



SEVERN
GLOCON

*Severe Service
Control Valves*



**Multi
Labyrinth
Trim***

*Patents Pending

Representative for Benelux
Energy Management Systems BV
Postbus 3034 1801 GA Alkmaar
Telf. +31(072)5401147
web : www.emsvalvesinstruments.com
email: info@emsvalvesinstruments.com



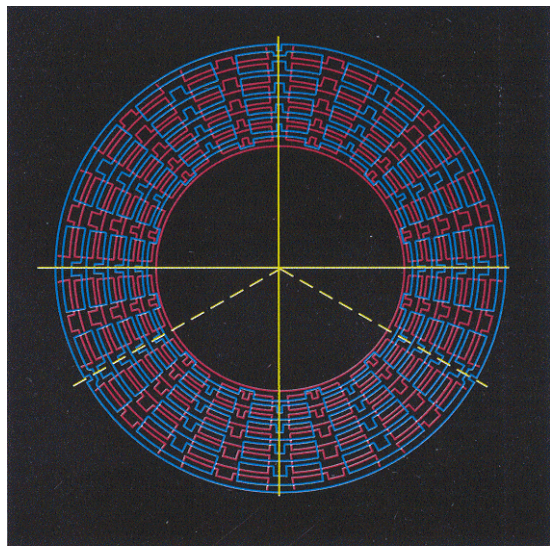
Reg. No. FM01959

Severe Service MLT Control Valves

Forty years of creating new designs (or adapting existing ones) has resulted in a large portfolio of both standard and highly specialised valves. However, in order to maintain our international reputation, our technical research and development team are continually looking to break new design frontiers using the latest IT, Engineering Management and CAD systems. Severn Glocon have been providing solutions for severe service applications for many years. These solutions often involve managing multi-stage pressure let-down, where it is essential to positively control the rate of fluid flow throttling to within safe operating envelope for the selected trim. This requires a full knowledge of the trim interstage pressure recovery characteristics in order to eliminate the onset of cavitation in liquids and aerodynamic shock waves in gaseous service, see Severn Glocon Sizing and Selection Manual SG10.



Design and Dimensioning with 2D/3D CAD



Typical MLT Plate Set

MLT (Multi Labyrinth Trim) Development

Severn Glocon analysis of the concentric multi-cage trim took into account both the strengths and weakness of such arrangements. It was evident that as a means of providing source treatment for noise problems and giving acceptably low pressure recovery values (in order to prevent liquid cavitation) the trim style had potential. The challenge was to enhance the performance virtues within a more cost-effective package.

- Plan view through a section of a concentric multi-cage trim.
- This view can be likened to a single flow plate within a multi-plate stack.
- A stack of flow plates can produce higher flow capacity per unit area.

With the concept of a multi-plate stack established in order to provide to the increased flow capacity for a given valve size the challenge was then to incorporate as many twists and turns into the fluid path. This was achieved by making the fluid move in both vertical and horizontal radial direction concurrently.

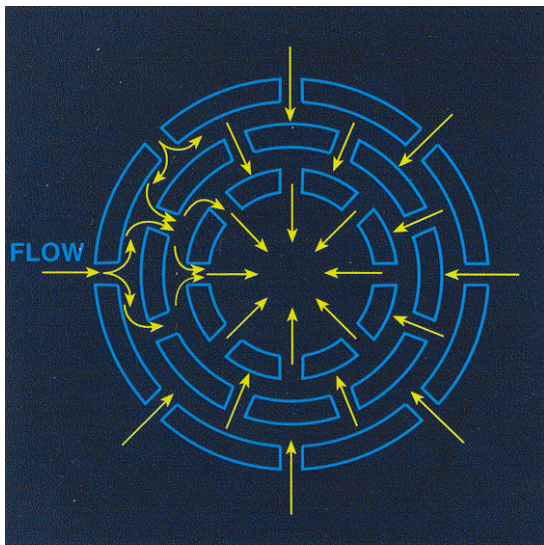
- The right angle turns and expanding flow passages removes the kinetic energy from the fluid while lowering the pressure in a velocity controlled manner.
- Abrupt increases are avoided.
- Each flow stream is made up of many right angle turns.
- Each right angle flow turn adds to the accumulating controlled pressure reduction.

One of the noteworthy features of the multi-cage trim design is to promote co-mingling of the adjacent flow streams, and hence pressure balance within the cage assembly. This interaction between the flow galleries is maintained as the stream pressure energy is progressively reduced within the trim confines. To bring this feature to the stack plates assembly it was essential to ensure the flow passageways allowed both radial and horizontal flow. In addition it was essential that this flow communication is also taking place between adjacent flow plates in the vertical stack.

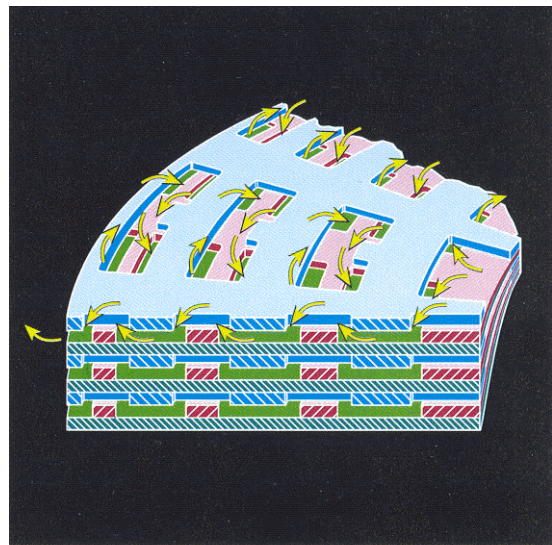
- Entry flow is split into many passageways.
- Multi-directional right angle flow turns.
- Internal flow resistance provided by transfer passages.
- Velocity control within the passageways.
- Multi-stream pressure balancing within the trim.

For convenience the MLT suitability for a particular application is determined by calculating the number of pressure drop stages required. The final trim exit velocity being held to pre-determined values. The MLT design rules are then applied to give the number of fluid turns involved, appropriate orifice slot and flow channel size.

Test evaluation of the MLT pressure recovery characteristic show improved values compared to a cage trim. More importantly the MLT can be economically built up into multi-stage pressure letdown unit to suit any application.



Plan sectional view of a concentric multi cage trim



MLT 3D view

Engineering Data Severn Glocon Multi Labyrinth Trim (MLT)

General

The Multi Labyrinth Trim is designed to be fitted into a wide range of existing valves, both globe, angle and special pattern.

The trim is a quick-change trim option to provide for easily accessible seat and trim components to minimise fitting and parts replacement times.

The MLT stack guided trim is available in both balanced and non-balanced configurations giving excellent rigidity and resistance to vibration and wear.

End Connection Sizes:

1/2 in (12mm) - 36in (900mm). For others consult factory.

Design Standards:

ANSI B16.34

Valve Body Ratings:

ANSI 150 -ANSI 2500
DIN/BS 4504 PN 10 to 400

Body Configurations:

Cast globe, angle, fabricated and Z pattern.

Body Face to Face Dimensions:

ISA. S75.03 1985. Options to Severn Glocon standard.

Bonnet Styles:

Standard, Normalising, Cryogenic and Bellows Seal.
For other styles consult factory.

Standard Bonnet Packing:

Teflon/Chevrons, Graphite and Low emissions.

Trim Options:

"Quick change" Multi-labyrinth.
Multi-stage pressure drop to suit application.
Standard range upto 40 stages of pressure let down.
Others consult the factory.

Inherent Trim Characteristics:

Equal %, Linear, or other.

Valve Plug Options:

Unbalanced, Balanced
Flow can be flow over or flow under depending on the application.

Maximum Plug/Seat Leakage Class:

ANSI/FCI 70.2. Class IV as standard,
Class VI with soft seat insert.
MSS SP-61

Sizing and Noise Reduction:

The procedures for carrying out valve sizing, velocity calculations and noise prediction are available on request.

Actuation:

Various types of actuation are available including

Series N Numotor pneumatic piston.
Series P Linear spring pneumatic cylinder.
Series W Diaphragm spring actuator.
In addition electric and electro hydraulic and manually operated versions are available.

Instruments:

A wide range of control instruments is available from Severn Glocon including: -
Positioners, Smart Positioners,
Air-filter Regulators, Volume Boosters etc.

Materials of Construction:

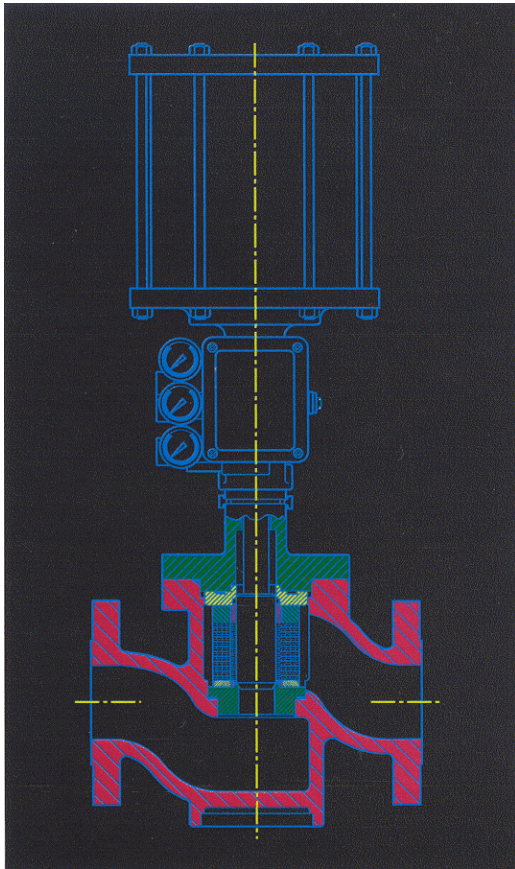
A wide range of standard materials is available for both the valve pressure containing parts and trim. These include Carbon Steel, Stainless Steel, Chrome Moly and high Nickel alloys.
Stellite and other coatings are available.
For full listing on materials consult the factory.

Temperature Range:

-196°C to 580°C.
For temperatures outside this range consult the factory.

Connection Styles:

End Connection:	Valve Size:	Rating
Integral	1 - 24 in	150 - 600
Flange	1 - 12in	900 - 2500
Screwed	1/2 - 2 in	150 - 2500
Socketweld	1/2 - 2in	150 - 2500
Buttweld	1/2 - 24 in	150 - 600
	1 - 24 in	900 - 2500

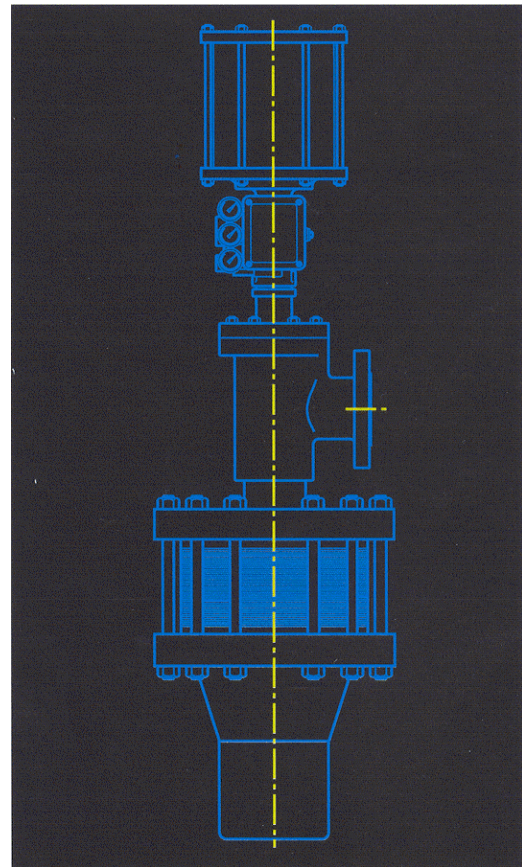


Typical MLT Globe valve.

MLT Benefits

Noise tests have shown that the superior fluid velocity control afforded by MLT valves during the staged pressure reductions have produced lower noise levels than those given by multi-cage designs. These comparisons were made for two different standards of trim of similar capacity, interchanged within the same valve body.

- Flow slots with large wetted periphery compared to drilled holes.
- Multi-plate stack giving smooth flow characteristics.
- Reduced tendency for pressure drop at plug cage interface by part exposed hole.
- Pressure recovery characteristics superior to drilled hole multi-cage configuration.
- Flow split and run as separate streams with comingling.
- Self-cleaning of internal passages due to comingling of flow streams.
- Inherent pressure balancing within the MLT trim including the entry and exit gives good stability and freedom from plug vibration.
- Suitable for both liquid, mixtures and gaseous service.
- MLT suitable for both control valve trims and vent stack applications.



MLT Low Noise vent angle valve system.



Reg. No. FM01959



**SEVERN
GLOCON**

12" GLOBE VALVE 5000 Series ANSI 600

c/w Pneumatic Cylinder Actuator

INCORPORATING

Multi-Labyrinth 760.00 CC Linear Trim

in Duplex SS / Stellite grd 6 – SA

BODY MATERIAL

ASTM A890 Gr 4A Duplex

FEATURES

POSITIONER	Fisher Fieldvue DVC6010AD (EExia)
AIRSET	Fisher 67AFR (St St)
SWITCHES	P&F Sensor (EExia)
FLOW BOOSTERS	Severn IB43 (St St)
POS TRANSMITTER	Fisher 4200 (EExia)
SOLENOID MTG	Maxseal ICO4 SS (EExd) ATEX
RECEIVER	BS5500/PED Cat III

CUSTOMER

BP Exploration Operating Company LTD

PROJECT

BP Rhum Development Project



SEVERN GLOCON LIMITED

St. Luke Street, Southgate Street, Gloucester GL1 5RE,
United Kingdom.
Telephone: +44 (0)1452 318900 Fax: +44 (0)1452 318901
Email: sales@severnglocon.com.uk
Website: www.severnglocon.com

