

Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

For greater understanding and definition.

Hydraulic Accumulators & More; Surge, Diaphragm, Piston, and Bladder Types. Surge accumulators and water hammer vessels, diaphragm accumulators and pressure pulsation dampers, bladder accumulators and piston type pump controllers.

Your local helpful source in Singapore, ERNEST LAU and CYNTHIA CHOO Globaltech Systems Eng PTE Ltd.

PulseGuard Ltd. & Inc.

Technical support available, obtain lead times, verify availability, find prices, overall cost, talk / chat, etc.: direct from the manufacturer.

HydroTrole serving the offshore oil and gas industry since 1974.

Marine Offshore Oil & Gas Rigs and Platforms. Hydro pneumatic compensator system for drill string wave motion. Hydro pneumatic compensator system for crane. Hydraulic winch drive for wire line machine. Hydro pneumatic skid package system for blow out preventer remote control. Guide line tensioners. Hydro pneumatic wrench for rotary table drill string. Hydro pneumatic tensioner system for marine conductor. Hydro pneumatic sub surface accumulator system for blowout preventer. Units for sour oil sampling. Hydro pneumatic units for mud pump pulsation damping. Sub surface valve hydraulic shutdown unit. Bypass hydraulic control system. Crane heave motion compensator. Wire line winch hydraulic drive. Surface valve / pig launcher central hydraulic system. Hot water expansion tank. Methanol Injection pump pulsation dampers.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Hydropneumatics with experience with offshore oil and gas, hydraulic control systems.

Skid Mounted Hydraulic Control System Packages

Skid mounted, packaged, central hydraulic control systems built up from a standard range of over 500 different hydraulic accumulators. Bladder type, piston type, indicating, and diaphragm type accumulators are our everyday business and have been for the last thirty seven years. Our team of hydraulic system engineers will design a package to be custom-built to your specific requirements. A typical down hole valve and surface valve control pack will consist of a tank, a 15 horsepower 3 phase, 1500 R.P.M. Div 1 Group 2A flame proof electric motor, a 50 US gpm, 3 throw ram pump or 3000 psi gear pump, an air driven or hand operated back up pump, tank strainer, pressure filtration, non return valves, pump controller, hydraulic accumulator skid package station and shear seal directional control valves, all mounted on a beveled edge skid.

Tank Units

For low pressure actuation, typically around 1500 psi pressure reducing valves can be used on a 3000 psi or even 6000 psi package thereby building in a wide pressure differential minimizing the hydraulic accumulator sizes and overall skid deck foot print. On the subject of overall physical size. no other manufacturer can draw from as large a range of hydraulic accumulators as we can (Hydrotrole limited manufacture them) therefore units can be sized exactly without wastage of space. All accumulator units can be connected to gas back- up bottles which themselves can either be supplied as part of the main system or as a separate skid mounted package.

Pump Units

Whether controlling BOP stack control systems, blow out preventers, emergency shut-down, emergency shut-in, down hole valves, surface valves, or pig launcher it pays to consult an engineering company that also manufactures the basic hardware components.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Special offshore oil & gas pressure tanks WITH MEMBRANE INTERNALS.

PRESSURE VESSELS

Pressure vessels have been our business for years and range in capacity from 50cm³ -1000 liters up to 3 tons weight per unit. They are available in 316 stainless or mild steel either electro less nickel plated or painted 30 microns epoxy grip primer, 2 coats high build epoxy at 100 microns and final metal pigment anodic sacrificial protection 30 microns min. Vessels are normally built to comply with the most stringent requirements of authorities: A.I.B., A.P.A.V.E., T.U.V., A.N.C.C., T.R.C., A.S.M.E.V111., DET NORSKE VERITAS, BUREAU VERITAS, LLOYDS and A.O.T.C. Available for volume expansion contraction compensation, water hammer, fire prevention systems, emergency shut-down, emergency shut-in, etc..

WITH ELASTOMER BAGS OR LININGS

Our separator vessels are ideally suited for use on BCF/Foam/Water storage tanks for fire control systems. Our rubber technologists can supply formulations of elastomers to suit most requirements and include Hypalon, Buna-N, Viton, Silicone and E.P.T., giving a temperature range of -30°C to +200°C and bladders which will be compatible with most known fluids. We even make CONDENSATE KNOCK OUT POTS for instrument hookups.

FUTURE NEEDS

The range of Sour Oil Sample Bottles was from a request (as a result of this expertise), by our agents, WILSON SUPPLY CO. for Moore, Barrett & Redwood and Expro. Yarmouth that cleanable units be designed. If you have a LARGE pressure SMALL vessel problem please ask for HYDROTROLE (Offshore) Limited input.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

PRESSURE Pulsation Dampeners, Suction Dampers, & Surge Arrestors WITH HAMMER PREVENTION AND HIGH FREQUENCY INTERCEPTION.

SUCTION DAMPERS

Fluctuating suction line velocities - particularly on piston pumps, cause severe cavitations. Especially where N.P.S.H. values are minimal, single port dampers do not efficiently reduce suction pulsation; because they must be 'T'd off line. Tests prove that 'in line' fitment (like a filter), of multi port pistofram units efficiently smooth suction flow. Pistoframs in the pump outlet will be sized to your exact pulsation damping spec. Result! - Less downtime, planned maintenance ability and longer packing life. Sizes 1/2 pint thru. 6 galls up to 10,000 p.s.i.

SURGE ARRESTORS

Single and twin port pipe line shock arrestors are available in pipe sizes 1/2" - 10" for line pressures up to 6,000 p.s.i. Suitable for multiplex plunger pumps and systems, cavitation prevention, etc.

DAMPER SIZING

For triplex pumps, damping to $\pm 2 \frac{1}{2} \%$ of max pressure: - Damper size = $3.175 \times$ (displacement of one plunger \times max. pump pressure / min. pump pressure). For $\pm 5\%$ damping divide damper size by 2. For Duplex Pump multiply Damper size \times 3. For Simplex multiply Damper size \times 7. Note: - If in-line damper to be used (frequencies in excess of 10 Hz) check ports will take flow rates; go up in damper size if necessary.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Offshore Marine Pressure Volume Temperature Sampling

TRANSPORTATION CYLINDERS - "SOUR OIL SAMPLE BOMBS" BOTTLES
Compatible with H₂S, Mercury and high aromatics, available for working pressures up to 15000 psi. A very robust construction against mechanical damage, built in a virtually infinite range of volumes (between 10cm³ and 50 liters) from ex stock modular subcomponents. NOTE: with SOSBO (sour oil sample bottles) your samples are enclosed in stainless sleeves and end caps which are replaceable in the event of staining or contamination. SOSBO's are internally corrosion inspect-able pressure vessels in which only the cost of liners and end caps need be incurred over many years of service, and in which you can ensure clinical cleanliness by internal inspection. SOSBO, a quality product which is inexpensive to keep as perfect as new.

Sample Bottles, Transportation Cylinders or "bombs" take suffix F.S.V. on the end of the model code for supply with the H.OS.L. built in FAIL SAFE VALVE.

MERCURY FIELD TRANSFER PUMPS (Outsourced)

316 st.st. displacement 100 cm³ per stroke for pressure up to 800 Bars (11,600 psig) supplied with Viton Seals and 1/8 National Pipe Taper, exhaust ported, teak mounted with fold away handle complete with gauge and carrying case. These pumps are also available with failsafe valves for easier transport, i.e. less dismantling.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Marine Sub Sea Surface Accumulators / Pressure Vessels

ACCUMULATORS - BLADDERS ARE ONE PIECE MOULDED, NO GLUE OR BONDS - limiting integrity and reliability.

A full range of purpose designed surface and subsea hydro pneumatic accumulators based on proven Hydrotrole range; available in bladder-piston-diaphragm-indicating (tale rod) and sleeve series. Subsea units (model numbers prefixed "SSA") are designed as standard for water depths down to 1500 ft; sea water lockout seals and totally enclosed gas charging valve chamber allow maximum safety and reliability. Deep submergence, suitable for well head christmas trees. Minimum safety factor 4:1. External finish as standard: - Primer - Carbo Zinc 11, Top Coat - Carboline Epoxy CE190HV.

PRESSURE VESSELS

Built to Hydrotrole specification SDC1-l/2/73 as standard or ASME8 and Lloyds; a non welded pressure vessel for internal and external pressure can be furnished from substantially stock components.

TRANSFER BARRIERS

Used to allow sea water pressure at any depth to be transmitted to internal fluid in equipment such as valve actuators, gear boxes, hydraulic units etc. to maintain pressure/volume balance, compensation for depth. One piece high integrity Buna-N rubber molding prevents intermixing of sea water and instrument fluid.

PRESSURE SWITCHES

Flame proof pressure switches for surface and subsea applications. Designed for BS 4683 Div 1 Group 2A gases. These switches are particularly suitable for hydraulic and similar instrument systems. Stainless steel fluid contact parts as standard.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Offshore Heave Motion / Crane Load Compensators

HEAVE MOTION COMPENSATORS

Using proven Hydrotrole hydraulic accumulator and cylinder technology and expertise the HYDROCOMP series of heave wave motion compensators provide the ultimate in safety reliability and performance. The unique co-axial construction - the accumulator actually surrounds the hydraulic ram - not only makes this the most rugged unit on the market, it also saves on deck space and weight. Hermetically sealed "dead" side of cylinder, retaining a slight positive Nitrogen pressure, prevents corrosive atmosphere being sucked in every stroke - a major problem with conventional systems. Elimination of hydraulic piping, double piston seals plus PTFE linear bearings between all wearing surfaces ensures maximum reliability and minimum down time.

RISER TENSIONER

Minimum sheave diameters are 30 x rope O.D.; all sheaves run on double taper roller bearings. NOTE: - HYDROCOMP linear compensators are now supplied with LIMISLIP over travel friction grip deck clamps and INDACC remote position indicators.

MOORING SYSTEM

Based on either axial or coaxial linear accumulator layouts mooring snubbers for tensioning loads up to 150 tons per single cable with stroke (line take up) capacitors up to 30 feet. Utilizing minimum of deck space tensioners may be mounted vertically or horizontally. Structural integrity not less than maximum load x 3.

CRANE LOAD COMPENSATOR - "THE CRESTPICKER" RANGE.

These wave motion arrestor units allow unloading of supply vessels in what would otherwise be impossible sea states, thereby enlarging the weather window. The unit is normally fitted to the main hoist cable and is an easy conversion for existing Rig/Platform cranes.

ROTARY GUIDE LINE TENSIONERS

Based on ultra efficient high response regenerative hydraulics system H.OS. L. rotary guide line Tensioner has been purpose designed for deep water rigs where high line capacity and minimum hardware weight are essential. Incorporation of a unique over travel limiter prevents shearing of safety clamp and allows round-the-clock automatic operation; all models can also be operated as straight compensated winches with local and remote controls.

Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Instant Response, Highest Flow Control Telemetry Accumulators

Of these piston accumulators the PistoFram, see right, has a faster response, higher flow rate, and is available with greater pressure capability than any known bladder type accumulator.

The MagDacc design enables system and remote multi pump control by telemetry.

The Indacc, where telemetry is not required. This piston accumulator enables pump control in hazard class environments without the use of any solenoid or electrical valves etc...

Accumulators Specification - Ordering Codes / Model Codes / "Call-Out"

The safest, longest life, most responsive accumulators: Our accumulators have a built in tamper proof fail safe, and the use of segmented lock ring down a step, prevents removal before de-pressurization, which makes them all tamper proof. Piston accumulators only lose their nitrogen pre-charge slowly and over a forcastable time; whereas bladders of accumulators are inclined to burst uncontrollably. See also: www.Hidryl.com



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Shock, Surge, and Water Hammer: Installation, Operation, and Maintenance

INSTALLATION MODES

Method of installation depends on the application.

1. For pulsation interception from triplex plunger pumps.

Place the unit that is to act as a pulsation interceptor on a piping base with diverter flute that is positioned no more than 12 diameters of the pipe, away from the outlet of the pump discharge manifold.

2. Valve closure shock prevention.

Place the unit that is to act as a shock preventer - water hammer absorber, no more than 12 pipe diameters of the pipe away from the fast closing valve that causes the hammering.

3. Pump startup surge reduction and stopping "back-flow bang".

Install the equipment that will enable the pump to start up without having to surge the pressure by placing it within 12 pipe diameters of the pump discharge valve. Similarly to decelerate the back flow towards the pump, place the deceleration volume close to the pump check valve.

SCHEDULED MAINTENANCE

An indication of need for service is a loss of cushion gas pressure.

Maintenance schedule depends on the application:

1. For pulsation interception from triplex plunger pumps.

The life of the moving component parts of SurgeGuard, JumboFlex, LiquiBello, and FloatOlator alleviators is dependant on the cyclic duty. For example if the pre-fill cushion gas pressure is set too high, then the moving part will "bottom" by fully exhausting after each pulse. If the pre-fill is set too low, then the moving part will be over deflected. Each user sets their own norms, but unless otherwise advised, aim for six months. Spares should be ordered with each unit.

2. Valve closure shock prevention.

The life of the moving component parts of SurgeGuard, JumboFlex, LiquiBello, and FloatOlator alleviators is dependant on the cyclic duty. How often the fast closing valve is "slammed" dictates how much work a water hammer preventer has to do, but if the size of the "absorber"/"attenuator" is large, the frequency of service is not likely to be more often than once per anum. It is the end user responsibility to establish. Spares should be ordered with each unit.

Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

3. Pump startup surge reduction and stopping "back-flow bang".

The life of the moving component parts of SurgeGuard, JumboFlex, LiquiBello, and FloatOlator alleviators is dependant on the cyclic duty. The number of pump "start-ups", "shut-downs", and how violent they are will set the time between strip and rebuilds. This is not normally more than once in three years. Responsibility for setting that schedule is with the end user. Spares should be ordered with each unit.

PRE-FILL CUSHION PRESSURE

Pre-fill pressure depends on the application.

1. For pulsation interception from triplex plunger pumps.

With SurgeGuard, JumboFlex, LiquiBello, and FloatOlator if the pre-fill cushion gas pressure is set too high, then the moving part will "bottom" by fully exhausting after each pulse. If the pre-fill is set too low, then the moving part will be over deflected. A "high pre-fill pressure", 80% of the steady state line pressure is used for volumetric dampening - reducing acceleration head generation for acoustic pipe resonance a low pre-fill pressure - 50% of line pressure is used. Please always provide a full set of system pressure readings when requesting a manufacturer's recommendation.

2. Valve closure shock, water hammer eliminators.

With SurgeGuard, JumboFlex, LiquiBello, and FloatOlator installed as a pipe shock water hammer preventer, the normal starting point is to pre-fill the alleviator to 70% of the normal pressure that is in the pipeline before the valve is slammed closed. Depending on pipe length and compressibility - acoustic velocity in some systems may be quietened by fine tuning cushion pressure

3. Pump startup surge reduction and stopping "back-flow bang"

With SurgeGuard, JumboFlex, LiquiBello, and FloatOlator pump start-up surge attenuators and backflow shock alleviators; the pre-fill pressure is generally as low as only 30% of the theoretical steady state line pressure reached when pumping. A low prefill cushion allows the unit to begin to accept flow shortly after the pump starts, sp preventing acceleration head surge. An indication of a need for service is a loss of cushion pressure.

Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Offshore Oil & Gas Application Surge Accumulators

Large volume choices for pump start-up surge, fast valve closure slam, water hammer prevention, compensation for volume expansion and contraction due to temperature change, and to act as a transfer barrier between two liquids.

Liquibello for Temps above Elastomer Capability

Typical "Blo" series High & Low Temp. Hammer, Shock & Surge Compensator also for volumetric compensation, with Stainless Bellows.

FloatOlator for Applications too Large for Molded Membranes

Typical "FOT" series High & Low Temp. Hammer, Shock & Surge Compensator also for Expansion, with Stainless Bellows.

SurgeGuard for Corrosive Liquids

Typical "Sug ss Series Surge Alleviator, With Options. 316L, wetted metal parts + EP, Nitrile, Hypalon, Fluorel etc bladder.

JumboFlex for Non Corrosive Liquids

Typical "Jof cs" Series Shock Attenuator, Epoxy coated carbon steel housing + EP, Nitrile, Hypalon, Fluorel etc bladder. For non corrosive systems.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Pulsation Dampers / Chemical Process Metering

Intercept instrument destabilizing high frequency, prevent resonance, stop acoustic waves, and address acceleration head forms of pulsation. All with flush in place and constant temperature pulsation damper features.

Pulsation Damper / Thru Flow Discharge Pulsation Preventer

For benzenes, bromines, -ides, -chloros + nitric permeation, and hazardous substances.

Thru Flow Diaphragm Accumulator / Pulsation Preventer

The Flexorber LP series is an adaptation with elastomeric membrane diaphragms for process control industry pulsation dampening.

Thru Flow Pressure Pulse Stabilizer / Pulsation Preventer

These stabilizers, for pressures up to 30000 psi, remove fluctuations and make your systems controllable whilst protecting instrument accuracy.

Flow Tranquilizer / Pulsation Preventer with Thru Flow

A flow tranquilizer quiets the disruptions in discharge velocity; pressure losses are minimized and overall efficiency is increased.



Hydraulic Accumulators

Surge, Diaphragm, Piston, and Bladder Types

Bladder accumulators with one piece molded, seamless, reliable bladders. PipeGuard dampeners, having a smaller diameter, are lower cost; particularly for higher pressures where the pressure shell has to be stainless steel for marine external corrosion resistance and other corrosive environments.

Pulsation Dampner, All Stainless, Bladder Gas Bag, Ultra Pressure
"Pig/UHP" ULTRA PRESSURE Series Pulsation Dampener, & Options Duplex (2205, F-51, US S31803) & Super Duplex Stainless (2507, UNS 32750) wetted metal parts + EP, Nitrile, Hypalon, Fluorel etc gas bags.

Pulsation Dampner, All Stainless, Bladder Gas Bag, Medium Pressure
Typical "Pig ss" Series Pulsation Dampener, & options. 316L, wetted metal parts + EP, Nitrile, Hypalon, Fluorel etc gas bags.

Pulsation Dampner Plastic PVC Housing, Bladder Gas Bag, Low Pressure
Typical "Pig Plas-PVC" Series Pulsation Dampner, & options. PVC Plastic wetted parts + EP, Nitrile, Hypalon, Fluorel etc gas bags.

Pulsation Dampner, Plastic PolyProp., Bladder Gas Bag, Low Pressure
Typical "Pig Plas-PP" Series Pulsation Dampner, & options. Poly-Prop. Plastic wetted parts + EP, Nitrile, Hypalon, Fluorel etc gas bags.

