



COMPLETION SERVICES

SECTION 3

Fluid Loss and Zonal Isolation System



FLUID LOSS AND ZONAL ISOLATION SYSTEM

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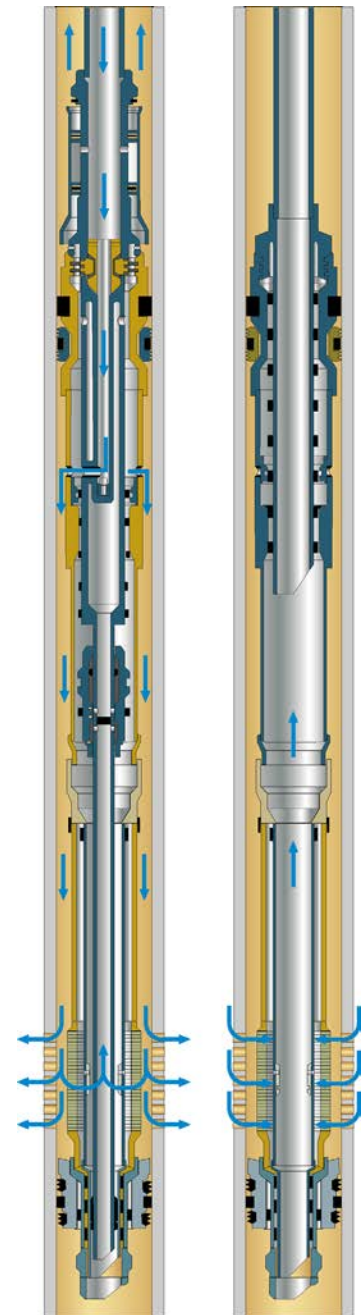
ISO Isolation System

Superior Completion Services' patented **ISO Isolation System** eliminates fluid loss to the formation after a gravel or frac-pack treatment by placing an internal isolation string across a production screen. The system provides selective production capabilities controlled by a mechanically or hydraulically actuated sleeve placed in the isolation string.

APPLICATIONS

- Zonal isolation
- Single or selective multizone completions
- Fluid loss control
- Selective production
- Sand control
- Shallow to deepwater wells
- Vertical or highly deviated wells

- Eliminates post-treatment fluid loss and aids in well control
- Provides selective production capability
- All installation is done at the surface
- Gravel pack operations are not compromised
- Post-treatment fluid loss pills are not required
- No extra trips to install isolation assemblies are needed
- Allows the integrity of the assembly to be pressure tested prior to coming out of the wellbore with service tools
- Provides bidirectional zonal isolation



ISO Isolation System

TECHNICAL DATA

Available in tubing sizes from 2 1/16 to 4 1/2 in. (52.9 to 114.3 mm) isolation tubing sizes. Other sizes available upon request.

ISO Isolation System																	
Casing OD		Packer Bore		Screen Size				Isolation String						Screen Wrapped			
				Base Pipe		Jacket OD		Pipe OD		MSV Size		MSV ID		Base Pipe		Jacket OD	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
5.00	127.0	2.69	68.3	2.88	73.0	3.57	90.7	52.4	2.06	2.06	52.4	1.63	41.3	2.38	60.3	3.06	77.8
5.50	139.0	2.69	68.3	2.88	73.0	3.57	90.7	2.06	52.4	2.06	52.4	1.63	41.3	2.88	73.0	3.57	90.7
7.00	177.83	3.25-4.00	82.6-101.6	4.00	101.6	4.70	119.3	2.38	60.3	2.38	60.3	1.88	47.6	2.88	73.0	4.50	114.3
7.63	193.7	3.25-4.00	82.6-101.6	4.50	114.3	5.20	132.0	2.88	73.0	2.88	73.0	2.31	58.5	3.50	88.9	5.00	127.0
9.63	244.5	3.25-6.00	82.6-152.4	5.50	139.7	6.20	157.4	3.50	88.9	3.50	88.9	2.81	71.5	4.50	114.3	5.50	139.7

REFERENCES

- Annular flow valve data sheet
- Multi-service valve data sheet
- Pressure-actuated circulating valve data sheet
- Radial flow valve data sheet

HPR Isolation System

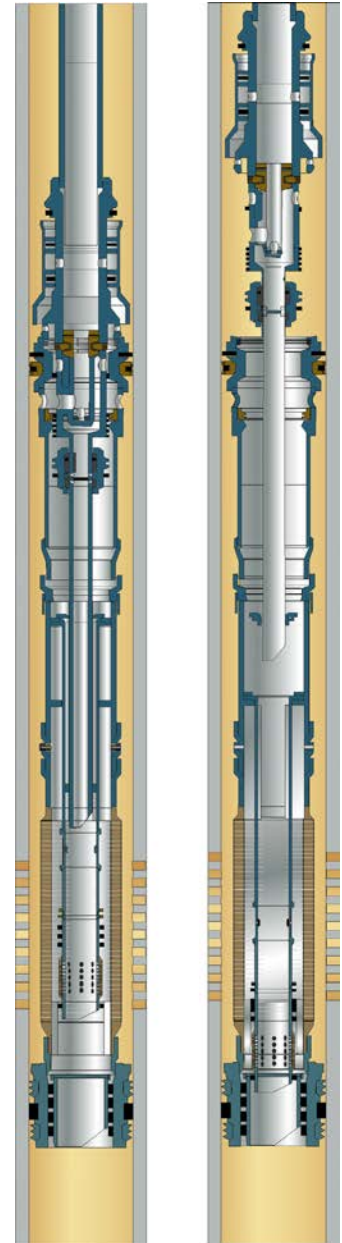
Superior Completion Services' hydraulically powered, retrievable **(HPR) Isolation System** is mechanically actuated to provide formation isolation after gravel or frac-packing. The system uses well hydrostatic pressure to position the isolation string across the production interval. Valve manipulation is not necessary during the job and wash pipe is not required for gravel packing. The HPR system is compatible with standard equipment and can be run with mechanically or hydraulically actuated isolation and production sleeves.

APPLICATIONS

- Zonal isolation
- Single or selective multizone completions
- Fluid loss control

Features and Benefits

- Set-down weight not required to position isolation string
- Eliminates fluid loss and aids in well control
- Simple, straight pickup to actuate
- Debris-resistant design
- Selectively retrievable
- Provides bidirectional zonal isolation
- Eliminates need for wash pipe



HPR Isolation System

TECHNICAL DATA

Available in 2 1/16 to 4 1/2 in. (52.9 to 114.3 mm) isolation tubing sizes

Other sizes available upon request

HPR Isolation System													
Casing OD		Packer Bore		Screen Size				Isolation String					
				Base Pipe		Jacket OD		Pipe OD		MSV Size		MSV ID	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
7.00	177.8	3.25	82.6	4.00	101.6	4.696	119.3	2.375	60.3	2.375	60.3	1.875	47.6
				4.00	101.6	4.00	101.6	4.696	119.3	2.375	60.3	2.375	60.3
7.63	193.7	3.25	82.6	4.00	101.6	4.696	2.375	60.3	2.375	60.3	1.875	1.875	47.6
				4.00	101.6	4.50	114.3	5.196	132.0	2.875	73.0	2.875	73.0
9.625-10.75	244.5-273.1	3.25-6.00	82.6-152.4	5.50	139.7	6.196	157.4	3.500	88.9	3.500	88.9	2.813	71.5

REFERENCES

ComPlete™ FP System data sheet

Multi-service valve data sheet

Pressure-actuated circulating valve data sheet

Interventionless Isolation System

Superior Completion Services' **Interventionless Isolation System** facilitates optimal formation treatment and gravel placement by achieving positive, selective, post-treatment zonal isolation without the use of wash pipe or mechanical shifting tools.

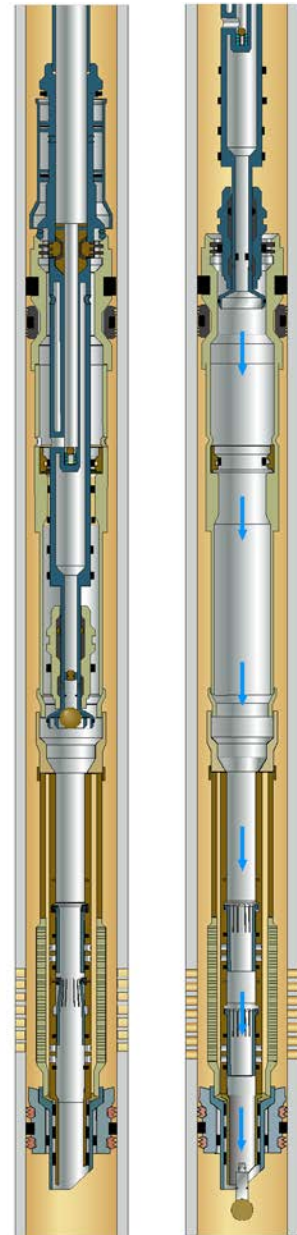
The system is compatible with Superior Completion Services' patented pressure-actuated isolation valves that allow wells to be placed on production without mechanical intervention. Eliminating the need for wash pipe and shifting tools reduces operational risks, as well as initial installation costs and rig time required for deployment. Gravel pack circulation is accomplished through a mechanical sleeve located at the bottom of the production screen. Once the job is completed, an actuation ball is released from the service tool closing the circulation sleeve and isolating the completion. Later, conventional production sliding sleeves are opened for production.

APPLICATIONS

- Zonal isolation
- Single or selective multizone completions

Features and Benefits

- Does not require wash pipe or shifting tools
- Provides optimum fluid loss protection and zonal isolation
- Can use mechanical or hydraulic sliding sleeves for production
- Soft-actuating valves eliminate pressure surges to the formation



Interventionless Isolation System

TECHNICAL DATA

Interventionless Isolation System*							
Screen Size		Isolation String OD		Isolation Sleeve ID		Compatible Packer Bore ID	
inch	mm	inch	mm	inch	mm	inch	mm
3.50	88.9	2.87	73.0	2.313	58.8	3.25	82.6
						4.00	101.6

* The tool is compatible with all current Superior Completion Services' zone isolation valves, including the mechanical multi-service valve, pressure-actuated circulating valve, annular flow valve and radial flow valve.

REFERENCES

- Multi-service valve data sheet
- Pressure-actuated circulating valve data sheet
- Annular flow valve data sheet
- Radial flow valve data sheet

Flapper Valves

Superior Completion Services' **Flapper Valves** are uniquely designed to combine optimum fluid loss protection with the ability to easily remove the flapper material. Flappers utilize frangible glass or ceramic materials to withstand high pressure differentials and still provide easy mechanical breakup.

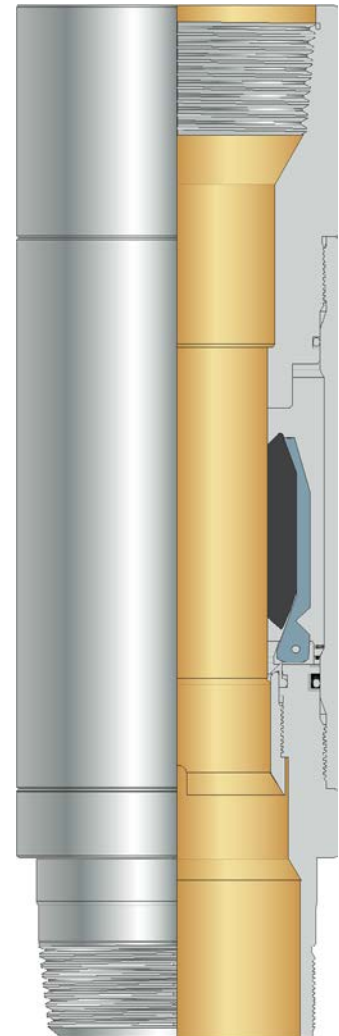
APPLICATIONS

- Fluid loss control
- Provides optimum fluid loss protection
- Withstands high pressure differentials
- Provides easy mechanical breakup
- Optional hydraulic breakup
- Provides one-way zonal isolation
- Dual flapper valve is available for severe fluid loss applications
- Optional eccentric design for maximum ID

TECHNICAL DATA

Flapper differential pressure capability ranges from 2,500 to 4,000 psi (17.2 to 27.6 MPa) depending on the size and material selected

Standard temperature rating 250°F (121°C)
 Maximum temperature rating 350°F (177°C)



Flapper Valve							
Casing Size		Maximum OD		Minimum ID		Compatible Packer Bore ID	
inch	mm	inch	mm	inch	mm	inch	mm
5-5½	127-139.7	3.71	94.2	1.930	42.02	2.688	68.275
6 %	168.7	5.01	127.25	2.470	62.73	3.25-4	82.55-101.6
7	177.80	5.57	139.95	2.980	75.69	3.25-4	
		5.545	140.83	2.968	75.38	3.25-4	
7 %	193.60	5.817	147.75	3.307	83.99	4	101.6
		5.972	151.68	3.348	85.03	4	101.6
9 %	244.47	7.015	178.18	3.745	95.12	4	101.6
		8.015	203.58	4.393	111.58	6	152.4
		8.015	203.58	4.645	117.98	6	152.4

Multi-Service Valve

Superior Completion Services' **Multi-Service Valve** provides zonal isolation and full-bore completion control. Communication can be easily established with conventional B or BO shifting tools or special coiled tubing shifting tools. The special slimline OD allows the valve to be run inside of the screen or liner assemblies while still maintaining optimum flow areas. The valve is available with both a standard and a selective profile allowing multiple valve usage in the same wellbore.

APPLICATIONS

- Both gravel pack and non-gravel pack installations
- Selective production
- Pre- and post-treatment zonal isolation

Features and Benefits

- Includes wireline-landing nipple profile above and packing bore below the valve mechanism for testing and contingency isolation
- Circulation ports have a larger flow area than the landing nipple and packing bore, which produces lower velocities and pressure drops across the ports
- Standard model B or BO shifting tools can be used to open and close the valve
- A special coiled tubing shifting tool is available with pump-through and bypass features
- Proprietary non-elastomeric packing provides excellent resistance to harsh chemical environments and high differential pressures
- Equalizing ports prevent damage to packing seals during valve opening
- Design certification includes differentially cycled 5,000 psi (34.5 MPa) with gas, 50 cycles at 250°F (121°C) testing
- Valve can be run in type-O (opens down) or type-A (opens up) configurations
- May also be actuated with special hydraulic shifting tools or wireline tractor systems



Multi-Service Valve (MSV)

TECHNICAL DATA

Standard temperature rating 300°F (149°C)
 Maximum temperature rating 350°F (177°C)

Multi-Service Valve											
Nominal OD		Minimum OD		Packing Bore Diameter		Tensile Yield Load		Differential Pressure Rating			
inch	mm	inch	mm	inch	mm	lb	kg	psi	MPa	inch ²	mm ²
2 1/16	52.4	2.35	59.6	1.63	41.3	51,000	23,192	8,000	55	4.71	3,040.0
2 3/8	60.3	2.71	68.8	1.88	47.6	104,000	47,273	10,000	69	5.89	3,800.0
		2.71	68.8	1.78	45.2	104,000	47,273	10,000	69	5.89	3,800.0
2 7/8	73.0	3.44	87.3	2.19	55.6	98,190	44,632	10,000	69	9.62	6207.1
		3.25	82.6	2.31	58.5	98,190	44,632	10,000	69	9.62	6207.1
		3.27	83.1	2.31	58.8	98,190	44,632	10,000	69	9.62	6207.1
		3.19	80.9	2.19	55.6	98,190	44,632	12,500	86	9.62	6207.1
		3.44	87.3	2.19	55.6	98,190	44,362	15,000	103.5	9.62	6207.1
3 1/2	88.9	3.97	100.7	2.81	71.5	196,327	89,240	8,000	55	18.80	12,129.0
		3.87	98.3	2.56	65.1	230,000	104,545	10,000	69	18.80	12,129.0
		3.87	98.3	2.56	65.1	270,270	104,545	10,000	69	18.80	12,129.0
		3.97	100.7	2.75	69.9	230,000	104,545	10,000	69	18.80	12,129.0
		3.97	100.7	2.81	71.5	230,000	104,545	10,000	69	18.80	12,129.0
		3.87	98.3	2.56	65.1	250,000	113,636	11,000	76	18.80	12,129.0
		4.00	101.6	2.56	65.1	250,000	113,636	11,000	76	18.80	12,129.0
		4.07	103.3	2.56	65.1	250,000	113,636	11,000	76	18.80	12,129.0
		4.32	109.8	2.56	65.1	286,690	113,636	11,000	76	18.80	12,129.0
		4.00	101.6	2.56	65.1	250,000	122,850	12,500	86	18.80	12,129.0
		3.97	100.7	2.75	69.6	230,000	130,314	12,500	86	18.80	12,129.0
		3.97	100.7	2.81	71.5	286,690	130,314	12,500	86	18.80	12,129.0
		4.035	102.5	2.56	65.1	230,000	104,545	15,000	103.5	18.80	12,129.0
4 1/2	114.3	5.01	127.3	3.69	93.7	202,730	92,150	10,000	69	14.85	9,580.6

REFERENCES

- PX profile nipple data sheet
- PR profile nipple data sheet
- Model B/Model BO shifting tools data sheet

COMPLETION TOOLS CATALOG

SECTION 3: Fluid Loss and Zonal Isolation System

Model B Shifting Tool

Superior Completion Services' **Model B Shifting Tool** is designed to selectively locate and shift most sliding sleeves and/or tubing-conveyed perforating (TCP) disconnect subs. This is accomplished by the tool's keys engaging the inner sleeve; depending on the direction that the tool requires (up or down), the sleeve is shifted.

Model BO Shifting Tool

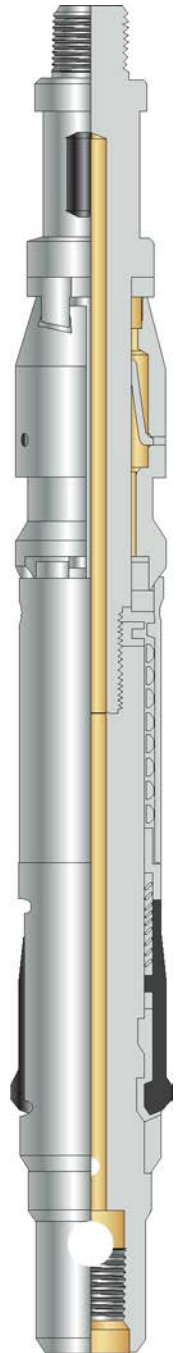
Superior Completion Services' **Model BO Shifting Tool** is designed to selectively locate and shift sliding sleeves only to the down position. The tool is converted to seeking mode by locating on the lower locating keys.

APPLICATIONS

- Any application where selective actuation of sliding sleeves is needed
- Actuating disconnect sub-applications
- Wells assisted by sucker-rod pumps

Features and Benefits

- Selectively locates and shifts most sliding sleeves and/or TCP disconnect subs



Model B / Model BO Shifting Tools

TECHNICAL DATA

Model B / Model BO Shifting Tools											
Size		Fish Neck OD		Pin Thread Connection		Made Up Length		OD (Keys Retracted)		OD (Keys Expanded)	
MODEL B SHIFTING TOOL											
inch	mm	inch	mm	inch	mm	inch	mm	in	mm	inch	mm
1 ¼	31.8	1.000	25.4	5/8-11	15.8-279.0	9.625	244.5	1.210	30.7	1.453	36.9
1 ½	38.1	1.188	30.2	15/16-10	23.8-254.0	10.500	266.7	1.406	35.7	1.719	43.7
1 ⅝	41.3	1.188	30.0	15/16-10	23.8-254.0	10.940	277.8	1.593	40.5	1.890	48.0
1 ⅝ ₇	43.4	1.188	30.2	15/16-10	23.8-254.0	11.313	287.4	1.750	44.5	2.120	53.8
1 7/9	45.2	1.375	34.9	15/16-10	23.8-254.0	11.313	287.4	1.840	46.7	2.156	54.8
1 7/8	47.6	1.375	34.9	15/16-10	23.8-254.0	13.000	330.2	1.965	49.9	2.438	61.9
2 1/8	54.0	1.375	34.9	15/16-10	23.8-254.0	11.813	300.1	2.156	54.8	2.656	67.5
2 1/3	58.8	1.750	44.5	15/16-10	23.8-254.0	11.938	303.2	2.530	64.3	2.968	75.4
2 3/4	69.9	2.313	58.8	11/16-10	17.5-254.0	12.188	309.6	2.718	69.0	3.031	77.0
2 4/5	71.5	2.313	58.8	11/16-10	17.5-254.0	12.188	309.6	2.718	69.0	3.156	80.2
3 1/4	82.6	2.313	58.8	11/16-10	17.5-254.0	14.125	358.8	3.200	81.3	3.640	92.5
3 2/3	93.7	3.125	79.4	15/16-10	23.8-254.0	13.313	338.2	3.656	92.9	4.125	104.8
3 4/5	96.9	2.125	54.0	15/16-10	23.8-254.0	12.938	328.6	3.734	94.8	4.093	104.0
MODEL B SHIFTING TOOL											
inch	mm	inch	mm	inch	mm	inch	mm	in	mm	inch	mm
2	50.8	1.375	34.9	15/16-10	23.8-254.0	19.250	489.0	1.828	46.4	2.188	55.6
2 ½	63.5	1.750	44.5	15/16-10	23.8-254.0	19.250	489.0	2.231	56.7	2.640	67.1
2 ¾	69.9	2.313	58.8	1 1/16-10	26.9-254.0	18.000	457.2	2.718	69.0	3.156	80.2
2 74/91	71.5	2.313	58.8	1 1/16-10	26.9-254.0	18.000	457.2	2.740	69.6	3.219	81.8

Pressure-Actuated Circulating Valve

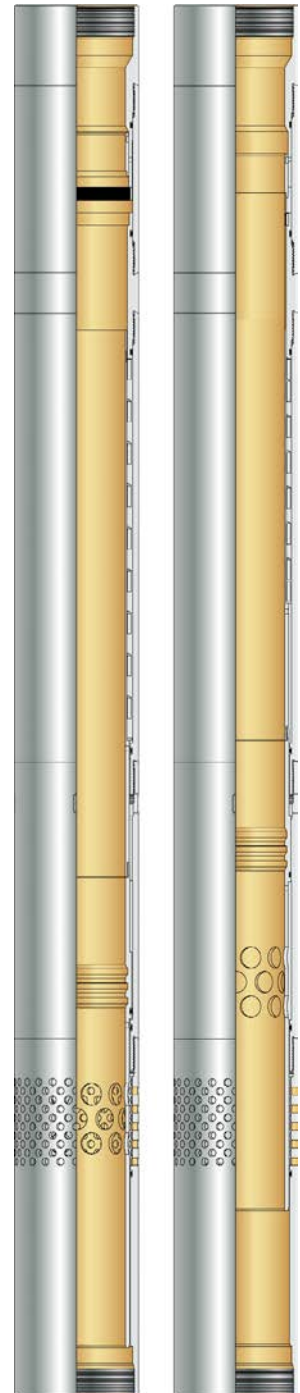
Superior Completion Services' patented **Pressure-Actuated Circulating (PACV) Valve** provides complete isolation of the productive interval during all phases of completion operations. The PAC valve operates hydraulically and requires no mechanical well intervention to initiate production. Once actuated, the valve provides a full-open flow path into the production tubing. Actuation is initiated by applying differential pressure from valve ID to OD. Initial actuation pressure unlocks the valves while maintaining pressure integrity (this patented PAC valve actuation method allows multiple valves to be in the same pressure cycle). Reducing the actuation pressure to equal the annular pressure allows the valve to cycle to the full open position.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall cost of completion
- Balanced design prevents premature actuation until seals are in place
- Provides positive bidirectional zonal isolation
- Redundant lock open system
- Unlocked position maintains pressure integrity
- Can be used in 5 to 10 3/4 in. (127.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is limited



Pressure-Actuated Circulating Valve

TECHNICAL DATA

Pressure-Actuated Circulating Valve												
Tubing Size		Maximum OD		Minimum ID		Temperature Rating		Differential Pressure Rating		Shifting Profile	Nominal Shear Range	
inch	mm	inch	mm	inch	mm	°F	°C	psi	MPa		psi	MPa
2 3/8	60.3	2.75	69.9	1.88	47.6	350	176.7	10,000	68.9	B	1,406-6,520	9.7-44.1
2 7/8	73.0	3.19	80.9	2.189	55.6	350	176.7	10,000	68.9	B	1,325-6,400	9.1-44.1
3 1/2	88.9	3.93	99.8	2.81	71.5	350	176.7	10,000	68.9	B	1,640-7,224	11.3-49.8
3 1/2	88.9	4.01	101.85	2.750	69.85	350	176.7	10,000	68.9	B	1,905-8141	13.13-56.13
3 1/2	88.9	3.99	101.35	2.562	65.07	350	176.7	15,000	103.5	B	1,820-7,841	12.5-54.0
4 1/2	114.3	4.77	121.0	3.50	88.9	250	121.1	10,000	68.9	Sup	1,440-2,880	9.9-19.9
4 1/2	114.3	5.51	139.95	3.688	93.67	350	176.7	15,000	103.5	B	1,845-8,762	12.7-60.4
5 1/2	139.7	6.07	154.2	4.82	122.5	250	121.1	8,000	55.2	Sup	1,910-3,660	13.2-25.2

REFERENCES

- ComPlete™ System data sheets (FP, FPDZ, HST)
- HPR Isolation System data sheet
- ISO Isolation System data sheet
- Screen-wrapped sleeves data sheet

Reclosable Pressure-Actuated Circulating (X-PAC) Valve

Superior Completion Services’ patented **X-PAC Valve** provides complete isolation of the productive interval during completion operations. The X-PAC valve operates hydraulically and requires no mechanical well intervention to initiate production. The X-PAC valve provides the added benefit of being reclosable to isolate the productive interval.

Once actuated, the valve provides a full-open flow path into the production tubing. Actuation is initiated by applying differential pressure from valve ID to OD. Initial actuation pressure unlocks the valves while maintaining pressure integrity (this patented valve actuation method allows multiple PAC valves to be in the same pressure cycle). Reducing the actuation pressure to equal the annular pressure allows the valve to cycle to the full open position.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions
- Post-completion zonal isolation

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall cost of completion
- Mechanical backup profile with compatible shifting tool
- Mechanically reclosable to provide an isolation barrier
- Provides positive bidirectional zonal isolation
- Unlocked position maintains pressure integrity
- Can be used in 7 to 10 3/4 in. (177.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is limited



Reclosable Pressure-Actuated Circulating (X-PAC)

TECHNICAL DATA

Temperature rating 250°F (121°C)

Reclosable Pressure-Actuated Circulating (X-PAC)															
Nominal OD		Minimum ID		Frac Mode Pressure Rating		Differential Pressure Rating		Nominal Shear Range		B Shifting Profile		Flow Area Through Valve		Flow Area Through ID	
inch	mm	inch	mm	psi	MPa	psi	MPa	psi	MPa	in	mm	inch ²	cm ²	inch ²	cm ²
5.57	141.2	2.188	55.6	12,500	86.2	10,000	69.0	1,761-8,289		2.19	55.6	4.28	27.6	3.76	24.3
5.57	141.2	2.313	58.8					2,200-4,800		2.31	58.8	4.2	27.1	4.20	27.1
6.64	168.7	2.750	70.2	10,000	69.0			2,090-4,270		2.75	69.9	5.67	36.6	6.00	38.7
6.64	168.7	2.813	71.5					2.81	71.5	5.67	36.6	6.21	40.1		
6.65	168.91	2.750	71.5	12,500	86.2	12,500	89.2	916-6,411	6.3-44.5	2.75	69.85	6.00	38.7	6.00	38.7
6.65	168.91	2.562	65.07	15,000	103.5	15,000	103.5	916-6,911	6.3-44.5	2.562	65.07	6.00	38.7	6.00	38.7

REFERENCES

- ComPlete™ System data sheets (FP, FPDZ, HST)
- HPR Isolation System data sheet
- ISO Isolation System data sheet
- Screen-wrapped sleeves data sheet

Radial Flow Valve

Superior Completion Services' patented **Radial Flow Valve** is used to provide selective isolation of a flow path between the annular area created by a concentric isolation string inside the screen and liner assembly and the ID of the concentric isolation string. The valve is in the closed position and run-in to provide positive isolation.

The valve is opened hydraulically by pressuring up on the tubing ID to create a differential, from the valve ID to the valve OD. At a predetermined pressure differential, the valve will shift to an unlocked condition. Returning the pressure across the valve to a near-balanced condition allows the valve to move to the open position, permitting flow into the production tubing.

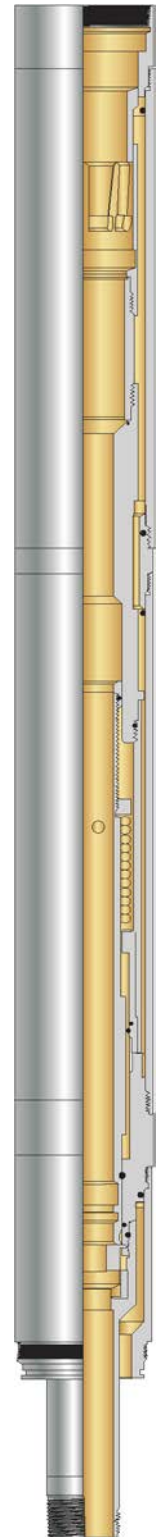
The valve is commonly used to isolate the lower zone of a dual completion or the lower zone of a intelligent well completion.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall cost of completion
- Balanced design prevents premature actuation until seals are in place
- Provides positive bidirectional zonal isolation
- Redundant lock open system
- Unlocked position maintains pressure integrity
- Can be used in 7 to 10 3/4 in. (177.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is limited



Radial Flow Valve

TECHNICAL DATA

Available in 6-, 10-, 20-, 30- and 40-ft (1.8-, 3.0-, 6.1-, 9.1- and 12.2-m) sealbore lengths

Temperature rating 350°F (177°C)

Radial Flow Valve																	
Nominal OD		Minimum ID		Flow Area Through Valve		Flow Area Through ID		Sealbore Size		Shear Range		Differential Pressure Rating		Type B Shifting Profile			
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	psi	MPa	psi	MPa	psi	MPa	inch	cm
5.13	130.3	2.31	58.7	5.90	149.9	4.19	106.4	3.25	82.6	938	6.5	6,568	45.3	10,000	69.0	2.31	58.7
5.56*	141.2	2.19	55.6	5.40	137.2	3.76	95.5	3.25	82.6	1,186	8.2	8,325	57.4	15,000	103.4	2.19	55.6
6.64	168.7	2.68	68.1	7.50	190.5	5.64	143.3	4.00	101.6	900	6.2	7,200	49.6	10,000	69.0	2.56	65.0
6.64	168.7	2.38	60.5	7.50	190.5	4.45	113.0	4.00	101.6	900	6.2	7,200	49.6	10,000	69.0	2.31	58.7
6.64	168.7	2.87	72.9	7.50	190.5	6.47	164.3	4.00	101.6	900	6.2	7,200	49.6	10,000	69.0	2.81	71.4
6.64*	168.7	2.56	65.0	5.30	134.6	5.16	131.1	4.00	101.6	916	6.3	6,411	44.2	15,000	103.4	2.56	65.0

* Pressure rating 15,000 psi (103.42 MPa).

REFERENCES

ComPlete™ system data sheets (FP, FPDZ)

ISO isolation system data sheet

Intelligent well completion system data sheet

Reclosable Radial Flow Valve (X-RFV)

Superior Completion Services' patented X-RFV system is used to provide flow path isolation between the annular area created by the concentric isolation string inside the screen and the blank assembly during stimulation treatments. This valve can also help maintain zonal isolation during upper-zone stimulation treatments. The X-RFV provides the added benefit of being reclosable to isolate the productive interval. The valve is in the closed position and run-in to provide positive isolation.

The valve is opened hydraulically by pressuring up on the tubing ID to create a differential from the valve ID to the valve OD. At a predetermined pressure differential, the valve will shift to an unlocked condition. Returning the pressure across the valve to a near-balanced condition allows the valve to move to the open position, permitting flow into the production tubing.

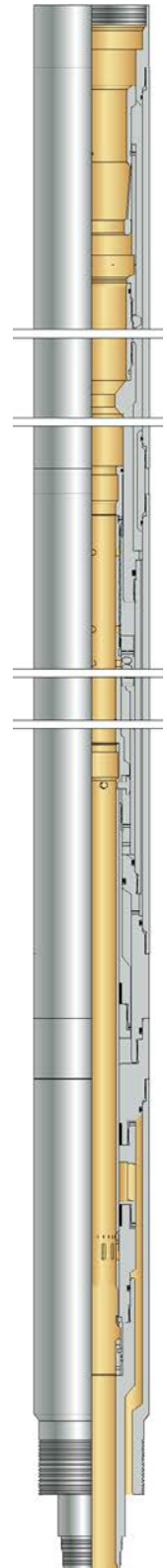
The valve is commonly used to isolate the lower zone of a dual completion or the lower zone of a intelligent well completion.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall project cost
- Balanced design prevents premature actuation until seals are in place
- Provides positive bidirectional zonal isolation
- Redundant lock open system
- Unlocked position maintains pressure integrity
- Can be used in 7 to 10 3/4 in. (177.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is not possible



Reclosable Radial Flow Valve (X-RFV)

TECHNICAL DATA

Reclosable Radial Flow Valve (X-RFV)																			
Nominal OD		Minimum ID		Flow Area Through Valve		Flow Area Through ID		Sealbore Size		Frac Mode Pressure		Temp Rating		Differential Pressure		Nominal Shear Range		Type B Shifting Profile	
inch	mm	inch	mm	inch ²	mm ²	inch ²	mm ²	inch	mm	psi	MPa	°F	°C	psi	MPa	psi	MPa	inch	cm
5.58	141.6	2.19	55.6	3.93	25.4	3.76	24.3	3.25	82.6	15,000	103.4	350	177	15,000	103.4	1,189-8,325	8.2-57.4	2.188	55.6
6.64	168.7	2.56	65.0	5.20	33.5	5.16	33.3	82.6	101.6	15,000	103.4	350	177	15,000	103.4	916-6,411	6.3-44.2	2.56	65.0
6.64	168.7	2.813	69.9	6.40	41.3	6.21	40.1	4.00	101.6	10,000	69.0	350	177	15,000	69.0	916-6,411	17.2-33.8	2.81	71.4

REFERENCES

- ComPlete™ system data sheets (FP, FPDZ)
- ISO isolation system data sheet
- SHARP well completion system data sheet

Annular Flow Valve

Superior Completion Services’ patented Annular Flow Valve is used to isolate a concentric flow path normally created between the inner concentric production tubing and an outer screen and blank assembly.

The Annular Flow Valve is utilized in the upper interval of a multizone completion to provide positive isolation after stimulation treatments have been completed. The valve is hydraulically actuated by creating a pre-set ID to OD differential across the actuating piston. The valve includes a balancing feature, which prevents treating pressure from prematurely shearing and shifting the actuating piston until the production seals are landed. Formation pressure has no effect on valve actuation.

The valve is commonly used to isolate the upper zone of a dual completion or the upper zone of a intelligent well completion.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions
- Post-completion zonal isolation

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall project cost
- Balanced design prevents premature actuation until seals are in place
- Provides positive bi-directional zonal isolation
- Redundant lock open system
- Unlocked position maintains pressure integrity
- Can be used in 7 to 10 3/4 in. (177.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is not possible



Annular Flow Valve

TECHNICAL DATA

Available in 10-, 20-, 30- and 40-ft (3.0-, 6.1-, 9.1- and 12.2-m) sealbore lengths

Annular Flow Valve																			
Nominal OD		Minimum ID		Flow Area Through Valve		Flow Area Through ID		Sealbore Size		Frac Mode Pressure		Temp Rating		Differential Pressure		Nominal Shear Range		Type B Shifting Profile	
inch	mm	inch	mm	inch ²	mm ²	inch ²	mm ²	inch	mm	psi	MPa	°F	°C	psi	MPa	psi	MPa	inch	cm
5.58	141.6	2.19	55.6	3.93	25.4	3.76	24.3	3.25	82.6	15,000	103.4	350	177	15,000	103.4	1,189-8,325	8.2-57.4	2.188	55.6
6.64	168.7	2.56	65.0	5.20	33.5	5.16	33.3	82.6	101.6	15,000	103.4	350	177	15,000	103.4	916-6,411	6.3-44.2	2.56	65.0
6.64	168.7	2.813	69.9	6.40	41.3	6.21	40.1	4.00	101.6	10,000	69.0	350	177	15,000	69.0	916-6,411	17.2-33.8	2.81	71.4

12,500 psi (86.1 MPa) frac mode available.

REFERENCES

- ComPlete™ system data sheets (FP, FPDZ)
- ISO isolation system data sheet
- SHARP well completion system data sheet

Reclosable Annular Flow Valve (X-AFV)

Superior Completion Services’ patented X-AFV system is used to isolate a concentric flow path created between the isolation string inside the screen and blank assembly. This valve can also help maintain zonal isolation during production installation without being pressure sensitive.

The X-AFV is utilized in the upper interval of a multizone completion to provide positive isolation after stimulation treatments have been completed. The valve is hydraulically actuated by creating a pre-set ID to OD differential across the actuating piston. The valve includes a balancing feature, which prevents treating pressure from prematurely shearing and shifting the actuating piston until the production seals are landed. Formation pressure has no effect on valve actuation.

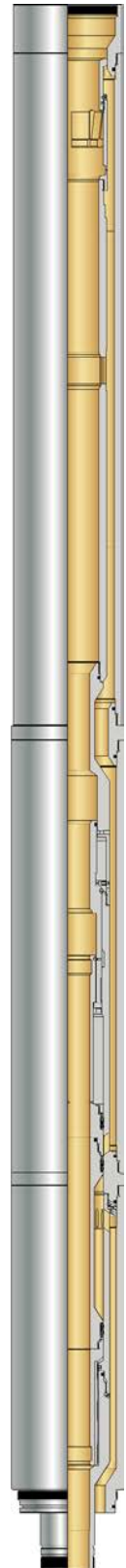
The valve is commonly used to isolate the upper zone of a dual completion or the upper zone of an intelligent well completion.

APPLICATIONS

- Interventionless zonal isolation and production initiation
- Fluid loss control
- Deviated wellbores
- Completion designs with limited tubing ID access
- Intelligent and multizone completions
- Post-completion zonal isolation

Features and Benefits

- Optimized flow areas for maximum production
- Interventionless actuation reduces operational risk and overall project cost
- Mechanical backup profile with compatible shifting tool
- Mechanically reclosable to provide an isolation barrier
- Balanced design prevents premature actuation until seals are in place
- Provides positive bidirectional zonal isolation
- Unlocked position maintains pressure integrity
- Can be used in 7 to 10 3/4 in. (177.8 to 273.1 mm) casing sizes
- Tubing-pressure actuated
- Ideal for use in deepwater intelligent completions where mechanical access is not possible



Reclosable Annular Flow Valve (X-AFV)

TECHNICAL DATA

Reclosable Annular Flow Valve																	
Nominal OD		Minimum ID		Flow Area Through Valve		Flow Area Through ID		Sealbore Size		Frac Mode Pressure		Temperature Rating		Nominal Shear Range		Type B Shifting Profile	
inch	mm	inch	mm	inch ²	cm ²	inch ²	cm ²	inch	mm	psi	MPa	°F	°C	psi	MPa	inch	mm
5.56	141.2	4.2	106.7	3.8	95.3	2.19	55.6	3.3	82.6	12,500	86.2	250	121	1,830-8,676	12.6-59.8	2.188	55.6
7.26	184.4	7.5	190.5	5.2	130.8	2.56	65.1	4.0	101.6	12,500	86.2	250	121	1.572	10.8	2.562	65.1
7.26	184.4	7.5	190.5	6.2	157.5	2.81	71.5	4.0	101.6	12,500	86.2	250	121	1.572	10.8	2.813	71.5
7.70	195.6	6.2	157.5	5.2	130.8	2.56	65.0	4.0	101.6	15,000	103.4	350	177	1,971-7,697	13.5-53.1	2.56	65.0

REFERENCES

- ComPlete™ system data sheets (FP, FPDZ)
- ISO isolation system data sheet
- Intelligent well completion system data sheet

Reclosable Hydraulic Well Barrier Valve (X-HBV)

Superior’s Hydraulic Well Barrier Valve (X-HBV) is utilized as a temporary barrier for service as a Type-CC V1 qualified product as per API-19V. The field-run and tested rigid frame is designed for harsh downhole environments. The debris tolerant interior hydraulic and mechanical mechanisms are configured for long-term, reliable service under severe wellbore conditions. In addition, the length between the ball and shifting profiles are customizable. The valve provides a unique hydraulic actuated trigger feature which allows a choice of cycles from 5, 8, 11, 14, 17, 20 +/- 1.

Superior’s X-HBV provides a one-time hydraulically trigger open feature despite multiple mechanical shifts to open or close prior to hydraulic activation. Once functioned hydraulically, the valve can be cycled open or closed numerous times by mechanical means. A multi-action, basket-style, soft-release collet shifting tool is utilized for valve operations during the well completion phase; to provide a positive mechanical shifting under severe fluid loss conditions. A hydraulic-actuated shifting tool can also be utilized to open or close the ball valve relayed downhole via coiled tubing. The slim-factor tool design is adequate for production tubing entry while maintaining engagement required for a reliable mechanical valve function.

The hydraulic actuator and the axial-supported cam driven mechanism are preloaded in a fluid-filled environment with floating pistons to adjust to wellbore hydrostatic conditions. The actuation piston is held in position with a pre-determined shear value.

A pressure-assisted inert seal enhances integrity in low pressure gas wells while maintaining positive assurance at higher differentials. The frame design incorporates applicable safety and temperature factors to qualify the assembly as a barrier valve.



Features and Benefits

- Ratings
 - 10,000 psi burst and collapse on body
 - 5,000 psi bi-directional burst and collapse across the ball
- Debris tolerant
 - Actuation mechanisms shielded from internal debris
 - A screen protected, oil filled hydraulic chamber guarantees a clean environment for moving parts
 - Smooth ID to prevent debris collection
- Shifting tools
 - Mechanical – Multi-action, soft-release, basket style collet
 - Hydraulic – Pressure actuated coiled tubing shifting tool
- Qualification
 - Bi-directional fluid loss control valve
 - Qualified as per API-19V as a Type-CC V1 barrier valve
 - Valve for well completions and abandonments
- Actuation
 - Mechanical – pre and post hydraulic actuation
 - Hydraulic – one time only; remote multi-cycle trigger for controlled opening
- Full bore ID maximizes production and permits access to the sandface
- Flexible upper completion operations such as pressure tests above a closed ball
- Multiple mechanical open and close cycles prior to and after hydraulic open

Reclosable Mechanical Well Barrier Valve (X-MBV)

Superior’s Reclosable Mechanical Barrier Valve (X-MBV) has been certified for service according to API-19V as a Type-CC V1 grade temporary well barrier.

The ridged frame is well-suited for harsh downhole environments. The debris tolerant mechanism has been configured for long-term reliable service in various well conditions. In addition, the distance between the ball and the shift open profile is customizable, per the operator’s well completion configuration.

The axial-support, cam-driven mechanism has successfully functioned closed under massive fluid loss situations and opened with above and below ball differentials. The exterior frame design incorporates safety and temperature factors to qualify the assembly as a temporary barrier. Pressure-assisted inert seals enhance integrity in low pressure gas wells while maintaining positive assurance at higher differentials.

A multi-action, soft-release, basket-style collet shifting tool is utilized for valve operations during the well construction phase: delivering a positive mechanical engagement while mechanically functioning under extreme fluid loss conditions. A hydraulic-actuated, shifting tool is utilized to open or close the ball valve in production setting. The slim-factor tool design is adequate for production accessory entry while maintaining a positive engagement during contingency operation.



Features and Benefits

- Ratings
 - 10,000 psi differential burst and collapse rated body
 - 5,000 psi differential burst and collapse rated ball
 - Certified as per API-19V Type-CC to V1
 - 8.190" max OD x 4.560" min ID
- Debris tolerant
 - Actuation mechanism shielded from internal debris
 - Customizable length enhances functionality
- Shifting tools
 - Mechanical - multi-action, soft-release basket style collet
 - Hydraulic - pressure actuated coiled tubing shifting tools
- Certified barrier valve
 - Zonal isolation valve
 - Barrier valve for well completion and abandonments
- Permit full bore ID from sandface to enhance production and unrestricted access
- Multiple mechanical open and close cycles
- Bi-directional fluid loss control valve

Reclosable Barrier Valves

TECHNICAL DATA

Pressure rating across ball 5,000 psi (34.5 MPa), 7,500 psi (51.71 MPa)
 Pressure rating across housing 10,000 psi (68.9 MPa)

Reclosable Well Barrier Valves									
Tubing Size		Maximum OD		Minimum ID		Thread Connection		Tensile Rating	
inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
5 ½	139.70	8.19	208.0	4.560	115.82	5 ½	139.70	600,000	272,155

Premium metallurgies available upon request.