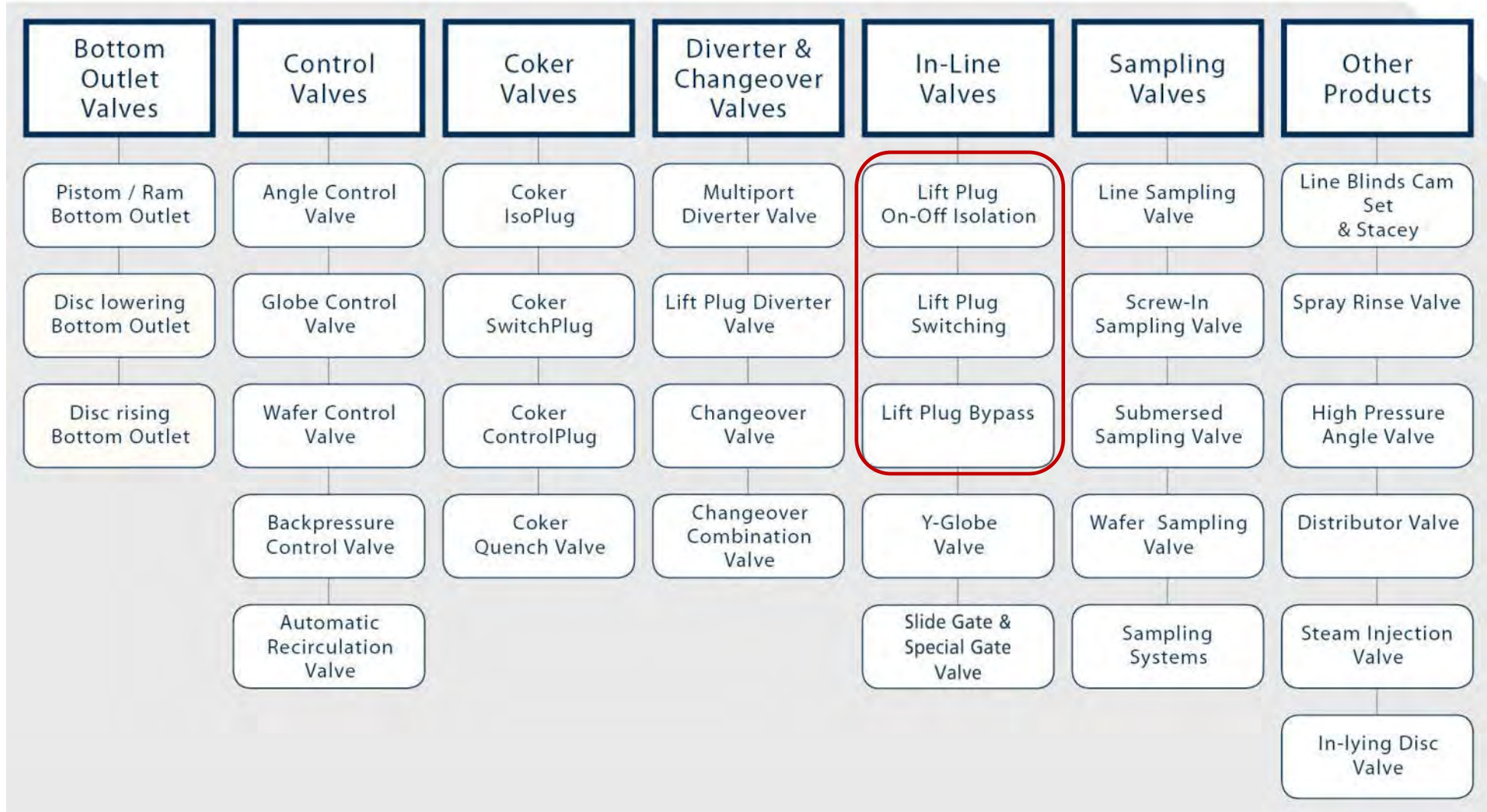


# Lift Plug Valve Presentation



- 1) SchuF Fetterolf Product Portfolio
- 2) Lift Plug Valve Design and Features
- 3) Lift Plug Examples – in different materials and high pressure
- 4) Case Studies

# SchuF Valve Portfolio



# The Lift Plug Valve Originals

The original lift plug valve invented by SchuF is a simple yet highly functional design. The upside down plug and removable bottom lid allow cleaning in, above and below during operation. It also featured the first double block and bleed functionality.



**Model 14NR The "Original" Lift Plug  
with inverted Plug - 1914**



**Model 12 The "Modern" Lift Plug  
– IsoPlug design - 2008**

- A. Integral double block and bleed design that ensures a perfect seal
- B. Protected Valve Seat (PVS) – valve life is increased as seat or body faces do not come in contact with the media flow
- C. Optional flushing and/or Purging (if required by process) is only required during operation from open to close or vice versa. This leads to significant cost savings in comparison with other valve designs
- D. Three line Sediment Defence System (3 SDS) - optional
- E. Automated Control Panel (ACP) can be used to control single or multiple valves, actuators and sensors
- F. Top or bottom entry design for ease of maintenance
- G. Customisation according to customer wish or process

# Key Lift Plug Features

- **Typical Sizes:** 1" to 40"; larger on request
- **Body & Trim Material:** Carbon/stainless steel, Duplex, Hastelloy, Inconel, Titanium, Zirconium or according to process requirement
- **Straight or inverted full bore 'roval' plug**
- **ASME 150# to 2500#**
- **Optional flush and purge connections**
- **Inline sediment removal (detachable bottom)**
- **Electric actuation with one or two motors**
- **Drain valve can be integrated**

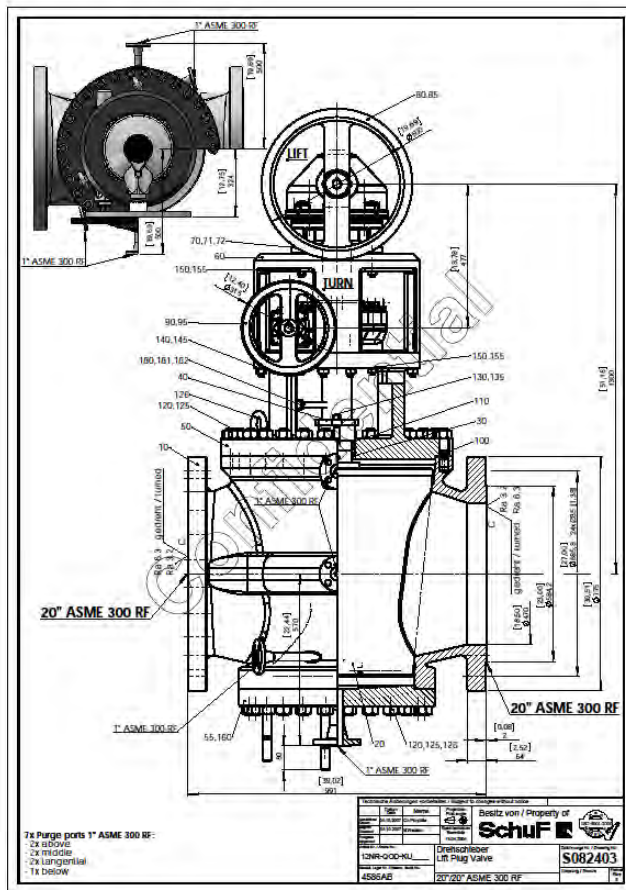




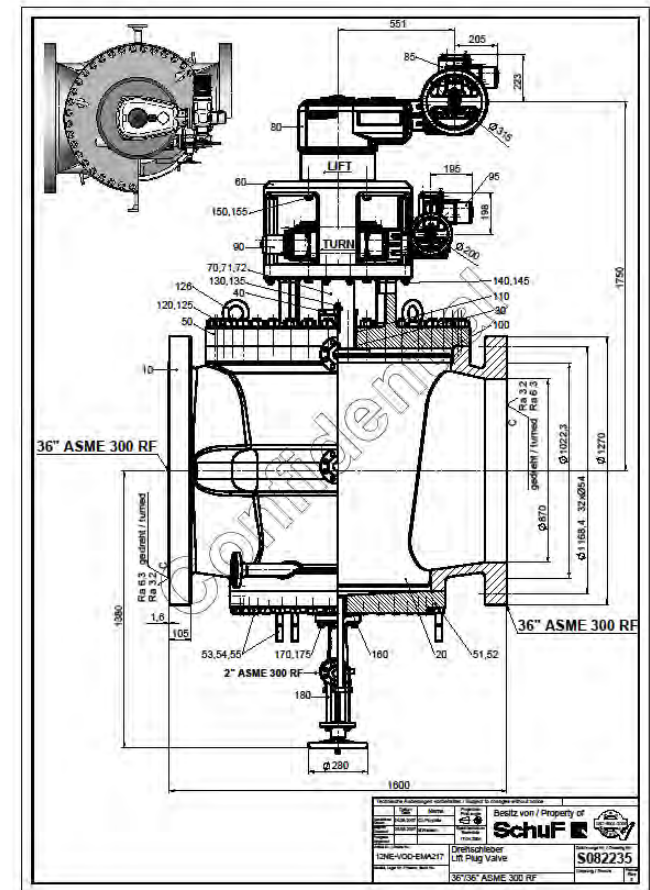
# Dirty Service Lift Plug Example

**Service:** Delayed Coking – high temperature, low pressure with entrained coke particles

## 20" IsoPlug Example



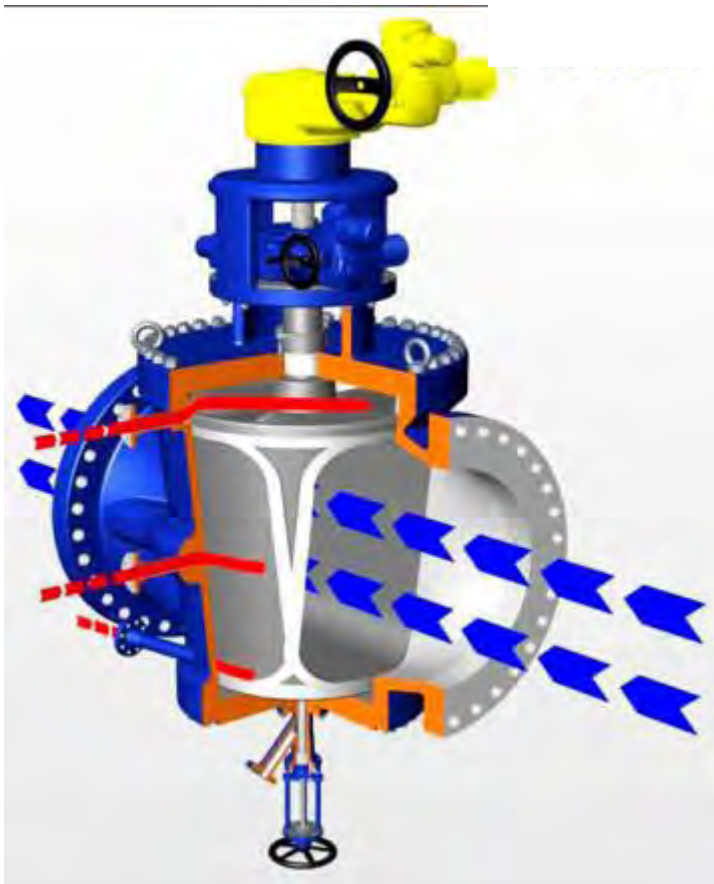
## 36" IsoPlug Example



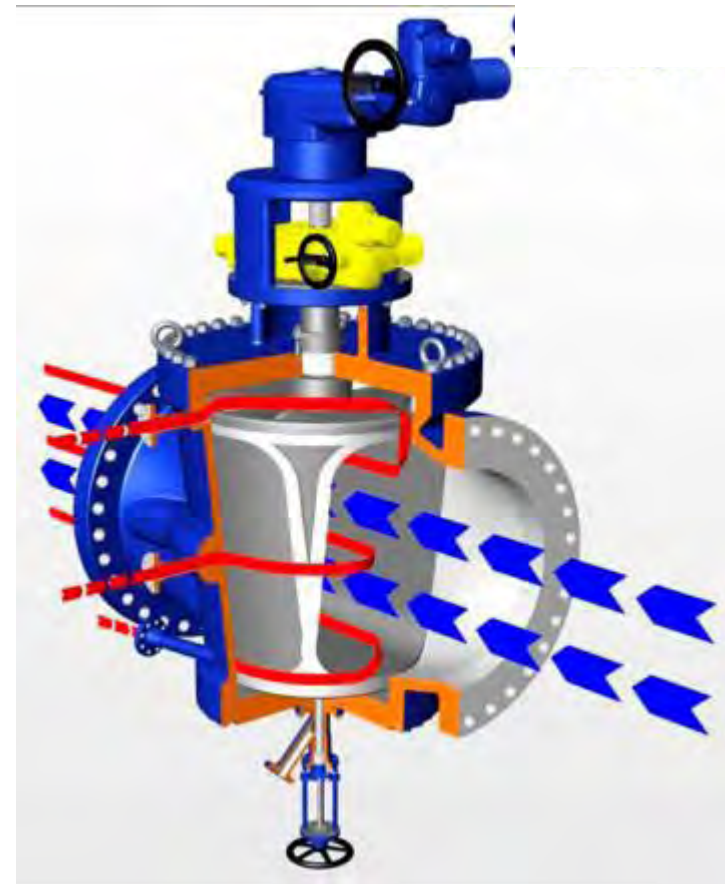
Here with optional vertical drain valve

**SchuF** FETTEROLF

# Sediment Defense System - 1<sup>st</sup> Line of Defense



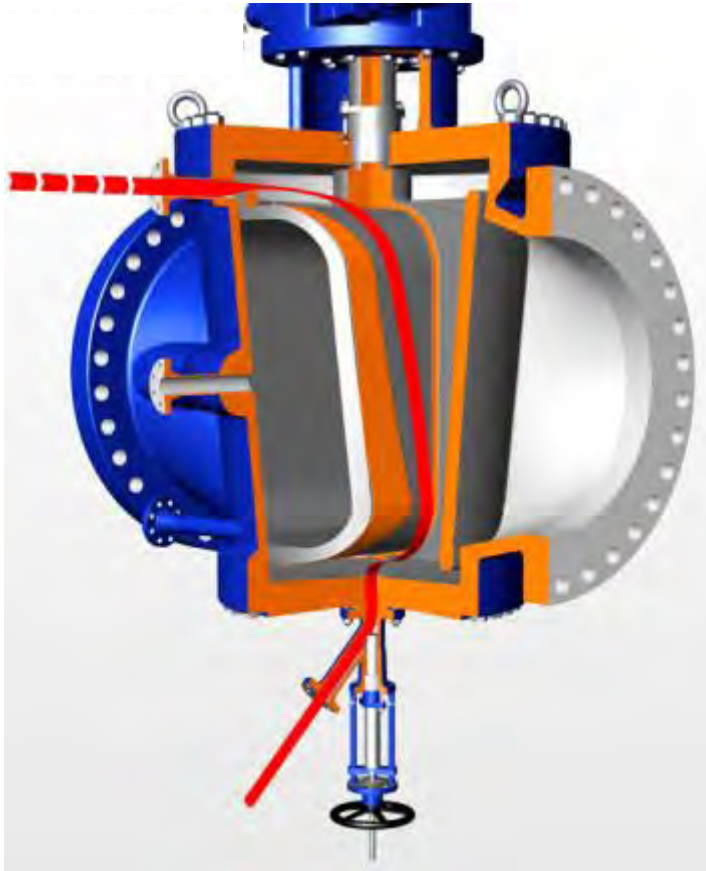
- The cut-away of the IsoPlug above shows the media in blue with the plug in open position
- The top actuator has been engaged and the plug starts to rise
- Note how steam flushing takes place during plug lifting (red lines)
- This is the first line of attack of the Sediment Defense System



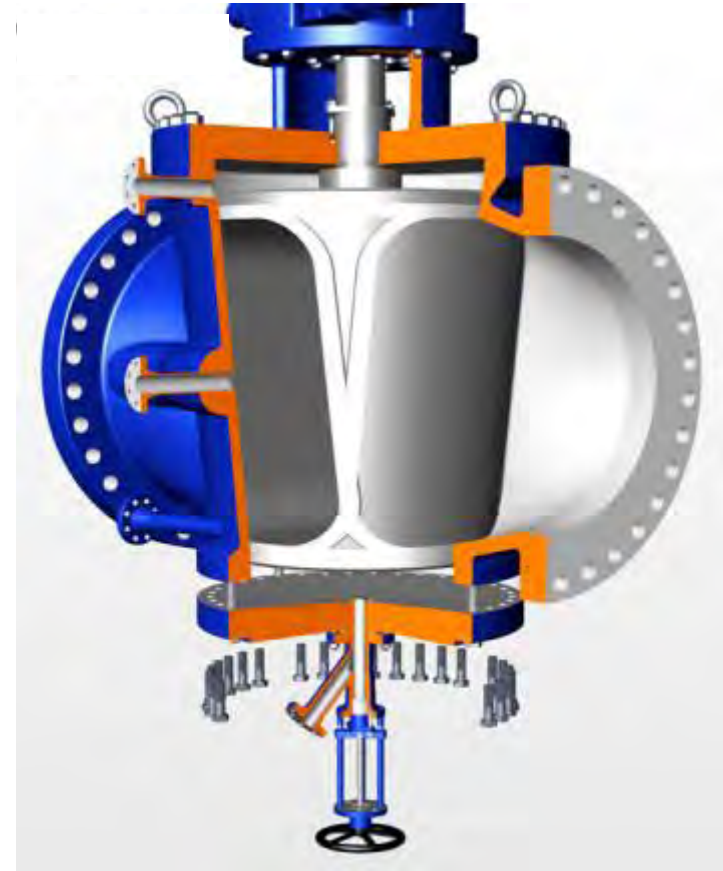
- The 2<sup>nd</sup> actuator has been engaged and the plug is turning
- Flushing will now take place in, around, above and below the plug



# SDS - 2<sup>nd</sup> and 3<sup>rd</sup> Lines of Defense

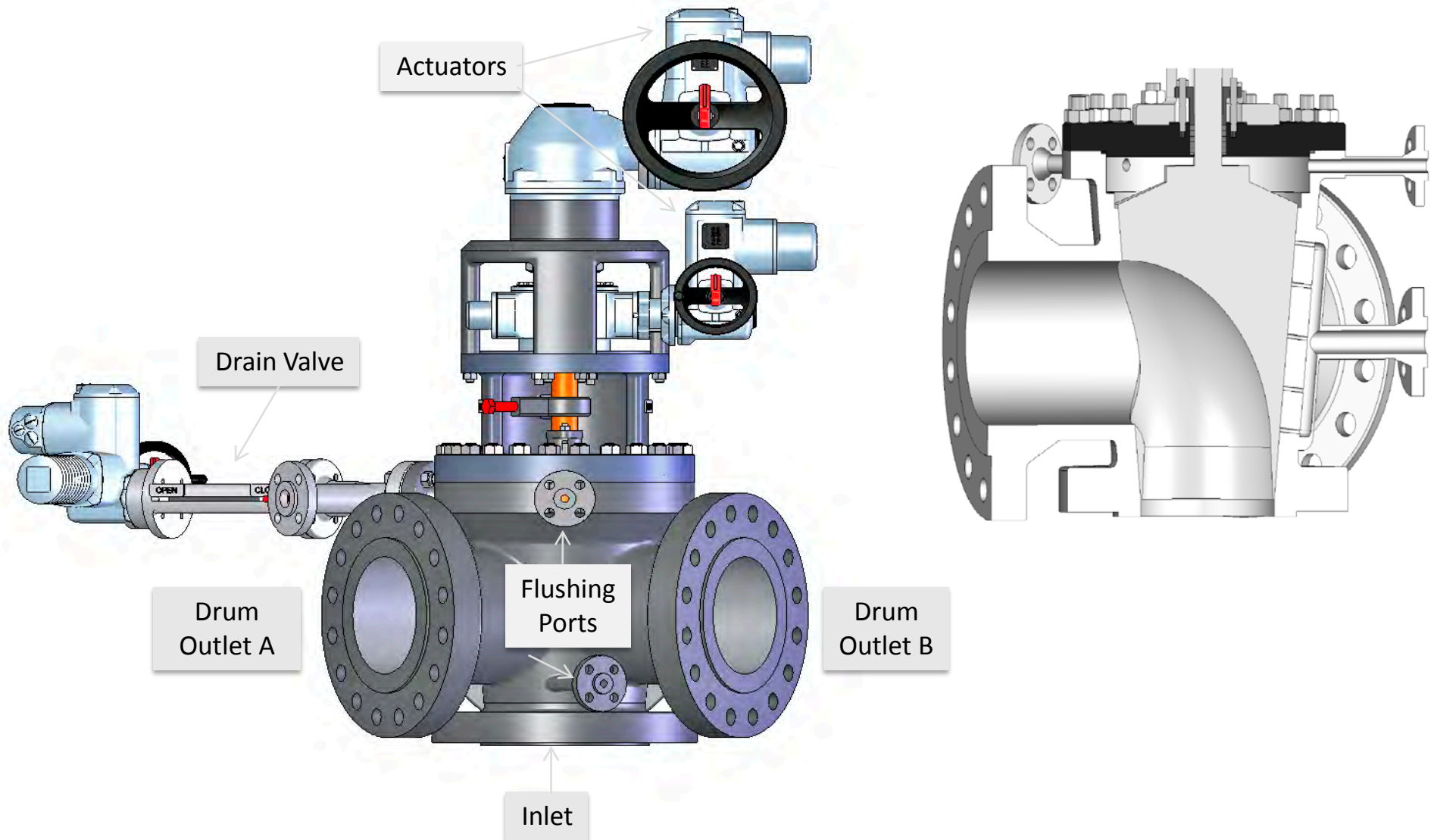


- The integral flush drain valve is now open
- A steam purge has been activated, and this will clean any remaining sediment debris above or below the valve plug
- Any debris will be deposited to a dump point

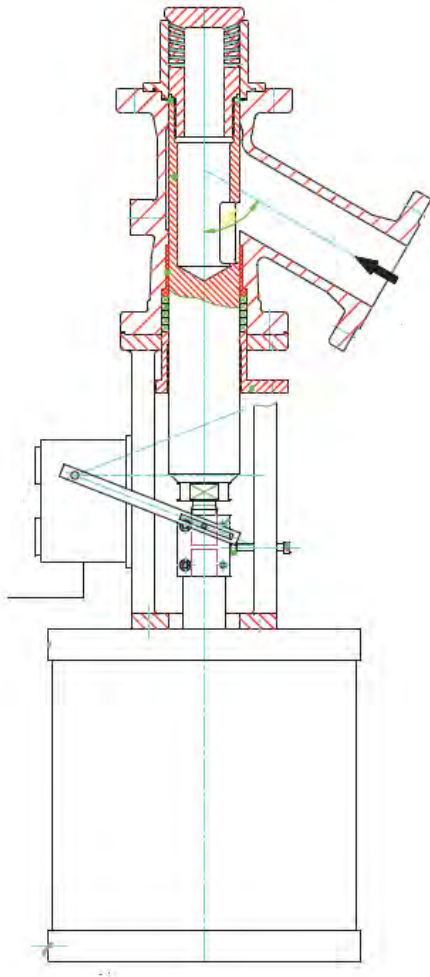


- The above drawing shows that the bottom of IsoPlug can be easily lowered (retracted) to carry out any necessary maintenance
- This is the 3<sup>rd</sup> element of the SchuF Sediment Defense System

# Lift Plug Valve Variant - SwitchPlug



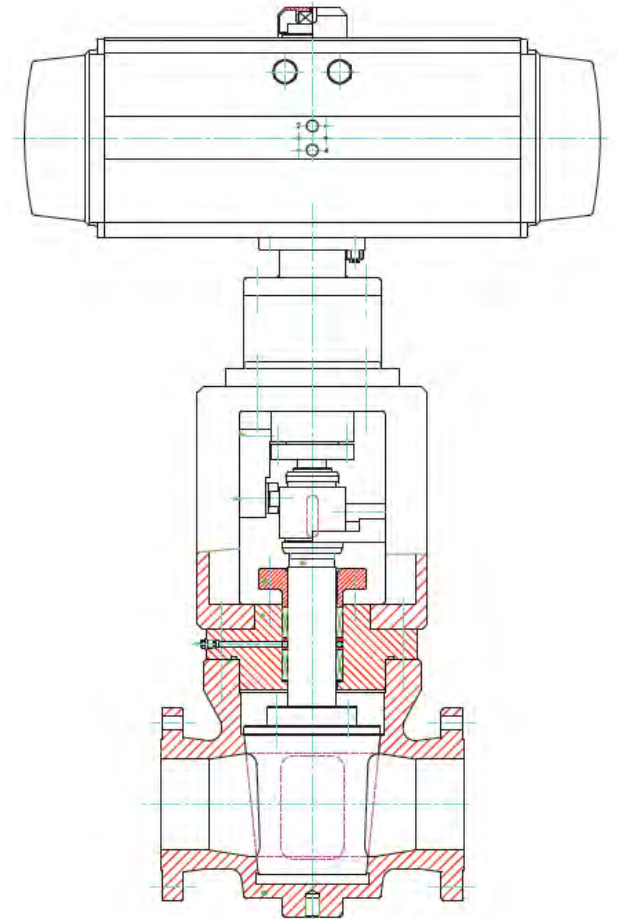
# Material Difference



**6", ASME 300# Steam injection valve  
in Zirconium (Zr 702C) for BASF**

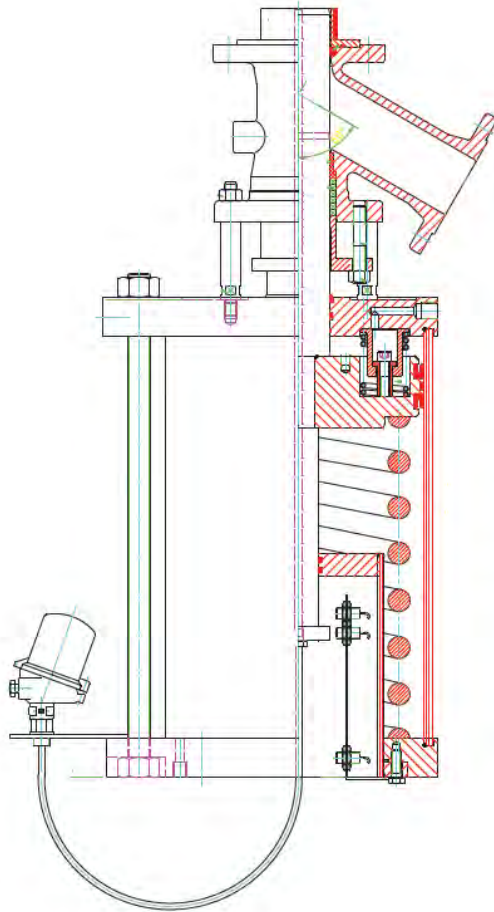


**6" (Drawing), 4" (picture), ASME 300# fire safe Lift Plug  
valve in Hastelloy (B3) - Fluor Daniel IIP Project**

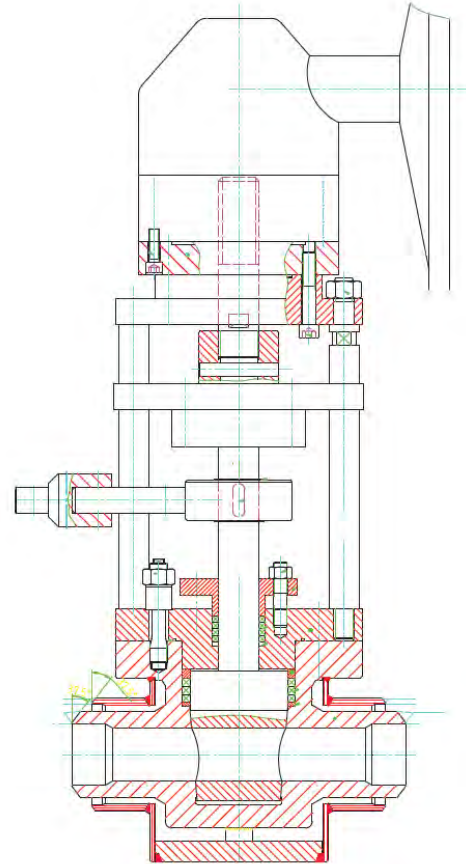




# Material Difference & High Pressure



**4", ASME 300# Bottom outlet valve  
in Titanium Grade 7- Boehringer**

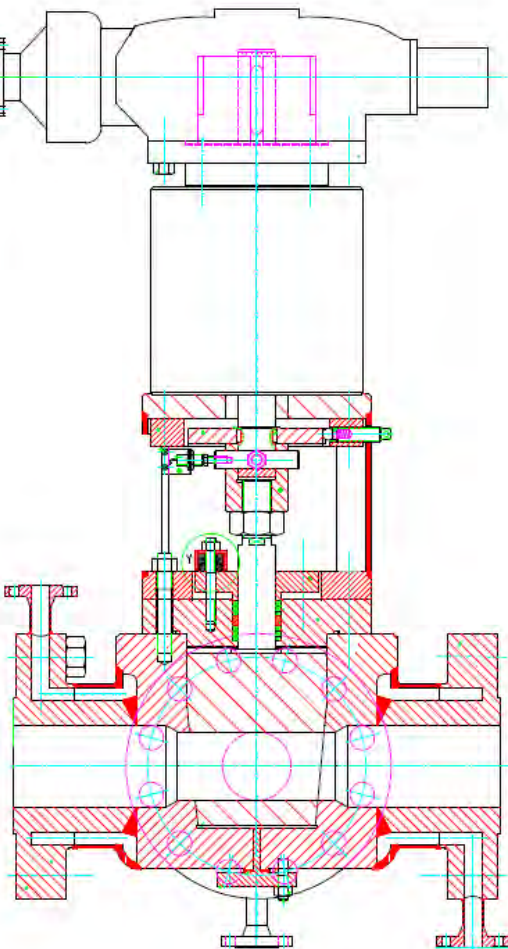


**4", ASME 2500# Lift Plug  
- Far Eastern**

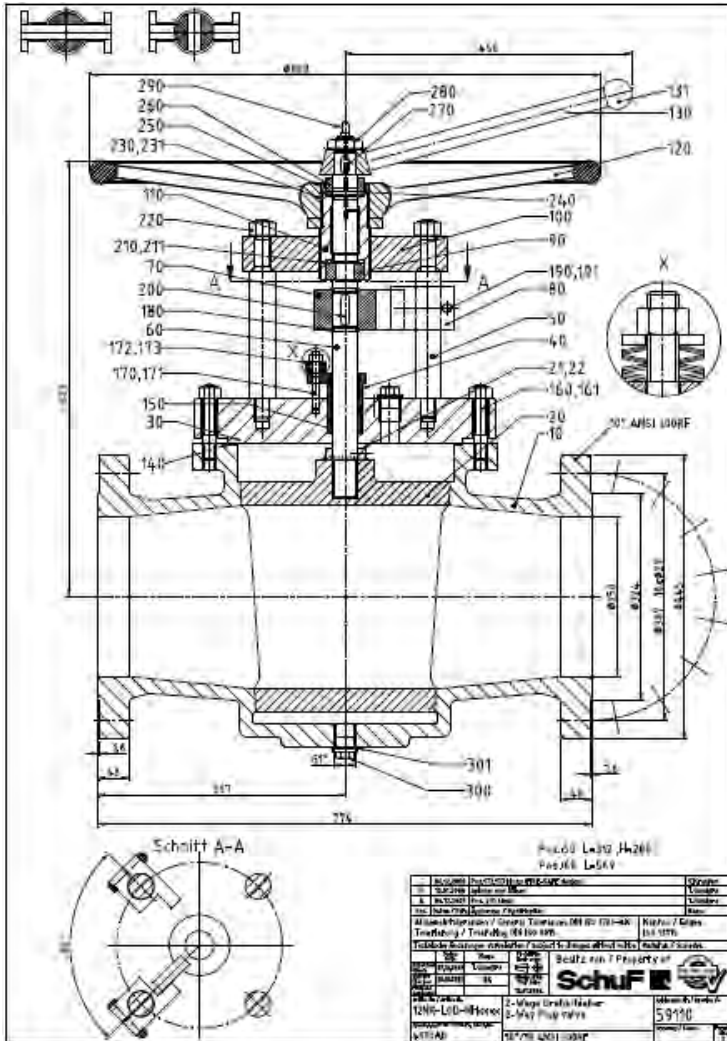


**12 DR – 3 Way Regular  
ASME 2500#, jacketed**



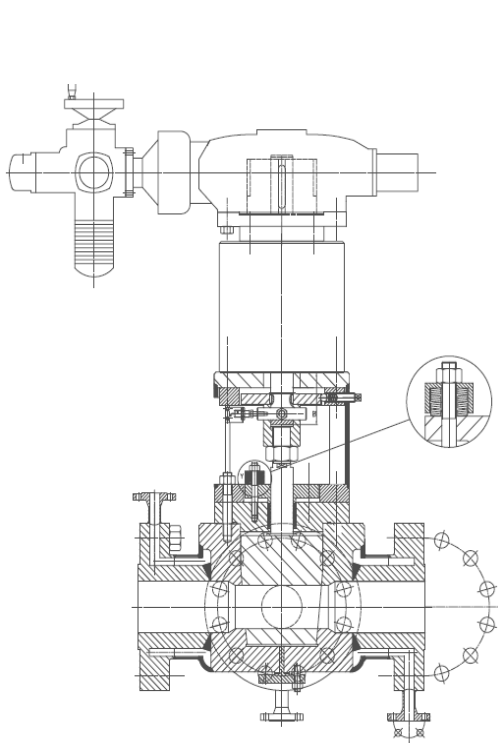


## 4", 320bar Lift Plug with LTS operation- Trevira

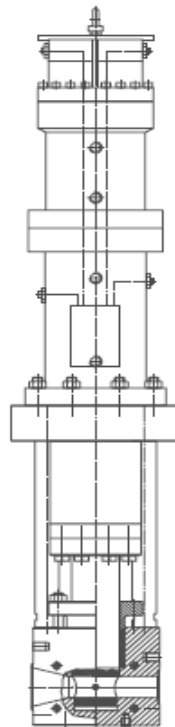


## 10", ASME 300# 2 Way Lift Plug – Borealis (please see case study)

SchuF Valves can be actuated using an electric motor, pneumatic or hydraulic actuators. An actuator can be used in combination with the SchuF LTS Operator or with two actuators for larger valve sizes.



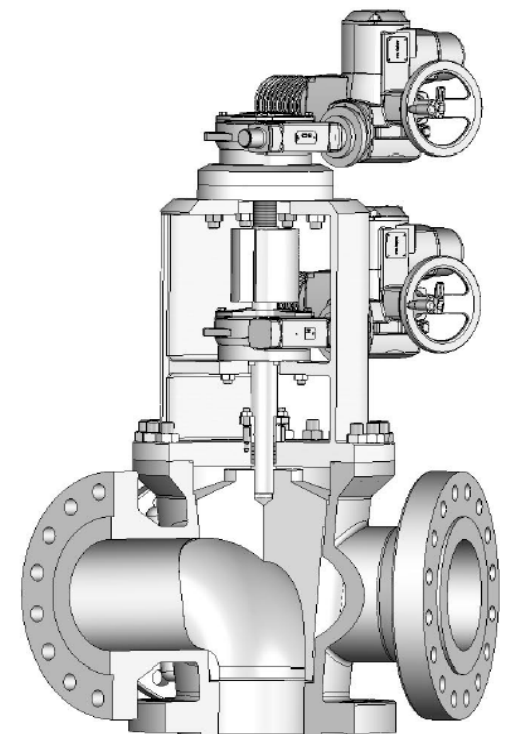
**Electric Motor with  
LTS**



**Hydraulic Lift  
Hydraulic Turn**

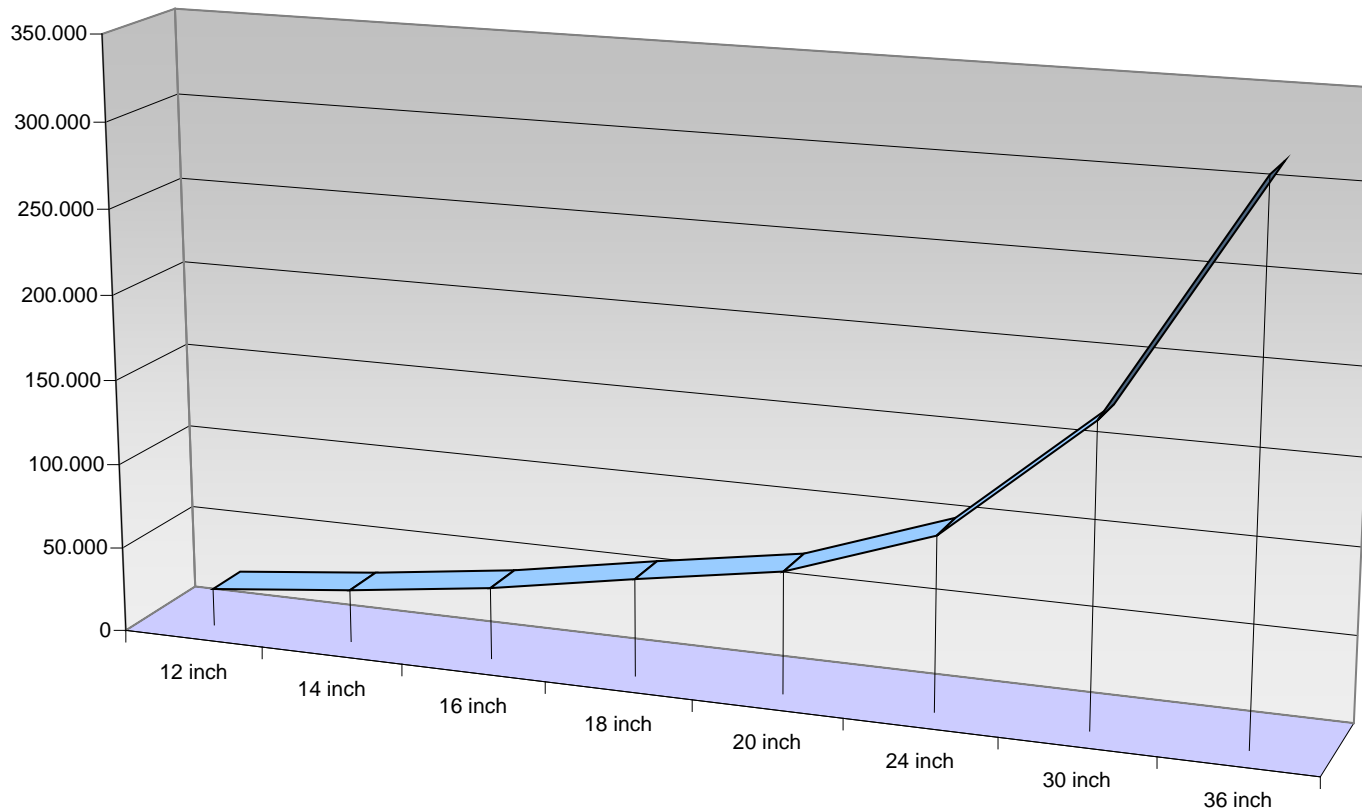


**Pneumatic Actuator & LTS  
with SchuF Operator**



**Electric Lift  
Electric Turn**

ANSI Class 300; 100% Port Cv Values



## SchuF Isoplug Type 12

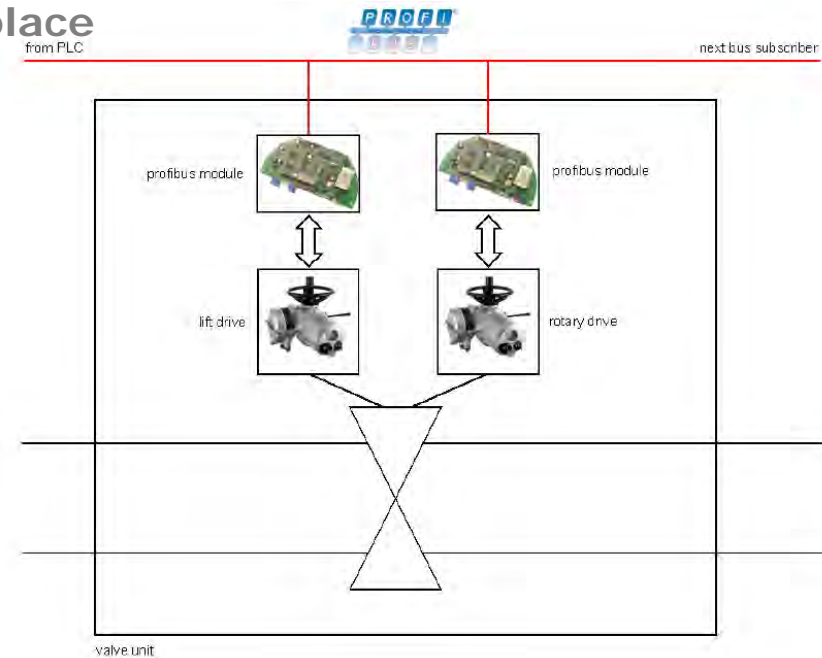
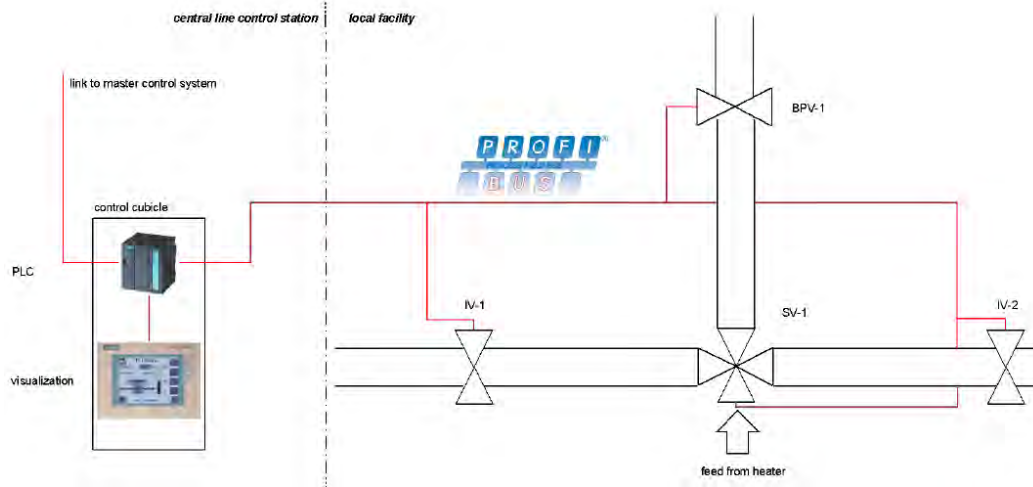
Cv values (full bore)

Size	DN	Cv
8 inch	200	10000
10 inch	250	16000
12 inch	300	22000
14 inch	350	31000
16 inch	400	42000
18 inch	450	57000
20 inch	500	71000
24 inch	600	105000
30 inch	750	175000
36 inch	900	290000

# Automated Control Panel (ACP)

The Automated Control Panel monitors and sequences one or more valves and controls the switching logic. It shows the condition of all valves in a flow diagram format. This delivers the following benefits:

- all but eliminates the possibility of operator error
- reduces exposure to heat and hazardous conditions
- reduces down time
- enables preventive maintenance to take place





# Lift Plug Reference Customers



FUJI FILTER MFG. CO., LTD.



BANTREL



Trevira  
THE FIBRE COMPANY

EASTMAN

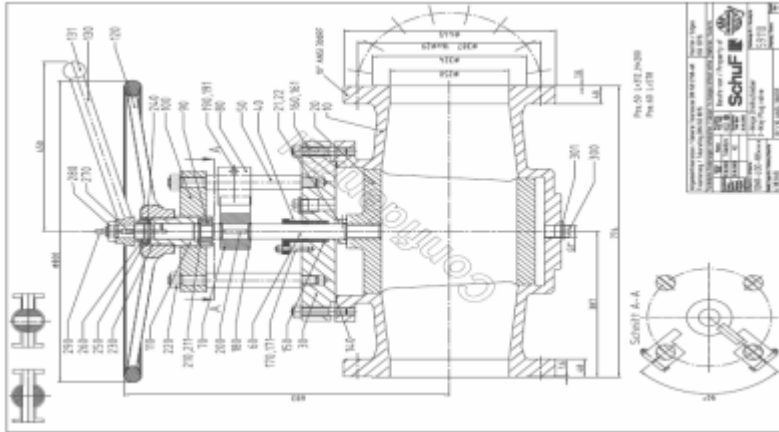
FLUOR

Member Reliance Group



SchuFF FETTEROLF

# Catofin Dehydrogenation Case Study



- Borealis runs an Air Products Catofin Dehydrogenation plant
- A de-oiler stripper takes C4+ heavies from C3 gas (propane); the bottom stream heavies are sent to 2 re-boilers to further remove C3
- Initially Borealis equipped the lines to and from the stripper with double block and bleed gate valves and spectacle plates.
- However the gate valve could not provide sufficient tightness and leakage followed. The leakage was so severe that the bleed could not relieve the pressure. Coke lumps also formed in the lines from the stripping column
- Borealis initially considered using a knife gate valve (due to cost), but finally decided to use a SchuF Lift Plug Valve as a double block and bleed.
- **The Lift Plug stopped the leakage and proved to work well in dirty service as it allowed the seat to be cleaned by turning during closure**
- After two years of successful operation, Borealis have bought an additional Lift Plug from SchuF for the 2<sup>nd</sup> re-boiler

# Lift Plug Data Table

Item	Standard Lift Plug	Optional
Size	8" (DN 200) to 24" (DN 600 )	8" (DN 200) to 36" (DN 900)
Pressure Class	ASME 150# to 900#	to ASME 2500#
Bore	Full bore roval	Full bore round
Operating temperature	minus 20°C (-4°F) to 350°C (662°F)	minus 196°C (-320°F) to 1000°C (1832°F)
Body & trim materials	C12 and CF8M	Duplex, Hastelloy, Titanium, Inconel, Zirconium etc.
Plug & Stem material	ASTM A217 C12, straight plug	As above; inverted plug option
Outlets/Inlet	2 Outlets	3 Outles, Inlet from below
Sealing	Standard metal to metal sealing; wide sealing lip	Standard metal to metal sealing; wide sealing lip
Flanges	Fully fanged raised face, RTJ, DIN and ANSI	JIS, BSE, Grayloc, and weld end
Purge / Flushing connections	n/a	5 or more ports ; 1" to 2"
Flow	Bi-directional	n/a
Actuation	Manual	Electric, pneumatic, or hydraulic
Jacketing	n/a	Full or partial are available
Retractable Bottom	Over 10"	Yes, on all sizes
Options	Extended spindle, special stuffing boxes	Extended spindle, special stuffing boxes
Valve combinations	n/a	Drain, flushing etc.

# Why SchuF Lift Plug Valves?

---

- Innovative valve designs **customised** to process specifics
- Reliable valve performance - **trouble free** service after many years in operation in similar severe industry applications
- Ability to adapt valve design to diverse operating conditions and use of **special materials**
- Quality German **precision** valve engineering
- **Lower cost** of ownership and reduced maintenance



# Thank You!



Web: [www.schuf.com](http://www.schuf.com)

E-mail: [valves@schuf.com](mailto:valves@schuf.com)

Tel.: +49 6198 571110

**SchuF FETTEROLF**

# Sample Lift Plug Reference list

Order Number	Q	Date	Customer	Country	Model	Description	Drawing	S m	S DN	P Class	Design P	Design T	Pressure Units	T	Medium/Application
31196	2	03.08.1994	Albers + Söhne	D	12	Lift-plug-valve	S043373	1 1/2"	DN40	16			xxx	xxx	
62112	1	04.02.2003	Albers + Söhne GmbH	D	12	Lift-plug-valve	S043373	1 1/2"	DN40	130	16	90	Bar(g)	°C	
63395	1	30.03.2007	Armour Valve Ltd.	CAN	12	4-Way-Lift-plug-valve	S082248	18"	DN450	600	43	871	Bar(g)	°C	
63395	1	30.03.2007	Armour Valve Ltd.	CAN	12	IsoPlug® Valve	S082403	20"	DN500	300			xxx	xxx	
63395	1	30.03.2007	Armour Valve Ltd.	CAN	12	IsoPlug® Valve		20"	DN500	300			xxx	xxx	
63395	1	30.03.2007	Armour Valve Ltd.	CAN	12	2-Way-Plug-Valve	S082235	36"	DN900	300			Bar(g)	°C	
66331	6	29.10.2008	Bantrel	CAN	12	IsoPlug® Valve	S083213	12"	DN300	300	70	945	Psi(g)	°F	Steam/Hydrocarb.
66331	2	29.10.2008	Bantrel	CAN	12	IsoPlug® Valve	S083212	14"	DN350	600	710	995	Psi(g)	°F	Heater Effluent
66331	8	29.10.2008	Bantrel	CAN	12	IsoPlug® Valve	S083091	30"	DN750	300	70	845	Psi(g)	°F	Steam/Hydrocarb.
66003	1	26.02.1998	BASF Coatings AG	D	12	Lift-plug-valve	S051694	2"	DN50	16	6,6	300	Bar(e)	°C	
64267	1	23.09.2005	BAYER AG	D	12	3-Way-Lift-Plug Valve.	S080897	1"	DN25	25	-1/46	350	Bar(g)	°C	Polymer
66189	1	26.05.2008	Bayer Antwerpen Comm. V	B	12	Lift-plug valve	S082850	3"	DN80	40	27,5	120	Bar(g)	°C	
66189	1	26.05.2008	Bayer Antwerpen Comm. V	B	12	Lift-plug valve	S082880	8"	DN200	40	27,5	120	Bar(g)	°C	
62671	1	06.10.2003	Borealis	B	12	Lift-plug valve	S059110	10"	DN250	300	16	105	Bar(g)	°C	Polypropylene
64719	1	24.04.2006	Borealis	B	12	Lift-plug valve	S081476	10"	DN250	300	18	-10/150	Bar(g)	°C	Liquid G4
32058	1	11.04.1995	Celanese Mexicana S.A. de C.V.	USA	12	Lift-Plug Valve.	S030214-04	3"	DN80	300			Bar(g)	°C	Polyester Polymer
32058	1	11.04.1995	Celanese Mexicana S.A. de C.V.	USA	12	Lift-Plug Valve.	S034358-02	4"	DN100	300			Bar(e)	°C	Polyester Polymer
64488	6	17.01.2006	Chemtex	USA	12	3-Way Lift Plug Valve	S081179	5"	DN125	1500	160	316	Bar(g)	°C	polymer
66394	1	05.09.2008	DAK Goose Creek, SC	USA	12	3-Way-Lift-Plug Valve.	S063128	3"	DN80	300	330	535	Psi(g)	°F	
62317	1	19.03.2003	Eastman Kingsport TN	USA	12	Lift plug valve.	S058777	1"	DN25	150	~ 10	~ 280	Bar(g)	°C	DMT
36951	1	20.10.1998	Eastman Kingsport TN	USA	12	Lift plug valve.	S052533	1"	DN25	150	10	270	Bar(g)	°C	Phthalic Anhydride, Benzoic Acid
37850	1	03.07.1999	Eastman Kingsport TN	USA	12	Lift plug valve.	S052662-1	2"	DN50	150	10	350	Bar(g)	°C	Polyester Polymer
62964	1	18.02.2004	FAR EASTERN TEXTILE LTD.	ROC	12	Lift plug valve.	S059523	4"	DN100	2500	250	350	Bar(g)	°C	PETP
64023	3	02.06.2005	Fluor Daniel IIP Team	TJ	12	Lift-plug valve	S080394	4"	DN100	300	F.V./12	-30/+220	Bar(e)	°C	MCB, MDI, PHOSGENE, HCl
64023	1	02.06.2005	Fluor Daniel IIP Team	TJ	12	Lift-plug valve	S080393	6"	DN150	300	F.V./16	-30/+220	Bar(g)	°C	MCB, MDI, PHOSGENE, HCl
64023	1	02.06.2005	Fluor Daniel IIP Team	TJ	12	Lift-plug valve	S080393	6"	DN150	300	F.V./16	-30/+220	Bar(g)	°C	MCB, MDI, PHOSGENE, HCl
64140	2	27.07.2005	FORMOSA CHEMICALS AND	ROC	12	2-Way-Lift plug valve.	S080814	4"	DN100	600	36	315	Kg/cm²	°C	
64140	1	27.07.2005	FORMOSA CHEMICALS AND	ROC	12	2-Way-Lift plug valve.	S080811	6"	DN150	600	36	310	Kg/cm²	°C	?
37107	6	04.12.1998	Formosa Petrochemical Co.	ROC	12	Lift plug valve.	S052662	2"	DN50	150	5,3	380	xxx	xxx	liquid sulphur
36356	4	27.05.1998	Formosa Petrochemical Co.	ROC	12	Lift plug valve.	S049526	4"	DN100	150	9,77/0,67	220/303	xxx	xxx	liquid sulphur
36356	4	27.05.1998	Formosa Petrochemical Co.	ROC	12	Lift plug valve.	S049526	4"	DN100	150	9,77/0,67	220/303	xxx	xxx	liquid sulphur
36736	4	02.09.1998	Formosa Petrochemical Co.	ROC	12	Lift plug valve.	S049526	4"	DN100	150	9,77/0,67	220/303	Bar(g)	°C	liquid sulphur
30872	2	16.05.1994	FUJI FILTER MFG. CO., LTD.	J	12	Lift-plug-valve		1 1/2"	DN40	1500			xxx	xxx	
35408	2	18.09.1997	Hoechst AG	D	12	Lift plug valve.	S051019-1	2"	DN50	300	170psi	300	xxx	xxx	Monomer
66593	2	17.11.2008	Innophos Fosfatados	MEX	12	2-Way-Lift plug valve.	S083400	4"	DN100	150	8,8	-10/+120	Bar(g)	°C	Melt Sulphur
66593	1	17.11.2008	Innophos Fosfatados	MEX	12	2-Way-Lift plug valve.	S083425	8"	DN200	150	8,8	-10 / +120	Bar(g)	°C	Melt Sulphur
39458	1	12.10.2000	Kary GmbH	D	12	Lift-plug valve		2 1/2"	DN65	0			xxx	xxx	
61215	1	27.03.2002	Kerr McGee Pigments b.v.	NL	12	Plug valve	S057902	8"	DN200	150	2,2	250	Bar(g)	°C	Chlorine gas
60136	1	19.04.2001	Lurgi Zimmer AG	D	12	Lift-Plug Valve.	S046790	1"	DN25	40	20	365	Bar(g)	°C	
60222	4	09.03.2001	M.J.M. Hüttenwerke Duisburg GmbH	D	12	Lift-plug valve	S056968	1 1/2"	DN40	16			xxx	xxx	
33129	19	09.01.1996	Nan Ya Plastics Corporation	ROC	12	Lift plug valve	S048412-1	2"	DN50	300	20	450	xxx	xxx	Salt solution
33129	1	09.01.1996	Nan Ya Plastics Corporation	ROC	12	Lift plug valve	S048412-2	2"	DN50	300	20	450	xxx	xxx	Salt solution
38050	6	02.09.1999	Nan Ya Plastics Corporation	ROC	12	Lift-plug valve	S053804	3/4"	DN20	300	31,5	300	Bar(g)	°C	
33129	1	09.01.1996	Nan Ya Plastics Corporation	ROC	12	Lift plug valve	S048413-1	4"	DN100	300	20	450	xxx	xxx	Salt solution
31486	1	21.11.1994	SchuF (USA) Inc.	USA	12	Lift-Plug Valve.		2"	DN50	600			Psi(g)	°F	?
34031	1	19.08.1996	SchuF (USA) Inc.	USA	12	Lift-Plug Valve.	S049524-1	2"	DN50	2500	2800	750	Psi(e)	°F	Polymer
33869	2	10.07.1996	SchuF (USA) Inc.	USA	12	Lift-Plug Valve.	S030214-05	3"	DN80	300	30	370	Bar(g)	°C	Polymer
32120	1	12.05.1995	SchuF (USA) Inc.	USA	12	Lift plug valve.	S047021	4"	DN100	2500			Psi(g)	°F	Polymer
64249	1	19.09.2005	SchuF Chemieventile Vertriebs-	D	12	Lift-plug valve	S081624	4"	DN100	16	30	-10 / 12	Bar(g)	°C	Petroleum
34039	2	15.08.1996	SHINKONG SYNTHETIC FIBERS CORP.	ROC	12	Lift-Plug Valve.	S049556-1	3"	DN80	40	10	280	xxx	xxx	PE / polymer melt
60243	2	22.05.2001	SHINKONG SYNTHETIC FIBERS CORP.	ROC	12	Lift-Plug Valve.	S057176	3"	DN80	300	35	360	Bar(g)	°C	Polyester Polymer
38812	1	29.03.2000	Snamprogetti	I	12	Lubricated Plug Valve	S054194-1	1 1/2"	DN40	1500	222	300	Bar(g)	°C	
38473	44	22.12.1999	Snamprogetti	I	12	Lubricated Plug Valve	S054311-3	1/2"	DN10	1500	222	300	Bar(e)	°C	Urea \ Fertilizer
38473	3	22.12.1999	Snamprogetti	I	12	Lubricated Plug Valve	S054311-3	1/2"	DN10	1500	222	300	Bar(g)	°C	Urea \ Fertilizer
38473	3	22.12.1999	Snamprogetti	I	12	Lubricated Plug Valve	S054311-3	1/2"	DN10	1500	222	300	Bar(g)	°C	Urea \ Fertilizer
38473	8	22.12.1999	Snamprogetti	I	12	Lubricated Plug Valve	S054311-3	1/2"	DN10	1500	222	300	Bar(g)	°C	Urea \ Fertilizer
38812	7	29.03.2000	Snamprogetti	I	12	Lubricated Plug Valve	S054311-3	1/2"	DN10	1500	222	300	Bar(g)	°C	
35401	1	15.09.1997	Sterlite Engineered Equipment Ltd	HK	12	Lift-Plug Valve.	S051048	12"	DN300	16	16	215	xxx	xxx	oxysat.
62631	2	30.08.2003	STORNIERT	D	12	Lift-Plug Valve.		3/4"	DN15	25	12	350	xxx	xxx	Polyester
62262	3	24.03.2003	Sudamin MHD GmbH	D	12	Lift-plug valve	S056968	1 1/2"	DN40	16			Bar(g)	°C	Heißwind mit 1150°C
63196	2	17.05.2004	Sudamin MHD GmbH	D	12	Lift-plug valve		1 1/2"	DN40	16			Bar(g)	°C	Heißwind mit 1150°C
38974	1	11.05.2000	Taiba Chemical Co., Ltd.	ROC	12	Lift-Plug Valve.	S054718	4"	DN100	300	14	290	xxx	xxx	Polymer melt
37524	1	11.05.1999	Teranoi AG	CH	12	Lift-plug valve.	S053141	3/4"	DN15	320	260	-10/+400	Bar(g)	°C	Schmelze
37524	1	11.05.1999	Teranoi AG	CH	12	Lift-plug-valve	S053143	6"	DN150	320	250	-10/+350	Bar(g)	°C	Schmelze
37524	2	11.05.1999	Teranoi AG	CH	12	Lift plug valve.	S053142	6"	DN150	320	250	-10/+350	Bar(g)	°C	Schmelze
62353	2	19.03.2003	Trevira GmbH	D	12	Lift-Plug Valve.	S058822	2"	DN50	25	16	350	xxx	xxx	Vorprodukt von PET
61747	1	24.09.2002	Zig Sheng Industrial Co., Ltd	ROC	12	Lift-Plug Valve.	S058390	1"	DN25	1500	198	260	Bar(g)	°C	polymer + additive / flushing medium
32083	1	27.04.1995	Zimmer AG	D	12	Lift-Plug Valve.	S046790	1"	DN25	40			xxx	xxx	Polyester