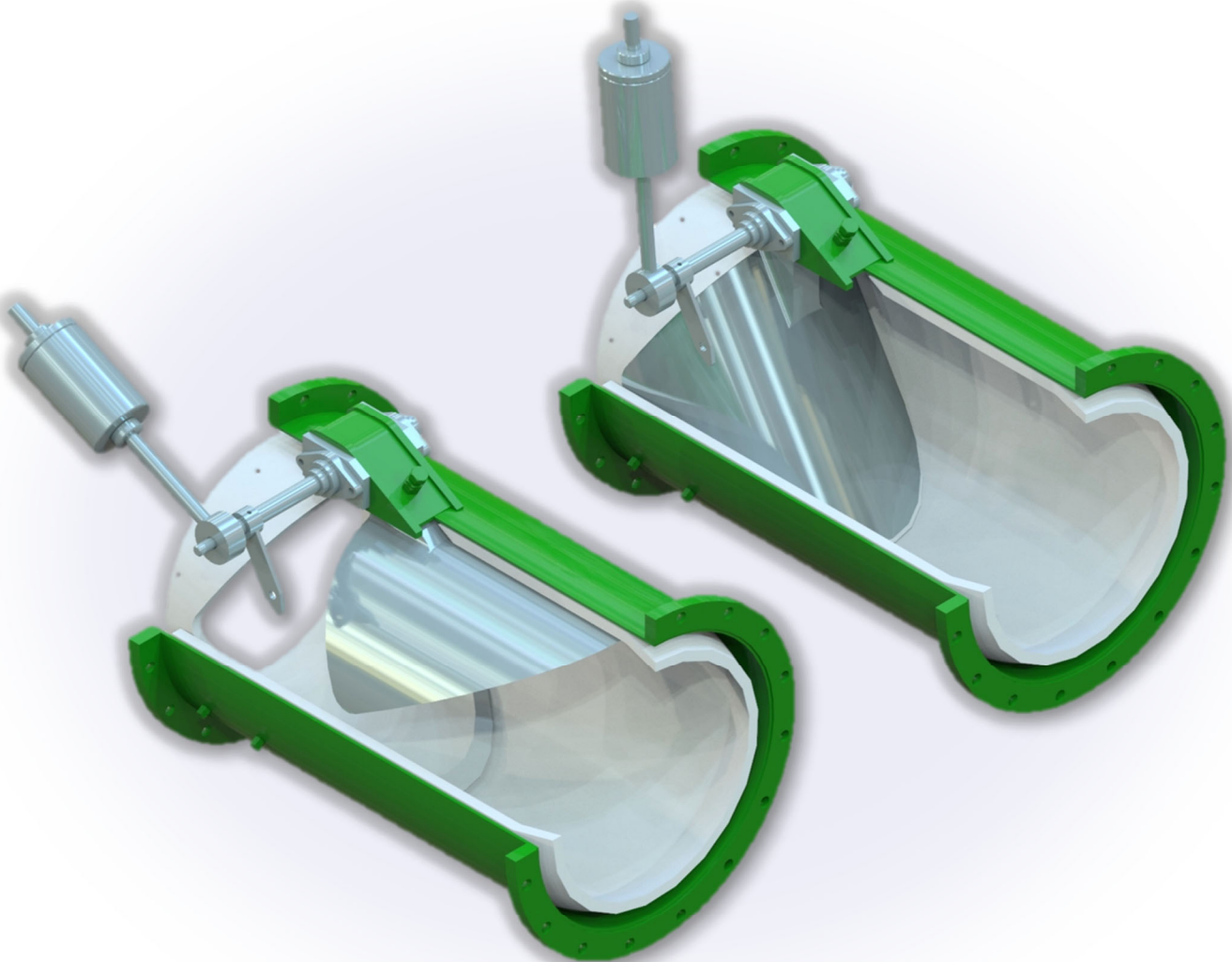


KleneFlo® Isolation & Non-Return Valve

Flow-Promoting Valves for Pulverised Fuel Applications



Greenbank Group UK

Incorporating:
Greenbank Terotech
Greenbank Engineering Services
Ammegen
Franklyn Yates Engineering



www.greenbankgroup.com

KleneFlo®

Isolating & Non-Return Valves

OVERVIEW

FLOW PROMOTING VALVES FOR PULVERISED FUEL APPLICATIONS

The Greenbank KleneFlo® valve is designed to operate in all pulverised fuel (PF) systems. Its design is flow promoting having an almost negligible pressure drop in its open position.

Over its length the KleneFlo® valve gives the lowest pressure drop of its type.

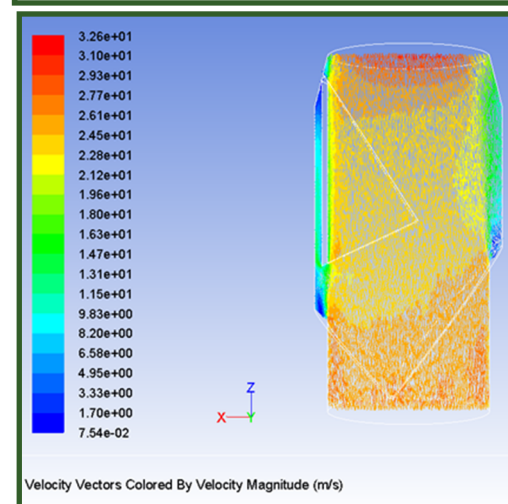
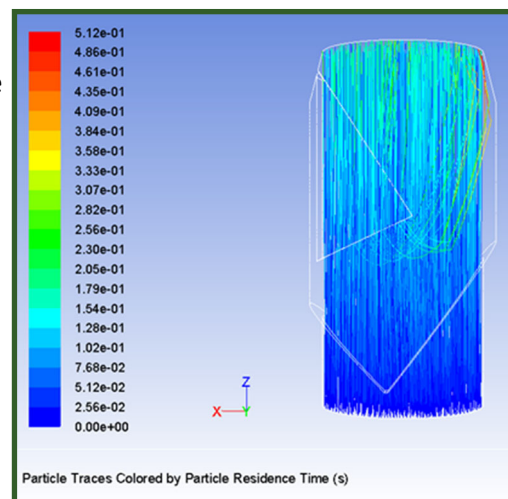
The KleneFlo® valve can be used as an anti-flashback / non-return valve (NRV) utilising an external counterbalance weight or a Mill Isolation Valve (MIV) utilising a powered actuator.

When used as an NRV, the design of the KleneFlo® valve ensures the air flow around the blade in all positions ensuring no build-up of PF around or behind the blade. This is particularly useful in coal and biomass fuel application enhancing the safety of the system.

The construction of the KleneFlo® valve is very simple and effective. The body comprises of a thick-walled mild steel shell in which can be inserted a replaceable wear resistant sleeve, flap and seat.

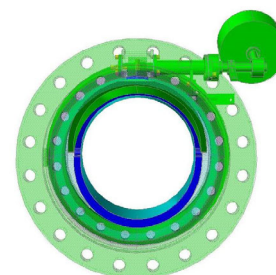
When the flap is open it sits close to the profile of the body eliminating steps, cavities and ledges, retaining a cylindrical cross-section, ensuring minimum interference and pressure drop during operation. When the flap is closed it sits firmly into a profiled seat.

The body of the valve can be either lined or unlined depending on duty, customer preference and/or life expectancy requirements.

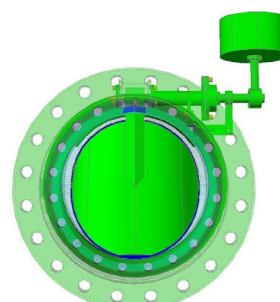


KLENEFLO® PF VALVE - BETTER BY DESIGN

- ◆ NFPA Compliant
- ◆ Minimal pressure-drop in open position.
- ◆ Low-maintenance, reliable and external bearing system.
- ◆ High quality, reliable, robust system.
- ◆ Self-cleaning, anti-fouling.
- ◆ Increased Safety, minimal blade and actuator arm pocket.
- ◆ Option for lining with abrasion resistant systems.
- ◆ Optimised design using CFD techniques.
- ◆ Suitable for PF coal, biomass and other fine particulates on 2-phase conveying systems.



NRV Shown
Open



NRV Shown
Closed

DESIGN PHILOSOPHY

ADVANCED PF FLOW CONTROL

Greenbank's KleneFlo® Balancing Damper has been specifically developed to maximise the flow of pulverised fuel (PF) and safety of operation and is designed in accordance with NFPA8503.

When the KleneFlo® valve is open the blade is in a position so the airstream can flow over the inside and outside faces of the blade, providing a self-cleaning operation. It provides the minimum pressure drop of all valves.

Within the KleneFlo® valve the airstream ensures PF particles cannot become trapped behind the blade which can happen with both D-Type and Knife-Gate valves. Trapping of PF can create premature failure due to erosion and possible build-up of PF behind the blade. PF behind the blade can cause a D-Type flap to close prematurely affecting PF/Air distribution and in turn combustion performance. It can also become a safety and fire hazard.

The external bearing arrangement promotes continuous operation, ease of maintenance and discourages sticking of the blades common to Knife-Gate designs.

Additionally, the blade arm recess is designed to alleviate further pockets for pulverised fuel to collect, rendering the valve the safest of its kind.

Greenbank's KleneFlo® Valves is designed as bespoke for each application and has its design refined by CFD for optimum performance.

The KleneFlo® Non-Return Valve.

The KleneFlo® non-return valve blade operates on a simple but reliable sealed bearing arrangement that has been developed and refined over the years to operate effectively with minimum maintenance.

A counterbalance weight is incorporated into the valve, which is adjusted on site to provide the correct closing torque.

The KleneFlo® non-return valve is designed to be installed upstream as close to the burner as possible in order to prevent the passage of flames or hot furnace gases back down the pipeline towards the mill.

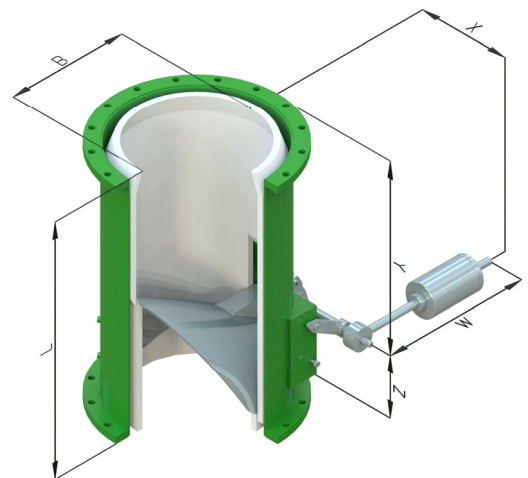
It can be installed and operated in multiple planes, vertical, horizontal or inclined.

The KleneFlo® Mill Isolation Valve.

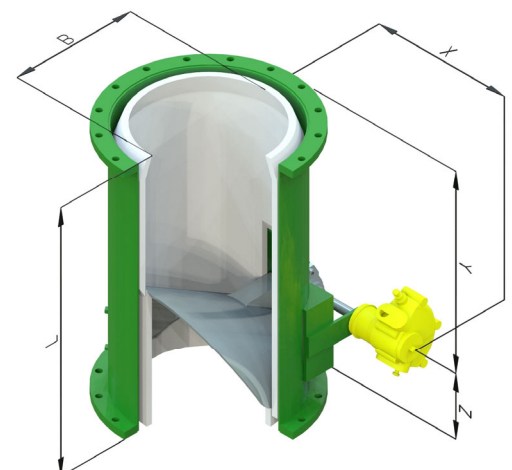
The KleneFlo® mill-isolation valve flap operates on the same bearing arrangement as the KleneFlo® non-return valve but is power operated by a pneumatic or electrical actuator.

The KleneFlo® mill-isolation valve is designed to be installed downstream as close to the pulverising mill and classifier assembly as possible enabling isolation during any maintenance period or during mill start-up as required.

Non-Return Valve



Mill-Isolation Valve



GENERAL SPECIFICATION

KLENEFLO® VALVE GENERAL SPECIFICATION

Size Range:

6" - 60"
150mm - 1525mm

Working Pressure:

7.25psi
48kPa

Design Pressure:

50psi (200psi min yield)
1379kPa (345kPa min yield)

General Design:

NFPA8503
GDCD 215

Flange Designs:

DN200-DN1600
Certified Carbon
BS EN/ANSI/ASME/API/DIN/JIS
Bespoke Design

Valve Body:

Certified Carbon Steel Body

Valve Linings (from):

Certified Carbon Steel (Sleeve Only)
Zalcon (Alumina-Zirconium)
Alumina
or White Cast Iron

Valve Blade (from):

White Cast Iron
Zalcon, Alumina-Zirconium Casting

Bearings/Seals:

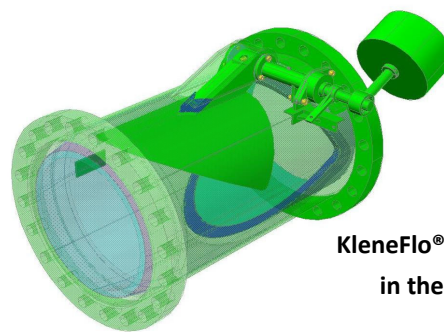
Labyrinth Seals
Stainless Steel Seal Self Aligning

Non-Return Actuation:

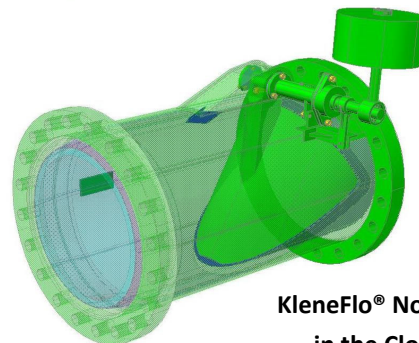
Counterbalance Arm and Weight

Mill-Isolation Actuation (options):

Air Cylinders (Kinetrol recommended)
Hydraulic Cylinders & Positioner
Electric Motor



KleneFlo® Non-Return Valve
in the Open Position



KleneFlo® Non-Return Valve
in the Closed Position

Above: Zalcon-Lined KleneFlo® Non-Return Valve

Below: Typical Dimensions - For Guidance Only

B Nominal	L Minimum	W Approx	X Minimum	Y Minimum	Z Minimum
254	574	418	329	229	157
280	615	444	342	242	168
303	650	466	353	253	176
336	702	500	370	270	190
356	732	520	380	280	198
380	771	548	394	294	208
400	800	564	402	302	214
432	849	596	418	318	227
456	886	620	430	330	236
480	923	644	422	342	245
508	967	972	456	356	257
540	1016	704	472	372	269
660	1201	824	532	432	315
940	1634	1104	672	572	424

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Engineering Excellence