KEYSTONE SLURRY CONTROL VALVE

FIGURE 634 - ASME CLASS 150

The F634 is a light/medium duty slurry control valve, short body style. For control of liquids, gases and light slurries.

- F634 037 - Scaling service control valve
- F634 039 - Slurry control valve

FEATURES

- Robust construction.
- Bi-directional slurry control valve.
- Swing through disc for minimum leakage.
- Extensive size range available.
- Wafer style body.
- Adjustable PTFE gland packing.
- Standardised mounting and drive adaptor connection allowing direct mounting of Keystone actuators and also allows for actuator removal while valve in line.
- Full repairability with replaceable internals that can significantly extend valve life.
- F634 037 features SSEC coating to prevent scaling, prevent against corrosion and improve wear resistance.
- Other coatings available for chemical and abrasive substances.
- Manufactured under quality system ISO 9001:2000. Certificate No Mel 0400133.
- Available with PED approval. Cert No: 0038/PED/MUM/0710020/1.

GENERAL APPLICATIONS

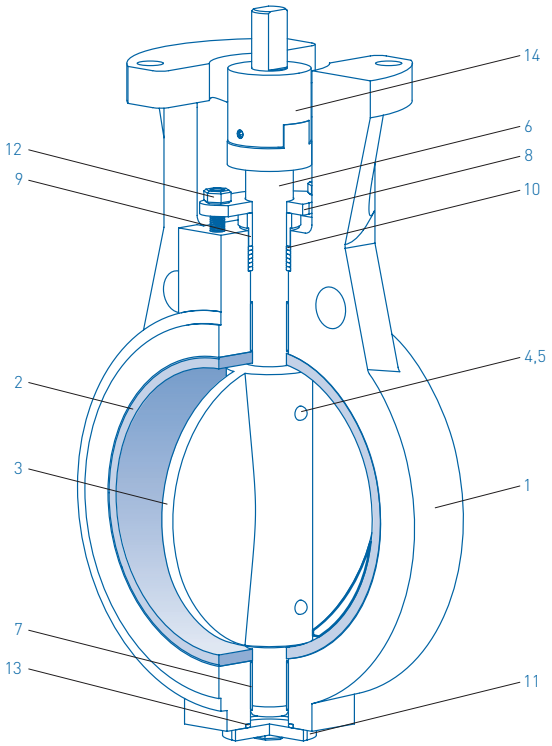
- F634 037 is ideally suited for use on green liquor, spent liquor or pregnant liquor service in the alumina industry or other scaling applications.
- F634 039 is suited for the control of liquids, gases and light/medium duty slurries.

TECHNICAL DATA

Size range:	DN 40-600
Temperature rating:	Up to 230°C
Pressure rating:	ASME B16.34 Class 150
MaxΔP:	Refer to chart
Standard flange drilling:	ASME B16.5 Class 150 F.F

KEYSTONE SLURRY CONTROL VALVE

FIGURE 634 - ASME CLASS 150



OPTIONS

- F79U Hard anodised aluminium pneumatic actuator, double acting or spring return.
- F79S Stainless steel pneumatic actuator, double acting or spring return.
- F79B Ductile iron pneumatic actuator, double acting or spring return.
- F79K Ductile iron pneumatic actuator, double acting or spring return.
- Icon 2000 Electric actuators.
- F427 Manual gear operators.
- F793 Positioners.
- F792 Switch boxes.
- F791 Solenoid valves.

PARTS LIST

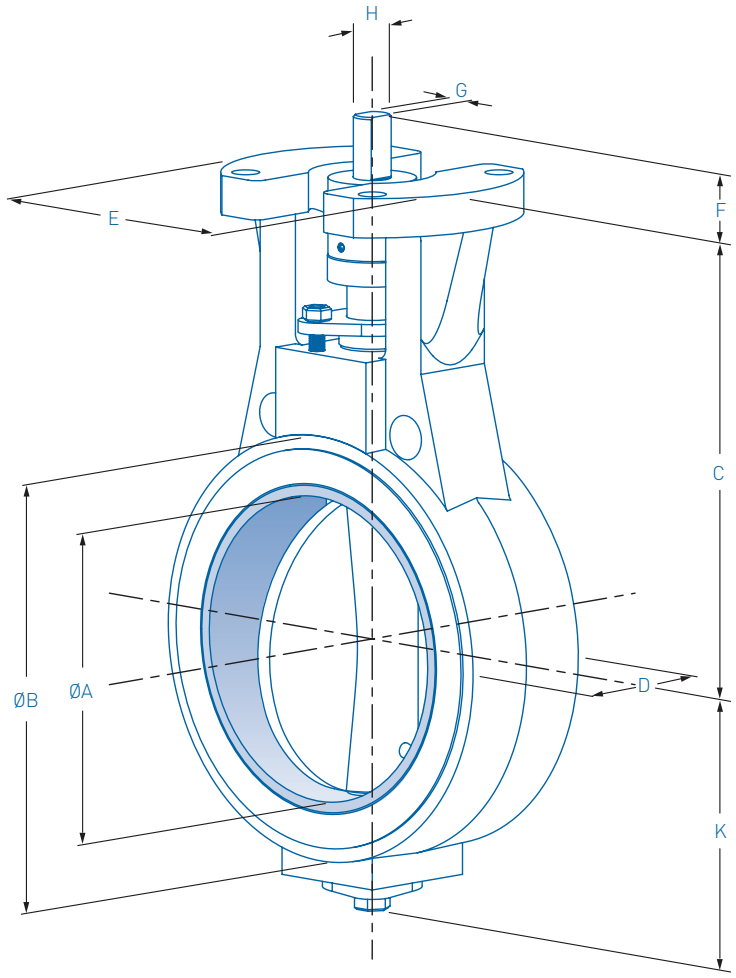
No.	Description	Material	Specification
1	Body	SG Iron	AS1831 500-7
		Carbon steel	ASTM A216 WCB
2	Liner	Carbon steel*	Commercial
3	Disc	SG Iron*	AS1831 500-7
4	Disc pin	Spring alloy steel	Commercial
5	Disc drive screw	431 S/S / Carbon steel	ASTM A276 431 Condition A / AS3678 Grade 250
6	Shaft	431 S/S*	ASTM A276 431 Condition A
7	Bearings	PTFE / glass	Commercial
8	Gland plate	Carbon steel	AS3678 Grade 250
9	Gland collar	431 S/S	ASTM A276 431 Condition A
10	Gland packing	PTFE Braid	PTFE
11	End cover	Carbon steel	AS3678 Grade 250
12	Fasteners	Alloy steel / 316 S/S	Commercial
13	O-ring	FKM	Commercial
14	Drive dog	431 S/S	ASTM A276 431 Condition A

NOTES

* F634 037 liner, disc and shaft coated with SSEC. Refer to Coating Engineering Guide for specifications.
Liner only available in F634 037.
Carbon steel bodies are available as an option.

KEYSTONE SLURRY CONTROL VALVE

FIGURE 634 - ASME CLASS 150



PRESSURE DIFFERENTIALS TABLE

Valve size DN	Valve closed at 0°	Valve open at 60°
40	1960	1960
50	1960	1960
65	1960	1960
80	1960	1960
100	1960	1960
150	1960	700
200	1960	570
250	1960	525
300	1960	315
350	1960	300
400	1600	220
450	1600	215
500	1350	175
600	1250	165

NOTE

Figures shown are allowable pressure differentials kPa at 65°C.

DIMENSIONS (mm)

Valve size DN	Stem code	Shaft dia inches	ØA	ØB	C	D	E	F	K	Q	Stem conn. H x G / ØH inches	Keyway inches	Top plate PCD mm	Top plate No. holes	Top plate Hole dia. mm	Mass kg	K_v at full open
40	BAD	⅜	40	80	127	55	110	31	40	-	¾ x ½	-	83	4	11	5	65
50	BAD	⅜	50	100	162	64	110	31	66	-	¾ x ½	-	83	4	11	6	72
65	BAD	⅝	63	117	167	64	110	31	75	-	¾ x ½	-	83	4	11	7	89
80	BAD	¾	76	133	196	70	115	31	85	30	¾ x ½	-	83	4	11	10	163
100	BAD	1	101	157	208	76	140	31	108	67	¾ x ½	-	83	4	11	13	348
150	CAF	1	154	216	238	76	152	51	132	135	1⅛	¼ x ¼	127	4	14	18	1094
200	CAF	1¼	203	270	295	83	182	51	174	185	1⅛	¼ x ¼	127	4	14	31	2375
250	CAK	1½	254	330	329	102	182	108	213	232	2¼	½ x ⅜	127	4	14	48	3752
300	CAK	1½	305	400	374	102	182	108	258	287	2¼	½ x ⅜	127	4	14	70	5745
350	CAK	1¾	336	444	390	111	182	108	275	317	2¼	½ x ⅜	127	4	14	100	7305
400	CAK	1¾	387	495	427	111	182	108	312	371	2¼	½ x ⅜	127	4	14	120	9930
450	DAK	2	438	540	457	127	200	108	344	419	2¼	½ x ⅜	165	4	21	145	12696
500	DAK	2¼	489	595	492	133	220	108	381	470	2¼	½ x ⅜	165	4	21	190	15533
600	DAK	2½	582	708	569	158	250	108	454	560	2¼	½ x ⅜	165	4	21	225	23123

NOTES

Q = The chordal dimension at face of valve for disc clearance into pipe or flange.

H = The dimension of the stem connection.

G = The dimension across the stem flats.

K_v = The flow rate of water in m^3/hr that will pass through a valve with a pressure drop of 1 bar (100 kPa) at 20°C

$C_v = 1.155\ K_v$

Dimensions are nominal ± 1mm.

SPECIAL COATINGS TO ENHANCE VALVE SERVICE LIFE

Standard Coating

SSEC: Synergistic Surface Enhancement Coating

Well suited for use in applications where corrosive media or abrasion is a problem, SSEC is ideal for applications with sticky, viscous media, scaling/plating or where galling is a problem. The low coefficient of friction prevents scale adhesion to the valve internal components thus extending valve service life. SSEC is a synergistic coating that combines the advantages of anodizing, plating or thermal spraying with the controlled infusion of polymers, dry lubricants and other materials to provide an entirely new composite with improved properties to the base metal. This coating will work on most metal surfaces and creates a harder-than-steel surface, excellent release (non-stick) properties, protects against wear, corrosion and chemical attack and provides permanent lubricity and a superior resistance to static build up of material.

Optional Coatings

PBSEC: Polymer Based Surface Enhancement Coating

PBSEC is a polymer-based impregnated surface enhancement coating ideal for applications where maximum corrosion resistance on ferrous and nonferrous metals is needed over a broad temperature range. Like SSEC, PBSEC exhibits a very low coefficient of friction, preventing scale adhesion to the valve internal components thus extending valve service life. It is ideal for applications where galling or sticky media and scaling/plating is a problem. It will work on most metal surfaces and has excellent release (non-stick) properties. PBSEC features excellent abrasion and galling resistance and a superior resistance to static build up of material.

TBSEC: Tungsten Based Surface Enhancement Coating

For applications where maximum wear resistance on ferrous and nonferrous metals is needed over a broad temperature range, Pentair introduces TBSEC. TBSEC is a specific combination of ceramics, metals and proprietary polymers that produces a moisture proof and nonporous structural integrity matrix. Adding TBSEC improves the base metal surface properties and is ideal for applications where galling or sticky media and scaling/plating is a problem. Applied by a thermal spray process, this coating will work on most metal surfaces and has excellent release (non-stick) properties, protects against wear and chemical attacks as well as it features excellent abrasion and galling resistance, and provides permanent lubricity and a superior resistance to static build up of material.

Engineering Data

SSEC

- Hardness/wear and abrasion resistance – Up to Rc 68. Equilibrium Wear Rate (EWR) using Taber abrasion testing methods (CS-10 wheel): 2.0 – 4.0 mg per 1,000 cycles.
- Coefficient of friction – As low as 0.09. Eliminates "stick-slip" problems. Often improves micro finish of a disc or liner.
- Temperatures – Operating range of -157° to 288°C (-250° to 550°F). Coating will survive temperatures of 760°C (1400°F), but all lubricant will dissipate above 426°C (800°F).
- Corrosion resistance – SSEC will survive 500 hours in ASTM B-117 salt spray. Selected types can withstand over 1,000 hours. Coating thickness will affect corrosion resistance. Special types can survive in Hydrogen Sulfide encountered in oil field applications.
- Thickness of SSEC – Surface build-up from 0.005 mm to 0.076 mm (0.0002" to 0.003"), control tolerances as low as ±0.005 mm (±0.0002").
- Applications – Steel, stainless, copper, brass, bronze, titanium and aluminium are the basic metals that can be enhanced by using SSEC. Abrasion resistance, lubricity, corrosion resistance and anti-stick plus galling can be obtained through use of SSEC.

PBSEC

- Coefficient of friction – Static can be as low as 0.4 while the dynamic can be as low as 0.3.
- Temperatures – Operating range from Cryogenic to 135°C (275°F) with short term up to 177°C (350°F).
- Corrosion resistance – Excellent chemical and abrasion resistance as well as high oxidative stability.
- Thickness of PBSEC – Normal coating thickness from 0.025 mm to 0.76 mm (0.001" to 0.030"). Thicker coatings can be applied.
- pH Range – Below 0 to 14
- Applications - Steel, stainless, copper, brass, bronze, titanium, and aluminium are the basic metals that can be enhanced by the using PBSEC. Abrasion resistance, lubricity, corrosion resistance and anti-stick plus galling can be obtained through use of PBSEC.

TBSEC

- Coefficient of friction – As low as 0.06.
- Environmental resistance – Excellent abrasion resistance and lubricity as well as various chemical and acid resistances.
- Temperatures – Operating range of -129° to 288°C (-200° to 550°F).
- Thickness of TBSEC – Normal coating thickness from 0.05 mm to 0.25 mm (0.002" to 0.010"). Thicker coatings can be applied.
- pH range – 4 to 10
- Applications - Steel, stainless, copper, brass, bronze, titanium and aluminium are the basic metals that can be enhanced by the using TBSEC. Abrasion resistance, lubricity and anti-stick plus galling can be obtained through use of TBSEC.

COATING SELECTIONS

	Abrasion	Anti-stick (lubricity)	Chemical resistance
SSEC	Good	Good	Good
TBSEC	Excellent	Excellent	Not recommended
PBSEC	Not recommended	Good	Excellent

NOTE

Pentair does not recommend any coating be used as an attempt to reduce metallurgy of the base material required for the application.

ANTICIPATED SEATING AND UNSEATING TORQUE VALUES – Nm

	Shut off pressure kPa									
	Normal service					Severe service				
Valve size DN	0	350	700	1000	1400	0	350	700	1000	1400
40	20	21	22	23	24	30	31	32	33	34
50	25	26	27	28	29	37	38	40	41	42
65	30	32	33	34	35	45	46	47	49	50
80	36	38	41	43	45	54	56	59	61	63
100	54	58	61	64	68	81	85	88	92	95
150	102	113	124	136	147	152	164	175	186	198
200	169	192	215	237	260	254	277	299	322	345
250	260	294	328	362	395	390	424	458	492	525
300	350	407	463	520	576	525	582	638	695	751
350	486	576	667	757	847	729	819	910	1000	1090
400	621	757	893	1028	1164	932	1068	1203	1339	1475
450	780	983	1186	1390	1593	1170	1373	1576	1780	1977
500	960	1243	1525	1808	2090	1441	1723	2006	2288	2570
600	1152	1429	1754	2079	2466	1701	2033	2387	2746	3085

DUTY DEFINITIONS

Normal

- Liquid service to 3 m/s
- Gases – Non-abrasive
  Natural gas
  Hot air
  Exhausts-flues
  Coke ovens gas
  Oxygen-nitrogen, etc
- Light-medium abrasion
  Pneumatic conveying
  3-4000 fpm – 20 m/s
  Crystallising liquors low velocity
  5-10% fine solids low velocity

Severe

- Medium abrasion
  Pneumatic conveying dense phase, average velocities.
  Magnetite slurries
  Cement slurries
  Bauxite slurries
  Ore slurries

K_v VALUES/FLOW RATE CO-EFFICIENTS

	Angle of disc opening									
Size DN	0	10	20	30	40	50	60	70	80	90
40	2	2	3	8	11	23	36	50	64	65
50	4	5	7	9	13	26	40	56	71	72
65	6	7	10	16	21	36	49	69	87	89
80	7	10	18	33	55	77	92	127	162	163
100	9	12	19	42	62	126	195	272	345	348
150	12	28	64	132	197	394	613	854	1084	1094
200	16	46	131	285	428	855	1331	1855	2353	2375
250	21	62	206	450	675	1351	2103	2929	3718	3752
300	26	108	316	690	1035	2069	3220	4485	5693	5745
350	38	141	402	877	1316	2632	4094	5703	7239	7305
400	43	185	547	1195	1784	3576	5565	7752	9840	9930
450	49	230	699	1524	2287	4575	7116	9912	12581	12696
500	65	291	855	1866	2798	5597	8706	12127	15392	15533
600	70	415	1273	2777	4165	8332	12960	18052	22913	23123

NOTE

This data is based on calculated theoretical figures.

K_v = The volume of water in m^3/hr that will pass through a given valve opening at a pressure drop of 1 bar (100kPa) at 20°C.

C_v = 1.155Kv

GUIDELINES

Operating torques for these valves are generated from bearing/packing friction, component weight, hydro-dynamic and contaminant forces, etc.

There are no hard and fast rules which can accurately and practically determine the sum total of all these forces. (Refer Pentair Valve Manual for further information).

The following guidelines are considered to be conservative and can confidently be used for routine duties. If you have any doubts consult a Pentair sales representative.

KEYSTONE SLURRY CONTROL VALVE

FIGURE 634 - ASME CLASS 150

TYPICAL SPECIFYING SEQUENCE

100	F634	037	ASME 150
Valve size	Figure number	Trim code	End connections

Trim code	Body	Disc	Shaft	Seat	Bearings	Packing
037	SG Iron / carbon steel	S.G. Iron / SSEC	431 S/S / SSEC	Carbon steel / SSEC	PTFE / Glass	PTFE
037P	SG Iron / carbon steel	S.G. Iron / PBSEC	431 S/S / SSEC	Carbon steel / PBSEC	PTFE / Glass	PTFE
037T	SG Iron / carbon steel	S.G. Iron / TBSEC	431 S/S / SSEC	Carbon steel / TBSEC	PTFE / Glass	PTFE
039	SG Iron / carbon steel	S.G. Iron	431 S/S	N/A	PTFE / Glass	PTFE

NOTE

Carbon Steel bodies are available as an option.

SSEC = Synergistic Surface Enhancement Coating

PBSEC = Polymer Based Surface Enhancement Coating

TBSEC = Tungsten Based Surface Enhancement Coating