Control ball valves for severe service

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Project overview

Joint development between HIT Valve and Parcol of a:

new control ball valve for severe services

HITVALVE
italian know how

Italian manufacturer of

CONTROL BALL VALVES

(also ON/OFF ball & gate valves)

PARCOL

Italian manufacturer of

CONTROL GLOBE VALVES

(also butterfly & plug control valves, desuperheating systems and safety relief valves)

Project overview

Common target: **to complete the production range**

HITVALVE
italian know how

AIM: control ball valve for **severe services**

BACKGROUND: experties in ball valves, production capabilities

PARCOL

AIM: control **ball** valve for severe services

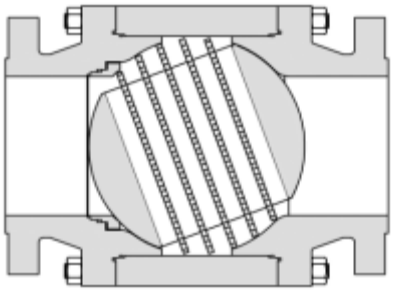
BACKGROUND: experties in severe services

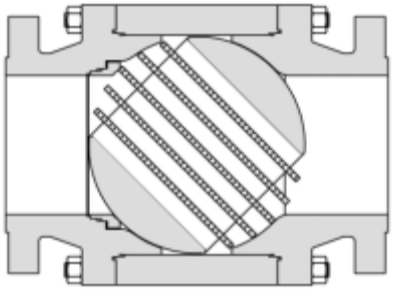
HC-7 Limiphon control ball valve

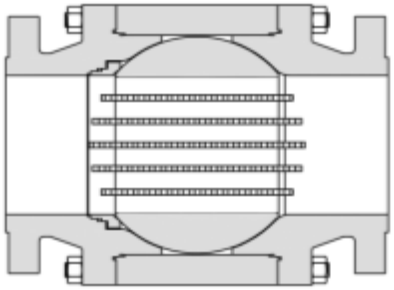
Why ball valves?

- ✓ **lower weight** at bigger sizes
- ✓ **higher capacities**
- ✓ **better seat tightness**

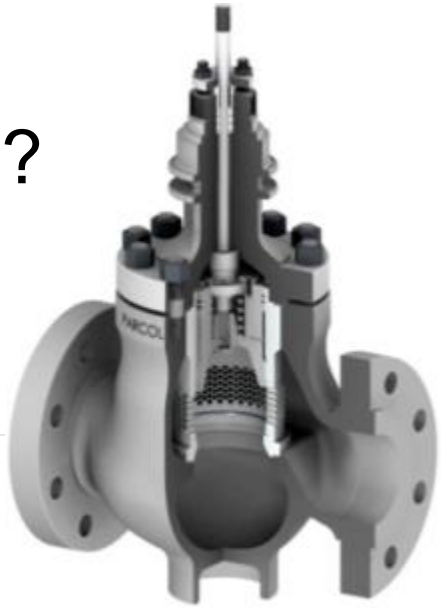
SMALLER & TIGHT SHUTOFF





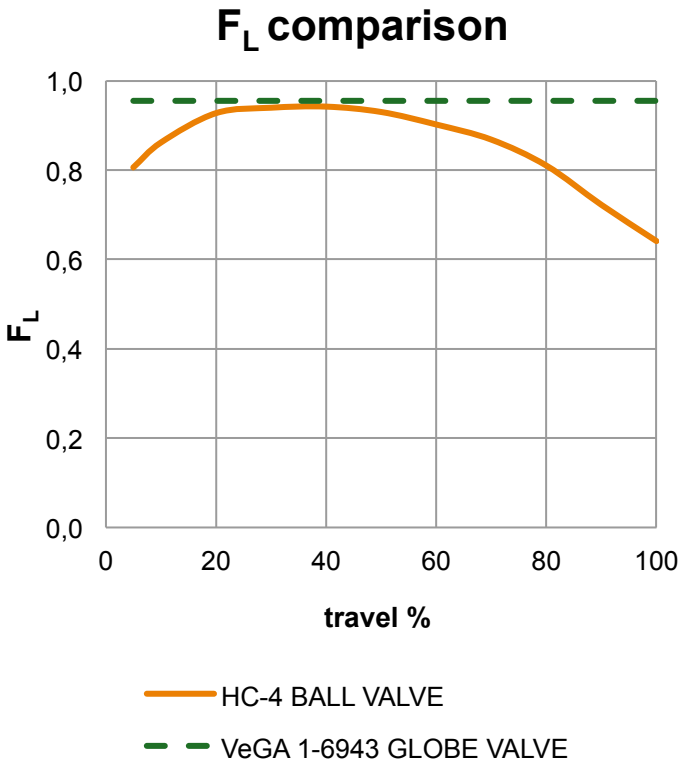


Why globe valves?



MORE EFFICIENT

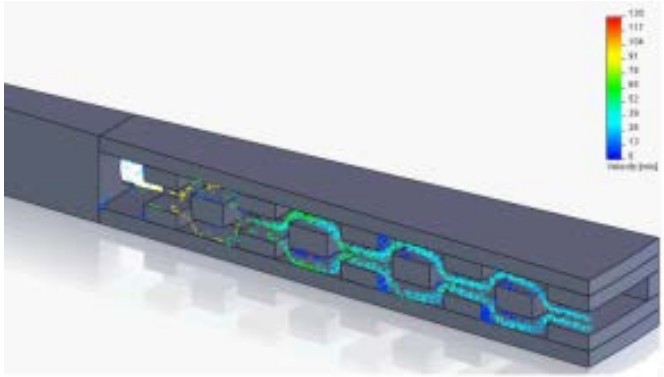
- ✓ **higher F_L and x_T** coefficients
- ✓ **constant performances** over the valve openings
- ✓ independent fluid channels with **better control of velocity**



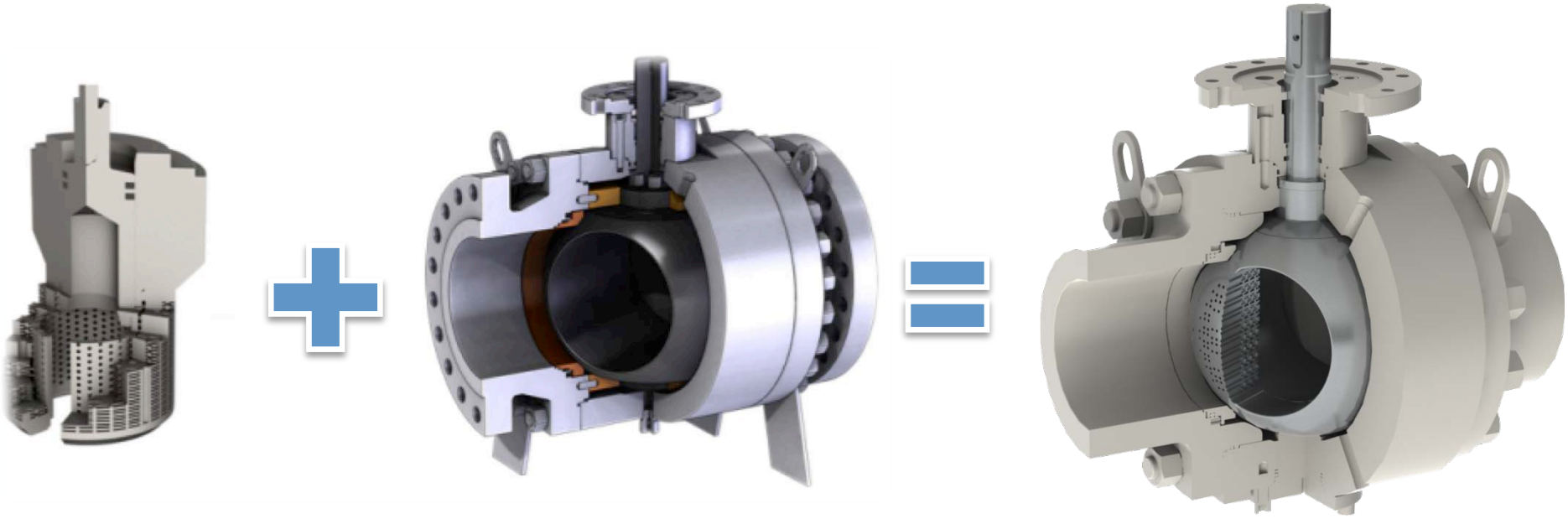
Limiphon: globe valve for severe sevices

- ✓ **labyrinth channels**
- ✓ **no cavitation** with liquid
  very low noise with gas
- ✓ **characterized trim**

BEST PERFORMANCE



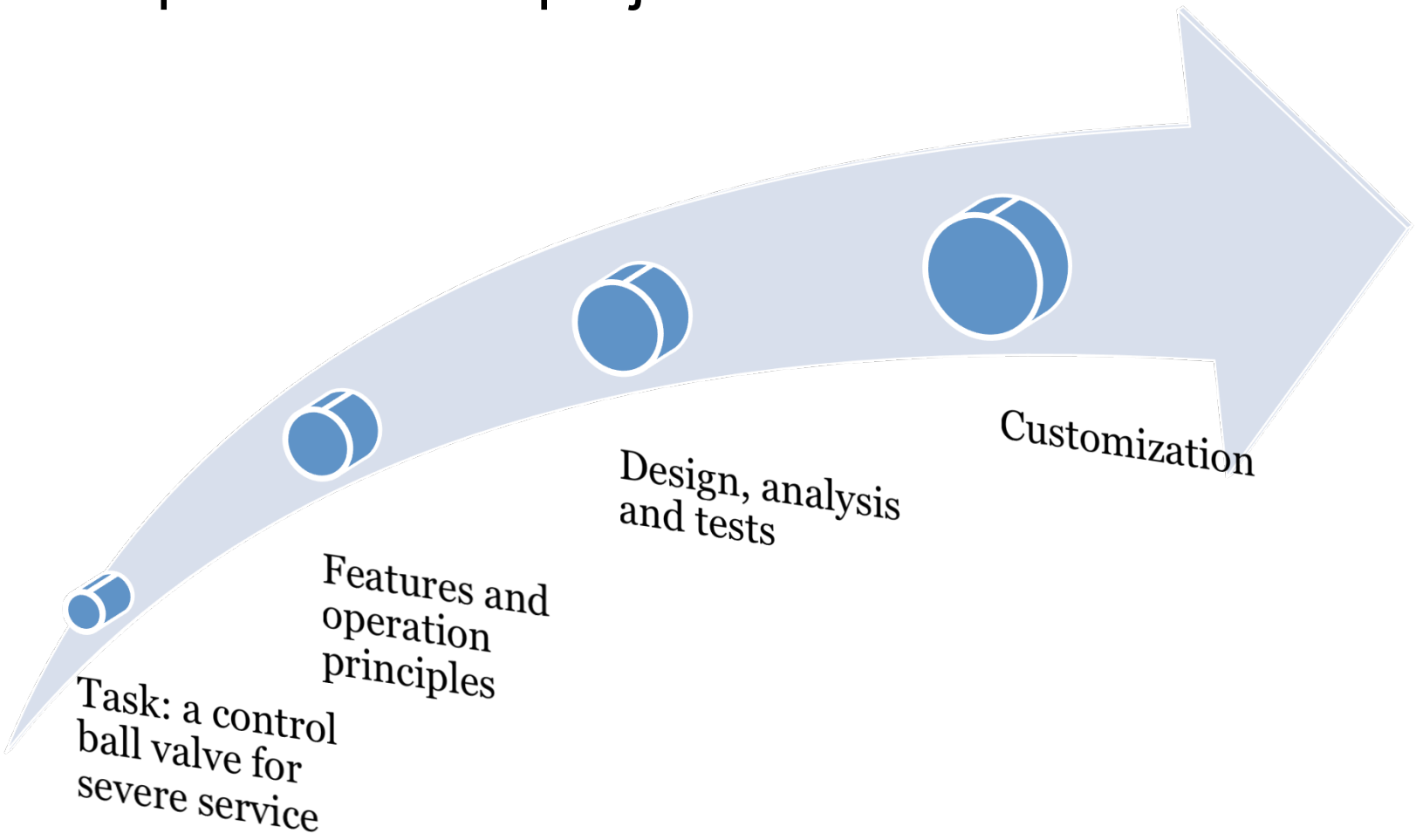
HC-7 Limiphon control ball valve for severe service



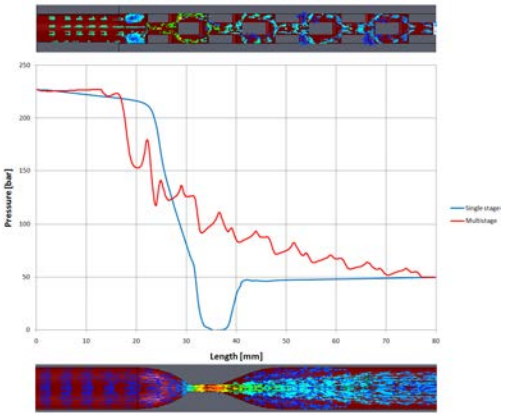
- ✓ Higher performances
- ✓ Trim characterization
- ✓ Lower weight
- ✓ Higher Capacity
- ✓ Tight shutoff

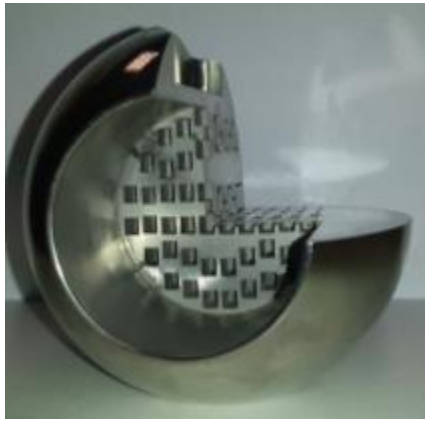
LIMIPHON TRIM CONCEPT inside the BALL

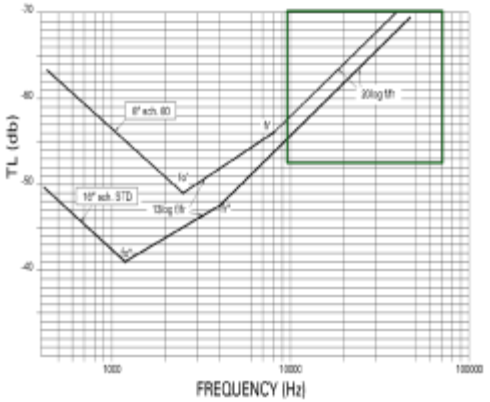
Development of the project



Features and operation principles







Multistep:

fully controlled pressure drop

- *higher F_L*
- *lower conversion of kinetic power to sound power*

Multipath:

indipendent fluid paths

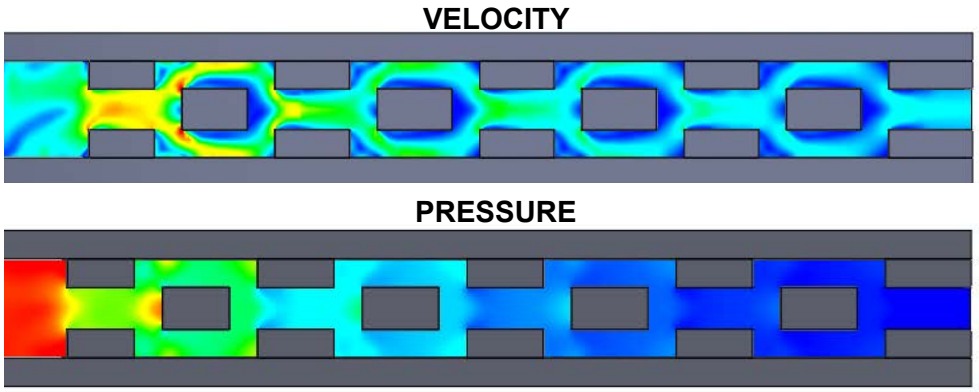
- *higher trasmission loss*

Features and operation principles

Labyrinth channels:

velocity control

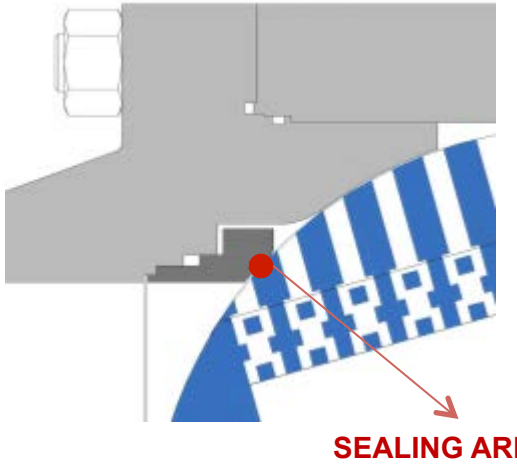
- *lower acoustic power*
- *less damages by erosion*
- *better noise prediction*



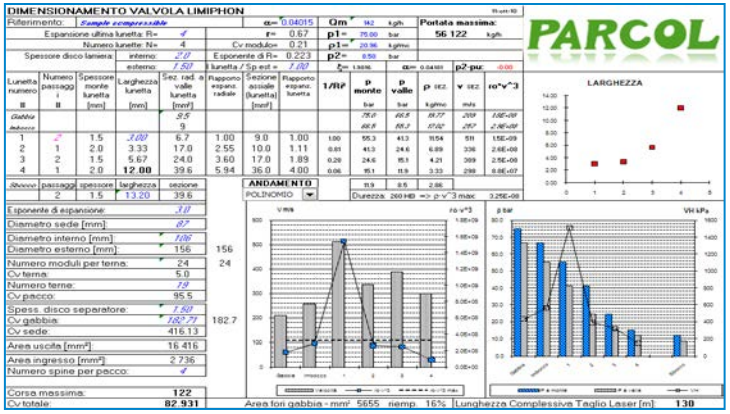
Splitting of sealing and regulating functions:

no direct flow impingement on the seating area

- *long lasting excellent tightness*

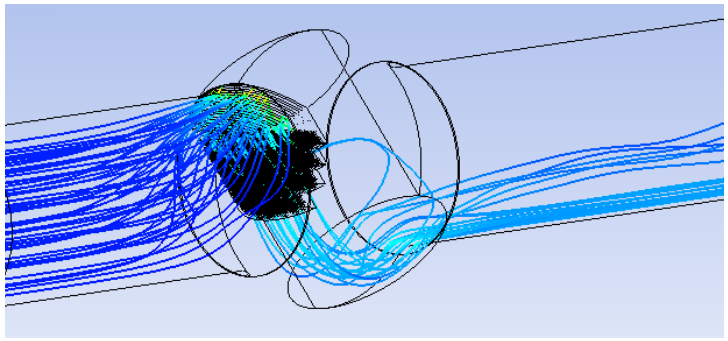


Design, Analysis & Tests



- ✓ **Analytical approach**

  for limiphon performance calculations



- ✓ **CFD analysis**

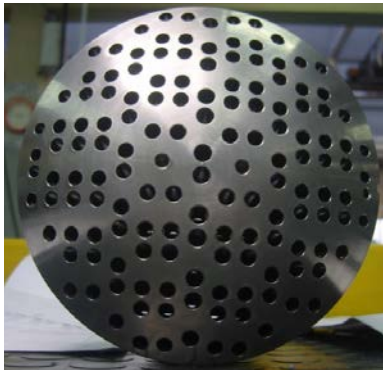
  for full trim characterization

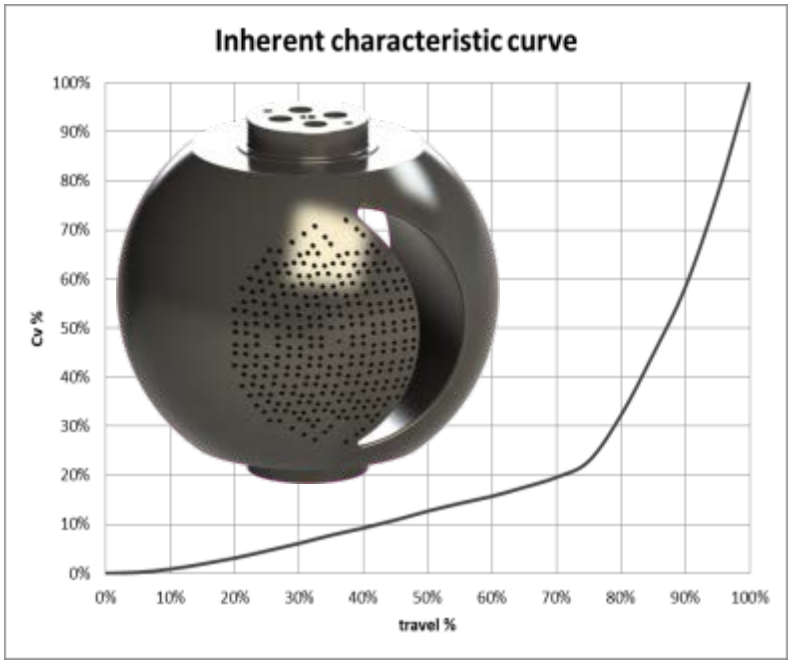
- ✓ **Experimental tests**

  for verification (Cv and x_T curves)

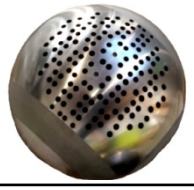
Customization

- ✓ **Fluid dynamic performances**
  - *number of stages*
  - *expansion factor*
  - *expansion shape*
- ✓ **Characteristic Curve**
  - *extension of Limiphon trim within the ball*
  - *labyrinth type at each valve opening*
- ✓ **Modulating precision**
  - number and position of labyrinths
- ✓ **Rangeability**
- ✓ **Materials and hardfacings**





Examples of applications

APPLICATION	FLUID	NPS – RATING	P_{INLET} P_{OUTLET} [bar A]	T_{DESIGN} [°C]	C_V [gpm]	Tightness class	
Slurry pump recirculation *Focus: anti-cavitation, high temperatures, erosion*	***Liquid*** *with particles*	*6" ANSI 600*	*13.5 3.3*	*397*	*121*	*FCI 70-2 Cl. V*	
Vent *Focus: acoustic performances, erosion*	***Gas***	*2" ANSI 1500*	*233 1*	*93*	*1.5*	*FCI 70-2 Cl. V*	
Blow down *Focus: tightness and velocity control at first valve openings.*	***Gas***	*4", 6", 8" ANSI 600*	*68.7 - 1*	*60*	*362 737 1655*	*ISO 5208 Rate B*	
Vent *Focus: acoustic performances, erosion*	***Vapor***	10" *ANSI 600*	32 2.2	337	*460*	*FCI 70-2 Cl. V*	

Conclusions

HC-7 Limiphon control ball valve

PROS

- ✓ higher performances
- ✓ tight shutoff
- ✓ completely customizable

CONS

- ✓ trade off between performances and capacity

Thanks for your attention

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