IMI CCI®

BE

Engineering
GREAT Solutions

Boiler Start-up Valve

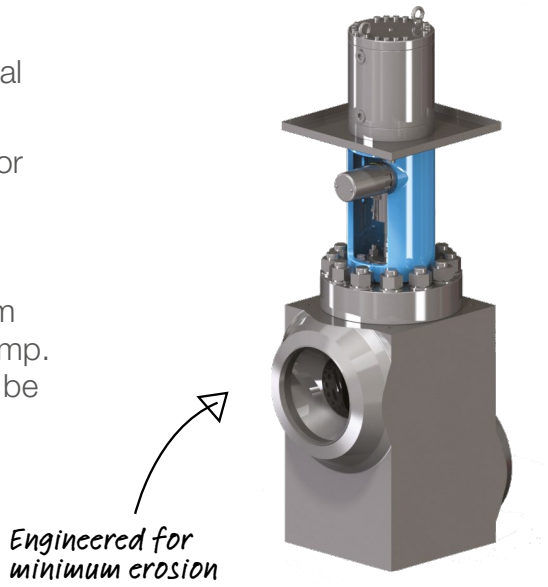
IMI Critical Engineering

BE - Boiler Start-up Valve

Once-through boilers require a minimum evaporator flow to cool the boiler tubes during start-up (minimum evaporator flow for spiral wound evaporators is approximately 30%).

A recirculation system recirculates water out of the water separator back into the feedwater tank or to the economiser/evaporator to ensure the minimum evaporator flow. Different layouts of the recirculation system exist, recirculation of the water from the separator back to the feed water tank and water recirculation from the separator back to the economiser inlet with a recirculation pump. In addition to the above operating modes the start-up valves can be used during boiler-filling and evaporator (air) purging.

This operating mode typically requires high flow at low differential pressure.



Key features

> **Trim design**
- Seat room purging:
  The trim is designed with a control edge upstream of the seat which shuts off the flow path for potentially damaging particles before the plug reaches the seat.
- Vena contracta separate from seat:
  In normal control mode the smallest flow area of the trim is downstream of the seat, keeping potential erosion away from the seat.
- Controlled gradual flow diversion:
  In the critical high velocity area, special care is taken to achieve a gradually controlled flow diversion preventing erosive water steam mixture hitting trim surfaces with high velocity.
- Anti-erosion coating on control surface:
  Proven, hard anti erosion coating to ensure long life time of the trim.

> **Flashing conditions**
Flashing water is highly erosive if it hits body or trim parts with high velocity. This must be avoided by design or the parts which are hit must be erosion resistant.

An angle over-the-plug configuration with its straight outlet for the flashing steam is therefore the most favourable configuration. A rapid increase of flow diameter at the point where the medium expands, avoids erosion downstream of the valve.

In the Z-shaped valve body, an outlet cage is needed to protect the body. It is recommended to have a straight pipe run downstream of the valve because the flashing water will also erode pipe bends.

> **Debris**
Boiler start-up valves often experience debris, because the water separator is typically the debris collector of the boiler. On the other hand the valve has to be absolutely tight for long operating periods. If the seat is only slightly damaged by debris which has been clamped between seat and plug, then continuous leakage of flashing water will quickly erode the seat further and increase the seat leakage. This will lead to severe damage of the valve. Therefore the trim design should prevent particles being trapped between seat and plug when the valve is closing.

Benefits

> Specifically designed as a separator drain valve for supercritical boilers.

> For operation with flashing water (saturated condition at the inlet).

> Quick change trim for easy maintenance.

> Seat area purging reduces particle damage.

> Angle and Z-shaped body design available.

> For easy inspection and maintenance, none of the internals are welded or bolted to the body or bonnet.

> Block tight according to MSS-SP61 or EN 12266-1 Class B.

Product specification

Design code
EN 12516-2, others upon request

Body style
Angle type; Flow-to-close
Z-type, Flow-to-close

Fluid data range
Inlet: 320bar / 450°C; Outlet: 60bar / 300°C

Pipe connection
Butt-welding according to customer requirement
Other connection types upon request

Trim
Unbalanced, quick change trim

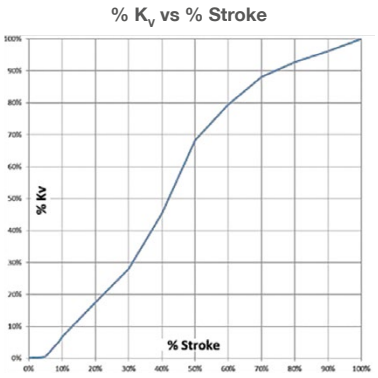
Actuation
Double-acting hydraulic actuator

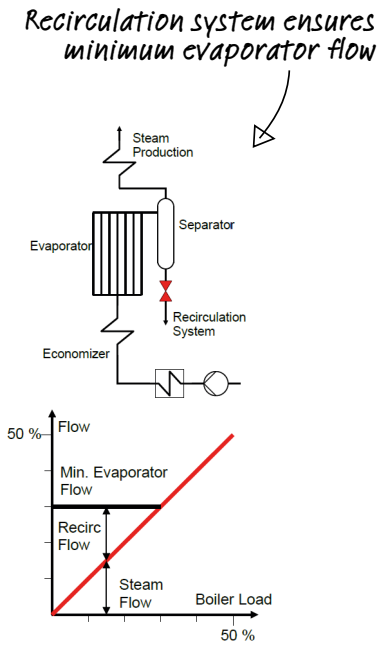
Seat/stem tightness
EN 12266-1 Cl. B or MSS-SP61or ANSI/FCI 70.2 Cl. V

Serviceability
Replaceable stem/plug, seat, inlet cage, outlet cage (Z-type design)
Bolted bonnet

Options
Transition pieces for large pipe diameters and material compatibility

Orientation
Standard actuator vertical up, others upon request

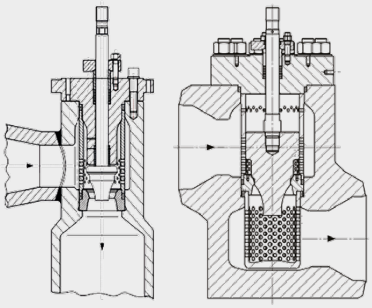




Typical materials

Body	A182 F12 / 13CrMo4-5 / A217 WC6 A182 F22 / 10CrMo9-10 / A217 WC9
Stem/Plug	X19CrMoVNbN11-1
Bonnet	A217 WC6 or same as body
Cage(s)	X20CrMoV11-1
Seat	X20CrMoV11-1

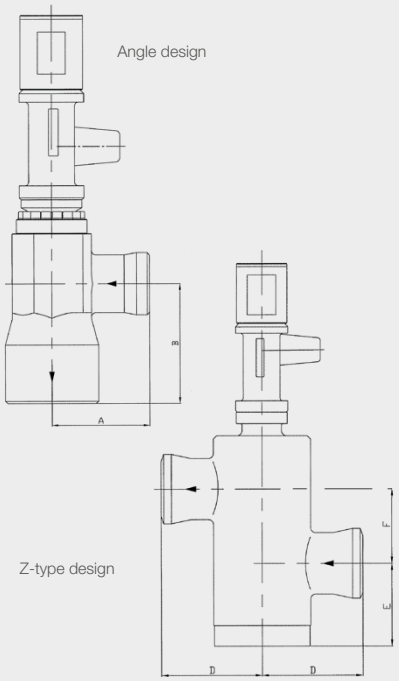
Note: Other materials upon request



General information

Valve type	Angle Design A (mm)	B (mm)	Weight (kg)	Flow capacity (ky)	Z-type Design D (mm)	E (mm)	F (mm)	Weight (kg)	Flow capacity
BE 45	330	330	~300	43	300	250	250	~530	43
BE 50				48	300	250	250	~530	48
BE 56				60	300	250	250	~530	60
BE 63				81	360	280	280	~700	81
BE 72	340	380	~660	101	360	280	280	~700	101
BE 80	380	420	~700	129	360	280	280	~700	129
BE 90				162	430	330	300	~910	162
BE 100	410	500	~810	225	430	330	300	~910	225
BE 112				285					285
BE 125	460	550	~1010	366	430	400	370	~1300	366
BE 140	510	600	~1350	448	400	280	370	~2300	448
BE 150				521	400	290	380	~2500	521
BE 160				590	420	290	410	~2700	590
BE 180	625	675	~1900	778	440	320	440	~2850	778
BE 200				977	460	340	460	~3000	977

Note: Values are for reference only. Final dimensions will be stated in the top assembly drawing



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