

QUALITY ASSURANCE

Weir pulsdempere og akkumulatorer quality programmes to cover the full scope of their activities. Comprehensive quality systems have been developed to serve the power, oil and gas and industrial markets which they serve.

Weir Valves and Controls holds approvals to:-

- ASME Section III 'N', 'NPT', 'NV'
- ASME Section I 'V'
- BS EN ISO 9001 : 1994
- API Q1 TO API LICENCES API 6D (6D-0182) AND API 6A (6A-0445)
- TUV-AD MERKBLATT WRD HP 0



The Quality systems have been approved for the supply of products to meet the requirements of the pressure equipment directive and compliance modules A, D1, H, B and D have been applied in categories I through IV respectively.

Weir Valves and Controls is committed to compliance with legislation and has an established environment and health and safety policy.

An ongoing commitment to customer care is met through the process of continuous improvement and the further development of our systems and processes towards meeting ISO 9001 : 2000.

VALVE TESTING FACILITIES

All pressure containing items are hydrostatically tested, seat leakage tested and functionally tested. In addition, gas, packing emission, cryogenic and advanced functional testing can be arranged.

Steam Testing can be applied to ASME Safety Valves of up to 6" bore size and up to set pressures 100 barg (1450 psig). The Steam Test Facility comprises a Steam Generator which supplies saturated steam at pressures up to 120 barg to an Accumulator Vessel which stores the steam until required. This in turn supplies steam to a Test Vessel on which the safety valve is mounted for testing. Pop testing of the safety valve is performed – by admitting steam from the Accumulator Vessel via pipework and a flow/pressure control into the Test Vessel, and recording the set pressure, full lift pressure and re-seat pressure. A check on leak tightness is also made. All measurements are controlled by a fully integrated, computerised system simulating customers actual operating conditions.

MATERIAL TESTING FACILITIES

- Non-destructive examination by radiography, ultrasonics, magnetic particle and liquid penetrant.
- Chemical analysis by computer controlled direct reading emission spectrometer.
- Mechanical testing for tensile properties at ambient and elevated temperatures, bend and hardness testing. Charpy testing at ambient, elevated and sub-zero temperatures.

Further technical information can be obtained from our Web site <http://www.weirvalve.com>

FLOWGUARD

Weir Valves & Controls Flowguard Ltd. specialises in the design and manufacture of **Pulsation Dampers** which are devices that, when fitted to flow-lines, smooth out undesirable fluctuations in pressure and flow. Thus metering and measuring equipment work more reliably, pumps become more efficient and pipeline equipment requires less maintenance attention.

Other devices are **Surge Alleviators**, used to prevent the damaging effects of water-hammer and **Thermal Expansion Compensators**, which offer protection against excess pressures from expanding liquids.

With over twenty years of worldwide experience, Flowguard offers an ISO 9001:2000 service. Qualified for ASME work and TUV, Flowguard's experienced applications and design staff will advise clients as to the most suitable materials of construction and sizing.

A wide spectrum of sectors is catered for including Offshore and Onshore Oil & Gas, Chemicals, Industrial Processes, Water Treatment and Effluent, Paints & Coatings, Food, Beverage and Pharmaceuticals. Special CIP, hygienic, designs have been developed for the latter.

CONTENTS

p2	Weir valves and Control Division
p4	Flowguard Pulsation Dampers
p5	Flowguard "DS" Series Pulsation Dampers
p6	Flowguard "FG" Series Pulsation Dampers
p7	Flowguard "DP & DV" Series Pulsation Dampers
p8	Flowguard "FD" Series Pulsation Dampers
p9	Flowguard "FB" Series Pulsation Dampers
p10	Flowguard "FG/TD" Series Pulsation Dampers
p11	Flowguard "RD" Series Pulsation Dampers
p12	Flowguard Speciality Products
p13	Flowguard Pipeline Surge Absorbers & Thermal Expansion Compensators
p14	Qualifications & Experience
p15	Worldwide Representation
p16	Weir Valves & Controls - Global

PULSATION DAMPERS, PIPELINE SURGE ABSORBERS & THERMAL EXPANSION COMPENSATORS

APPLICATIONS

Flowguard Pulsedampere,akkumulatorer to control pressure and flow pulsations caused by reciprocating and other positive displacement pumps. Careful selection of the damper type and its location can substantially attenuate pressure fluctuations allowing smooth steady flow of process fluid and reduced levels of pipe vibration and noise. Flowguard Dampers are by design very efficient giving levels of performance unmatched by adapted hydraulic accumulators; their simple concept and construction makes them economically priced and easy to maintain. They can be supplied to suit pressures from atmospheric up to 2500 bar/36,000 psi in a wide range of sizes and materials to suit most process applications. Connections can be single, twin or multi-ported and, where flanges are used, they are always welded rather than screwed.

Flowguard Pipeline Surge Absorbers are designed to prevent damage to equipment or instrumentation when there is a sudden change in flow velocity. Rapid valve closures, pump shutdowns or failures, the filling up of empty pipelines and pump start-ups can all cause excessive pressure surges. Flowguard Pipeline Surge Absorbers act as a cushion against these 'water hammer' effects, and minimise the risk of pipeline damage and spillage.

Flowguard Thermal Expansion Compensators provide a very simple self contained solution to the problem of accommodating the expanded liquid volume created when a closed system is subjected to a temperature rise. The Compensator is a vessel charged with an inert gas separated from the process liquid by a flexible membrane. The increased volume of liquid caused by rising temperature will displace the membrane and compress the gas limiting the pressure rise to a predetermined set point. As the temperature falls the liquid is automatically displaced back into the system. The need for relief valves, return pipework and waste tanks is eliminated and there is no loss of product.

Applications notes:-

All Flowguard products should be mounted vertically either up or down unless specifically requested otherwise. There may be traces of silicon lubricant on the internals.

WHY PULSATION DAMPERS?

- **Stop pipe shake, vibration, noise, water hammer and shock**
 - Prevent mechanical damage and leaking connections. Reduce the risk of injury to personnel and damage to the environment from leakage.
- **Instrumentation Accuracy**
 - Pulsation free flow allows flow meters, pressure gauges and other instrumentation to give stable accurate and reliable readings.
- **Instrumentation Protection**
 - Prevent damage caused by pressure surges, improve reliability and maintain accuracy.
- **Pump Protection**
 - Prevent damage and excessive wear and tear due to acceleration forces with reciprocating pumps.
- **Prevent Cavitation**
 - Suction dampers allow the virtual elimination of acceleration losses where NPSH is low.
- **Continuous Flow of Product**
 - Metering and dosing applications – prevent slugging and inaccurate dosing. Mixing – increase effectiveness of static and dynamic mixers. Spraying – avoid uneven or overlapping spray pattern.
- **Increase Pump Efficiency**
 - Allow higher pump speeds to be used resulting in higher flow rates from a given pump size.
- **Increase System Capacity**
 - If flow is smooth pipes can handle greater flow allowing plant upgrades without changing pipe work.

BLADDER TYPE PULSATION DAMPERS (CONTINUED)

FG AND HG SERIES

This series of dampers offer solutions specifically tailored to client needs. Bespoke choices in shell materials and membrane materials.

The HG type is specifically designed for much higher pressures up to 2000 bar.

Examples of shell materials are : 316 Stainless Steel, Titanium, Hastalloy, Monel, Duplex, Alloy 20, Inconel.

Wide choice of membrane materials, including NBR, EPDM, Viton, Butyl, and Hydrogenated versions.



FG bladder type dampers in 316 Stainless Steel.

QUALITY ASSURANCE :ISO9001 : 2000 DESIGN & MANUFACTURE

Qualified for most worldwide engineering and technical requirements.

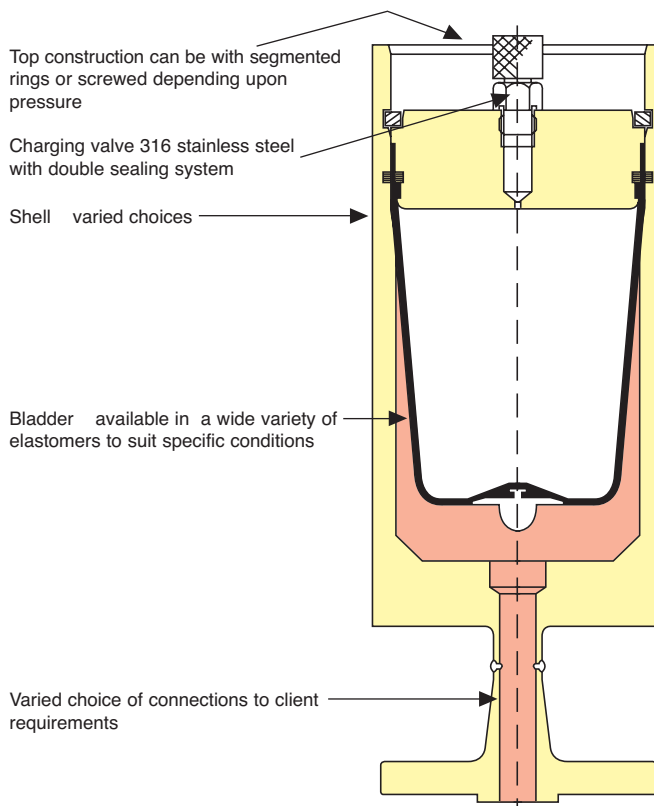


Documentation Hydrostatic Test Certificate : Installation, Operation and Maintenance Instruction And others to suit. e.g. 3.1.b Certs; 3rd party appraisal radiographics, NDE etc.

Pressures are calculated in accordance with PD 5500 and are based on 316 stainless steel at a design temperature of 50°C

Elastomers (All bladders are one-piece moulding) Nitrile, EPDM and Viton B

Specifications may change without notice.



Model Ref	Volume (litres)	Pressure (bar)	Connection NPT female
FG 10	0.01	303	1/2"
FG 20	0.25	305	1/2"
FG 30	0.5	225	1"
FG 40	1.0	195	1 1/2"
FG 50	2.0	137	1 1/2"
FG 57	3.5	114	1 1/2"
FG 60	5.0	59	2"
FG 70	10	59	2"
FG 80	15	53	2"

Model Ref	Diameter (mm)	Length (mm)	Weight (Kg)
FG 10	66	153	3
FG 20	82	187	5
FG 30	95	239	8
FG 40	120	240	12
FG 50	114	388	13
FG 57	141	430	19
FG 60	168	423	23
FG 70	168	533	25
FG 80	219	675	48

Above are based on standard designs: HG designs are bespoke to suit

BLADDER TYPE PULSATION DAMPERS (CONTINUED)



DP AND DV SERIES

MAIN ADVANTAGES

- Ex-stock availability; economical
- Proven performance; reliable
- Simple maintenance and installation
- Resistant to most chemicals
- Full technical back-up
- ISO 9001 : 2000

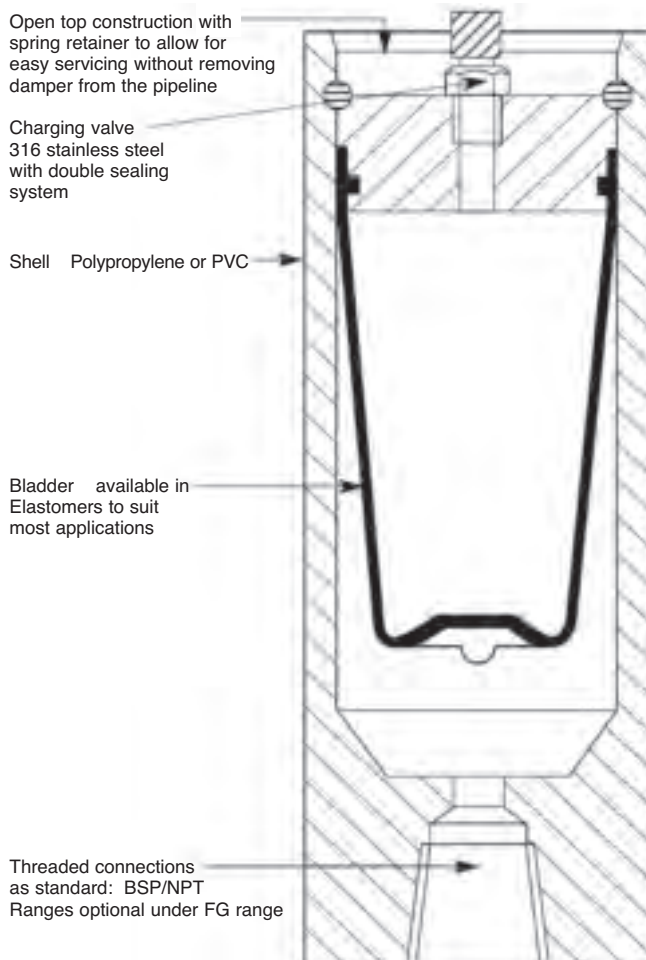
Documentation	Hydrostatic Test Certificate: Installation, Operation and Maintenance Instruction
Shell Material	Polypropylene (DP Series) or PVC (DV Series)

Pressures are calculated in accordance with BS 5500 and are based on polypropylene at a design temperature of 30°C.

Elastomers (all bladders are one-piece moulding) Nitrile, EPDM and Viton B are general choices.

Note: DP and DV series are not suitable for use in temperatures below 0 degrees Centigrade.

Specifications may change without notice.



Model Ref	Volume (litres)	Pressure (bar)	Connection NPT female
DP 10	0.1	10	1/2"
DP 20	0.25	10	1/2"
DP 30	0.5	10	1"
DP 40	1.0	10	1 1/2"
DP 50	2.0	10	1 1/2"
DP 57	3.5	10	1 1/2"
DP 60	5.0	10	2"

Model Ref	Diameter (mm)	Length (mm)	Weight (Kg)
DP 10	75	155	0.5
DP 20	95	190	1.0
DP 30	100	255	1.3
DP 40	125	255	1.9
DP 50	125	400	2.6
DP 57	150	435	5.0
DP 60	190	440	6.6

P.T.F.E. DIAPHRAGM PULSATION DAMPERS

FD SERIES

Simple construction features a contoured Teflon (PTFE) diaphragm with a 316 stainless steel housing as standard and the choice of screwed or welded flange connection. The membrane is Teflon and is ideal for aggressive liquids. Housings may also be material such as Polypropylene, PVC or special alloy and twin port configuration is available as an option.

MAIN ADVANTAGES

- 316 stainless, polypropylene and P.V.C. construction
- Quick delivery
- Easy to fit
- Threaded or flanged connections
- Proven performance
- Simple maintenance
- Withstands very arduous chemicals

P.T.F.E. DIAPHRAGM PULSATION DAMPER

Documentation	Standard Certification to DIN 50049 3.lb
Shell Material	316 Stainless Steel, Polypropylene and PVC, Titanium, Hastelloy C, Monel 400

Pressures are calculated in accordance with BS 5500 and are based on 316 stainless steel at a design temperature of 50°C

The shell material is stainless steel as standard but can be polypropylene (depending on pressure) as an option.

Other materials such as Titanium, Hastalloy, Incoloy, Monel etc. can also be provided.

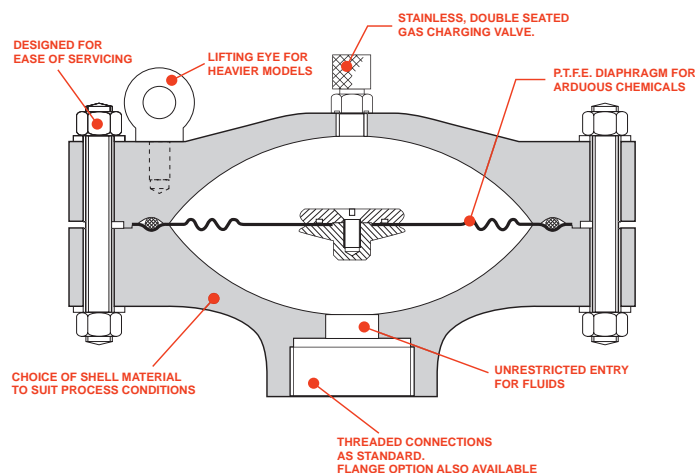
FD50, 60, 80 shells are made from metal spinnings with sheradised carbon steel flange rings.

Twin ported “flow through” connections are available as special.

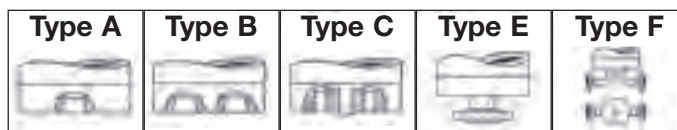
Model Ref	Volume (litres)	Pressure (bar)	Connection NPT female
FD 05	0.05	98	1/2"
FD 10	0.1	82	1/2"
FD 20	0.25	70	1/2"
FD 30	0.5	64	1"
FD 40	1.0	60	1 1/2"
FD 50	2.0	10	1 1/2"
FD 60	5.0	10	2"
FD 80	15	10	2"



FD Teflon membrane damper in 316 Stainless Steel.



Connection Options



Specifications may change without notice.

Model Ref	Diameter (mm)	Length (mm)	Weight (Kg)
FD 05	139	73	5
FD 10	157	87	9
FD 20	188	103	15
FD 30	227	113	24
FD 40	265	136	31
FD 50	300	230	17
FD 60	380	261	33
FD 80	500	379	75

COMPACT DIAPHRAGM DAMPERS

RD SERIES

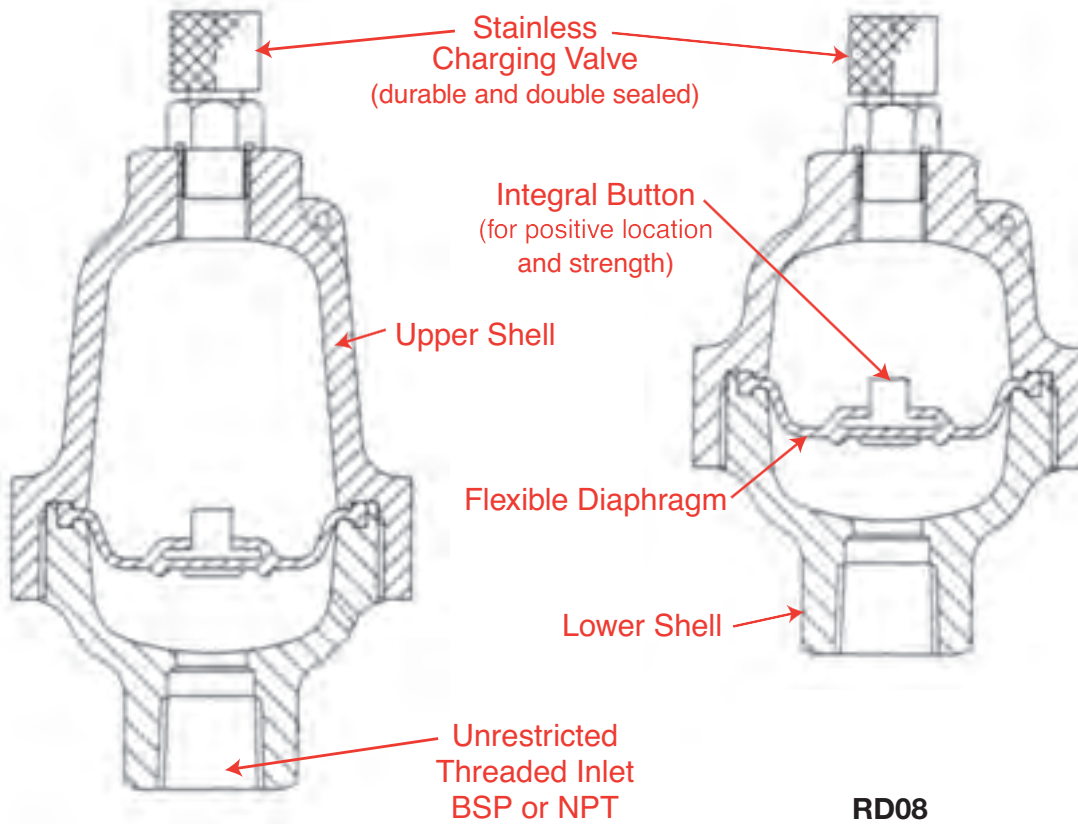
MAIN ADVANTAGES

- Compact design
- Ex-stock availability; standard product
- Simple maintenance and installation
- Developed for medium pressure duties
- Ideal for industrial applications
- Wide chemical compatibility

Documentation	Hydrostatic Test Certificate: Installation, Operation & Maintenance Instruction
Shell Material	316 Stainless Steel (CF8M)
Diaphragm	Nitrile, EPDM or Viton



Items are either made from solid bar or castings, depending upon availability.



RD12

RD08

tables are based on castings:

Model Ref	Diameter (mm)	Length (mm)	Weight (Kg)
RD 08	80	134	1.5
RD 12	80	161	1.7

Specifications may change without notice.

Model Ref	Volume (litres)	Operating* Pressure bar	Connection BSP or NPT
RD 08	0.08	100	1/2"
RD 12	0.12	100	1/2"

* Max. allowable through temps to 95°C

WORLDWIDE REPRESENTATION

GLOBAL PRESENCE

AS PART OF THE WEIR GROUP plc.

The Weir Group plc operates as a global family in five distinct operating divisions :- Clear Liquid, Minerals, Services, Techna and Weir Valves & Controls.

Details may be found on the Group website : www.weir.co.uk

AS PART OF THE WEIR GROUP VALVES AND CONTROLS DIVISION.

This is also a worldwide subset of the Group. Further details are shown overleaf.

WEIR VALVES & CONTROLS FLOWGUARD LTD. REPRESENTATION.

Head Office in New Mills, Derbyshire, England.

Dedicated offices : in Houston, Texas, USA

& at Asbach, near Bonn, Germany.

Agents / Distributors

COUNTRY	COMPANY	TELEPHONE	FAX
Australia	Control Overload	00 61 3 9527 5236	00 61 3 9527 7835
Belgium	Lataire, Smets & Partners	00 32 497 827887	00 32 3458 1053
Canada Ontario	Peacock Inc.	001 905 812 7100	001 905 812 0069
Canada Quebec	Peacock Inc.	001 514 366 5900	001 514 366 8167
Canada Vancouver	Peacock Inc	001 604 552 3185	001 604 502 3109
Denmark	Axflow A/S	00 45 70 103550	00 45 70 103555
France	Pyricon (UK) Ltd.	00 44 207 7358777	00 44 207 7358778
Germany, Austria & Switzerland	WVC Flowguard	00 49 2683 937313	00 49 2683 937 315
India			
Iran	Pollyaim	00 44 208 863 0457	00 44 208 863 0469
Ireland	Fraser Ross	00 353 902 89451	00 353 902 89450
Italy/Spain	Pyricon (UK) Ltd	00 44 207 735 8777	00 44 207 735 8778
Japan	Avery-Laurence (Japan) Co. Ltd.	00 813 3405 5055	00 813 3423 1579
Malaysia (Industrial)	Sakti Suria (M) SDN BHD	00 603 8061 6868	00 603 8061 7033
Malaysia (Oil & Gas)	Tanjung Offshore Services SDN BHD	00 603 4252 3888	00 603 4252 0468
Netherlands	Promotec	00 31 35 6282280	00 31 35 6216252
Norway	Flow-Teknikk	00 4766 775400	00 4766 775 401
Oman	United Engineering Services	00 968 51 6850	00 968 56 2083
Portugal	Cirtec	00 351 21 383 3434	00 351 21 385 9602
Qatar	Qatari Industrial Equipment	00 974 460 0044	00 974 460 0041
Saudi Arabia	Gas Arabian	00 9663 826 8465	00 9663 827 6083
Scotland	Chemical Metering Resources	00 44 1224 282700	00 44 1224 874111
Singapore, Indonesia	Seal Control	00 65 6296 2988	00 65 6368 0573
South Africa	Weir Valves & Controls SA	00 27 11 929 2927	00 27 11 929 2925
Sweden	AB Telfa	00 46 31 775 1950	00 46 314 26198
Thailand & Vietnam	P.J.Services Pte Ltd	00 65 6545 3533	00 65 6545 8183
Turkey	Opalit	00 90 312 446 1277	00 90 312 436 7356
UAE	Emirates General Trading	00 971 2644 8721	00 971 2644 4845
USA	Flowguard USA	001 713 673 5186	001 713 673 5113
Eastern European Territories	Dawcul (UK) Ltd	00 44 1628 472737	00 44 1628 890055



Pulsation Dampers, Pipeline Surge Absorbers & Thermal Expansion Compensators



PULSATION DAMPERS, PIPELINE SURGE ABSORBERS & THERMAL EXPANSION COMPENSATORS

WEIR VALVES AND CONTROLS

Weir Valves and Controls brings competitive unity to a group of specialist manufacturing companies located across the globe. Combining and maximising the strategic aims of the member companies, Weir Valves and Controls develop a versatile, comprehensive and proactive relationship with customers, contractors and end users.

A rigorous programme of information management ensures each member company is aware of new developments on a worldwide basis. This means that the group is able to take a more anticipatory role in defining the future needs and expectations of the market by fully utilising the organisation’s critical resources to create and add value to our customers while generating a real competitive advantage for Weir Valves and Controls.

Weir Valves and Controls is a leading world renowned OEM of isolation and control valve products for the global Energy sector.

The division continually meets market demands with proven reliability and flexibility by utilising engineered product configuration systems and a continuous programme of IT development in the move towards e-Business.

With a comprehensive range of engineered valve products Weir Valves and Controls have developed an extensive global installed base and expertise across a wide range of industrial sectors:-

- Power Generation
- General Industrial
- Oil and Gas Production
- Refining
- Petrochemical
- Chemical
- Pulp and Paper
- Desalination



3-way valves
Butterfly valves
Check valves
Gate valves
Globe valves
Isolation devices
Safety valves



Isolation and control butterfly valves



Choke valves
Globe control valves
Sever service valves and desuperheaters
Turbine Bypass valves



Pulsation Dampers
Pipeline Surge Absorbers
Thermal Expansion Compensators



Check valves
Gate valves
Globe valves
Isolation devices
Safety valves



Ball valves
Pipeline check valves and integrated systems
Through conduit gauge valves



Change-over valves
Flame arresters
Low pressure and vacuum valves
Pilot operated safety relief valves
Pressure relief manhole cover
Spring-loaded safety relief valves
Tank blanketing system



Nuclear safety valves



Triple offset butterfly valves

BLADDER TYPE PULSATION DAMPERS

DS - Series

Bladder type units specially designed as Pulsation Dampers which feature maintenance friendly top access for bladder removal and replacement in situ.

The DS-Series of dampers are offered as standard in 316 stainless steel with bladders made from a choice of NBR, EPDM, or Viton.

Connections to process are either screwed or flanged.

Many thousands of these dampers worldwide testify to the effectiveness of this simple design concept in smoothing the flow from reciprocating pumps, to enable accurate metering and reduced vibrations.



DS bladder type dampers in 316 Stainless Steel.

QUALITY ASSURANCE : ISO9001 : 2000

MAIN ADVANTAGES

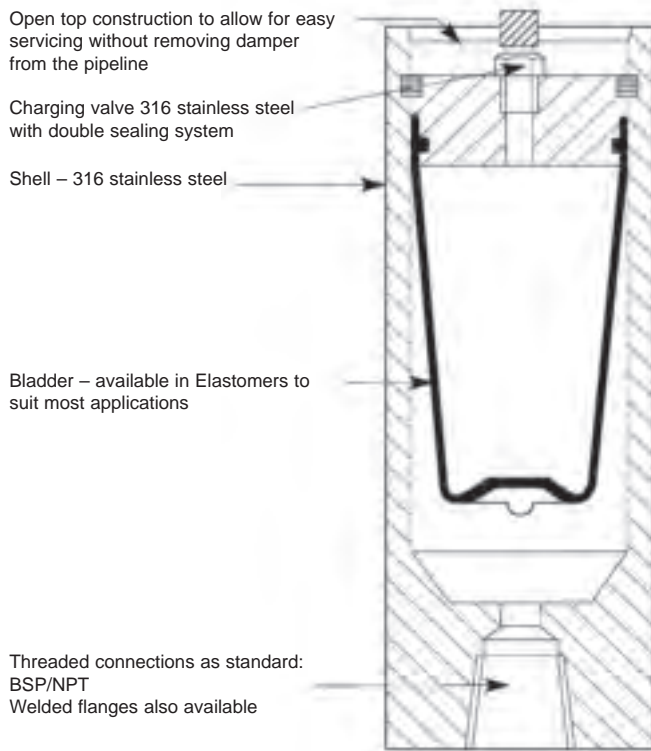
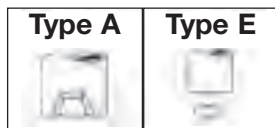
- Ex-stock availability
- Choice of connection
- Simple maintenance and installation
- Proven performance
- ISO 9001 (2000) Accreditation
- Suitable for most processes
- PED approvals for up to Cat III module H

Documentation	Hydrostatic Test Certificate : Installation, Operation and Maintenance Instruction
Shell material	316 Stainless Steel

Pressures are calculated in accordance with PD 5500 and are based on 316 stainless steel at a design temperature of 50°C

Connection Options

Elastometers (All bladders are one-piece moulding) Nitrile, EPDM and Viton B

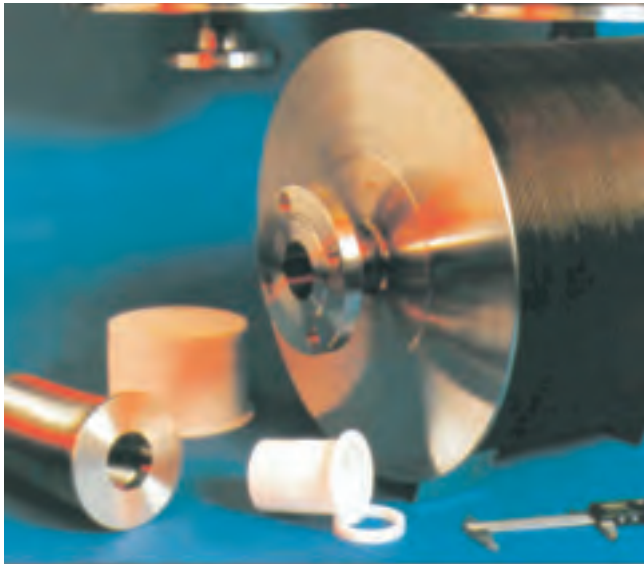


Specifications may change without notice

Model Ref	Volume (litres)	Pressure (bar)	Connection NPT female
DS 10	0.01	303	1/2"
DS 20	0.25	305	1/2"
DS 30	0.5	225	1"
DS 40	1.0	195	1 1/2"
DS 50	2.0	137	1 1/2"
DS 57	3.5	114	1 1/2"
DS 60	5.0	59	2"
DS 70	10	59	2"
DS 80	15	53	2"

Model Ref	Diameter (mm)	Length (mm)	Weight (Kg)
DS 10	66	153	3
DS 20	82	187	5
DS 30	95	239	8
DS 40	120	240	12
DS 50	114	388	13
DS 57	141	430	19
DS 60	168	423	23
DS 70	168	533	25
DS 80	219	675	48

BELLOWS TYPE PULSATION DAMPERS



Membranes in Teflon and 316 Stainless Steel for FB units, for aggressive fluids or high temperatures, with good pressure capabilities.

Specifications may change without notice.

FB SERIES

The FB series of dampers can be chosen either from Teflon (PTFE) suitable for exceptionally aggressive chemicals or from alloy metals when high temperature resistance is needed.

The Flowguard PTFE bellows are knife-cut on precision CNC machinery for exactness and perform typically up to 20 bar.

The metal alloy bellows, e.g. stainless steel, are specially formed and welded by precision process and perform to much higher pressures, up to 100 bar typically.

The FB/TD features a double membrane construction with a bellows process membrane (as 'FB') and provides a unique application solution for even higher pressures.

Model Ref	Volume (litres)	Diameter (mm)	Length (mm)	Weight (Kg)
FB/TD 10	.10	130	279	15
FB/TD 20	.25	140	340	15
FB/TD 30	.50	165	340	25
FB/TD 40	1.00	191	430	50
FB/TD 50	2.00	229	610	80
FB/TD 60	5.00	279	714	150
FB/TD 70	8.19	380	780	250

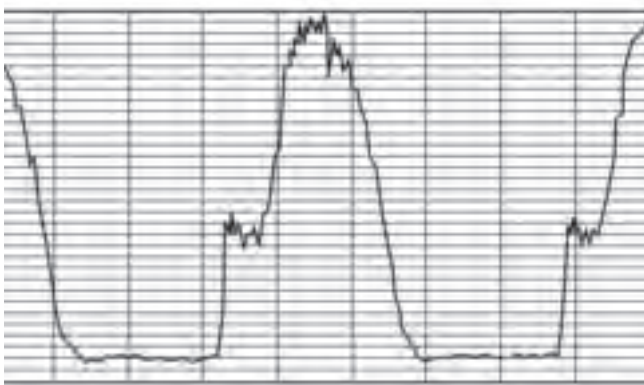
PRESSURE PERFORMANCE INDICATION

With all Flowguard pulsation dampers, the resultant pressure smoothing is a design feature arrived at in consultation with clients. The actual example below shows typical results:-

Typical target industrially is $\pm 5\%$

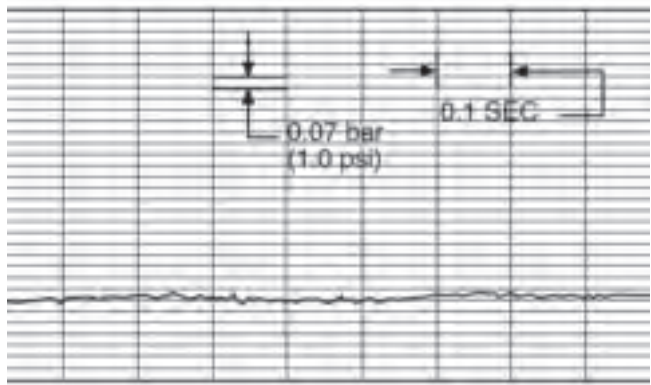
Single acting metering pumps running on water at 60 strokes per minute.

WITHOUT DAMPER



Pressure variation - 0 to 2 bar
Flow variation - 0 to 16 l/min

WITH DAMPER

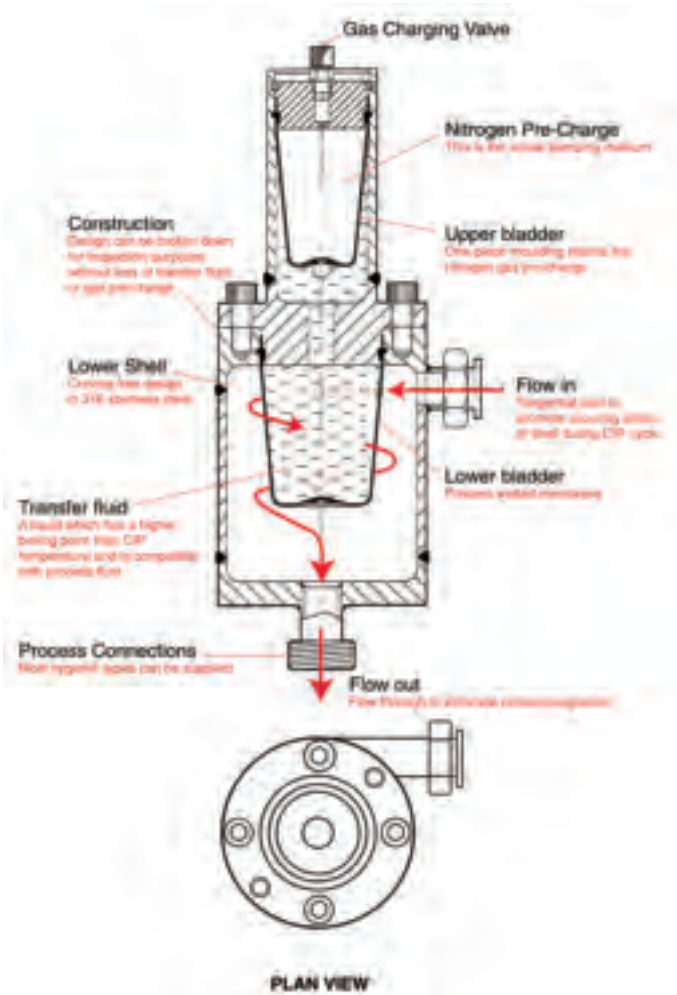


Pressure variation $\pm 0.07 \text{ bar } (\pm 5\%)$
Flow variation - steady at 7 l/min.

FG/TD HYGIENIC DESIGN

Hygienic Design Pulsation Dampers

Designed specifically for CIP applications in the Pharmaceutical, Food, Confectionery, Personal Care Products, Beverage and Brewing Industries. Unique internal rotational flow to provide a scouring action.



Certificate of Cleanliness by leading laboratory.

FG/TD - Series

Called the FG/TD, this range is produced specifically for hygienic applications most commonly found in food, beverage, pharmaceutical and toiletry industries. The design is crevice free, twin ported for flow through use and elimination of product stagnation as well as suitable for CIP. To this end the inlet port is mounted tangentially to promote a “scouring action” of the shell during the cleaning cycle. As these units are made to order elastomer selection and type, connection type and size and polishing requirements are all as per customer’s requirement. Vulnerable areas such as the lower bladder anchorage point are profiled to avoid creation of a residue trap and the base/outlet port are tapered to facilitate handling of the many viscous, slurry type products encountered in the food industry.

The design is based on a transfer fluid contained between nitrogen pre-charged upper bladder and a lower process, fluid wetted, bladder. Pulsations in the process fluid impact on the lower bladder and are transmitted through the transfer fluid to the upper bladder where they are absorbed by the gas and damping takes place in the usual way. To prevent product contamination should a rupture occur in the lower bladder, the transfer fluid is custom selected for compatibility with the pumped product. Additional options include heating jackets, mounting brackets, rupture detection devices and specialist polishing.

Typical Applications

Insulin Plant: FG/TD dampers fitted in the suction side of triplex pumps to provide steady flow to a heat exchanger.

Cola Production: fitted to a blending pump inlet to provide stable suction conditions.

Brewing: an FG/TD unit fitted as a hydraulic surge alleviator to prevent water hammer damage to pipeline equipment.

Homogenisers: several examples where vibrations and noise have been eliminated.

Confectionery: FG/TD damper fitted to pump outlet to provide even pressure for successful chocolate coatings.

SPECIALITY PRODUCTS (CONTINUED)

ENGINEERED ACCUMULATORS

Specifically designed to meet exacting client needs, Flowguard offers engineered devices to act as accumulator.

Often when sizes are larger than conventional bladder designs, then Piston Accumulators are provided. These also allow higher temperature excursions and are ideal for use as Liquid Expansion Compensators.



AIR CHAMBER DAMPERS

When convenient, some applications are suited to simply having an air chamber to cushion out pulsations.

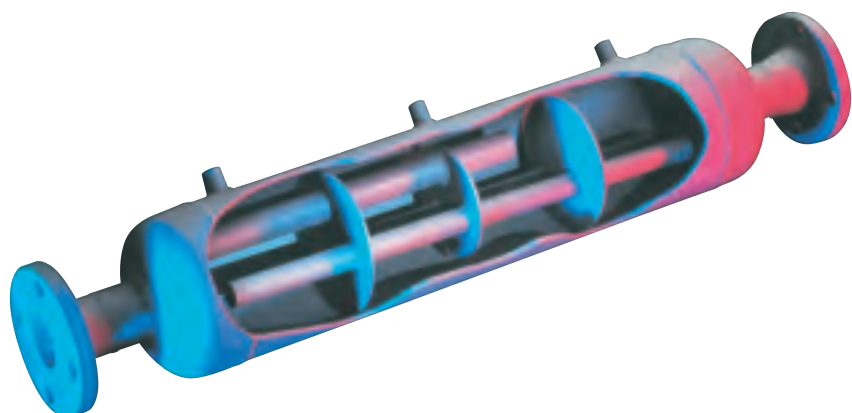
Flowguard offers simple pressure vessels for these applications when air entrainment into process fluid is not a problem issue.

All Flowguard pressure containment vessels are designed and manufactured to strict manufacturing codes.

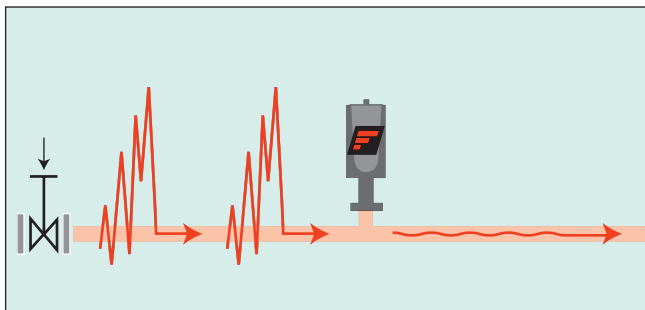
HIGH FREQUENCY BLADDERLESS DAMPERS.

Manufactured under special licence from leading edge USA designer, these devices are ideal for remote applications when totally maintenance free is mandatory.

Also ideal for cryogenic conditions. These units have no moving parts and are best suited to higher frequency application.



**PIPELINE SURGE ABSORBERS
& THERMAL EXPANSION COMPENSATORS**



A Flowguard surge absorber is computer designed to alleviate the energy spike.

PIPELINE SURGE ABSORBERS

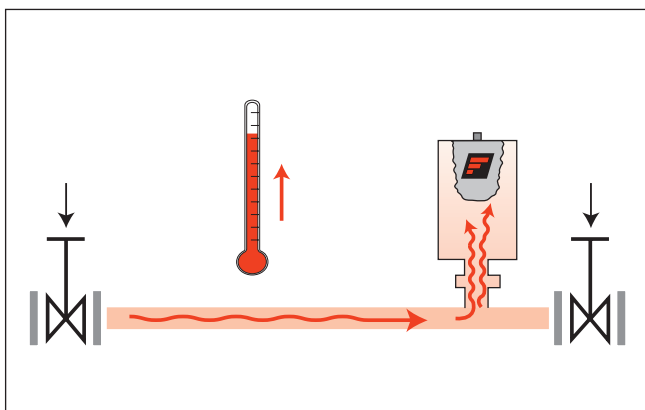
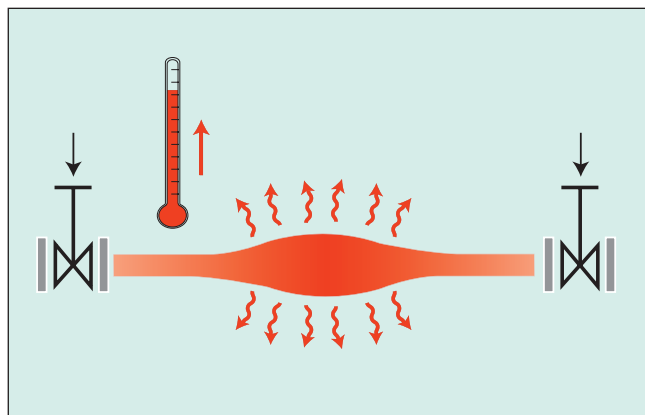
Severe pressure surges are caused by rapid changes in the velocity of fluid flow. These surges travel as a spike at the speed of sound along the pipe until they are either reflected or attenuated. This surge of pressure, often referred to as water hammer, can cause severe, if not catastrophic, damage to pipelines.

Flowguard Surge Absorbers cause a cushion by virtue of a nitrogen filled bladder which absorbs the energy wave, thus preventing the wave to continue to travel along the pipeline. Hydraulic surges are often caused by valves closing too rapidly or by pumps suddenly starting and stopping.

Typical applications for Flowguard Surge Absorbers are in Tanker Loading Points, Aircraft Fuelling Systems, Water Transportation Mains, Emergency Shut-downs, Valves, Bore-hole Pumps, to name just a few.

Computer aided designs are generated to calculate the extent of the Flowguard cushion needed specifically for the client's system.

THERMAL EXPANSION COMPENSATORS



A Flowguard Thermal Expansion Compensator is a vessel charged with an inert gas separated from the process liquid by a flexible membrane. The increased volume of liquid caused by rising temperature will displace the membrane and compress the gas limiting the pressure rise to a predetermined set point. As the temperature falls the liquid is automatically displaced back into the system. The need for relief valves, return pipework and waste tanks is eliminated and there is no loss of product.

MAIN ADVANTAGES

- NO product loss
- NO weeping relief valves
- NO disposal problems
- NO damaged equipment
- NO return pipework
- NO burst disc replacement
- NO leaking joints
- NO waste tanks
- NO worry

Left unattended, liquid expansion can result in very severe pressures occurring in pipelines. These pressure rises can happen over a relatively short period of time.

QUALIFICATIONS AND EXPERIENCE



Flowguard products are designed and manufactured to exacting standards and quality control. Our designers are happy to accept new ideas from clients and confidentiality is taken for granted.

Weir Valves & Controls Flowguard Ltd., is well known and has a good reputation globally in most worldwide regions and is always gaining good repute and spreading into new territories.

Continuous improvement is a lifestyle adopted by the Company and enables customer focus to be a paramount feature in all its undertakings.

BRIEF HISTORY

Formed originally in 1980, Weir Valves & Controls Flowguard Ltd. has grown steadily each year to become a well-known worldwide provider to the major oil and gas industries. Both offshore and onshore activities are well catered for with Flowguard products and the Company has also developed its reputation in all other industrial sectors. Since 1998, when acquired by the Weir Group plc, the Flowguard brand has seen greater growth supported by the Group and its Valves & Controls Division across all quarters of the world.

APPLICATIONS EXAMPLES

A more comprehensive list is available on request, however below are just a small number of the territories and projects:-

1980	Kansas Gas, Iran	2001	Methanol Injection, USA
1983	Gulfaks, Norway		IBN-SINA, Saudi Arabia
1985	Grangemouth Refinery, UK		BP White Tiger, Vietnam
1986	Confectionery, UK		Shell Penguins, UK
1989/90	Woodside, Australia		ABB Global, Netherlands
1992	Royal Navy - UK		Celanese, Singapore
1993	Nigerian National Oil	2002	Eleme, Nigeria
1995	Sarak, Malaysia		Foster Wheeler Bimas, Turkey
	Drug Manufacturer, Denmark		Sincor, Venezuela
1996	ETAPS, North Sea		Sulaiman, UAE
1997	Plastics, Formosa		Novartis, Ireland
2000	Margarine, UK		BP Thunderhorse, USA
	Petronas, Malaysia		BP Mad Dog, USA
	S-Oil, Taiwan		
	KCC, UAE		
	Aramco Khuffgas, Saudi Arabia		
	Reverse Osmosis, Greece		



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