◆ The third letter (**X**) identifies the material of the separator element between the charging gas (N₂ or air) and the liquid in the circuit (except for the piston accumulators, for which it identifies the material of "o"-rings):

N Nitrile rubber (NBR)	E EPDM rubber	V FKM rubber	B Butyl rubber
S Silicone rubber	G Hydrogenated NBR	R Low temperature nitrile rubber	
T TFM y PTFE	F FKM (70% fluorine)	C Neoprene rubber	A Aflas
	I Stainless steel	D TFM & FKM double membrane	H Hypalon

- ◆ Followed by a last digit (#) which refers to the number of connecting ports (see the standard thread size available on each technical note; these are referenced at the very end of the code as such if different from our standard thread size):

1 One connection port **2** Two connection ports

- ◆ Finally, the last set of two to four letters (XXXX) (or its absence) identifies the raw material of the accumulator body and the bladder or membrane inserts:

AI AISI 316L Stainless steel **DU** Duplex **SDU** Super Duplex **TI** Titanium
HAST Hastelloy **AC** Carbon steel **ALLY** Special alloy
SA Carbon steel – internal nickel coating accumulator for water service
PP Polypropylene **PC** PVC **PCC** Chlorinated PVC **PD** PVDF

- ◆ In some instances an extra codification for one or more special characteristics is added, separated by slashes after the basic part of the reference code:

E Special manufacture **DR** Quick dismantling design **CR** Reinforcing jacket
IN Indicator rod attachment **BA** With a connection for an additional cylinder
NS Apparatus without welded seams **IC** Internal HALAR[®] coating **SB** No insert bladder
TF PTFE connection port **TFG** Graphite-PTFE connection port
PE Polyethylene connection port **PD** PVDF connection port **PC** PVC connection port
HC Hastelloy connection port **CC** With a heating jacket
(90°) Connection port at 90° **(LINIA)** In-line accumulator

Let's see an overall example:

F007A11I1-AI/CC
F007A11I1-AI/CC

F	Bellows type	007	0.65 litres volume
A	Fitted with a ¼" BSP valve	11	110 bar design pressure
I	Stainless steel bellows	1	One connection port
AI	Stainless steel body	CC	With a heating jacket

So this reference corresponds to a stainless steel, bellows type, accumulator with an internal volume of 0.65 litres, designed for working at a pressure of 110 bar, fitted with a stainless steel bellows, one standard connection port, a ¼" BSP gas charging valve and a heating jacket.

12th Rev., April 2018

FOR HIGHER PRESSURES, SIZES, MATERIALS AND THREAD CONNECTIONS, PLEASE CONSULT

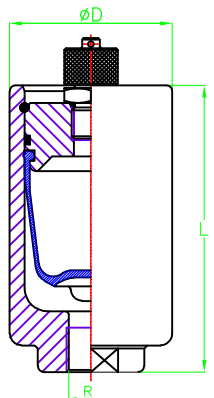
A02≡20bar
A03≡30bar
A04≡40bar
A05≡50bar
A18≡180bar
A26≡260bar

ORDER EXAMPLE: U015 A04 B 1 AI

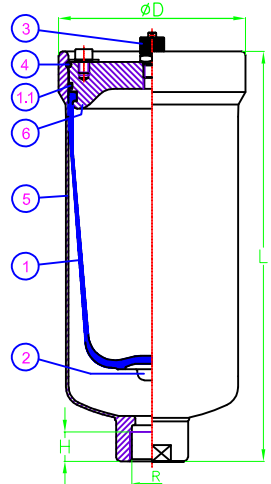
Capacity: 1.5 litres
 A04≡40bar
 B= BUTYL Rubber Bladder
 3/4" Standard Connection
 Body & insert material: AISI 316L

Value of "K": $\frac{\text{Maxi. Pressure}}{\text{Filling gas Pressure}} \leq K$ (@Constant Temp.)

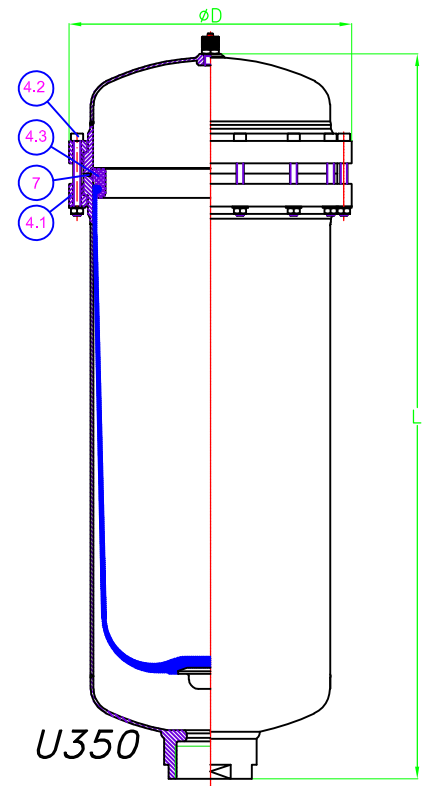
Wall thickness acc. to AD-2000 code
 Hydrostatic test pressure @ 1.5 * Design pressure @ 20°C



U000 to U003



U007 to U250



U350

H = MAXI. LENGTH OF THREAD CONNECTION

PULSATION DAMPER Reference	VOLUME (litres)	DESIGN PRESSURE (bar-g @50°C)	D (mm)	L (mm)	R (BSP)	H (mm)	WEIGHT (Kg)	K VALUE
U000	0.04	260	55	70	3/8"	14	0.8	2.5
U001	0.09		97	1.0				
U002	0.18	180	70	122	1/2"	16	1.8	3.0
U003	0.36		85	3.6				
U007	0.65	50	88	208	3/4"	20	2.5	3.5
U010	0.95		211	4.3				
U015	1.50	40	113	256	1"	27	4.6	5.0
U030	2.60		305	5.3				
U040	3.80	30	140	405	1-1/2"	30	5.7	4.0
U060	5.60		167	10.0				
U100	10.40	30	217	432	2"	30	15.0	5.0
U150	15.00		645	19.2				
U250	25.00	20	270	677	2-1/2"	30	26.0	4.0
U350	35.00		302	28.5				

7	"O" RING	1	NBR, BUTYL, EPDM & FKM
6	COVER	1	AISI 316L
5	BODY	1	AISI 316L
4.3	RETAINING RING	1	AISI 316
4.2	BOLTS & NUTS	14	DIN 912 & 934 A4-70
4.1	RETAINING RING	2	AISI 316L
4	RETAINING RING	1	DIN17224 (AISI 316)
3	INFLATING N ₂ VALVE	1	AISI 316L (1/4" BSP)
2	INSERT	1	AISI 316L
1.1	"O" RING	1	NBR, BUTYL, EPDM & FKM
1	BLADDER	1	NBR, BUTYL, EPDM & FKM
No	DENOMINATION	QT.	MATERIALS

Standard Bladder Rubbers: N=NBR, B=BUTYL, E=EPDM, V=FKM (Other Rubbers: Neoprene, Hypalon, HNBR, etc.)	N	B	E	V
Rubbers Max. Working Temperatures (°C)	+80 -15	+100 -30	+130 -30	+200 -20

<u>Working Temperatures versus Working Pressures **</u>				
For a temperature of	80°C	correspond design pressure	x	0.87
" " " "	100°C	" "	x	0.82
" " " "	130°C	" "	x	0.78
" " " "	200°C	" "	x	0.68

TOLERANCES:
 External dimensions: ±3%
 Volume: ±2.5%
 Weight: ±5%

THE MAX. WORKING TEMPERATURE CAN BE REDUCED DEPENDING ON THE LIQUID IN CONTACT

ATTENTION! ALWAYS MUST BE MOUNTED VERTICALITY (VALVE 3 ON TOP)

Those Pulsation Dampeners ought to be filled with gas at a value of 0.80x the pressure to stabilize and that at the working temperature

NOTE: The precharge with gas or air must be done slowly and with our charging tool Ref. BV160A1TM

 08243 MANRESA (BARCELONA) SPAIN Phone: 34.93.8330252 E-mail: hidracar@hidracar.com	Customer	Customer Ref.	Replaced Drg.N° AV.AI.MP-BP.IN.DOC (Rev.23)	Drawn E.Ponsa	Approved
	Title S.S.MEDIUM & LOW PRESSURE BLADDER PULSATION DAMPERS (standard units)		Drg.No AV.AI.MP-BP.IN.DOC	Rev. 24	Date Sep-19