



COMPLETION SERVICES



2019
**COMPLETION TOOLS
CATALOG**

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COMPLETION SERVICES

SECTION 1

Gravel Pack and Frac-Pack Systems



GRAVEL PACK AND FRAC-PACK SYSTEMS

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ACCESSORIES

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ComPlete™ FP System

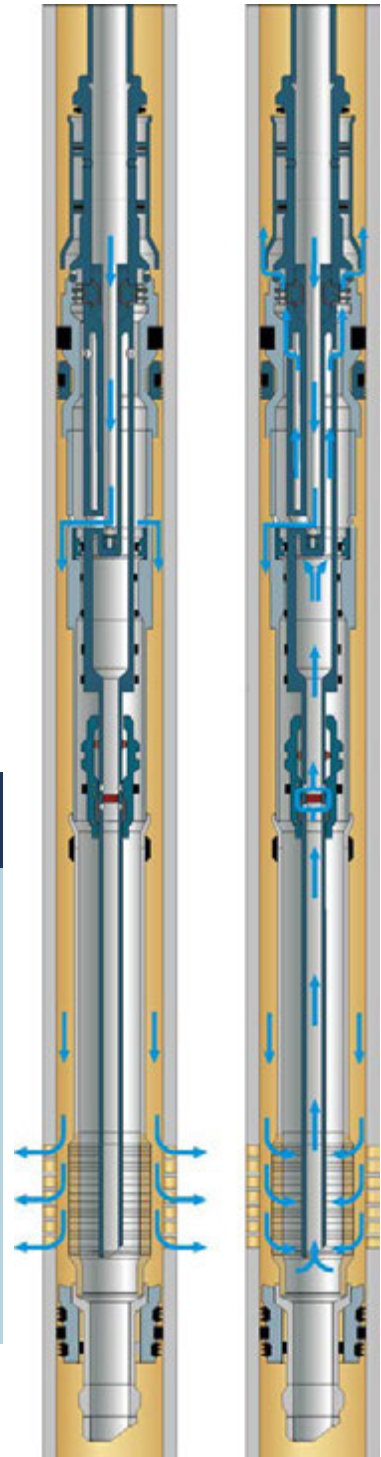
Superior Completion Services' **ComPlete™ Frac-Pack (FP) System** is a single-trip, single-zone, frac/gravel pack completion system. The system allows set-down weight to be applied in both squeeze and circulating positions to eliminate problems associated with tubing movement during the well treatment. It can be repeatedly cycled between the squeeze and circulating positions with minimal up and down movement of the work string. The system is simple in design and offers mechanical indications of all positions and tool movements. The service tool position is the same in the squeeze and circulating positions, minimizing the potential for erosion.

APPLICATIONS

- Conventional single-trip gravel and frac-packing
- Acid stimulation treatments
- Horizontal or vertical well displacements
- Conventional multizone stack-pack completions

Features and Benefits

- Hydraulic pressure release (tubing or annular) with contingency mechanical release
- True live annulus pressure monitoring in the weight-down circulating position
- Reverse circulation through wash pipe is possible in the circulating position for removal of pills, debris, etc.
- Ports are aligned in all treating positions
- Treating sleeve incorporates bonded production seals for maximum pressure integrity and reliability
- Isolation valve provides zonal isolation in reverse position
- Short overall length



ComPlete™ FPDZ System

Superior Completion Services' **ComPlete™ Frac-Pack Deep-Zone (FPDZ) System** is a frac-pack rated sand control placement technology. It is specially configured for deep completions where work string stretch and drag make downhole tool manipulation more challenging. The system offers extended tool length, increasing the acceptable range for reverse position. Dual collets on the service tool ensure positive manipulation of the circulating valve while picking up to reverse and provide a positive weight indication when the reverse position is achieved.

APPLICATIONS

- Ultra-deep completions
- Sand control
- Deepwater
- Highly deviated well trajectories

Features and Benefits

- Extended reverse position
- Dedicated circulating valve collet for controlling return flow
- Mechanical indication of reverse position
- Successful tool manipulation in ultra deep and highly deviated wellbores
- Resists unintentional closing of the circulating valve due to work string slingshot effect
- Hydraulic pressure release (tubing or annular) with redundant mechanical release
- True live annulus pressure monitoring in the circulating position
- Reverse circulation through wash pipe is possible in the circulating position for removal of pills, debris, etc.
- Ports are aligned in all treating positions
- Treating sleeve incorporates bonded production seals for maximum pressure integrity and reliability
- Isolation valve provides zonal isolation in reverse position



REFERENCES

- CompSet™ Packers data sheet
- CompSet™ Ultra packer data sheet

ComPlete™ FP Anti-Swab System

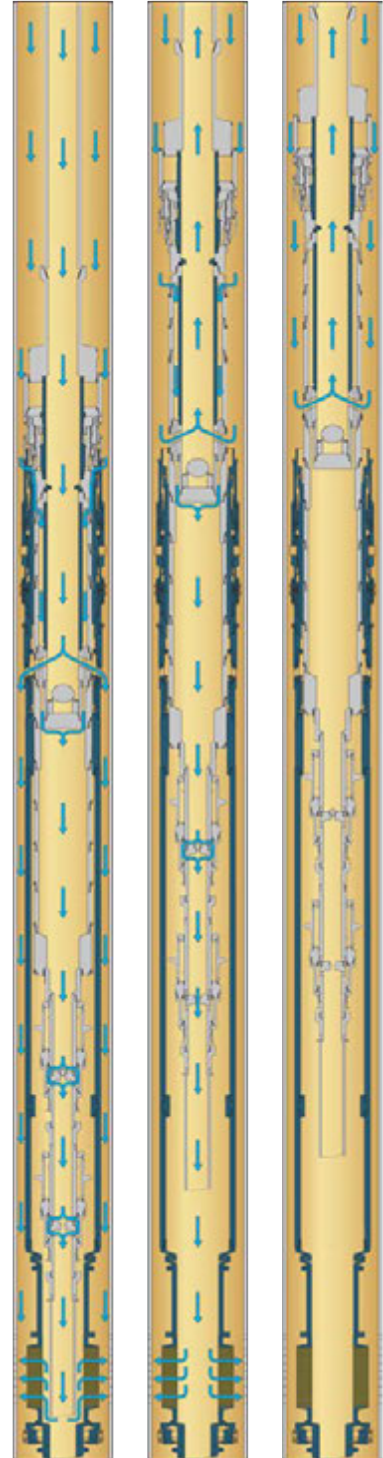
Superior Completion Services' **ComPlete™ Frac-Pack Anti-Swab (ASW) System** is a frac-pack stimulation tool technology designed for highly unconsolidated formations requiring sand-control treatment. The simple yet extremely effective tool design ensures that the wellbore hydrostatic is maintained on formation at all times while running in hole, during and after packer setting, spotting treatment, etc. It is specially configured for deepwater completions to overcome the drag and stretch related challenges endured by long work string in complicated wellbore trajectory. The service tool locates at the same spot on the packer for a weight-down frac or a true-squeeze position, overcoming confusion related to tool position. The extended nature of the tool provides enough room in reverse position during spotting or slurry reversal. This system consists of both proprietary and premium metal-to-metal for an absolute system integrity.

APPLICATIONS

- Ultra-deep completions
- Highly unconsolidated
- Deepwater
- Maintains hydrostatic on formation

Features and Benefits

- Proprietary and premium metal to metal connection
- Dedicated valve for anti-swab function using a controlled weep sub-system
- Positive surface indication of engagement during packer testing
- Effortless tool manipulation in challenging downhole environment and deviated wellbores
- Proprietary design to prevent sling shot during manipulating service tool downhole
- Hydraulic pressure release with secondary rotational release
- Positive isolation valve provides zonal isolation in reverse position
- Also consists of other features and benefits of the FPDZ System



REFERENCES

- CompSet™ Packers data sheet
- CompSet™ Extreme packer data sheet

ComPlete™ FP System

TECHNICAL DATA

Minimum Overall Length 16 ft (4.9 m)
Temperature Rating 350°F (177 °C)

ComPlete™ FP System									
Casing Size		Minimum OD		Pump Rate		Proppant Volume		Differential Pressure Rating	
inch	mm	inch	mm	bbl/min	m ³ /min	lb	kg	psi	MPa
5 - 5 ½	127 - 139.7	2.69	68.3	15	2.38	150,000	68,040	10,000	68.9
7 - 7 ¾	177.8 - 196.9	3.25	82.6	25	3.98	300,000	136,079	10,000	68.9
7 - 9 ⅝	177.8 - 244.5	4.00	101.6	35	5.56	350,000	158,759	10,000	68.9
9 ⅝ - 13 ⅜	244.5 - 339.7	4.75	120.7	40	6.36	600,000	272,158	10,000	68.9
9 ⅝ - 13 ⅜	244.5 - 339.7	6.00	152.4	50	7.95	1,000,000	453,598	10,000	68.9

ComPlete™ FP Extreme/ Anti-Swab System									
Casing Size		Minimum OD		Pump Rate		Proppant Volume		Differential Pressure Rating	
inch	mm	inch	mm	bbl/min	m ³ /min	lb	kg	psi	MPa
7 ¾*	196.9	4.00	101.6	40	6.36	500,000	226,799	12,500	86.2
9 ⅝ - 10 ⅞*	244.5 - 257.2	6.00	152.4	60	9.54	>500,000	>226,799	12,500	86.2

ComPlete™ FP Ultra System									
Casing Size		Minimum OD		Pump Rate		Proppant Volume		Differential Pressure Rating	
inch	mm	inch	mm	bbl/min	m ³ /min	lb	kg	psi	MPa
7 ¾*	196.9	3.88	98.55	40	6.36	500,000	226,799	15,000	103.4
9 ⅝ - 10 ⅞*	250.8 - 257.2	5.50	139.7	60	9.54	1,000,000	453,597	15,000	103.4

* Tested with intermediate- and high strength proppant.

REFERENCES

CompSet™ Packers data sheet
CompSet™ Ultra packer data sheet

Molded-Seal Closing Sleeve

Superior Completion Services' **Molded-Seal (MS) Closing Sleeve** is used in high-rate water packs, fracturing and stimulation in vertical or horizontal well completions. The unique port body and closing sleeve provides maximum proppant deployment and positive sealing after zonal treatment. The MS closing sleeve is assembled as a **ComPlete™ Frac-Pack (FP) System** with Superior Completion's **CompSet™ Packers**.

APPLICATIONS

- Vertical or horizontal well completions
- High-rate water packs, fracturing and stimulation

Features and Benefits

- Large treatment ports
- Inverted molded seals for positive isolation
- Compatible with all ComPlete™ system packers
- Debris-tolerant design ensures complete sleeve closure after stimulation

TECHNICAL DATA

Pressure Rating 10,000 to 15,000 psi (68.9 to 103.4 MPa)

Temperature Rating Up to 350°F (177°C)



REFERENCES

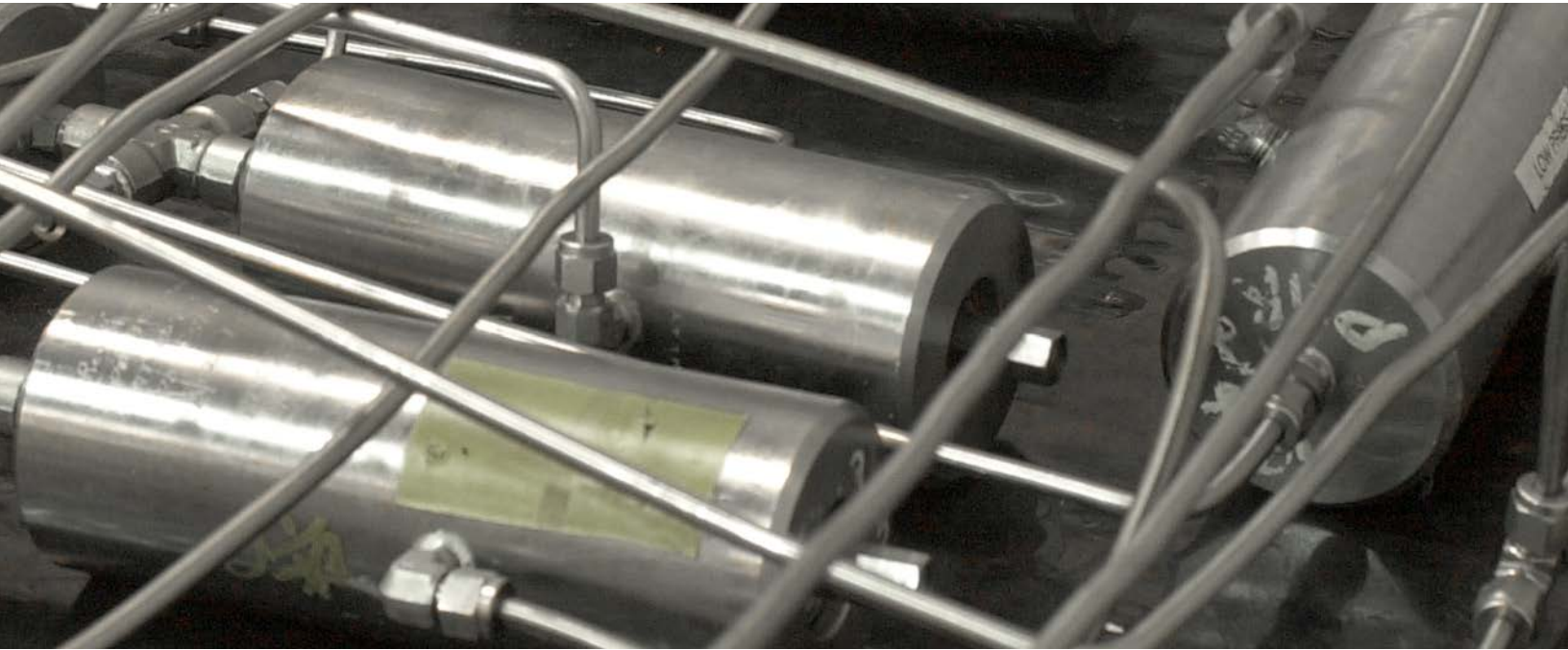
- ComPlete™ FP data sheet
- CompSet™ Packers data sheet
- CompSet™ Ultra packer data sheet



COMPLETION SERVICES

SECTION 2

Single-Trip Systems



SINGLE-TRIP SYSTEMS

ComPlete™ MST System	6
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ComPlete™ PST System	10
ComPlete™ HST System	12

ACCESSORIES

ComPlete™ MST System

Decripler Sub	14
Disappearing Check Valve	15
Multi-Profile Multi-Service Valve	16
Multi-Profile Shifting Tools	18

ComPlete™ RST System

Depth Verification Tool	19
Multi-Cycle On-Off Tool	20

ComPlete™ HST System

Pressure-Actuated Differential Valve	21
Ball-Actuated Anti-Reversing Valve	22

ComPlete™ MST System

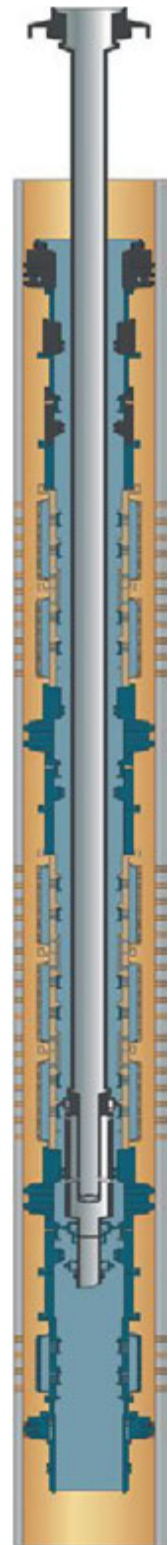
Superior Completion Services' **ComPlete™ Multizone Single-Trip (MST) System** uses a patented method to reduce the number of trips necessary to conventionally stimulate and complete multiple intervals in a wellbore. Rig time associated with conventional multizone stacked completions is reduced, offering an attractive economic alternative to the stack and frac-pack completion technique. Although a typical application for the **ComPlete™ MST System** would be two to six intervals, there is no limit to the number of zones that can be effectively completed.

APPLICATIONS

- Ultra-deep completions
- Multizone completions
- Zonal isolation and selective production
- Sand and non-sand control applications

Features and Benefits

- Full-bore ID is compatible with production tubing
- Provides positive independent zonal isolation for each interval during completion and production operations
- No limit on zone lengths; a minimum of 30 ft (10 m) distance is required between intervals
- Retrievable, testable, dual-element isolation packer provides reservoir isolation during stimulation and production
- Proprietary technology includes new sealing elements at each interval for added reliability
- Proprietary locating design offers new indicator and set-down point with defined slurry port alignment when stimulating each interval
- Every position is mechanically identified and hydraulically verified, providing enhanced diagnostics
- Service tool configuration offers circulating position with real-time live annulus monitoring, as well as conventional squeeze treatment capability
- Selective production may be initiated with slickline-, wireline-, tractor- or coiled tubing-conveyed shifting tools
- May be integrated with interventionless production initiation systems
- Available with a patented screen communication system that enhances treating capabilities and provides a continuous production flow path
- Compatible with other ComPlete™ Single-trip Systems and Superior Completion Services' Intelligent System



ComPlete™ MST System

TECHNICAL DATA

Temperature Rating 350°F (177 °C)

ComPlete™ MST System									
Casing Size		System Bore		Differential Pressure Rating		Pump Rate	Total Proppant		Proppant Type
inch	mm	inch	mm	psi	MPa	BPM	lb	kg	
7	177.8	2.75	69.9	10,000	68.9	25	600,000	272,727	20/40 Bauxite
7½	193.7	2.75	69.9	10,000	68.9	25	600,000	272,727	20/40 Bauxite
7½ - 7¾	193.7-196.8	3.25	69.9	10,000*	86.2	35	750,000	340,909	20/40 Bauxite
9 ½	244.5	3.75	95.3	10,000*	86.2	40	1,500,000	681,818	20/40 Bauxite
9 ¾	244.5	5.125	130.2	8,500	58.6	45	750,000	340,909	16/20 Carbolite

* Differential Pressure Rating for treating is 12,500 psi

REFERENCES

- ComPlete™ System data sheets (HST, RST, PST)
- Multi-position multiservice valve data sheet
- Screen communication system data sheet
- Intelligent well completion system data sheet

ComPlete™ RST System

Superior Completion Services' patented **ComPlete™ Releasable Single-Trip (RST) System** allows the operator to perforate, and gravel pack or frac-pack zones of interest within a single-trip into the wellbore.

Guns are anchored into a previously set depth verification tool (DVT), allowing the GP/FP components to be released and placed at a safe distance from the perforating operations. This separation helps eliminate the transmission of mechanical shock loads and uses the fluid column to reduce the pressure wave from gun detonation, avoiding damaged packers, twisted screens, premature packer setting and other types of failures associated with perforating gun detonation.

APPLICATIONS

- Ultra-deep completions
- Cased hole completions with sufficient sump area
- Critical fluid loss control completions
- Underbalanced and overbalanced perforating

TECHNICAL DATA

Available Sizes	5 to 10 1/8 inch (127.0 to 257.2 mm)
Differential Pressure Rating	up to 12,500 psi (86.2 MPa)
Temperature Rating	350°F (177 °C)

REFERENCES

ComPlete™ system data sheets (FP, MST)
CompSet™ packers data sheet
Depth verification tool data sheet
Flapper valves data sheet
ISO isolation system data sheet
Multi-position multi-service valve data sheet
Multi-cycle on-off tool data sheet

Features and Benefits

- Saves rig time
- Reduces fluid losses
- Eliminates need for a separate perforating run
- Eliminates logging trip to place gun on depth
- Eliminates the effects of mechanical shock loads at gun detonation
- Reduces pressure pulse at gun detonation
- Minimal rathole requirements, perforations plus approximately 30 ft (9.1m) below the DVT
- DVT run on wireline or tubing prior to the packer and gun assembly
- DVT released upon gun detonation
- Provides the standard **ComPlete FP System** capabilities
- May be integrated with interventionless production initiation systems

ComPlete™ RST System: Operating Sequence

Set Depth
Verification
Tool (DVT)

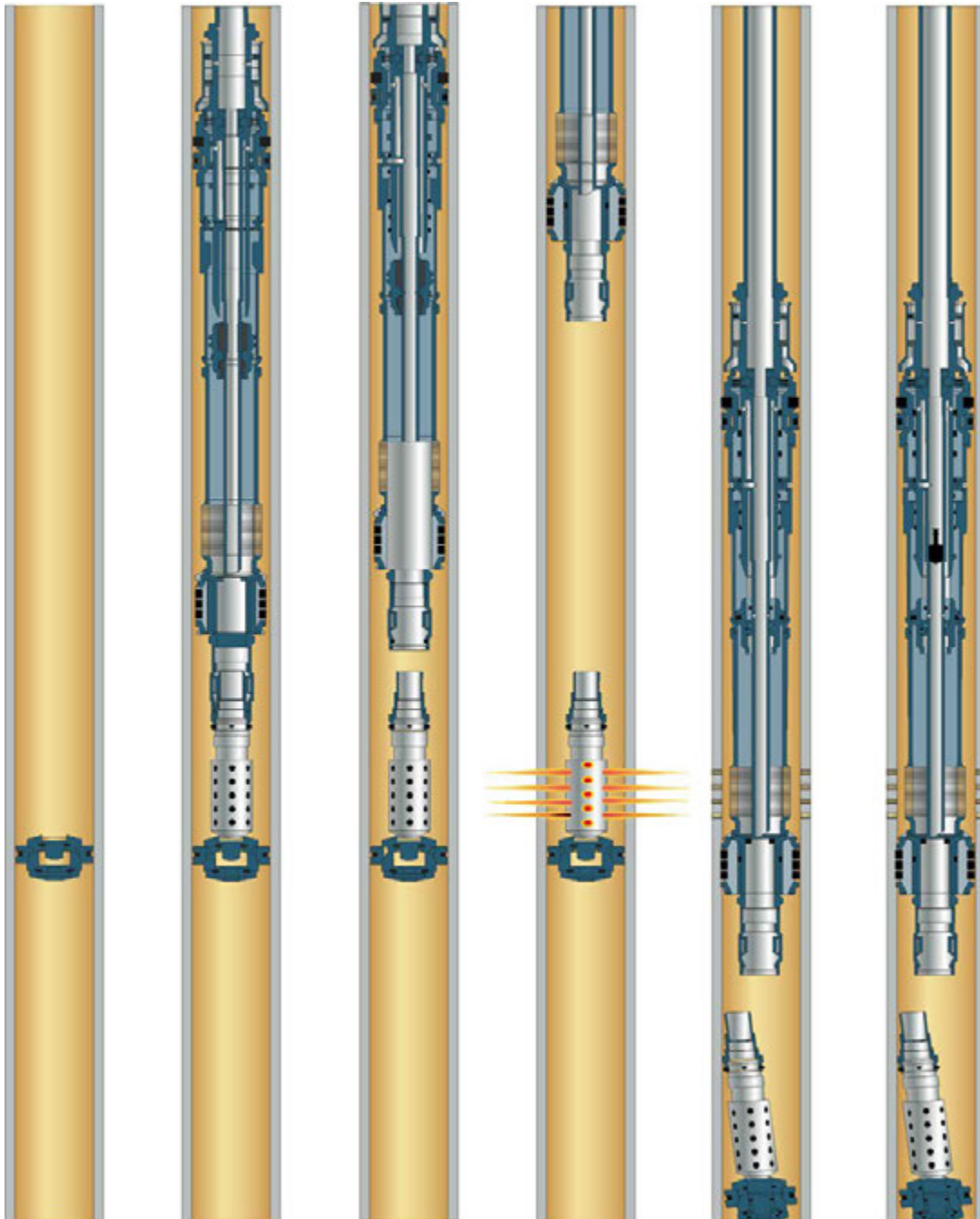
Running
Perforating/Gravel
Pack Assembly

Disengage
Gravel Pack
Assembly

Reposition and
Set Perforation
Packer, Detonate
Guns, Release
DVT

Reposition
Gravel Pack
Assembly

Gravel Pack
Frac-Pack



ComPlete™ PST System

Superior Completion Services' **ComPlete™ Production Single-Trip (PST) System** allows the perforating, and gravel pack or frac-pack of a single zone in a single-trip. With the **ComPlete™ PST System** the perforating guns and GP assembly are run into the wellbore on the production string. No service tools or work strings are required. This configuration allows the placement of a GP or FP in only the squeeze configuration. The system utilizes the same perforating gun and GP separation method as the **ComPlete™ RST System** to avoid possible issues with gun shock and pressure waves at the time of gun detonation.

APPLICATIONS

- High-pressure wells
- Severely depleted wells
- Marginal wells

TECHNICAL DATA

Available Sizes	5 to 10 1/8 in. (127.0 to 257.2 mm)
Differential Pressure Rating	up to 12,500 psi (86.2 MPa)
Temperature Rating	up to 350°F (177°C)

Features and Benefits

- Saves rig time
- Reduces fluid losses
- Eliminates the need for service tools, work string and wash pipe
- Eliminates need for a separate perforating run
- Eliminates logging trip to place gun on depth
- Eliminates the effects of mechanical shock loads at gun detonation
- Multiple treating positions available: reverse and squeeze
- Minimal rathole requirements, perforations plus approximately 30 ft (9.1 m) below the DVT
- May be integrated with interventionless production initiation systems

REFERENCES

ComPlete™ RST system data sheet

CompSet™ packers data sheet

Depth verification tool data sheet

Flapper valves data sheet

ISO isolation system data sheet

Multi-position multi-service valve data sheet

Multi-cycle on-off tool data sheet

Franklin, B., Daulton, D. and Farias, R. April 2009. Creating the Economics for Completion. Oilfield Technology: 3-6.

ComPlete™ PST System: Operating Sequence

**Set Depth
Verification
Tool (DVT)**

**Running
Perforating/Gravel
Pack Assembly**

**Disengage
Gravel Pack
Assembly**

**Reposition and
Set Perforation
Packer, Detonate
Guns, Release
DVT**

**Reposition
Gravel Pack
Assembly**

**Gravel Pack
Frac-Pack**

**Break Disk
Produce
Well**



ComPlete™ HST System

Superior Completion Services' patented **ComPlete™ Horizontal Single-Trip (HST) System** allows the washdown, frac or gravel pack, and stimulation of a horizontal, highly deviated or vertical well in a single-trip. The system can save rig time and reduce the potential for fluid loss to the formation.

The system provides real-time pressure monitoring during treatments to ensure optimum sand control and stimulation. It maintains well hydrostatic pressure and prevents any pressure surge on the formation. In addition, a variety of mechanical fluid loss devices may be utilized for well control after the treatment.

APPLICATIONS

- Multizone completions
- Deepwater
- Zonal isolation
- Open or cased-hole wells
- Long horizontal, vertical or highly deviated wells

TECHNICAL DATA

Available Sizes	7 to 13 3/8 in. (177.8 to 339.7 mm)
Differential Pressure Rating	up to 12,500 psi (86.2 MPa)
Temperature Rating	up to 350°F (177°C)

Features and Benefits

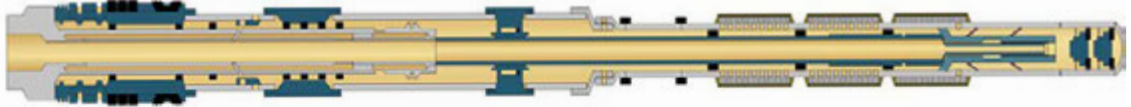
- Horizontal sand control and stimulation performed in a single-trip
- Potential rig time savings of up to 50%
- Provides the ability to selectively stimulate or clean up the sand controlled region
- Maintains well hydrostatic pressure on the formation
- Positive ball seat; no pressure surge on formation
- Reliable tool conversion to stimulation position (when stimulation is required)
- Standard circulating and squeeze position available
- Allows real-time pressure monitoring of sand control and stimulation treatments
- Multiple mechanical fluid loss devices available
- Reduces formation exposure time and potential reservoir damage
- Compatible with Superior Completion Services' UniFlo™ Inflow Control Device (ICD) screen systems

REFERENCES

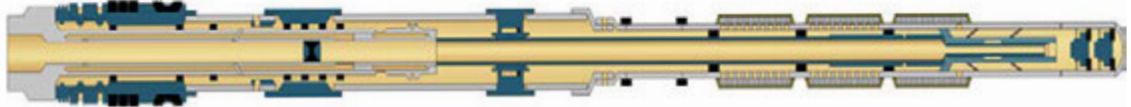
CompSet™ packers data sheet
CompSet™ Ultra packer data sheet
UniFlo ICD screens data sheet

ComPlete™ HST System: Operating Sequence

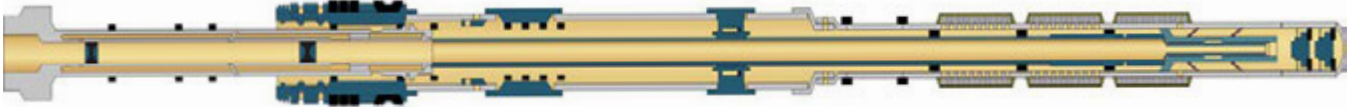
RIH, Washdown



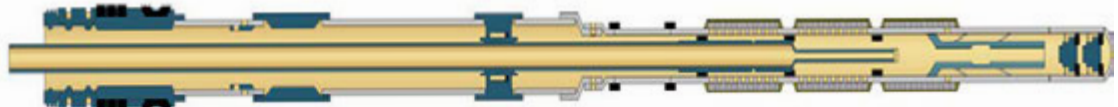
Set Packer, Gravel Pack



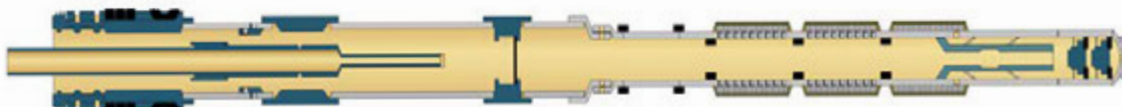
Convert Tool



Stimulate Well



POOH, Isolate Well



MST: Decripler Sub

Superior Completion Services' **Decripler Sub** with sleeve test profile provides a temporary bottom to positively locate the service tool position during surface assembly. It then engages the end of the service tool to allow decripling of the open-only shifting tool. Once decripled, the device shears, which removes all restrictions and leaves a full open ID. The upper housing also contains a shearable sleeve profile that may be engaged by the open-only shifting tool to ensure proper operation. This profile shears down with minimal weight, allowing the shifting tool to pass through.

APPLICATIONS

- Multizone completions

Features and Benefits

- Allows opening tool to be run in the hole in a crippled position, preventing the opening of any sliding sleeves
- Provides full open ID once actuated
- Provides positive overpull indication of actuation
- Provides set-down indication of shifting tool function
- Hydraulic backup system exists in the event that the mechanical decripler fails to activate the opening tool
- Once the opening tool is activated, the service tool has full open ID for circulation

TECHNICAL DATA

Available Sizes 7, 7 5/8 and 9 5/8 in. (177.8, 193.8 and 244.5 mm)

REFERENCES

ComPlete™ MST System data sheet

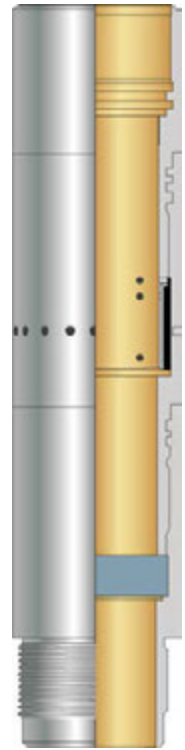


MST: Disappearing Check Valve

Superior Completion Services' **Disappearing Check Valve** is utilized with the **ComPlete™ Multizone Single-Trip (MST) System** and enables the completion assembly to be pressure-tested during run-in. The valve contains a one-way check valve that allows the **ComPlete™ MST System** completion assembly to be filled with fluid during the run-in.

APPLICATIONS

- Multizone completions



Features and Benefits

- Allows pressure tension during assembly
- Glass disc pressure rating +/-2,500 psi (17.2 MPa)
- Provides full open ID after disc removal
- Allows tubing to fill during BHA makeup

TECHNICAL DATA

Disappearing Check Valve					
Maximum OD		Minimum ID		Maximum OD	
inch	mm	inch	mm	inch	mm
3.95	100.3	2.92	74.0	1,500	10.3
5.97	151.5	4.63	117.5	2,300	15.9
5.96	151.3	4.79	121.7	2,000	13.8

REFERENCES

ComPlete™ MST System data sheet

MST: Multi-Profile Multi-Service Valve

Superior Completion Services' Multi-Profile Multi-Service Valve is a modified version of the standard multi-service valve. This production sliding sleeve utilizes the same robust nonelastomeric seal system and patented equalizing system. The multi-profile valve version is available with five different shifting profiles, allowing selective actuation. Corresponding shifting tools are available for use with slickline, wireline, coiled tubing or standard tubing.

APPLICATIONS

- Multizone reservoirs
- Selective production and injection wells
- Zonal isolation

Features and Benefits

- Proven non-elastomeric sealing technology
- Five selective profiles available
- Patented seal equalizing system
- May be actuated with slickline, electric line, coiled tubing or standard tubing
- Provides selective access for production and injection control
- Facilitates multizone single-trip completions
- Provides positive bidirectional zone isolation

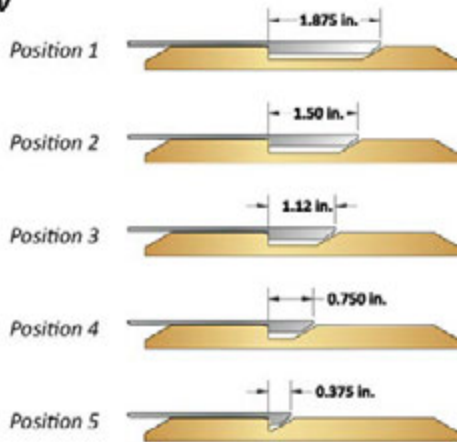


MST: Multi-Profile Multi-Service Valve

TECHNICAL DATA

Selective Profiles

Shallow



Deep

Multi-Profile Multi-Service Valve

Nominal Size		Minimum OD		Minimum ID		Tensile Yield Load		Collapse Pressure		Burst Pressure		ID Flow Area		Ported Body Flow Area	
inch	mm	inch	mm	inch	mm	lb	kg	psi	MPa	psi	MPa	in ²	mm ²	in ²	mm ²
3 ½	88.9	4.03	102.4	2.84	72.1	185,000	84,091	10,000	69	10,000	69	6.34	4,087.0	18.80	12,129.0
4	101.6	4.54	115.3	3.33	84.6	219,000	99,545	12,500	86	12,500	86	8.73	5,627.6	8.74	5,634.1
4 ½	114.3	5.05	128.3	3.83	97.3	250,000	113,636	10,000	69	10,000	69	11.52	7,432.9	25.45	16,419.3
7	177.8	6.66	169.2	5.28	134.0	324,156	147,344	10,000	69	10,000	69	21.85	14,099.3	29.17	18,819.3

REFERENCES

ComPlete™ MST System data sheet

MST: Multi-Profile Shifting Tools

MODIFIED MODEL B SHIFTING TOOL

Superior Completion Services' modified model B shifting tool is designed to shift Superior Completion's Multi-Profile Multi-Service Valve (MSV). Modifications include longer keys and modified springs to allow five-zone selectivity. Selective keys are available to shift sleeves from positions one through five. The shifting tool incorporates a standard shear-release mechanism found on the standard B shifting tool. The modified B shifting tool cannot be used with standard MSV assemblies.

SHEARABLE COLLETED CT SHIFTING TOOL

Superior Completion Services' shearable colleted shifting tool is designed to shift Superior Completion's Multi-Profile Multi-Service Valve using coiled tubing. The collet is designed with a shearable release mechanism allowing it to be utilized in both the open and closed directions. It is available in positions one through five.

NONSHEARABLE CT SHIFTING TOOL

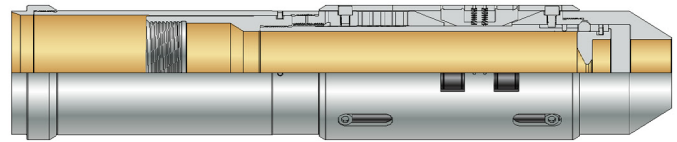
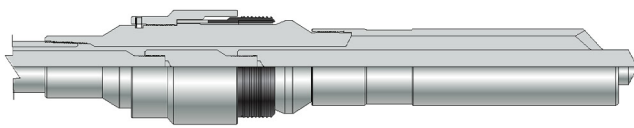
The nonshearable shifting tool is designed to run on coiled tubing and to selectively shift Superior Completion Services' position one through five Multi-Profile Multi-Service Valve. The valve does not contain a shear release feature and is only recommended for shifting valves in the downward direction.



RST: Depth Verification Tools

TECHNICAL DATA

RST: Depth Verification Tools							
Size		Weight Range		Maximum OD		Minimum ID	
inch	mm	lb	kg	inch	mm	inch	mm
5 x 2.68	127.0 x 68.1	11.5-21.4	5.2-9.7	3.95	100.3	2.735	69.5
5.5 x 2.68	139.7 x 68.1	13-23	5.9-10.5	4.465	113.4	1.985	50.4
7 x 3.25	177.8 x 82.6	17-29	7.7-13.2	5.94	150.9	2.94	74.7
7 x 3.25	177.8 x 82.6	29-41	13.2-18.6	5.63	143.0	3.22	81.8
7.625 x 3.25	193.7 x 82.6	29.7-39	13.5-17.7	6.439	163.6	2.94	74.7
9.625 x 3.25 - 4.75	244.5 x 82.6 -120.7	36-53.5	16.4-24.3	6.439	163.6	2.94	74.7



REFERENCES

ComPlete™ System data sheets (PST, RST)

RST: Multi-Cycle On-Off Tool

Superior Completion Services' **Multi-cycle On-Off Tool** is normally utilized with Superior Completion's **ComPlete™ Single-Trip Perforating and Gravel Pack Systems**. It is utilized between the perforating guns and the gravel pack assembly and provides a known break point between upper and lower assemblies. It also provides positive overpull weight indication to verify that the guns have fully released from the GP assembly.

APPLICATIONS

- Deepwater
- Mature fields
- Standard completions

Features and Benefits

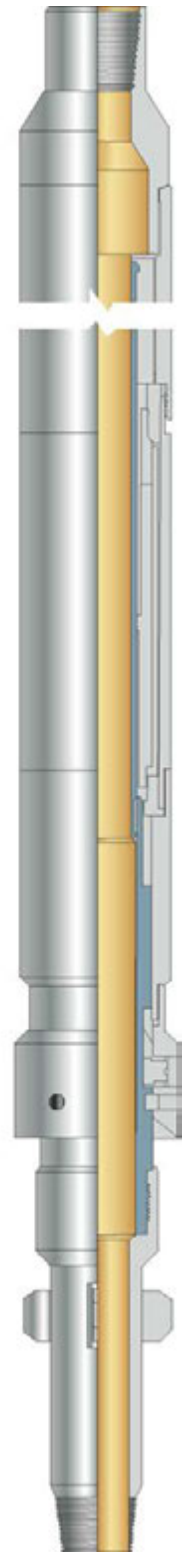
- Variable shear rate for initial release
- Multiple-acting J-latch for on-off pickup/set-down cycling of the tool
- Allows guns and GP assembly to be run in a single-trip
- Provides repeatable, positive overpull indication of release
- Relatchable for contingency operations

TECHNICAL DATA

Multi-Cycle On-Off Tool							
Casing Size		Maximum OD		Minimum ID		Thread Connections	
inch	mm	inch	mm	inch	mm	inch	mm
5	127.0	3.95	100.3	1.95	49.5	2 3/8 EUE	60.3
5 1/2	139.7	4.32	109.6	1.95	49.5	2 3/8 EUE	60.3
7 3/4	196.9	5.53	140.5	2.43	61.7	2 7/8 EUE	73.0
9 5/8	244.5	6.03	153.2	2.43	61.7	2 7/8 EUE	73.0

REFERENCES

ComPlete™ System data sheets (MST, PST, RST)



HST: Pressure-Actuated Differential Valve

Superior Completion Services' **Pressure-Actuated, One-Way Flow, Differential Valve** is normally used in horizontal gravel pack operations. The valve is run in the closed position and is run inside a screen or wash pipe assembly. While running the horizontal gravel pack assembly into the well the valve remains closed and allows circulation to the bottom of the screens. During gravel pack pumping operations differential pressure cycles the valve to an open position for optimum sand placement across the screen section.

APPLICATIONS

- Horizontal completions

Features and Benefits

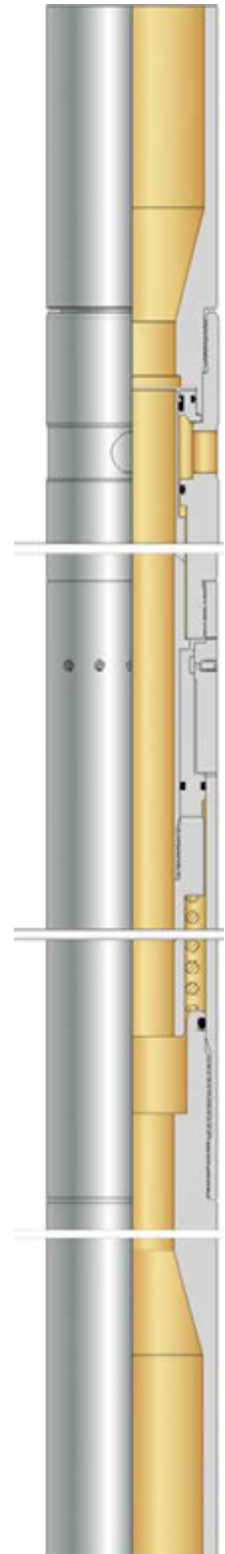
- ID to OD differential pressure actuation
- Adjustable initial opening pressure
- Low flowing pressure restriction

TECHNICAL DATA

Available Size	4.0 in. OD x 1.9 in. ID (101.6 mm OD x 48.3 mm ID)
Differential Pressure Rating	10,000 psi (68.9 MPa)
Temperature Rating	350°F (177°C)

REFERENCES

ComPlete™ HST System data sheets



HST: Ball-Actuated Anti-Reversing Valve

Superior Completion Services' **Ball-Actuated Anti-Reversing Valve** is designed to allow the conversion of a full open ID assembly to a one-way fluid check valve. The valve may be positioned anywhere in the work string during initial run-in. To convert to a check valve, a ball is dropped from surface and tubing pressure is applied. The ball moves into a check position with a positive seat above, preventing flowback up the tubing string. It is most commonly used in acidizing long sections to allow breaking connections with lighter fluid in the tubing.

APPLICATIONS

- Long-zone stimulation treatments
- Horizontal wells

Features and Benefits

- Positive ball seat with 5,000 psi (34.5 MPa) differential rating
- Adjustable initial shear pressure
- Prevents tubing flowback during treating operations
- Eliminates the need for balanced pressure conditions prior to breaking connection

TECHNICAL DATA

Available Size	6.1 in. OD x 2.74 in. ID (154.9 mm OD x 69.6 mm ID)
Differential Pressure Rating	10,000 psi (68.9 MPa)
Temperature Rating	300°F (148.9°C)

REFERENCES

ComPlete™ HST System data sheets



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

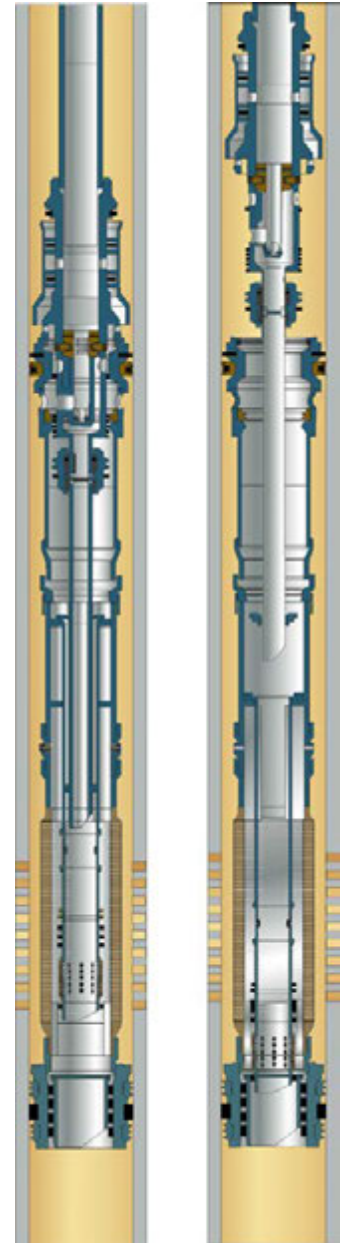
Superior Completion Services' hydraulically powered, retrievable **(HPR) Isolation System** is mechanically actuated to provide formation isolation after gravel or frac-packing. The system uses well hydrostatic pressure to position the isolation string across the production interval. Valve manipulation 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	1.875	47.6
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	2.313	58.5
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.

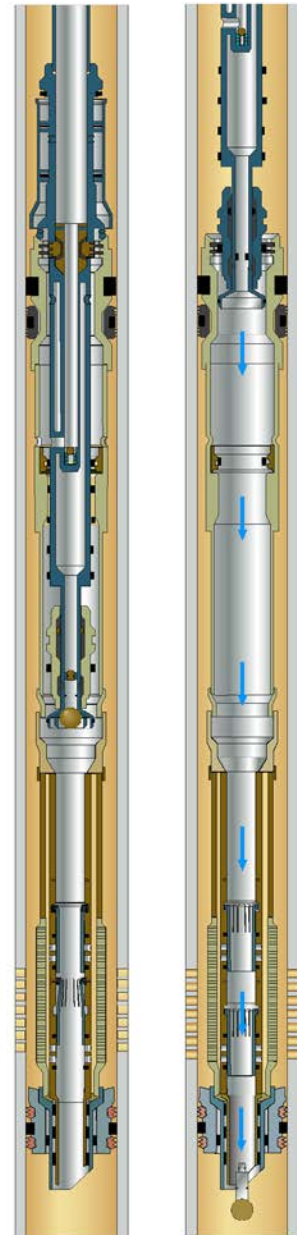
The system is compatible with Superior Completion Services' patented pressure-actuated isolation valves that allow wells to be placed on production without mechanical intervention. Eliminating the need for wash pipe and shifting tools reduces operational risks, as well as initial installation costs and 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.

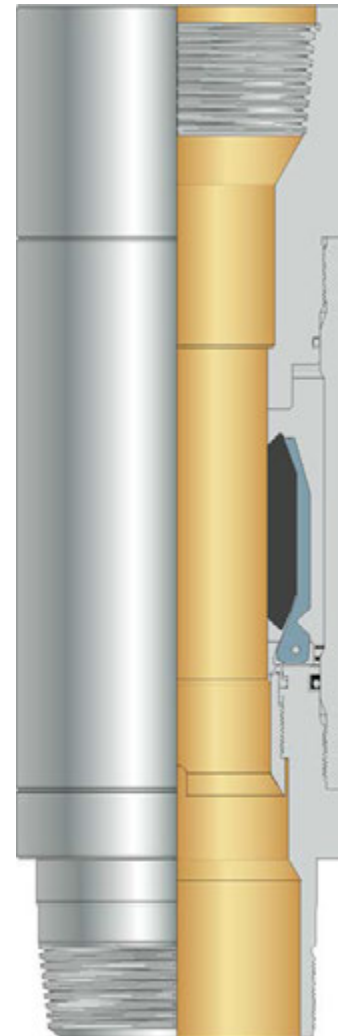
APPLICATIONS

- 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	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
4.70	119.4	1.93	49.0	2.91	73.9	2.92	74.2	2.69	68.3	870	6.0	6,960	48.0	10,000	69.0	1.87	47.5
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.

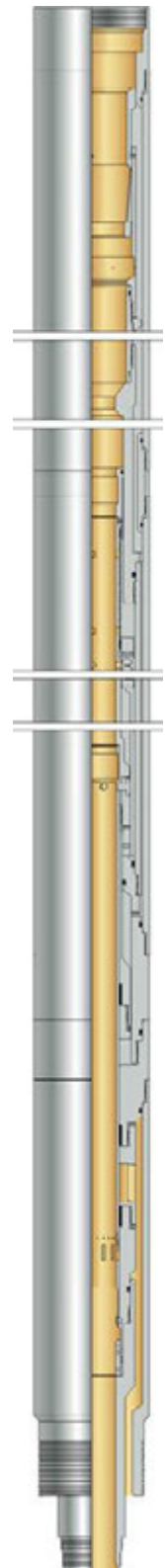
The valve is commonly used to isolate the lower zone of a dual completion or the lower zone of a intelligent well completion.

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.

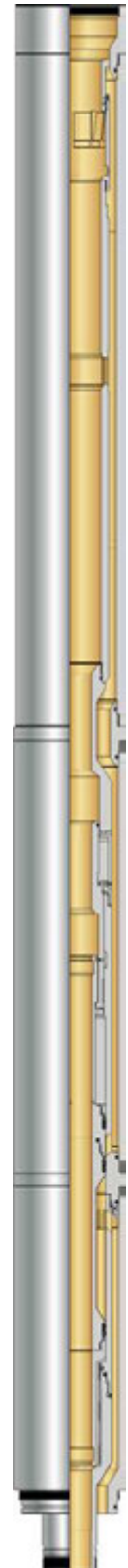
The valve is commonly used to isolate the upper zone of a dual completion or the upper zone of an intelligent well completion.

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

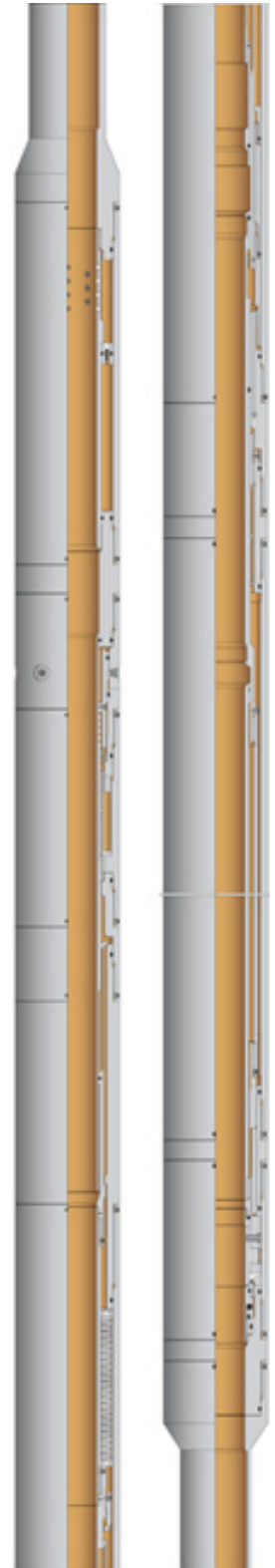
Reclosable Hydraulic Well Barrier Valve (X-HBV)

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

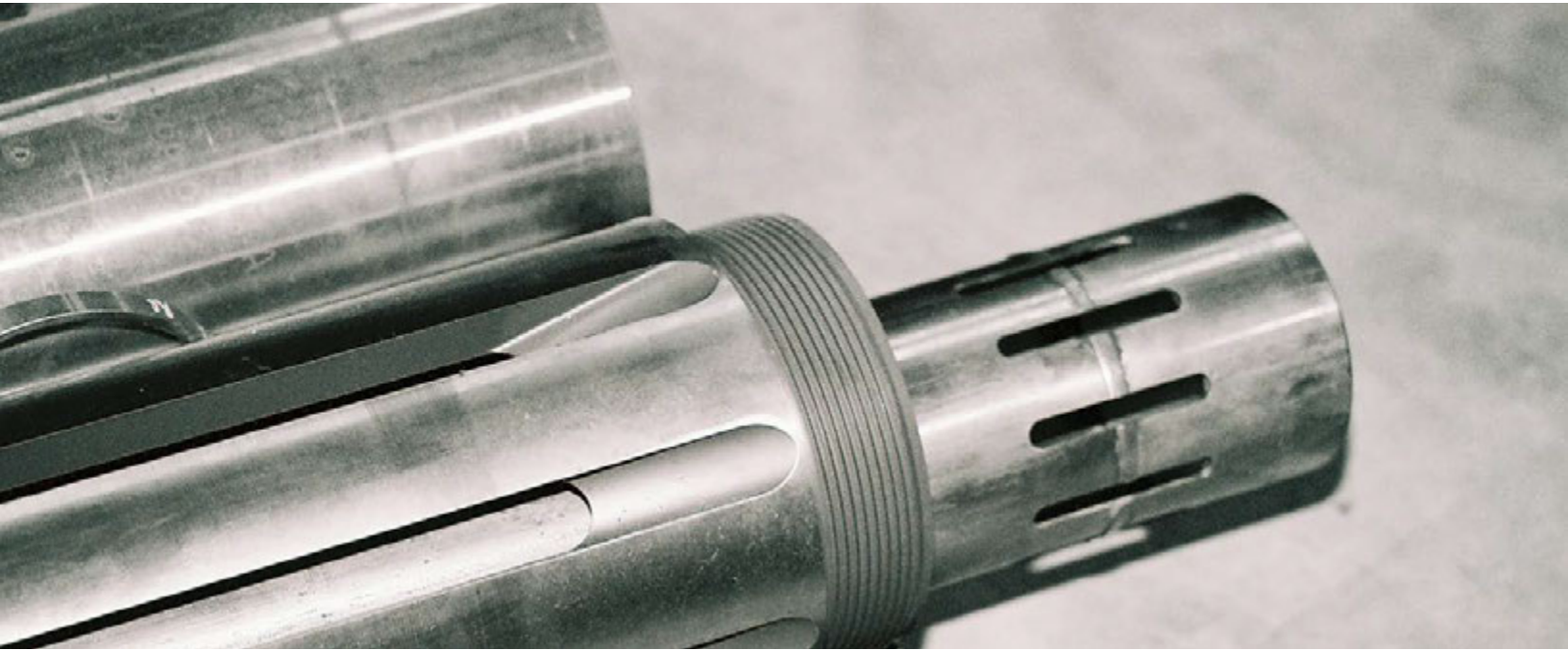
Premium metallurgies available upon request.



COMPLETION SERVICES

SECTION 4

Sealbore Packers and Accessories



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COMPLETION TOOLS CATALOG

SECTION 4: Sealbore Packers and Accessories

Comp-Perm™ Permanent Sealbore Packers

Superior Completion Services' **Comp-Perm™ Permanent Sealbore Production Packers** are part of a highly versatile system of tools and accessories that can be set mechanically, hydraulically, or on wireline. The production packers are frequently used as sump packers or on stimulation jobs where extremely high pressures and/or temperatures are encountered.

Standardized threads, seal diameters, seal lengths and packer tops allow maximum interchangeability with other common sealbore equipment. Optional packer bottoms are included in the full line of packer accessory equipment.

APPLICATIONS

- Completion operations
- Sand control
- Production packer applications

Features and Benefits

- Wireline-, mechanical- or hydraulic-setting options
- Adjustable shear for setting
- Metal backup system expands to casing ID to prevent rubber extrusion
- Parts keyed for easy millout
- A variety of elastomer materials (AFLAS®, Viton®, nitrile) are available



Comp-Perm™ Permanent Sealbore Packers

TECHNICAL DATA

Differential pressure rating 10,000 psi (68.9 MPa)
Temperature rating up to 350°F (177°C)

Comp-Perm™ Permanent Sealbore Packers													
Casing OD		Casing Weight Range		Maximum Casing ID		Minimum Casing ID		Maximum Tool OD		Minimum Bore Through Seals		Packer Bore	
inch	mm	lb/ft	kg/m	mm	inch	inch	mm	inch	mm	inch	mm	inch	mm
5.00	127.0	15.0-20.8	22.3-30.9	4.41	112.0	4.16	105.6	3.97	100.8	1.94	49.2	2.69	68.3
5 ½	139.0	23.0-26.0	34.2-38.7	4.47	113.5	4.55	115.5	4.25	108.0	1.94	9.2	2.69	68.3
		17.0-23.0	25.3-34.2	4.89	124.3	4.67	118.6	4.44	112.7	1.94	9.2	2.69	68.3
		13.0-17.0	19.3-25.3	5.04	128.1	4.89	124.3	4.56	115.9	1.94	9.2	2.69	68.3
7	177.8	20.0-23.0	29.8-34.2	6.46	164.0	6.37	161.7	6.00	152.4	2.38	60.5	3.25	82.6
		23.0-26.0	34.2-38.7	6.37	161.7	6.28	159.4	5.88	149.2	2.38	60.5	3.25	82.6
		26.0-38.0	38.7-56.5	6.28	159.4	5.92	150.4	5.69	144.5	2.38	60.5	3.25	82.6
		20.0-23.0	29.8-34.2	6.46	164.0	6.37	161.7	6.00	152.4	3.00	76.2	4.00	101.6
		23.0-26.0	34.2-38.7	6.37	161.7	6.28	159.4	5.88	149.2	3.00	76.2	4.00	101.6
7 ¾	193.7	24.0-33.7	35.7-50.1	7.03	178.4	6.77	171.8	6.44	163.5	3.00	76.2	4.00	101.6
		33.7-39.0	50.1-58.0	6.77	171.8	6.63	168.3	6.25	158.8	3.00	76.2	4.00	101.6
9 ¾	244.5	29.3-53.5	43.6-79.6	9.06	230.2	8.54	216.8	8.13	206.4	3.50	88.9	4.75	120.7
		29.3-53.5	43.6-79.6	9.06	230.2	8.53	216.8	8.13	206.4	5.00	127.0	6.00	152.4
10 ¾	273.1	65.7	97.8	9.56	242.8	9.40	238.8	9.28	235.6	5.00	127.0	6.00	152.5

* Packers tested to API 11D1 and rated V0 – V6. Please contact your Superior representative for further information on specific sizes.

REFERENCES

Completion tools seal systems data sheet
Packer plugs and accessories data sheet

CompSet™ Packers

CompSet™ HP-II (≤10,000 psi Differential)

CompSet™ XTR (12,500 psi Differential)

CompSet™ Ultra (15,000 psi Differential)

Superior Completion Services' **CompSet™** externally retrievable sealbore packers are designed for high-pressure (HP) and high-temperature completions. These packers provide positive isolation during maximum loads, differentials and temperature cycles for harsh completion. They also provide stimulation applications, including gravel and frac-packing, high-rate water packing, stimulations and horizontal completions. The CompSet™ packers can also be used as production sealbore packers and have been tested and manufactured in accordance with API 11D1 specifications.

APPLICATIONS

- Gravel/frac-packing
- Sand control
- Horizontal, deviated and vertical wells
- Zonal isolation; production isolation

Features and Benefits

- Single-sealing packing element eliminates extrusion and extends packer life downhole
- External retrieving sleeve facilitates easy packer retrieval with obstruction in sealbore
- Designed for simple external release and retrieval; optional internal release
- Large bore through packer and seals
- Single high pressure sealing element
- Splined to facilitate milling removal if required
- Gauge ring on lower end of packer helps prevent premature setting when an obstruction or tight spot is encountered
- Hydraulic- or wireline-set
- Can be released with restricted ID
- Rotationally locked



CompSet™ Packers

TECHNICAL DATA

CompSet™ Packers			
	CSHP Series	Extreme Series	Ultra Series
Casing Size	5" - 11 ¾"	7 ¾" & 9 7/8" - 10 1/8"	7 ¾" & 9 7/8" - 10 1/8"
Packer Bore	2.68" - 6.00"	4.00" & 6.00"	3.88" & 5.50"
Differential Pressure Rating	≤ 10,000 psi	12,500 psi	15,000 psi
Temperature Rating	Ambient - ≥250 °F	Ambient - 300 °F	40 -300 °F
API 11D1 Validation Grades	V6 - V0	V3 - V0	V0

REFERENCES

Completion tools seal systems data sheet

Packer plugs and accessories data sheet

CompSet™ Packers

TECHNICAL DATA

CompSet Packers											
Casing OD		Casing Weight Range		Maximum OD		Minimum ID*		Standard Seal ID		Differential Pressure Rating	
inch	mm	lb/ft	kg/m	inch	mm	inch	mm	inch	mm	psi	Mpa
5	127.0	11.5-15.0	17.1-22.3	4.25	108.0	2.69	68.2	1.93	48.9	10,000	69.0
		18.0-21.0	26.7-31.3	4.00	101.5	2.69	68.2	1.93	48.9	10,000	69.0
5 ½	139.7	13.0-15.5	19.3-23.0	4.52	121.8	2.69	68.3	1.93	48.9	10,000	69.0
		17.0-23.0	25.3-34.2	4.52	114.7	2.69	68.3	1.93	48.9	10,000	69.0
		26.0	38.70	4.52	108.0	2.69	68.3	1.93	48.9	10,000	69.0
6 ⅝	168.3	28.0-32.0	41.6-47.6	5.52	140.1	2.69	68.3	1.93	48.9	7,500	51.7
7	177.8	20.0-26.0	29.7-38.7	6.08	154.3	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		26.0-32.0	38.7-47.6	5.89	149.6	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		32.0-38.0	47.6-56.5	5.74	145.7	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		41.0	61.0	5.64	143.3	3.25	82.6	2.38	60.3	10,000	69.0
7 ⅞	193.7	24.0-29.7	35.7-44.2	6.68	169.7	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		29.7-39.0	44.2-58.0	6.44	163.5	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
9 ⅝	244.5	36.0-43.5	53.6-64.7	8.53	216.7	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		36.0-43.5	53.6-64.7	8.53	216.7	4.75, 6.00	120.7-152.4	3.47, 4.99	88.1, 126.6	10,000	69.0
		43.5-53.5	64.7-79.6	8.32	211.4	3.25, 4.00	82.6, 101.6	2.38, 2.99	60.3, 75.8	10,000	69.0
		43.5-53.5	64.7-79.6	8.32	211.4	4.75, 6.00	120.7-152.4	3.47, 4.99	88.1, 126.6	10,000	69.0
9 ⅞	250.8	62.8	93.5	8.42	213.9	6.00	152.4	4.74	120.3	10,001	69.0
10 ¾	273.1	55.5-65.0	82.6-97.8	9.38	235.7	4.75, 6.00	120.7-152.4	3.47, 5.00	88.1, 127.0	8,000	55.2
11 ¾	298.5	54.0-65.0	80.4-96.7	10.40	264.2	4.75	120.7	3.47	88.1	8,000	55.2

CompSet Extreme Packers											
Casing OD		Casing Weight Range		Maximum OD		Minimum ID*		Standard Seal ID		Differential Pressure Rating	
inch	mm	lb/ft	kg/m	inch	mm	inch	mm	inch	mm	psi	Mpa
7 ¾	196.9	46.1	68.6	6.68	169.7	4.00	101.6	2.99	76.0	12,500	86.2
9 ⅞	250.8	62.8	93.5	8.42	213.9	6.00	152.4	4.74	120.3	12,500	86.2
10 ⅞	257.1	79.3	117.9	8.42	213.9	6.00	152.4	4.74	120.3	12,500	86.2

* Alternate bore configurations available upon request.

REFERENCES

Completion tools seal systems data sheet
Packer plugs and accessories data sheet

CompSet™ Ultra Packer

Superior Completion Services' **CompSet™ Ultra Retrievable Sealbore Packer** is designed for ultra high temperature and pressure completions. The packer provides positive isolation during maximum loads, differentials and temperature cycles for harsh completion production environments.

APPLICATIONS

- Gravel/frac-packing
- Sand control
- Horizontal and vertical wells
- Zonal isolation; production isolation

Features and Benefits

- Single-sealing packing element eliminates extrusion and extends packer life downhole
- External retrieving sleeve facilitates packer retrieval with obstruction in sealbore
- Designed for simple external release and retrieval; optional internal release
- Large bore through packer and seals
- Single high pressure sealing element
- Splined to facilitate milling removal if required
- Gauge ring on lower end of packer helps prevent premature setting when an obstruction or tight spot is encountered
- Hydraulic- or wireline-set
- Can be released with restricted ID
- Rotationally locked

TECHNICAL DATA

Available sizes	10 1/8 in., 9 7/8 in. and 7 3/4 in. (257.2 mm, 250.8 mm and 196.85 mm)
Differential pressure rating	15,000 psi (103.4 MPa)
Temperature rating	350°F (177°C)

REFERENCES

Completion tools seal systems data sheet



Seal Systems

Superior Completion Services provides a variety of **Seal Systems** and alloy materials to accommodate most well conditions. It is important to know the well conditions and the work needed before choosing the proper seal system. Consideration should be given to temperatures, hostile elements, seal movements and maximum pressure differentials. These factors will determine the seal type, metal material and accessories to be utilized.

For all sealbore tubing accessories, standardization of threads, seal diameters and seal lengths have been carefully considered in the design to maximize interchangeability with competitive sealbore equipment. All steel components for the sealbore tubing accessories are manufactured to meet NACE MR0175 standards for H2S service. The accessories are also available in several types of material with the following examples:

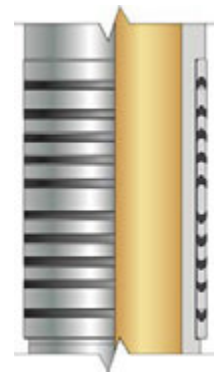
- High-strength alloy steel for high-pressure applications
- 9CR-1MO alloy steel for H2S and CO2 applications
- High-nickel alloy steel for severe corrosion applications

Two basic seal types are currently available:

- Elastomer bonded to metal commonly known as molded seals available in:
 - Nitrile, Viton®, Fluorel®, EPDM, ECO
- HSN materials Chevron-style, lip-type seals commonly known as V-rings available in:
 - Nitrile, Viton, Fluorel, Teflon®, AFLAS®, Ryton® and Kalrez® materials



Molded Seal System



Standard Chevron Seal System

Molded Seal System

This system is recommended for applications where it is likely that the seals will be disengaged from the packer sealbore with differential pressure pre-sent. Two seal rings are bonded to a metal sleeve with an internal O-ring to provide a positive seal. This system is available in various elastomers and is application dependent.

Standard Chevron Seal System

This system's seal stack consists of chevron seal rings with steel spacers. This seal configuration is best suited for applications in which the seals will not disengage from the packer sealbore.

HSN seal stack: *recommended for maximum temperatures of 350°F (177°C) in a standard service environment*

Seal Systems

Seal Spacer Tube

In installations requiring floating seals and sealbore extensions, installation costs can be reduced by using spacer tubes between the seal units, reducing the number of seal units required.

VTR Premium Seal System

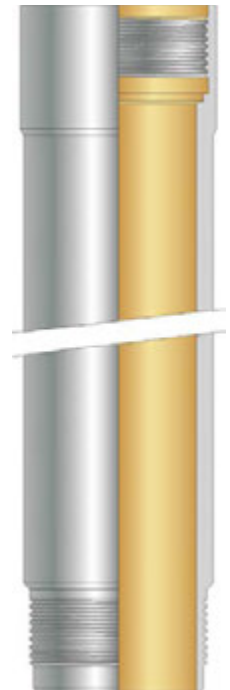
This system's seal stack consists of alternate Viton, Teflon and Ryton seal rings with middle and end metal spacers. It is recommended for maximum temperatures of 400°F (205°C) high pressure, and a limited H₂S and/or CO₂ environment. Not recommended for applications where amine-based inhibitors will be used.

ATR Premium Seal System

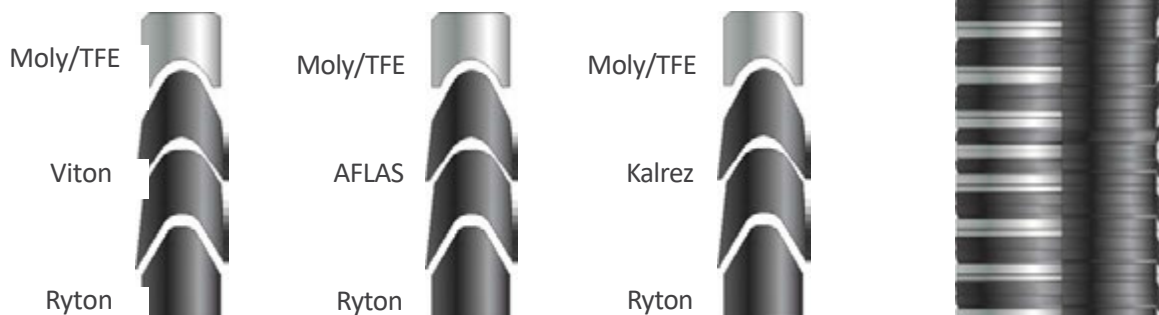
This system's seal stack consists of alternate AFLAS, Teflon and Ryton with metal end and middle spacers. Recommended for maximum temperatures of 400°F (205°C), amine inhibitors and H₂S and/or CO₂ environments.

KTR Premium Seal System

This system's special seal stack consists of Kalrez, Teflon and Ryton with metal end and middle spacers. Recommended for maximum temperatures of 500°F (260°C), amine inhibitors and a high H₂S and/ or CO₂ environment.



Seal Spacer Tube



Viton, Kalrez and Teflon are registered trademarks of DuPont Performance Elastomers LLC. Flourel is a registered trademark of 3M Co. AFLAS is a registered trademark of Asahi Glass Co., Ltd. Ryton is a registered trademark of Chevron Phillips Chemical Co. LLC.

Uni-Pac™ System

Superior Completion Services has developed a unique, state-of-the-art production seal for high-pressure, high-temperature (HP/HT) environments. This production sealing design uses the same technology incorporated in the HP packer one-piece sealing element. Uni-Pac™ Seals are designed to be used with locators, pop-lock assemblies, anchor assemblies, straddle assemblies and indexing mule shoes.

APPLICATIONS

- HP/HT environments

Features and Benefits

- Zero extrusion gap
- Reliable seal for unloads
- Limited thread connections
- No slip-on metal spacers
- One-piece mandrel
- Available with high-torque, metal-to-metal connections
- Premium Uni-Pac seals are offered in a variety of materials

TECHNICAL DATA

Available sizes	2.688 to 6.00 in. (68.3 to 152.4 mm)*
Differential pressure rating	up to 15,000 psi (103.4 MPa)

REFERENCES

Completion tools tubing seal accessories data sheet
Mule shoes data sheet



Sealbore Packer Accessories

Re-entry Guide

The re-entry guide is the standard bottom for all Superior Completion Services packers unless ordered otherwise. The wireline re-entry guide is available with a choice of thread connections to adapt to sealbore extensions, millout extensions or tubing run below a packer.



Re-entry Guide



Sealbore Extension Coupling



Sealbore Extension to Tubing Adapter



Knockout Plug

Sealbore Extension Coupling

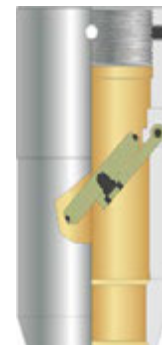
This concentric coupling is used to connect two sealbore extensions together to obtain more sealbore length. These couplings allow for a continuous, concentric sealbore connection between sealbore extensions.

Adapters

Tubing adapters used for running a tailpipe below a packer, sealbore extension or millout sub are available with a choice of tubing threads. Millout adapters are used to adapt the millout sub to the packer. These are not required for all sizes of sealbore packers.

Knockout Plug

With a knockout plug installed, the packer serves as a temporary bridge plug, allowing pressure work to be performed above the packer. The knockout plug is removed with the production tube as the seal assembly is landed and falls to the bottom of the well. These plugs feature a pressure-balanced equalization system to ensure easy and reliable operation.



Flapper Assembly

Flapper Assembly

The flapper assembly contains a spring-loaded, flapper-type, backpressure valve that holds pressure from below only. The valve is opened with the production tube when the seal assembly is landed into the packer and automatically closes when the production tube is removed. A differential pressure below the packer acts across the seal area of the flapper, holding it closed. This force must be overcome with tubing weight to open the flapper.

Sealbore Packer Accessories

Sealbore Extension

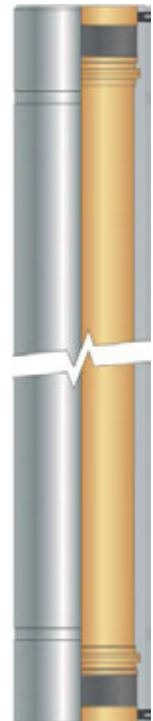
This extension is generally used in installations where floating seals are required due to excessive tubing contraction. Sealbore extensions have the same sealing bore ID as the corresponding packer to allow a continuous sealbore for the lower-most seals of a long seal assembly. Sealbore extensions are available in a variety of lengths.

Millout Sub

The millout sub is used in installations where a larger ID is required to accommodate the latching mechanism of a washover tool. This allows the permanent packer to be retrieved with the tool after milling over the outside of the packer. Millout subs are commonly installed between the packer and sealbore extension in installations using floating seal units.



Sealbore Extension



Millout Sub

Sealbore Packer Accessories

Superior Completion Services' **Sealbore Packer Accessories** meet NACE MR0175 standards for H₂S service. The accessories are also available in other materials such as:

- High-strength alloy steel for high-pressure applications
- CR-MO alloy steels for H₂S and CO₂ applications
- Incoloy® alloys for severe corrosion applications

Cap



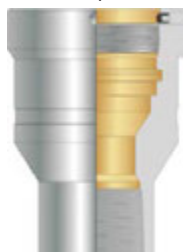
Knockout Plug



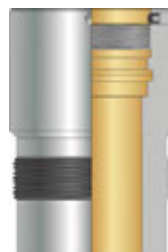
Flapper



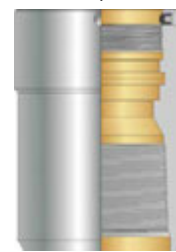
Packer Tubing Adapter



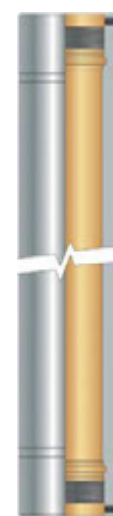
Millout Adapter



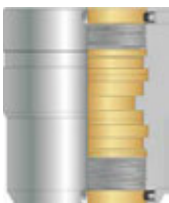
Millout-to-Tubing Adapter



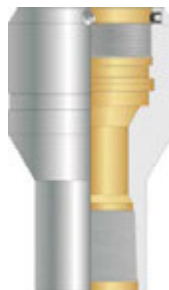
Millout Sub



Packer-to-Sealbore Extensions



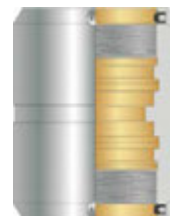
Sealbore Extension to Tubing Adapter



Sealbore Extension



Sealbore Extension Coupling



Re-entry Guide



Incoloy is a registered trademark of Special Metals Corporation.

Tubing Seal Accessories

Locator Seal Nipple

Superior Completion Services' locator seal nipple is run between the seal assembly and production tubing. The locator is designed to locate on the top of the sealbore to provide an indication of the seal assembly's location. The locator is designed to prevent downward tubing movement but allows the seals to move freely with tubing contraction.

Pop-Lock Locator

The pop-lock locator is run between the seal assembly and production tubing. The locator's latch assembly is designed to engage a corresponding thread in the downhole completion assembly. At a predetermined overpull, the latch will release from the thread, providing a surface indication of positive latch engagement and release. The locator provides a positive depth confirmation by tagging a large surface at the top of the packer's sealbore. Pop-lock locators are offered in a variety of threads, including premium threads.

Anchor Latch

Superior Completion Services' anchor latch is run between the seal assembly and the production string. A positive latch snaps into the corresponding thread on the completion assembly and anchors the tubing in place. The anchor latch may be released by applying a slight upstrain with RH rotation.

Tubing Seal Nipple

The tubing seal nipple allows the seal assembly to connect directly to the tubing without a locating shoulder or pop-lock locator assembly. The seals and tubing are then able to pass through the corresponding sealbore without locating.



Locator Seal Nipple Assembly



Pop-Lock Locator



Anchor Latch



Tubing Seal Nipple

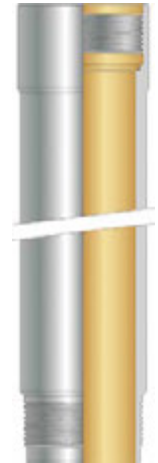
Tubing Seal Accessories

Seal Spacer Tube

In installations requiring floating seals and sealbore extensions, installation costs can be reduced by using spacer tubes between the seal units, reducing the number of seal units required.

O-Ring Seal Sub

The Superior Completion Services O-ring sub provides a seal between a polished stinger (run on the end of wash pipe) and a corresponding outer assembly. Other applications for the sub include diverting fluid through screen assemblies or isolating lower zones from upper zones during treating operations.



Seal Spacer
Tube



O-Ring Seal
Sub

Dual-Flow Head

Superior Completion Services' **Dual Flow Head** is run in conjunction with a production seal assembly, forming a positive seal in the top gravel pack packer and may also be used with Superior Completion's sealbore packers to create a dual tubing completion. The long-string flow is routed through isolation tubing running through the upper zone screen assembly. The upper zone flows concentrically between the OD of the isolation string and the ID of the production seal assembly.

APPLICATIONS

- Dual tubing completions
- High-pressure completions
- Deep dual completions

Features and Benefits

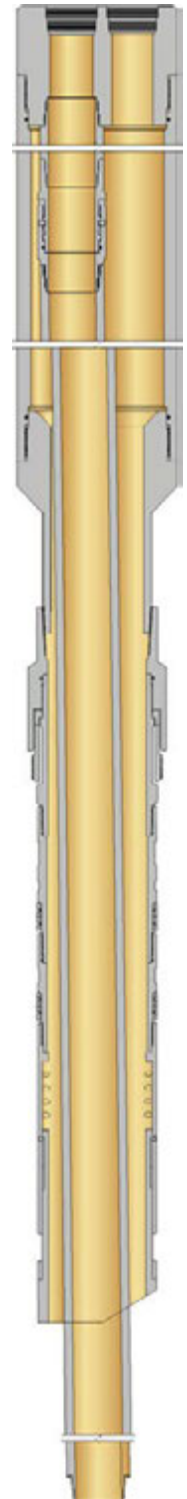
- Allows high-pressure dual completions
- Easily retrieved; no dual-packer required

TECHNICAL DATA

Dual-Flow Head							
Size		Tubing 1		Tubing 2		Lower Seal Assembly OD	
inch	mm	inch	mm	inch	mm	in	mm
7 x 7 $\frac{1}{8}$ x 2 $\frac{3}{8}$	177.8 x 193.7 x 60.3	2 $\frac{3}{8}$	60.3	2 $\frac{3}{8}$	60.3	4	101.6
9 $\frac{5}{8}$ x 4 $\frac{3}{4}$ x 2 $\frac{7}{8}$	244.5 x 120.7 x 73.0	2 $\frac{7}{8}$	75.0	2 $\frac{7}{8}$	73.0	4 $\frac{3}{4}$	120.7
9 $\frac{5}{8}$ x 6 x 3 $\frac{1}{2}$	244.5 x 152.4 x 88.9	3 $\frac{1}{2}$	88.9	3 $\frac{1}{2}$	88.9	6	152.4

REFERENCES

- Comp-Perm™ permanent sealbore packers data sheet
- CompSet™ packers data sheet
- CompSet™ Ultra packer data sheet



Mule Shoes

Half-Mule Shoe

Superior Completion Services' half-mule shoe is run below seal assemblies to allow easy entry into packer bores.

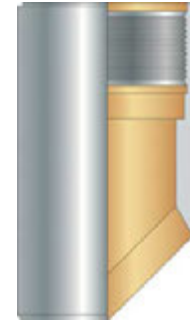
Indexing Mule Shoe

Superior Completion Services' indexing mule shoe with spring protection is designed to assist in guiding the end of a downhole assembly when entering a reduced ID, such as a packer bore or liner top. The rotational action incorporated in the mule shoe design eliminates the need to rotate the pipe from surface. The lower portion of the mule shoe rotates in multi-degree increments, manipulating the angled end of the mule shoe to easily enter the reduced ID. The sub is actuated by applying set-down weight to the end of the assembly, compressing the actuator spring. As the set-down weight is removed, the end of the assembly travels through a J-track, rotating a fixed distance each cycle.

Dual-Indexing Mule Shoe

The dual-indexing mule shoe includes two indexing mechanisms to provide redundant operation. This is especially useful in highly deviated wells or in applications where wellbore cleanliness is in question.

Half-Mule Shoe



Indexing Mule Shoe



Dual-Indexing Mule Shoe

Mule Shoes

TECHNICAL DATA

Mule Shoes						
	Size		Maximum OD		Minimum OD	
	inch	mm	inch	mm	in	mm
Half-Mule Shoe	2.287	58.1	2.63	66.7	1.94	49.2
	3.250	82.6	3.19	81.0	2.38	60.5
	4.000	101.6	3.87	98.3	3.00	76.2
	4.750	120.7	4.69	119.1	3.50	88.9
	6.000	152.4	5.94	150.8	5.00	127.0
Indexing Mule Shoe with Spring Protection	2.687	68.3	2.63	66.7	1.90	48.3
	3.250	82.6	3.19	81.0	2.35	59.6
	4.000	101.6	3.95	100.3	2.91	74.0
	4.750	120.7	4.68	118.9	3.21	81.5
	6.000	152.4	5.94	150.8	4.86	123.3
Indexing Mule Shoe with Spring Protection	2.687	68.3	2.63	66.7	1.90	48.3
	3.250	82.6	3.19	81.0	2.35	59.6
	4.000	101.6	3.95	100.3	2.91	74.0
	4.750	120.7	1.68	42.7	3.21	81.5

Mechanical Shear Safety Joint

Superior Completion Services' **Mechanical Shear Safety Joint** provides a known break point in the downhole assembly. It has been designed to withstand differential pressures of 10,000 psi (68.9 MPa) for standard service applications. Upon request, 12,500- and 15,000-psi (86.2- and 103.4-MPa) differential pressure rated designs are available. Milled slots and lugs provide a rotational lock feature to aid in packer entry, fishing and milling operations. Premium threads and metallurgy are also available upon request.

APPLICATIONS

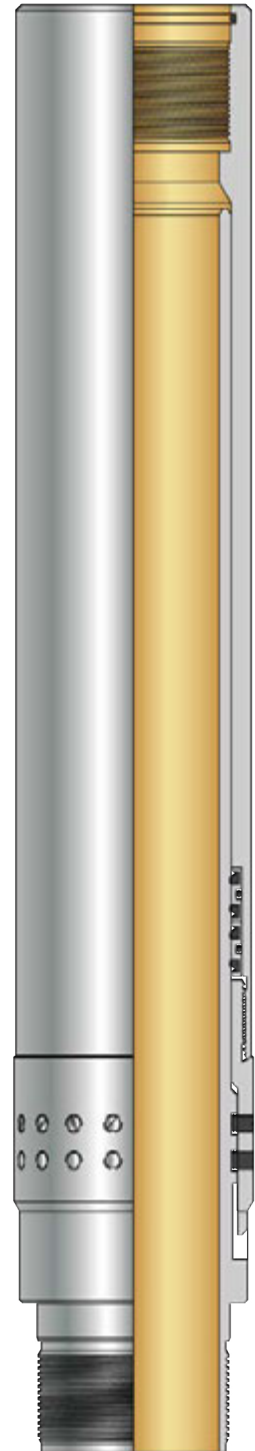
- Long horizontal sections
- General completion assemblies

Features and Benefits

- Rotationally locked assembly
- Shear-pinned value is adjustable to break at 70,000 to 230,000 lb (31,818 to 104,545 kg) tension
- 12-, 24- and 36-in. (304.8-, 609.6- and 914.4-mm) seal surface are available
- Optional overshoot with internal molded seals used during contingency operations

TECHNICAL DATA

Mechanical Shear Safety Joint						
	Size		Maximum OD		Minimum ID	
	inch	mm	inch	mm	in	mm
Molded Safety Shear Sub	2 ¾	60.3	2.93	74.4	1.94	49.3
	2 ⅞	73.0	3.56	90.3	2.36	59.8
	3 ½	88.9	4.38	111.3	3.00	76.2
Safety Shear Sub	4	101.6	4.92	124.8	3.49	88.5
	4 ½	114.3	5.19	131.9	3.89	98.7
Molded Safety Shear Sub	5	127.0	5.85	148.6	4.25	108.0
	5 ½	139.7	6.13	155.6	4.74	120.3
	7	177.8	7.69	195.2	6.04	153.4



Hydraulic Shear Safety Joint

Superior Completion Services' **Hydraulic Shear Safety Joint** is designed for the ComPlete™ single-trip systems to run above screen sections, blank sections, and directly above isolation packers. This shear sub contains a hydraulic-release mechanism, which is able to carry the full load of the gravel pack assembly into the wellbore. This prevents the load from being carried by the shear joint screws, allowing long, heavy assemblies to be run without fear of premature shearing.

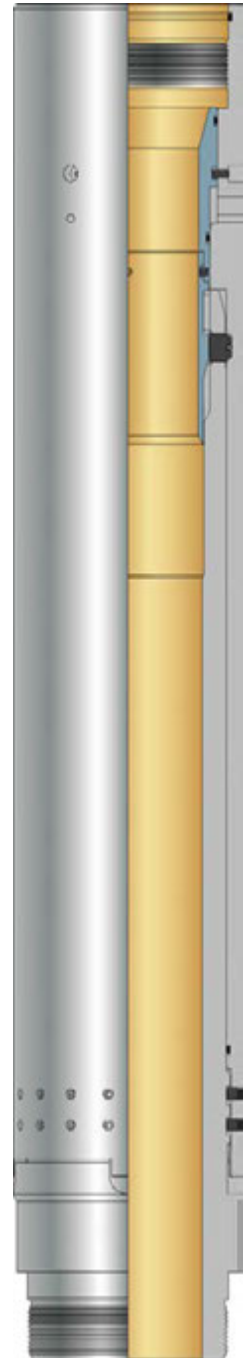
The hydraulic-actuation feature is initiated by applying tubing to annulus differential pressure. Once actuated, the load is relieved from the hydraulic mechanism and transferred to the shear screws. If retrieval is initiated, this break point in the assembly enables retrieval of isolation packers separately from screens in the same zone. The shear joint contains polished OD sealing lengths ranging from 8 to 24 in. (203.2 to 609.6 mm). A bonded inverted seal overshoot is available for re-entry if needed.

APPLICATIONS

- Long completion intervals
- Multizone single-trip completions

Features and Benefits

- Allows full weight carrying capability prior to actuation
- Allows standard shear values for retrieval while maintaining high weight carrying ability
- Rotationally locked assembly
- Production molded seal assembly available for contingency operations



Hydraulic Shear Safety Joint

TECHNICAL DATA

Hydraulic Shear Safety Joint								
	Maximum OD		Minimum ID		Collapse/ Burst Rating		Seal Travel Length	
	inch	mm	inch	mm	inch	mm	in	mm
Short Hydraulic Shear Joint*	8.05	204.5	3.75	95.3	10,000	69.0	24	609.6
	8.12	206.1	5.13	130.2	8,500	58.6	8	203.2
Hydraulic Shear Joint	7.00	177.8	4.26	108.1	12,500	86.2	24	609.6
	7.53	191.3	5.46	138.8	8,500	58.6	24	609.6

* Recommended to be run above Complete™ MST system isolation packers.

REFERENCES

Complete™ system data sheets (HST, MST, RST)

Expansion Shear Joints

Superior Completion Services' **Expansion Shear Joints** provide limited up or down movement between the upper and lower connections. The expansion joint is rotationally locked and sealed to withstand high differential pressures. The assembly is shear-pinned together and movement will not occur until the pre-set shear release value is exceeded.

APPLICATIONS

- Long assemblies with projected tubing movement
- Subsea wells
- Reservoirs with concerns over compaction

Features and Benefits

- Allows both upward and downward travel
- Variable initial shear value settings
- Provides a smooth mandrel for resealing if required
- Bonded seal overshot available for contingency operations

TECHNICAL DATA

Expansion Shear Joints							
Size		Maximum OD		Minimum ID		Maximum Stroke	
inch	mm	inch	mm	inch	mm	feet	m
2 3/8	60.3	3.03	77.0	1.97	50.0	10	3.1
3 1/2	88.9	4.11	104.4	2.85	72.4	10	3.1
4 1/2	114.3	5.53	140.5	3.98	101.1	10	3.1
5 1/2	139.7	7.38	187.5	4.68	118.9	5	1.5



Packer Plugs and Accessories

VT Equalizing Packer Plug

The VT Equalizing Packer Plug is used to temporarily seal the ID of Superior Completion Services' sealbore packer. The plug latches into the top threads of the packer to form a positive seal in both directions. The packer plug contains an equalizing valve to allow the plug to be set and returned above a flapper valve or other closed system.

Dual-Equalizing Packer Plug

The Dual-Equalizing Packer Plug has the same features as Superior Completion Services' VT equalizing packer plug. It includes an optional grapple release control bar that may be run with a standard short catch overshot for retrieval.

Packer Plug Running Tool

The Packer Plug Running Tool consists of an overshot that is shear-pinned to the packer plug control bar prior to being run into the wellbore. The running tool also engages an equalizing valve located above the top of the packer plug. The equalizing valve is run in the open position, which allows the plug to be landed in a closed system. Once landed, the running tool is sheared free, closing the equalizing valve and isolating the area below the packer plug.

Packer Plug Retrieving Tool

The Packer Plug Retrieving Tool is made up of a washover head with an internal retrieving sleeve. The retrieving sleeve engages the lug mounted on the packer plug control bar to provide positive engagement for reliable retrieving. The overshot has milling teeth to break up hard debris when washing over the plug control bar.

Debris-Free Retrieving Tool

Superior Completion Services' Debris-Free Packer Plug Retrieving Tool is uniquely designed to allow complete washover of the packer plug prior to engaging the retrieving tool. The retrieving tool is shrouded by a shearscrewed and spring-loaded wash pipe assembly. Once the packer plug is circulated clean, set-down weight shears the retrieving tool from the outer shroud, allowing it to engage the plug. The spring-loaded shroud stays engaged with the plug top, trapping debris that may have been washed into the tubing.



VT Equalizing Packer Plug



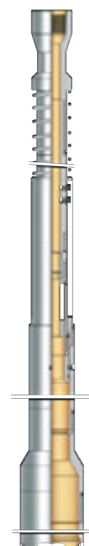
Packer Plug Retrieving Tool



Packer Plug Running Tool



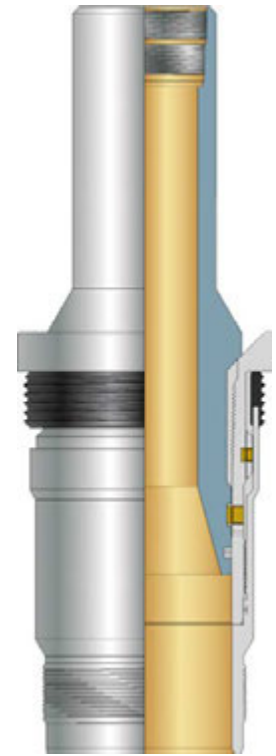
Dual-Equalizing Packer Plug



Debris-Free Retrieving Tool

Straddle Fixture

Superior Completion Services' **Straddle Fixture** isolates the uppermost molded seal frac sleeve of an intelligent (selective) or dual sand control completion. The straddle running tool includes a premium box connection; the shear pins rotationally lock the running tool. The Straddle Fixture is forced in position and anchored with an anchor latch ring and released with upward pull. The fixture is designed with an internal retrieving thread for easy engagement. Straight upward pull will shear the support under the latch ring, releasing the fixture. The **Straddle Fixture** will also release with a slight upward pull and RH rotation.



APPLICATIONS

- Production isolation

Features and Benefits

- Positive locator
- Rotationally locked assembly
- Shear-type/straight-pull release
- Redundant rotational release
- Pressure balanced

TECHNICAL DATA

Available seal unit sizes	4 to 6 in. (110.6 to 152.4 mm)
Available materials	4140 and 13 chrome

REFERENCES

CompSet™ Packers data sheet
CompSet™ Ultra Packers data sheet

Spud-Type Packer Retrieving Tool

The **Spud-Type Packer Retrieving Tool** is utilized to reclaim Superior Completion Services' CompSet™ series of externally retrievable packers. The tool utilizes a standard retrieving overshoot in conjunction with an inner jar-down mandrel to assist in releasing the CompSet™ HP packers. The inner mandrel is free to move up and down through the overshoot, providing a mechanical jarring effect.

APPLICATIONS

- Packer retrieval

Features and Benefits

- Sliding inner mandrel assists in mechanical jarring action
- Standard retrieving overshoot
- Allows upward and downward jarring action on the packer
- LH thread for contingency release



REFERENCES

- CompSet™ Packers data sheet
- CompSet™ Ultra Packers data sheet



COMPLETION SERVICES

SECTION 5

Production Packers



PRODUCTION PACKERS

CompPro™ HydroSeal HP Packer	75
ComPlete™ MST System Isolation Packer	77
CompPro™ TIP Packer	79
CompPro™ Dual Packer	81

CompPro™ HydroSeal HP Packer

Superior Completion Services' **CompPro™ HydroSeal HP Packer** is a versatile, hydraulically set, tubing-retrievable production packer. It includes several design features to enhance reliability in deep completions with long production strings. A pressure-sensitive mechanical lock feature prevents pre-setting during run-in and during the placement of packer fluids.

Packer setting is achieved by plugging or sealing the ID below the packer mandrel and applying pressure to the production tubing. Once the desired setting pressure is attained, an annular test may be performed to confirm packer seal integrity. The internal lock ring stores all applied hydraulic energy to ensure positive sealing. The packer is retrievable and multiple release options are available.

APPLICATIONS

- High-pressure, high-temperature wells
- Ultra deep completions
- Highly deviated wells

Features and Benefits

- Wire mesh-supported elastomer
- One-piece mandrel helps prevent movement during setting
- Hydraulic interlock prevents premature packer setting
- Multiple pressure-assisted seals: above, internal and below
- Rotationally locks in running, set and release positions
- Multiple release options available, including straight pull, hydraulic punch nipple or cut-to-release



CompPro™ HydroSeal HP Packer

TECHNICAL DATA

Differential pressure rating 10,000 psi (68.9 MPa)
Temperature rating 350°F (177°C)

CompPro™ HydroSeal HP Packer											
Casing Size		Casing Weight Range		Maximum OD				Minimum ID		Connection	
inch	mm	lb/ft	kg/m	inch	mm	inch	mm	inch	mm	Top	Bottom
7	178.0	29.0-32.0	43.2-47.7	5.87	149.1	2.38	60.3	2 7/8	73.0	2 7/8	73.0

Premium metallurgies available upon request.

RELEASE OPTIONS:

1. Straight pull
2. Slickline release (requires special key engagement, a downward shift, and then an upward shift)
3. Cut-to-release (cutting length adjustable)
4. Contingency—cut the tubing directly above packer then engage short catch on upper outer sub

REFERENCES

CompPro HydroSeal Packer data sheet
CompPro HydroSeal HP-PT packer data sheet

ComPlete™ MST System Isolation Packer

Superior Completion Services' **ComPlete™ MST System Isolation Packer** is an integral part of Superior Completion's multizone singletrip (MST) system, providing zonal isolation between reservoirs. This hydraulically set packer is frac-rated and provides two elements with a testable feature to confirm the packer is fully set. If required, the packer can be retrieved with straight pull. The FlowSafe™ WR Safety Valve can be installed as a primary safety valve landed in a hydraulic nipple. It can also be used to remediate a failed Tubing-Retrieveable (TR) Safety Valve.

The ComPlete MST System Isolation Packer is adapted from other field-proven production and service packer designs. The packer allows multiple reservoirs to be isolated and treated in a single trip.

APPLICATIONS

- Multizone reservoirs
- Zonal isolation
- Deepwater
- Sand control

Features and Benefits

- Hydraulically set
- Dual elements with a testable feature
- Hold down buttons for frac rating
- Straight-pull retrieval
- Allows isolation and treatment of multiple zones in a single trip
- Additional time savings as multiple packers can be set and tested at once



ComPlete™ MST System Isolation Packer

TECHNICAL DATA

ComPlete™ MST System Isolation Packer									
Casing Size		Weight Range		Minimum ID		Pressure Rating		Minimum Test Pressure	
inch	mm	lb	kg	inch	mm	psi	MPa	psi	MPa
7	177.8	23.0	10.4	2.75	69.9	10,000	69.0	3,500	24.1
7	177.8	26.0	11.8	2.75	69.9	10,000	69.0	3,500	24.1
7	177.8	26-32	13.2-14.5	2.75	69.9	10,000	69.0	3,500	24.1
7	177.8	32-38	14.5-17.2	2.75	69.9	10,000	69.0	3,500	24.1
7 5/8	193.7	29.7	13.5	2.75	69.9	10,000	69.0	3,500	24.1
9 5/8	244.5	47-53.5	21.4-24.3	3.75	95.3	10,000	69.0	3,500	24.1
9 5/8	244.5	47-53.5	21.4-24.3	5.13	130.2	10,000	69.0	3,500	27.6
9 7/8	250.8	62.800	28.5	3.75	95.3	10,000	69.0	3,500	24.1
10 1/8	257.2	72.900	33.1	3.75	95.3	10,000	69.0	3,500	24.1

REFERENCES

ComPlete™ MST system data sheet

CompPro™ TIP Packer

Superior Completion Services' **CompPro™ Testable Isolation Production (TIP) Packer** is a versatile, hydraulically set, high-performance, tubing retrievable packer that includes several design features to enhance reliability. The packer is designed with dual high-pressure sealing elements to ensure a positive seal. The dual elements enable high-pressure integrity tests without exposing liner tops or casing strings to test pressures. This configuration also provides a means of pressure testing the packer when positioned between producing intervals.

The packer is also designed with no mandrel movement during setting, allowing multiple packers to be set simultaneously. The TIP packer is certified to handle 10,000 psi (68.9 MPa) differential pressures in both oil and gas environments. The packer is retrievable, and several release options are available.

APPLICATIONS

- High-pressure, high-temperature wells
- Multizone completions

Features and Benefits

- Multiple release options available, including straight pull and cut-to-release
- One-piece mandrel prevents movement during setting
- Dual high-pressure and self-energizing sealing elements enhance packer seal and differential rating
- Unique pressure-sensitive interlock feature prevents premature setting
- Bidirectional slips
- Rotationally locks in running, set and release positions
- Pressure-assisted seals: above, internal and below
- Gauge ring positioned at lower end of packer
- Maximum slip area for high loads and pressure differentials



CompPro™ TIP Packer

TECHNICAL DATA

Differential pressure rating 10,000 psi (68.9 MPa)
Temperature rating 350°F (177°C)

CompPro™ TIP Packer									
Casing Size		Tool Size		Casing Weight Range		Maximum OD		Minimum ID	
inch	mm	lb	kg	inch	mm	Inch	mm	Inch	mm
7	177.8	7.000 x 3.00	177.8 x 76.2	20.0-26.0	29.7-38.6	6.07	154.0	2.98	75.6
		7.000 x 3.00	177.8 x 88.9	32.0	47.6	5.88	149.4	2.93	74.2
		7.000 x 3.00	177.8 x 88.9	35.0-41.0	52.1-61.0	5.63	142.9	2.97	75.4
7 5/8	193.6	7.625 x 3.00	193.6 x 76.2	29.7-39.0	44.2-58.0	6.44	163.5	2.99	75.8
7 3/4	196.8	7.750 x 3.00	196.8 x 76.2	46.1	68.5	6.42	162.9	2.68	67.9
		9.625 x 3.00	244.4 x 76.2	53.5	79.6	8.31	211.0	2.97	75.4
		9.625 x 3.75	244.4 x 95.2	53.5	79.6	8.31	211.0	3.72	94.4
9 5/8	244.54	9.625 x 4.00	244.4 x 101.6	53.5	79.6	8.31	211.0	3.94	100.1
		9.875 x 3.00	250.8 x 76.2	62.8-65.1	93.4-96.8	8.42	213.9	2.86	72.6
9 7/8	250.8	9.875 x 3.75	250.8 x 95.2	62.8	93.4	8.42	213.9	3.72	94.4
		10.125 x 3.00	257.1 x 76.2	79.20	117.8	8.42	213.9	2.97	75.4
10 3/8	257.1								

CompPro™ Dual Packer

Superior Completion Services' **CompPro™ Dual Packer** is a hydraulic-set, dual string production packer. The packer is constructed on a short rigid frame with the sealing elastomers and a setting chamber positioned between opposing slips. Both production tubing strings are installed as the packer is deployed. Tubing hangers are normally landed and tested prior to packer setting. The packer is V-3 certified for service up to 5,500 psi according to API 11D1 specifications. An adjustable mechanical release requires tension on the long string to shear release the long string mandrel from the lower slip cone.

APPLICATIONS

- Deviated and horizontal wells
- High-volume instrumented applications
- Well monitoring, gas venting, chemical injection and hydraulic-line access
- Multizone isolation

Features and Benefits

- Stackable for multizone applications
- Three element sealing system
- Secondary Setting: Applied Hydraulic Pressure Long String Internal
- Setting Chamber below packer elements; extends production sealing life
- No mandrel movement during setting; ideal for setting after wellhead installation
- Pressure assisted internally and on the above annulus during production
- Release: Adjustable predetermined Long String Over-Pull with Sequential Upper Slip disengagement (Optional: Scoop Head with J-Latch and various types of seals)



CompPro™ Dual Packer

TECHNICAL DATA

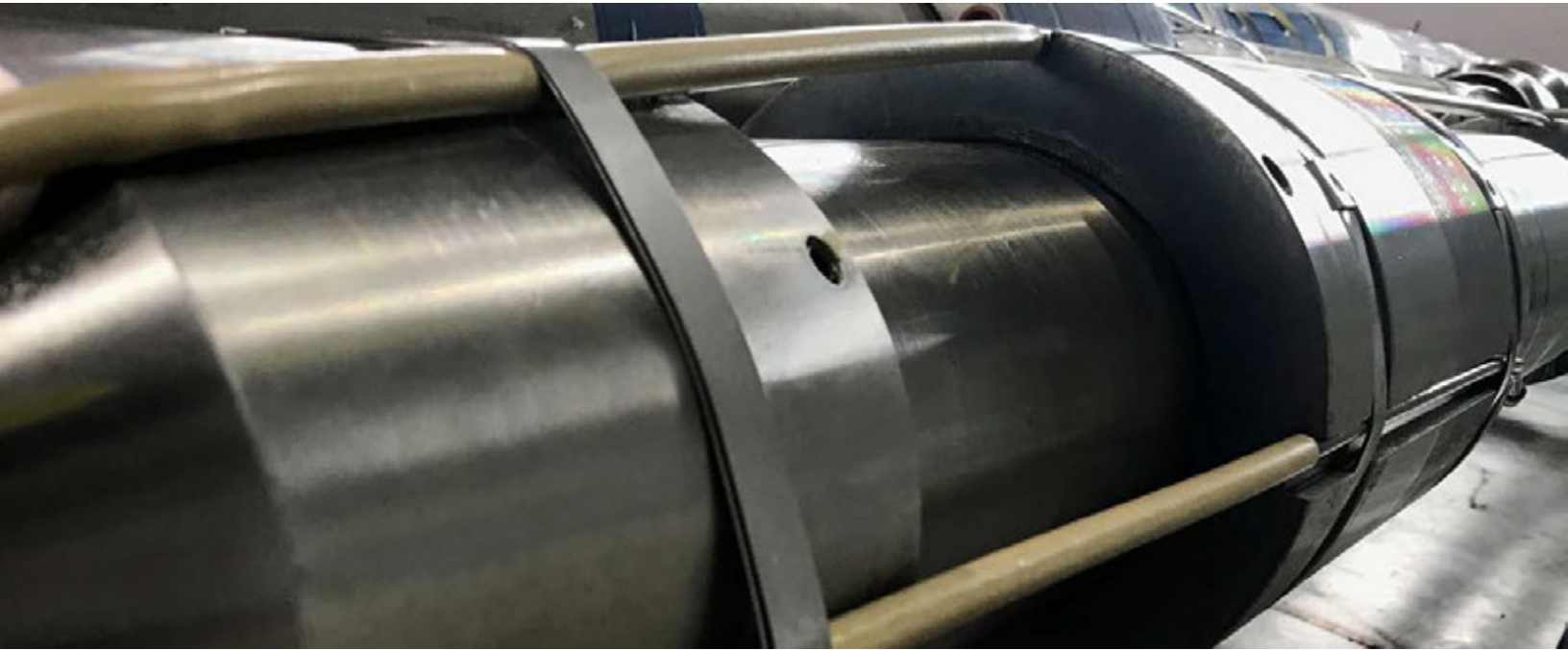
CompPro™ Dual Packer									
CASING SIZE					PACKER				
		ID		Gauge OD	Long String		Short String		String Set
OD	LBS	Min	Max	Max	Size/ID Min	Conn/Cust	Size ID Min	Conn/Cust	
7.00	17-23	6.284	6.629	6.181	2.375/1.930	2.375/4.7#	2.375/1.930	2.375/4.7#	Short
7.00	26-32	5.990	6.380	5.938					
7.625	24-29	6.781	7.129	6.672	2.875/2.370	2.875/6.5#	2.375/1.930	2.375/4.7#	Short
7.625	33-39	6.510	6.882	6.410					
9.625	43-47	8.562	8.892	8.465	3.500/2.872	3.500/9.3#	3.500/2.872	3.500/9.3#	Short
9.625	46-53	8.404	8.822	8.310					



COMPLETION SERVICES

SECTION 6

Intelligent Systems



INTELLIGENT SYSTEMS

Hydraulic-Actuated Well Completion (HAWC™) System

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Hydraulic- Actuated Well Completion (HAWC™) System

HAWC™ is Superior's intelligent well completion package, consisting of a pass-through production packer and independently operated hydraulic control sleeves. The system has numerous applications in deepwater, multizone, high-angle completions, and production field management. It provides flexibility to selectively control flow from various zones in a single well and has the capability to remotely shift between producing zones, thereby maximizing overall production. With real-time measurement of downhole temperature and pressure, operators can isolate and adjust the internal flow. The HAWC™ system is known for its reliability, and provides consistent long-term performance in challenging downhole environments.

APPLICATIONS

- Deepwater wells
- Multizone completions
- Remote production/injection access
- High-angle completions
- Production field management

Features and Benefits

- Reliably and economically controls multiple completions in a single well and remotely shifts production between zones to optimize field production
- Provides an additional barrier for well control operations when demobilizing the rig
- The HAWC well completion package includes:
 - HAWC system valves that allow remote flow control of multiple zones
 - High-pressure isolation production packer with multiple pass-throughs
 - The integration of surveillance equipment that provides real-time, reliable, multizone measures of downhole temperature and pressure



Hydraulic-Actuated Well Completion (HAWC™) System

SYSTEM COMPONENTS

1. Hydraulic Set Instring Pass Through Packer (cut or shear release)
2. Break assembly
3. Upper HAWC System Valve (w/ "R" Profile Sub)
4. Lower HAWC System Valve (w/ "R" Profile Sub)
5. Pressure containing shroud assembly

TECHNICAL DATA

Differential Pressure Rating	Up to 15,000 psi (103.42 MPa) VO Rated w/ 10% Safety Factor and Temperature De-Rated
Maximum Temperature	350°F (177°C)

Hydraulic-Actuated Well Completion (HAWC™) System													
Casing Size		Casing Drift Diameter		Lower Sleeve				Upper Sleeve				Connection	
inch	mm	inch	mm	Size		ID		Size		ID		inch	mm
9 5/8	244.5	8.5	2.159	3.5	88.9	2.75	69.9	3.5	88.9	2.75	69.9	3.437	76.2
						2.813	71.45	4.5	114.3	3.347	85.013		
9 7/8	250.8	8.5	2.159	3.5	88.9	2.75	69.6	3.5	88.9	2.75	69.9	3.437	76.2
						2.813	71.45	4.5	114.3	3.347	85.013		
10 3/8	257.17	8.5	2.159	3.5	88.9	2.75	69.6	3.5	88.9	2.75	69.9	3.437	76.2
						2.813	71.45	4.5	114.3	3.347	85.013		

REFERENCES

HydroSeal HP-PT packer data sheet
 HAWC system accessories data sheet
 HAWC system valve data sheet
 TIP-PT packer data sheet
 Turner, D. 2006. Smart Well, Deepwater Solutions Petroleum Africa 4 (1)
 Burman, J.W., Renfro, K.D., Conrad, M., Parker, C., Turner, D., and Franklin, B. 2005. Design Considerations for Interventionless, Commingled Multizone Selective Sand Control Deepwater Completions. Paper SPE 95598 presented at SPE Annual Technical Conference and Exhibition, Dallas, Texas, 9-12 October.
 Johnson D.E., Turner, D., Walker, D.J., Harris, D. and McDaniel D. 2002. Reliable and Completely Interventionless Intelligent Well Completion Technology: Application and Field Study. Paper OTC 14252 presented at the Offshore Technology Conference, Houston, Texas 6-9 May



COMPLETION SERVICES

SECTION 7

Subsurface Safety



SUBSURFACE SAFETY

FlowSafe™ Tubing-Retrievable Safety Valve	85
FlowSafe™ Wireline-Retrievable Safety Valve	87
FlowSafe™ Safety Valve Lock Mandrels	89
Superior Landing Nipples	91

FlowSafe™ Tubing-Retrievable Safety Valve

Superior Completion Services' **FlowSafe™ Tubing-Retrievable Safety Valve (TRSV)** is a flapper-type, equalizing or non-equalizing, surface-controlled subsurface safety valve (SCSSV) installed in the production string. The valve is designed to provide subsurface isolation to minimize loss of production and protect human life. It also reduces the potential for environmental discharge or damage to production equipment resulting from an uncontrolled surface or subsurface event.

The **FlowSafe™ SCSSV** is hydraulically controlled from the surface through a control line connected to the well control/emergency shutdown system. The FlowSafe™ TR Safety Valve is designed to facilitate easy installation of secondary FlowSafe™ Wireline-Retrievable (WR) Insert Safety Valve to provide continuous fail-safe operation.

APPLICATIONS

- Production and cement through applications
- Any area in which the integrity of the wellhead can be compromised

Features and Benefits

- Hydraulically controlled
- Single rod piston design
- Certified per API 14A specifications
- Maximized flow-through ID design
- Self-equalized through flapper option
- Non-elastomeric seals
- Metal-to-metal body joints
- Secondary lockout/communication
- Inverted dual ferrule control line connection
- Optimized design helps eliminate sand fouling
- Compact design and minimal number of parts increases reliability
- Minimized number of potential leak paths
- Premium metallurgies available for varied environments



FlowSafe™ Tubing-Retrievable Safety Valve

TECHNICAL DATA

FlowSafe™ Tubing-Retrievable Safety Valves												
FLOWSAFE™ TR 5,000-PSI SAFETY VALVES												
Tubing Size		Model	Maximum OD		Polished Bores				Working Pressure		Tensile Strength**	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa	lb	kg
2 ¾	60.3	BT(E)-5	3.625	92.08	1.875	47.6		55.6			167,191	75,837
2 ¾	73.3	BT(E)-5	4.610	117.1	2.313	58.7	2.188	86.0			186,180	84,450
3 ½	88.9	BT(E)-5	5.175	131.4	2.813	71.4	2.750	69.9	5,000	34,474	302,760	137,330
4 ½	114.3	BT(E)-5	6.908	175.4	3.813	96.9	3.688	93.7			425,740	193,112
4 ½	114.3	BTSP(E)-5	6.550	166.4	3.813	96.9	3.688	93.7			380,007	172,368
5 ½	139.3	BTSP(E)-5	7.686	195.2	4.563	115.9					602,970	272,502
7	177.8	BTSP(E)-5	9.203	238.8	5.963	151.0					886,905	402,293
FLOWSAFE™ TR 7,500-PSI SAFETY VALVES												
Tubing Size		Model	Maximum OD		Polished Bores				Working Pressure		Tensile Strength**	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa	lb	kg
4 ½	114.3	BTSP(E)-7.5	6.915	175.6	3.813	96.9	3.688	93.7			535,980	243,116
5 ½	139.3	BTSP(E)-7.5	8.107	205.9	4.563	115.9			7,500	51,710	780,264	353,922
7	177.8	BTSP(E)-7.5	9.537	242.2	5.963	151.0					1,353,420	613,901
FLOWSAFE™ TR 10,000-PSI SAFETY VALVES												
Tubing Size		Model	Maximum OD		Polished Bores				Working Pressure		Tensile Strength**	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa	lb	kg
2 ¾	60.3	BT(E)-10	3.625	92.1	1.875	47.6					198,485	90,031
2 ¾	70.3	BT(E)-10	5.130	130.3	2.313	58.7	2.188	55.6			282,132	128,427
3 ½	88.9	BT(E)-10	5.540	140.7	2.813	71.4	2.750	69.9			374,733	169,979
3 ½	88.9	BT(E)-10	5.540	140.7	2.653	71.4			10,000	68,948	374,733	169,979
4 ½	114.3	BTSP(E)-10	7.350	186.7	3.813	96.9	3.688	93.7			468,509	212,512
5 ½	139.7	BTSP(E)-10	8.592	218.2	4.563	115.9					780,264	353,922
7	177.8	BTSP(E)-10	9.982	253.5	5.963	151.0					1,455,058	660,003

- The data provided above is not inclusive of all pressure ratings and ODs available in the tubing sizes listed. For additional information, contact your Superior Completion Services representative.
- The tensile ratings listed are specific to the metallurgy for the valves listed and are exclusive of end connections. Tensile calculations are performed at ambient temperatures. Additional information is available upon request.

REFERENCES

The FlowSafe™ SCSSV brochure
FlowSafe™ WR Safety Valve data sheet

FlowSafe™ Wireline-Retrievable Safety Valve

Superior Completion Services' **FlowSafe™ Wireline-Retrievable (WR) Safety Valve** is a flapper-type, equalizing or non-equalizing, surface-controlled subsurface safety valve (SCSSV). The valve is designed to provide subsurface isolation to minimize loss of production and protect human life. It also reduces the potential for environmental discharge or damage to production equipment resulting from an uncontrolled surface or subsurface event.

The FlowSafe™ WR Safety Valve can be installed as a primary safety valve landed in a hydraulic nipple. It can also be used to remediate a failed Tubing-Retrievable as an Insert Wireline Safety Valve.

APPLICATIONS

- Offshore environments and onshore wells located in environmentally sensitive areas
- Any area in which the integrity of the wellhead can be compromised

Features and Benefits

- Hydraulically controlled
- Certified per API 14A specifications
- Maximized flow-through ID design
- Self-equalized through flapper option
- Optimized design helps eliminate sand fouling
- Compact design and minimal number of parts increases reliability
- Replacement for an existing TR safety valve
- Facilitates flow assurance well design criteria
- Minimized number of potential leak paths
- Premium metallurgies available for varied environments



FlowSafe™ Wireline-Retrievable Safety Valve

TECHNICAL DATA

FlowSafe™ Wireline-Retrievable Safety Valve										
Tubing Size		Model	Inside Diameter		Polished Bores				Working Pressure	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa
2 3/8	60.33	BW(E)-5/10	0.810	20.57	1.875	47.6				
2 7/8	73.03	BW(E)-5/10	11.25	28.58	2.313	58.7	2.188	55.6		
3 1/2	88.90	BW(E)-5/10	1.500	38.10	2.813	71.4	2.750	69.9	5,000 or	34,474 or
4 1/2	114.30	BW(E)-5/10	2.125	53.98	3.813	96.9	3.688	93.7	10,000	68,948
5 1/2	139.3	BW(E)-5/10	2.600	66.04	4.563	115.9				
7	177.8	BW(E)-5/10	3.500	88.90	5.963	151.0	6.000	152.0		

FlowSafe™ Wireline-Retrievable Safety Valve Hydraulic Nipple										
Tubing Size		Model	Inside Diameter		Polished Bores				Working Pressure	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa
2 3/8	60.33	BW(E)-5/10	1.875	47.6						
2 7/8	73.03	BW(E)-5/10	2.188	55.6	2.313	58.7				
3 1/2	88.90	BW(E)-5/10	2.563	65.1	2.813	71.4	2.750	69.9	5,000 or	34,474 or
4 1/2	114.30	BW(E)-5/10	3.750	95.25	3.813	96.9	3.688	93.7	10,000	68,948
5 1/2	139.3	BW(E)-5/10	4.563	115.9						
7	177.8	BW(E)-5/10	5.963	151.0	6.000	152.0				

The data provided above is not inclusive of all pressure ratings and ODs available in the tubing sizes listed. For additional information, contact your Superior Completion Services representative.

REFERENCES

FlowSafe™ TR safety valve data sheet

FlowSafe™ SCSSV brochure

FlowSafe™ Safety Valve Lock Mandrels

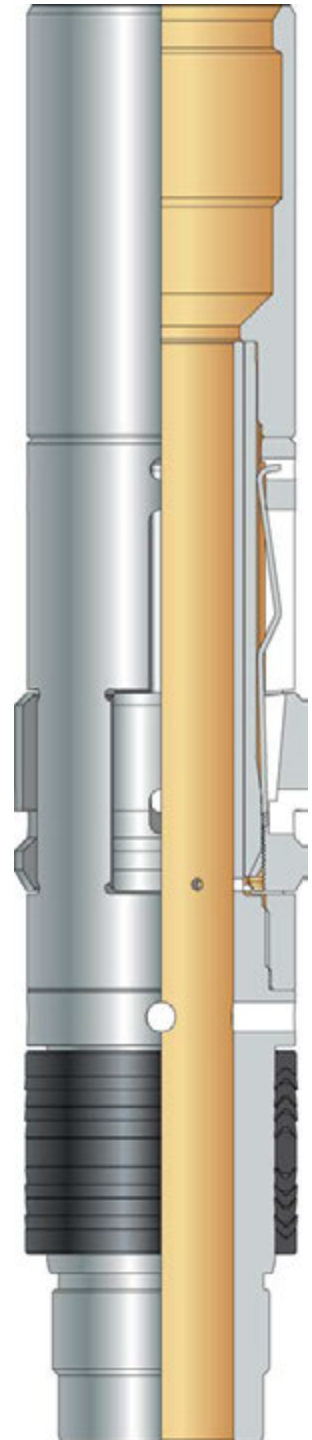
Superior Completion Services' **FlowSafe™ Safety Valve Lock** mandrels are designed specifically for wireline safety valve applications. These feature Industry standard profiles and offer 10K pressure ratings from below with an ID that matches the WLSV. These are manufactured under API Q1 and built to API 14L standards.

APPLICATIONS

- Insert wireline safety valve
- Wireline safety valve with hydraulic nipple
- Standard lock applications where a reduced ID is acceptable

Features and Benefits

- API 14L Certified
- Rated to full working pressure for the safety valve
- Validation grade up to V1
- Metallurgy selected for application



FlowSafe™ Safety Valve Lock Mandrels

TECHNICAL DATA

FlowSafe™ Wireline Retrievable Safety Valve Lock Mandrels										
Tubing Size		Model	Inside Diameter		Polished Bores				Working Pressure	
inch	mm		inch	mm	inch	mm	inch	mm	psi	MPa
2 3/8	60.33	SESX/SESR	0.810	20.57	1.875	47.6				
2 7/8	73.03	SESX/SESR	11.25	28.58	2.313	58.7	2.188	55.6		
3 1/2	88.90	SESX/SESR	1.500	38.10	2.813	71.4	2.750	69.9	5,000 or	34,474 or
4 1/2	114.30	SESX/SESR	2.125	53.98	3.813	96.9	3.688	93.7	10,000	68,948
5 1/2	139.3	SESRT	2.600	66.04	4.563	115.9				
7	177.8	SESRT	3.500	88.90	5.963	151.0	6.000	152.0		

REFERENCES

FlowSafe™ TR safety valve data sheet

FlowSafe™ SCSSV brochure

Superior Landing Nipples

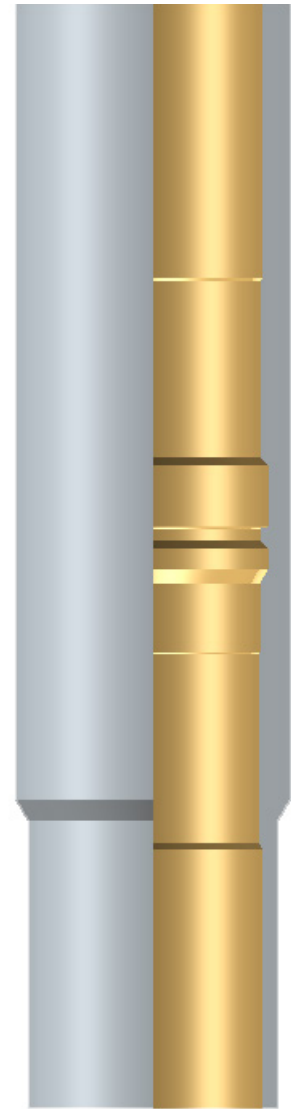
Superior Completion Services offers a complete line of industry standard **Landing Nipples**. The nipples are available in a standard commodity line manufactured under API Q1 quality standards and a premium line of certified nipples manufactured under API 14L standards. These nipples are compatible with industry standard locks made for the selected profile and other standard flow control accessories. Nipples are available in standard 4130-45 series alloys, 9 or 13 chrome, Inconel and material to match service environment.

APPLICATIONS

- Land blanking plugs
- Land gauge hangers
- Land velocity valves
- Land chokes
- Land equalizing check valves

Features and Benefits

- Available in commodity and certified types
- Full line of industry standard profiles and sealbores
- Available with selective and No-Go varieties
- Designed for standard and heavy wall tubing sizes
- Available in standard and premium thread varieties
- Compatible with standard slickline flow control accessory tools



Superior Landing Nipples

TECHNICAL DATA

Superior Landing Nipples										
Tubing Size		Model	Weight		Polished Bores				Working Pressure	
inch	mm		inch	kg/m	inch	mm	No Go ID	mm	psi	MPa
2 3/8	60.33	SEX	4.600	6.85	1.875	47.63				
		SEXN	4.6	6.85	1.875	47.63	1.791	45.49		
		SESR	5.960	8.86	1.710	43.43				
2 7/8	73.03	SEX	6.400	9.53	2.313	58.75				
		SEXN	6.400	9.53	2.313	58.75	2.205	56.0	5,000 or	34,474 or
		SESR	8.700	12.96	2.125	53.98			10,000	68,948
3 1/2	88.90	SEX	9.300	13.84	2.813	71.45				
		SEXN	9.300	13.85	2.813	71.45	2.665	67.7		
		SESR	12.95	19.29	2.562	65.07				
4 1/2	114.30	SEX	12.750	18.99	3.813	96.85				
		SEXN	12.75	18.99	3.813	96.85	3.725	94.6		
		SESR	15.5	23.09	3.688	93.68				

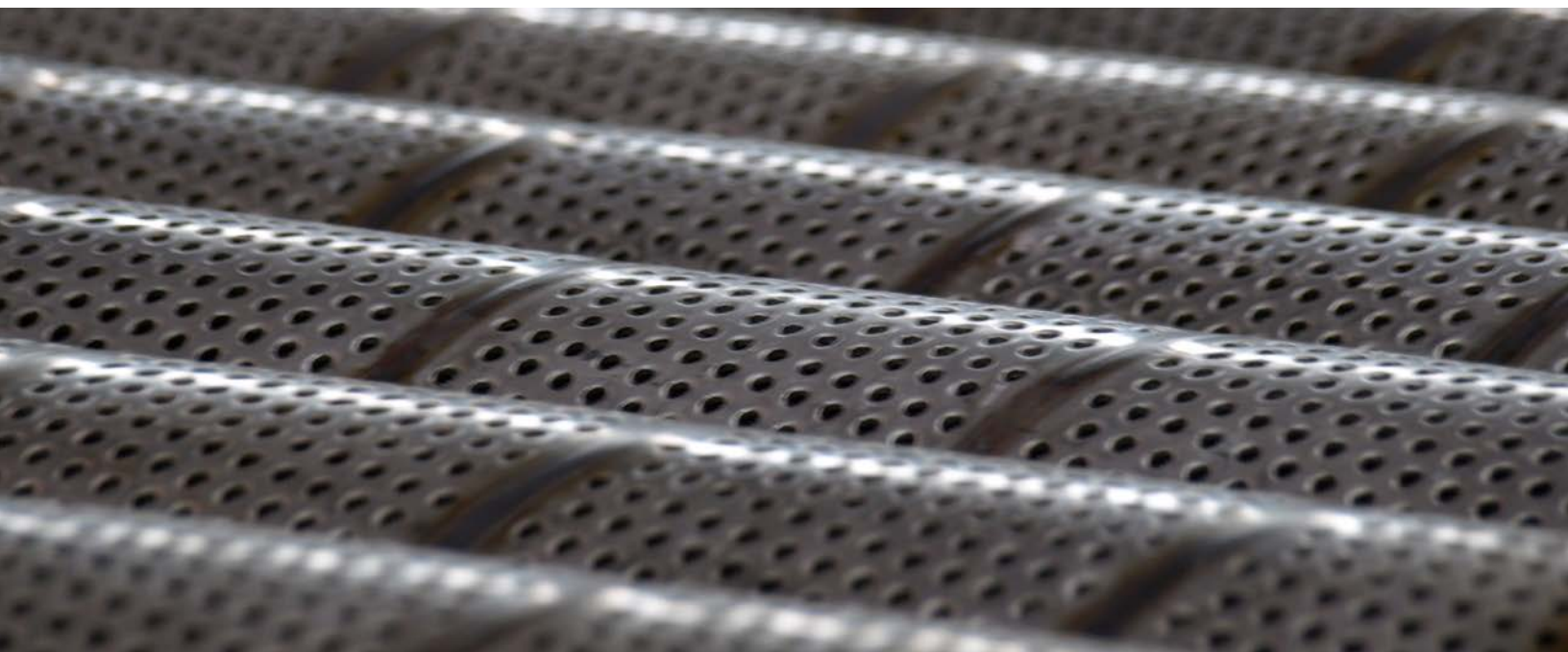
* Note - this is not a complete listing of availability.



COMPLETION SERVICES

SECTION 8

Well Screens & ICD Technologies



WELL SCREENS AND ICD TECHNOLOGIES

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EconoWeld™

Superior Completion Services' **EconoWeld™** screens, a slip-on wire wrap jacket welded directly to the base pipe, are tough, long-lasting screens designed for gravel pack and standalone screen installations inside perforated casing and limited openhole environments. Superior Completion Services combines innovative wire-wrap technology and advanced manufacturing processes to create **EconoWeld™** screens. This product fits the need when an economical solution is required for your specific application.

APPLICATIONS

- Cased hole applications and short barefoot completion environments
- Particularly well suited for fracturing, high-rate gravel pack and standalone operations

Features and Benefits

- Innovative wire shape provides maximum erosion resistance and strength compared with standard configurations
- Higher number of ribs provides greater strength and tolerance for the life of the screen
- Improved design reduces washouts caused by necking of wrap wire
- Heavy-duty construction enables the screen jacket to maintain gauge tolerances
- Superior Completions Services is capable of shaping custom wire configurations with our own in-house wire-shaping mill
- Wire jacket welded directly to the base pipe offers savings
- Conventional and heavy-duty (HD) wire options are available



EconoWeld™

TECHNICAL DATA

EconoWeld™														
Base Pipe OD		Base Pipe Weight		Perforations				Standard Screen OD		HD Screen OD		Inlet Area		
inch	mm	lb/ft	kg/m	inch	mm	holes/ft	holes/m	inch	mm	inch	mm	0.006in Slot	0.008in Slot	0.0012in Slot
2.375	60.3	4.6	6.8	3/8	95.3	48	157	2.82	71.6	2.86	72.6	6.58	8.92	12.84
2.875	73.0	6.4	9.5	3/8	95.3	48	157	3.35	85.09	3.46	87.8	8.04	10.47	15.06
3.500	88.9	9.2	13.7	3/8	95.3	60	197	3.97	100.8	4.00	101.6	9.53	12.40	17.84
4.000	101.6	9.5	14.1	3/8	95.3	60	197	4.46	113.3	4.52	114.8	10.71	13.95	20.07
4.500	114.3	11.6	17.3	3/8	95.3	72	236	4.95	125.7	5.03	127.8	11.98	15.60	22.44
5.000	127.0	15.0	22.3	3/8	95.3	72	236	5.49	139.4	5.54	140.7	13.18	17.16	24.69
5.500	139.7	17.0	25.3	3/8	95.3	84	276	5.96	151.4	6.03	153.1	14.38	18.72	26.94
6.625	168.3	24.0	35.7	3/8	95.3	84	276	7.13	181.1	7.18	182.3	17.09	22.25	32.01
7.000	177.8	23.0	34.2	3/8	95.3	96	315	7.49	190.2	7.55	191.8	18.00	23.43	33.72

Metallurgy: Screens available in 316L or nickel alloy 825; base pipe available in a multitude of materials upon request.
 Wire Combo: Standard screen uses 0.090"x0.075" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.
 HD screen uses 0.060"x0.100" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.
 EconoWeld™ screens features Keystone shaped wrap wire for plugging resistance.

REFERENCES

Wire-wrapped and premium well screens brochure

ProWeld™

Superior Completion Services' **ProWeld™ Screens**, a slip-on wire wrap jacket attached to the base pipe, are tough, long-lasting screens designed for gravel pack and standalone screen installations inside perforated casing and limited openhole environments. Superior Completion Services combines innovative wire-wrap technology and advanced manufacturing processes to create **ProWeld™ Screens**. The result is a product that outperforms conventional wire-wrap screens with superior strength and an extended service life. Gauge accuracy is validated through the use of photometric automated gauge measuring system on every jacket manufactured.

APPLICATIONS

- Cased and limited openhole environments
- Particularly well-suited for fracturing, high-rate gravel pack and standalone operations

Features and Benefits

- Innovative wire shape provides maximum erosion resistance and strength compared with standard configurations
- Higher number of ribs provides greater strength and tolerance for the life of the screen
- Improved design eliminates necking of the wrap wire as it is being welded to the rib
- Heavy-duty construction enables the screen jacket to maintain gauge tolerance
- Superior Completion Services is capable of shaping custom wire configurations with our own in-house wire-shaping mill
- Conventional and heavy-duty (HD) wire options are available to meet your needs



ProWeld™

TECHNICAL DATA

ProWeld™														
Base Pipe OD		Base Pipe Weight		Perforations				Standard Screen OD		HD Screen OD		Inlet Area		
inch	mm	lb/ft	kg/m	inch	mm	holes/ft	holes/m	inch	mm	inch	mm	0.006in Slot	0.008in Slot	0.0012in Slot
2.375	60.33	4.6	6.8	3/8	95.3	48	157	2.82	71.60	2.86	72.64	6.66	8.67	12.84
2.875	73.03	6.4	9.5	3/8	95.3	48	157	3.35	84.07	3.38	85.85	7.85	10.22	14.71
3.500	88.90	9.2	13.7	3/8	95.3	60	197	3.97	99.82	4.00	101.6	9.34	12.15	17.49
4.000	101.60	9.5	14.1	3/8	95.3	60	197	4.46	112.52	4.52	114.80	10.52	13.70	19.71
4.500	114.30	11.6	17.3	3/8	95.3	72	236	4.97	126.20	5.03	127.76	11.74	15.29	22.00
5.000	127.00	15.0	22.3	3/8	95.3	72	236	5.45	138.43	5.41	139.70	12.94	16.85	24.24
5.500	139.70	17.0	25.3	3/8	95.3	84	276	5.96	151.38	6.03	153.16	14.14	18.41	26.49
6.625	168.28	24.0	35.7	3/8	95.3	84	276	7.13	182.37	7.18	181.36	16.84	21.92	31.55
7.000	177.80	23.0	34.2	3/8	95.3	96	315	7.49	190.20	7.55	191.77	17.74	23.09	33.23

Metallurgy: Screens available in 316L or nickel alloy 825; base pipe available in a multitude of materials upon request.
 Wire Combo: Standard screen uses 0.090"x0.075" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.
 HD screen uses 0.060"x0.100" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.
 ProWeld™ TOP screens feature Keystone shaped wrap wire for plugging resistance.

REFERENCES

Wire-wrapped and premium well screens brochure

ProWeld™ Precision TOP

Superior Completion Services' **ProWeld™ Precision TOP** is a wire jacket directly wrapped to the base pipe providing a shrink fit coupled jacket. Delivering a robust, long-lasting screen designed for extended reach and long horizontal laterals as gravel pack and standalone screen installations inside perforated casing and openhole environments. Superior Completion combines innovative wire-wrap technology and advanced manufacturing processes to create **ProWeld™ Precision TOP Screens**. The result is a product that outperforms conventional wire-wrap screens with superior strength and an extended service life. Gauge accuracy is validated through the use of an optical photometric automated gauge measuring system.

APPLICATIONS

- Long extended-reach and horizontal wells
- Standalone screen with Inflow Control Device, ICD
- Cased and openhole environments
- Particularly well-suited for fracturing, high-rate gravel pack and standalone operations
- Delivering selectivity by adapting a sliding sleeve to receive a direct wrapped wire jacket such as ProWeld™ Precision TOP for a robust product

Features and Benefits

- Innovative wire shape provides maximum erosion resistance and strength compared with standard configurations
- Higher number of ribs provides greater strength and tolerance for the life of the screen
- Improved design reduces washouts caused by necking of wrap wire
- Heavy-duty construction enables the screen jacket to maintain gauge tolerance
- Superior Completion Services is capable of shaping custom wire configurations with our own in-house wire-shaping mill
- Conventional and heavy-duty (HD) wire options are standard



ProWeld™ Precision TOP

TECHNICAL DATA

ProWeld™ Precision TOP														
Base Pipe OD		Base Pipe Weight		Perforations				Standard Screen OD		HD Screen OD		Inlet Area		
inch	mm	lb/ft	kg/m	inch	mm	holes/ft	holes/m	inch	mm	inch	mm	0.006in Slot	0.008in Slot	0.0012in Slot
2.375	60.33	4.6	6.8	3/8	95.3	48	157	2.77	70.35	2.81	71.37	6.66	8.67	12.84
2.875	73.03	6.4	9.5	3/8	95.3	48	157	3.27	83.05	3.31	84.07	7.85	10.22	14.71
3.500	88.90	9.2	13.7	3/8	95.3	60	197	3.89	98.80	3.94	100.08	9.34	12.15	17.49
4.000	101.60	9.5	14.1	3/8	95.3	60	197	4.42	112.27	4.46	113.28	10.52	13.70	19.71
4.500	114.30	11.6	17.3	3/8	95.3	72	236	4.91	124.71	4.96	125.98	11.74	15.29	22.00
5.000	127.00	15.0	22.3	3/8	95.3	72	236	5.41	137.41	5.46	138.68	12.94	16.85	24.24
5.500	139.70	17.0	25.3	3/8	95.3	84	276	5.92	150.37	5.97	151.64	14.14	18.41	26.49
6.625	168.28	24.0	35.7	3/8	95.3	84	276	7.03	178.56	7.10	180.34	16.84	21.92	31.55
7.000	177.80	23.0	34.2	3/8	95.3	96	315	7.43	188.72	7.48	189.88	17.74	23.09	33.23

Metallurgy: Screens available in 316L or nickel alloy 825; base pipe available in a multitude of materials upon request.

Wire Combo: Standard screen uses 0.090"x0.075" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.

HD screen uses 0.060"x0.100" "keystone" shaped wrap wire and 0.090"x0.140" "house" shaped rib wire.

ProWeld TOP screens feature Keystone shaped wrap wire for plugging resistance.

REFERENCES

Wire-wrapped and premium well screens brochure

SlimFlo™ Pre-Packed

Superior Completion Services' **SlimFlo™ Pre-Packed** Screens are designed with large spacer ribs on the outer screen for better concentricity and higher flow capacity. Used in conjunction with gravel packs, these robust screens provide an additional level of protection against erosion during sand placement and secondary protection against voids in the gravel pack.

APPLICATIONS

- Sand control
- High-rate water, gravel and frac-pack operations
- Openhole and horizontal completions
- When the potential for an incomplete pack is possible due to high leak-off zone, etc.

Features and Benefits

- Designed to have an annular pre-pack of 0.200 in. (5.08 mm) or greater
- Uses keystone- or house-design wrapped wire
- Pre-packing process helps ensure void-free, tight, uniform sand packs
- Intermittent spacer ribs maintain concentricity and ensure a uniform pack annulus
- Protects against erosion during sand placement
- Provides barrier to sand production through voids in the gravel pack
- Greater number of ribs increases tensile strength and provides a rounder, smoother jacket surface
- Available in standard and heavy-duty (HD) options



SlimFlo™ Pre-Packed

TECHNICAL DATA

SlimFlow™ Pre-Packed								
Base Pipe OD		Standard Screen OD		HD Screen OD		0.006in Slot	Inlet Area 0.008in Slot	0.0012in Slot
inch	mm	inch	mm	inch	mm	in ² /ft	in ² /ft	in ² /ft
2.375	60.33	3.14	79.76	3.19	81.03	7.54	9.81	14.12
2.875	73.03	3.64	92.46	3.68	93.47	8.73	11.36	16.35
3.500	88.90	4.3	109.22	4.32	109.73	10.21	13.29	19.13
4.000	101.60	4.81	122.17	4.86	123.44	11.4	14.84	21.35
4.500	114.30	5.29	134.36	5.33	135.38	12.64	16.45	23.67
5.000	127.00	5.81	147.57	5.83	148.08	13.82	17.99	25.89
5.500	139.70	6.31	160.27	6.33	160.78	15.01	19.54	28.11
6.625	168.28	7.44	188.98	7.46	189.48	17.60	23.03	33.14
7.000	177.80	7.82	198.62	7.84	199.13	18.6	24.21	34.83

Metallurgy: Screens available in 316L or nickel alloy 825; base pipe available in a multitude of materials upon request.

Wrap Combo:

Standard Screen: The outer jacket uses 0.090"x0.075" "keystone" shaped wrap wire on 0.060"x0.100" "house" shaped rib wire. The inner jacket utilizes 0.090"x0.075" "keystone" shaped wrap wire on 0.090"x0.075" "keystone" shaped rib wire or a 0.075" "round" wire

HD Screen: The outer jacket comprises of a 0.090"x0.075" "keystone" shaped wrap wire on 0.090"x0.140" "house" shaped rib wire. The inner jacket utilizes 0.090"x0.075" "keystone" shaped wrap wire on 0.090"x0.075" "keystone" shaped rib wire or a 0.075" "round" wire

REFERENCES

Wire-wrapped and premium well screens brochure

EconoFlo™

EconoFlo™ is an economical woven or stacked metal mesh screen solution that delivers premium performance for use in brown fields, heavy oil, and wherever steam cycling or injection is required. When the economics of an application do not merit the premium cost of a preferred metal mesh screen with larger inflow area, **EconoFlo™** is the answer.

EconoFlo™ consists of a single layer of woven mesh material or a stacked layer of square weaves. It can be equipped with a drainage layer for use in applications requiring Inflow Control Devices (ICD) for balanced inflow control or sliding sleeves for on/off control. EconoFlo™ offers flow-through areas ranging from 40% to 60% depending on the designed micron rating of the filter layer.

EconoFlo™ offers a premium solution as a qualified and field-proven product when thermal cycling is required in cyclic steam stimulation, steam injectors or steam assisted gravity drain applications. Many customers default to the use of slotted liners and wire-wrap jacket screens on the basis of cost alone. However, slotted liners have limited inflow areas, from 3% to 5%, and wire-wrap jackets only offer inflow areas that range from 6% to 12% depending on the slot opening size. The inherent challenges of these types of solutions are their tendency to plug or produce sand over time and to not withstand the multiple thermal cycling effects during steaming operations.

EconoFlo™ has much higher inflow areas: up to ten times greater than traditionally used slotted liners and wire-wrap jackets. It continues to function long after plugging would be encountered with other options and its free-floating jacket enables use in cyclic temperature environments. **EconoFlo™** can also be used as a standalone solution in lieu of the more expensive method of gravel packing. EconoFlo™ can extend the time between production and re-drilling due to plugged screens by months or years, if not until the end of the wells' production life cycle.

APPLICATIONS

- Low cost environments (brown fields & heavy oil)
- Thermal cycling
- Standalone screen
- Run with Inflow Control Devices (ICD)
- Install with sliding sleeves



EconoFlo™

Features and Benefits

- Metal mesh design offers up to ten times greater inflow area than other options
- Low cost — competitive with slotted liners and wire-wrap jackets
- Minimized manufacturing cost delivers a low-cost solution with premium performance
- Large 316Lss wire diameters used in weaved or stacked mesh design permits the use of acid treatments without loss of sand control
- Swaging filter assembly to base pipe eliminates any need for welding
- Free-floating jacket enables movement of the screen assembly independent of the base pipe in thermal applications
- Inner drainage layer allows compatibility with inflow control devices and sliding sleeves
- Incorporation of Inflow Control Devices (ICD) and sliding sleeves enables balanced inflow control and on/off control
- Multi-Pore Geometry (MPG), or a bi-modal distribution metal mesh option, provides varied apertures throughout the filter media — ideal for when sand grain distribution would normally require gravel packing and when standalone screen is preferred
- Mid-joint break accommodating use of centralizers

TECHNICAL DATA

Available sizes 3.500 to 6.625 in. (88.9 to 168.3 mm)
Temperature rating up to 650°F (343°C)

EconoFlo™									
Base Pipe OD		Base Pipe Weight		Size		Perforations		Screen OD	
inch	mm	lb/ft	kg/m	inch	mm	holes/ft	holes/m	inch	mm
3.5	88.9	9.2	13.69	0.375	9.53	60	197	4.000	101.60
4	101.6	9.5	14.14	0.375	9.53	60	197	4.500	114.30
4.5	114.3	11.6	17.26	0.375	9.53	72	236	5.000	127.00
5.5	127	15	22.23	0.375	9.53	72	236	5.000	139.70
5	139.7	17	25.32	0.375	9.53	84	276	6.000	152.40
6.625	169.3	24	65.72	0.375	9.53	84	276	7.125	180.98

Metallurgy: Mesh available in 316L; base pipe available in a multitude of materials upon request.
Multi-mode and single-mode weave micron ratings available.

SureFlo™

SureFlo™ is a premium metal mesh screen using diffusion bonding techniques which allows for the manufacture of the filter media with “NO” welding on the filter material itself. By its mere design, the product is very robust with the mechanical strengths approaching that of a direct wrap on a pipe wire jacket screen such as our **ProWeld™ TOP** product. **SureFlo™** is designed to be run in rugged environments such as long open hole horizontal sections and extended reach drilling applications; the need to push/pull or rotate the downhole sand face completion assembly over cutting beds or drilling ledges to reach the desired depth is required here.

SureFlo™ offers flexibility when it comes to customized screen design. Its modular design creates an ease of manufacturing to accommodate accessories, such as centralizers, swell packers, and blank sections to fit each application. SureFlo offers the multi-layer filter media and protective perforated shroud diffusion bonded together as a single unit increasing the robustness of the end product.

APPLICATIONS

- **Openhole**
 - High pull-/push-off values required to reach target depth
 - Long horizontal sections
 - Standalone screen, SAS
 - Gravel pack
- **Cased hole**
 - High collapse resistance required
 - Frac-pack
 - Gravel-pack

Features and Benefits

- Combining the mesh filter layer and the protective shroud into a single component leads to increased overall strength
- Combined filter mesh, drainage mesh and protective shroud creating a monolithic robust fit for use assembly
- Filter lengths of four foot sections accommodate customization without impacting lead times
- No end rings required, reducing the overall outside diameter of SureFlo over 10% less than the customary premium mesh screens
- Optimized manufacturing process yielding significant cost savings to the end user
- Filter layer available in a multitude of configurations and micron sizes accommodating “fit for purpose” design



SureFlo™

TECHNICAL DATA

Available sizes 2.375 to 6.625 in. (60.3 to 168.3 mm)
Temperature rating up to 650°F (343°C)

SureFlo™									
Base Pipe OD		Base Pipe Weight		Size		Perforations		Screen OD	
inch	mm	lb/ft	kg/m	inch	mm	holes/ft	holes/m	inch	mm
2.375	60.33	4.6	6.85	0.375	9.53	48	157	2.875	73.03
2.875	73.003	6.4	9.52	0.375	9.53	48	157	3.375	85.73
3.5	88.9	9.2	13.69	0.375	9.53	60	197	4.000	101.60
4	101.6	9.5	14.14	0.375	9.53	60	197	4.500	114.30
4.5	114.3	11.6	17.26	0.375	9.53	72	236	5.000	127.00
5	127	15	22.23	0.375	9.53	72	236	5.500	139.70
5.5	139.7	17	25.32	0.375	9.53	84	276	6.000	152.40
6.625	169.3	2.4	65.72	0.375	9.53	84	276	7.125	180.98

Metallurgy: Mesh available in 316L and Alloy 20; base pipe available in a multitude of materials upon request.

SureFlo™ CT

SureFlo™ CT is a premium metal mesh screen designed for use in slim hole or coiled tubing applications. **SureFlo™ CT** offers a reduced outside diameter in a woven metal mesh design making it an excellent offering for remediation where tubular restrictions exist. **SureFlo™ CT** is equipped with a filter layer, plain square weave and a shroud all bonded together. The process of bonding creates a single unit and a much more robust offering.

SureFlo™ CT offers flexibility when it comes to customized screen design. Its modular design creates an ease of manufacturing to accommodate accessories such as centralizers, swellable packers and blank sections to fit each application. **SureFlo™ CT** offers the multilayer filter media and protective perforated shroud diffusion bonded together as a single unit increasing the robustness of the end product.

APPLICATIONS

- Remediate failed sand control
- Slimhole
- Tubing completions run on coiled tubing or wireline
- Vertical, deviated or openhole

Features and Benefits

- Combining the mesh filter layer and the protective shroud into a single component leads to increased overall strength.
- Combined filter mesh, drainage mesh and protective shroud creating a monolithic robust fit for use assembly.
- Filter lengths of four foot sections, accommodate customization without impacting lead times.
- No end rings required reducing the overall outside diameter of SureFlo™ CT over 10% less than the customary premium mesh screens.
- Optimized manufacturing process yielding significant cost savings to the end user.
- Filter layer available in a multitude of configurations and micron sizes accommodating “fit for purpose” design.



SureFlo™ CT

TECHNICAL DATA

SureFlo™ CT													
Base Pipe OD		Base Pipe ID		Screen OD		Screen Weight		Coupling OD		Standard Length			
inch	mm	inch	mm	inch	mm	lb/ft	kg/m	inch	mm	Total Length		Screen Length	
										ft	m	ft	m
1.315	33.40	1.049	26.6	1.62	41.1	2.9	4.3	1.66	42.4	10	3.048	8	2.44
1.66	42.15	1.38	35.1	1.97	50	3.8	5.6	2.054	52.2	10	3.048	8	2.44
1.9	48.26	1.61	40.9	2.21	56.1	4.4	6.5	2.2	2.2	10	3.048	8	2.44
2.094	53.19	1.751	44.5	2.401	60.99	5	7.4	2.5	2.5	10	3.048	8	2.44

Metallurgy: Mesh available in 316L and Alloy 20; base pipe in a multitude of materials upon request.

REFERENCES

Wire-wrapped and premium well screens brochure

DynaFlo™ FM

Superior Energy Services-Completion Services **DynaFlo™ FM** (Fixed Mesh) screens are heavy duty premium metal mesh sand-exclusion screens designed for use in long openhole horizontal completions and cased gravel/frac-packed environments.

DynaFlo™ FM screens are the result of a unique manufacturing process that efficiently forms and tightly secures the protective shroud, drainage layer and filter media around an inner support shroud layer. This tightly formed, well-anchored filtration media is ideally suited for downhole environments which can require a premium metal mesh screen with high burst and collapse ratings.

Superior quality manufacturing provides a screen with the highest quality, strength and durability. **DynaFlo™ FM** is a premium metal mesh screen offering the installation performance challenging that of wrap-on-pipe wire jacket screens. **DynaFlo™ FM** is an economical premium metal mesh screen solution that is customizable to meet your needs.

APPLICATIONS

- Long horizontal openhole completions
- Cased hole
 - High-rate water-packs
 - Frac-pack
- Vertical or deviated wellbore
- With Inflow Control Device (ICD)
- Sliding sleeve wrapped screens
- Injectors
- Producers

Features and Benefits

- Tightly bound filter media delivers a robust solution for high rate wells where vibration may be an issue
- Unique construction improves burst and collapse ratings of premium metal mesh screens
- The design of the DynaFlo™ FM accommodates any need for customization



DynaFlo™ FM

TECHNICAL DATA

DynaFlo™ FM									
Base Pipe OD		Base Pipe Weight		Perforations		Hole Spacing		Screen OD	
inch	mm	lb/ft	kg/mm	inch	mm	holes/ft	holes/m	inch	mm
2/375	60.33	4.6	6.90	0.375	9.53	48	157	2.98	75.7
2.875	73.03	6.4	9.50	0.375	9.53	48	157	3.48	88.4
3.5	88.90	9.2	13.70	0.375	9.53	60	197	4.10	104.1
4	101.60	9.5	14.14	0.375	9.53	60	197	4.60	116.8
4.5	114.30	11.6	17.26	0.375	9.53	72	236	5.10	129.5
5	127.00	15	22.23	0.375	9.53	72	236	5.60	142.2
5.5	139.70	17	25.32	0.375	9.53	84	276	6.10	155.0
6.625	169.3	24	35.72	0.375	9.53	84	276	7.23	183.6

SYSTEM COMPONENTS

- Perforated base pipe
- Inner perforated shroud, 16 gauge standard size
 - 304Lss standard material; also available in higher alloys as required
 - Available in required gauge size to meet mechanical needs
- Filtration media
 - 316Lss standard material; also available in higher alloys as required
 - Available in various weave patterns
- Drainage/Separation layer
 - Standard in 20x20 (PSW); other size PSW's available
 - Outer perforated shroud, 14 gauge standard size
 - 304Lss standard material; also available in higher alloys as required
 - Available in required gauge size to meet mechanical needs

DynaFlo™ Interceptor™

DynaFlo™ Interceptor™ is a premium metal mesh downhole sand exclusion device that employs a unique manufacturing process. This process enables the individual components to be constructed as an integral unit, creating a strong and durable product.

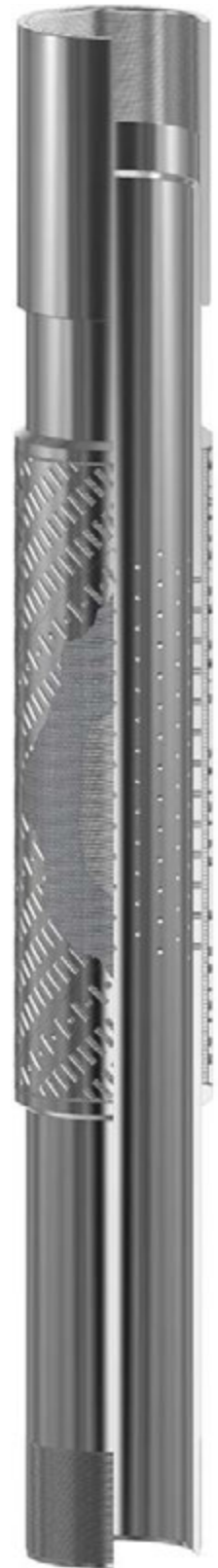
The **DynaFlo™ Interceptor™** screen's improved design enables it to perform in the most challenging of environments, including open hole horizontals, short radius wells, sidetracks and re-entries. **DynaFlo™ Interceptor™** offers added protection for virtually any gravel pack/frac-pack application. It is equipped with an inner drainage wire wrap layer, a high inflow area woven filter media and a dimpled outer shroud to protect the filter layer from direct impact of solid-laden fluids. **DynaFlo™ Interceptor™** can stand up to the harshest environments and still deliver impeccable filtering performance.

APPLICATIONS

- Long horizontal gravel packs
- Standalone screen (SAS) in openhole
- Horizontal wellbores
- Producing wells
- Injector wells
- High-rate water and frac-packs
- With ICD or AICD completions

Features and Benefits

- Available in a variety of micron ratings and metallurgy
 - Enables customizing for each and every application
- Equipped with an inner wire wrap drainage layer
 - Provides support for the mesh filtration layer offering it mechanical strength
- Mesh filtration layer
 - Assures maximum inflow area and filtration performance
 - Sized to gravel/proppant or PSD of reservoir grain sizes
- Dimple Shroud
 - Provides protection of filtration layer during installation and over the production life of cycle well
 - Delivers long term protection against direct impact of particles against mesh filtration layer & minimizes erosion effects
- Special manufacturing process that compresses all layers into one
 - Eliminates any welding or heat from welding filtration layer



DynaFlo™ Interceptor™

TECHNICAL DATA

DynaFlo™ Interceptor™									
Base Pipe OD		Base Pipe Weight		Perforations		Hole Spacing		Screen OD	
inch	mm	lb/ft	kg/mm	inch	mm	holes/ft	holes/m	inch	mm
4.500	114.3	11.6	17.26	0.375	9.56	72	236	5.32	78.2
5.500	139.7	17	25.32	0.375	9.56	84	276	6.37	90
6.625	169.3	24	35.72	0.375	9.56	84	276	7.45	106.7

Pore Size Availability

Fine	110µm < d10 , 200µm
Medium	200µm < d10 , 300µm
Coarse	300µm < d10 , 350µm

**DynaFlo™ Interceptor™ a Superior Energy - Completion Services Branded Product Manufactured by First Filter, Inc.

DynaFlo™ DB

Superior Completion Services' **DynaFlo™ Diffusion-Bonded (DB) Screens** are heavy-duty premium sand-exclusion screens designed for use in gravel pack and standalone screen installations in cased and openhole environments. DB screens offer 30 to 40% greater surface area than deep media screens.

DynaFlo™ DB Well Screens incorporate DB-laminated filter media comprised of either three or four layers of wire mesh selected to provide accurate particle size control while maximizing flow rate and strength. The DB filter media is protected by an outer perforated shroud. The entire assembly is welded onto a specified base pipe to provide a rugged sand-exclusion screen. The base pipe is either perforated (standard) or non-perforated with special production control valves positioned as needed.

APPLICATIONS

- Sand control
- High-rate water packs, fracturing and openhole environments
- Vertical, deviated or horizontal wells
- Horizontal openhole completions with Inflow Control Device, ICD

Features and Benefits

- Extensive selection of media available for a wide range of formation sand sizes to optimize sand control effectiveness
- Fixed pore geometry enhances sand control under high operating pressures
- Enhanced screen properties include rigidity, strength and resistance to distortion, abrasion and vibration
- Mesh porosity: 55% minimum
- Multiple-layered design incorporates filtration and drainage layers into a single rigid cartridge



DynaFlo™ DB

TECHNICAL DATA

DynaFlo™ DB									
Base Pipe OD		Base Pipe Weight		Perforations		Hole Spacing		Screen OD	
inch	mm	lb/ft	kg/m	Size	Size	holes/ft	holes/m	inch	mm
2.375	60.33	4.6	6.58	0.375	9.53	48	157	3.08	78.23
2.875	73.03	6.4	9.52	0.375	9.53	48	157	3.58	90.93
3.5	88.90	9.2	13.69	0.375	9.53	60	197	4.2	106.68
4	101.60	9.5	14.14	0.375	9.53	60	197	4.7	119.38
4.5	114.30	11.6	17.26	0.375	9.53	72	236	5.2	132.08
5	127.00	15	22.23	0.375	9.53	72	236	5.7	144.78
5.5	139.70	17	25.32	0.375	9.53	84	276	6.2	157.48
6.625	169.3	24	35.72	0.375	9.53	84	276	7.33	186.18

Metallurgy: Mesh available in 316L or nickel alloy 20; base pipe available in a multitude of materials upon request. Nominal weave micron ratings: 75, 100, 125, 135, 150, 175, 200, 225, 250, 275.

REFERENCES

Wire-wrapped and premium well screens brochure

CoilFlo™ DB

Superior Completion Services' **CoilFlo™ Diffusion-Bonded (DB) Screens** are innovative sand control products that enable economical through-tubing completions to be performed with coiled tubing (CT) or wireline. DB screens offer 30 to 40% greater surface area than deep-media screens.

CoilFlo™ DB Well Screens incorporate DB laminated filter media comprised of either three or four layers of wire mesh selected to provide accurate particle size control while maximizing flow rate and strength. This filter media is protected by a perforated outer shroud.

APPLICATIONS

- Sand control
- Through-tubing completions on CT or wireline
- Vertical, deviated or horizontal wells

Features and Benefits

- Extensive selection of media available for a wide range of formation sand sizes to optimize sand control effectiveness
- Fixed pore geometry enhances sand control under high operating pressures
- Enhanced screen properties include rigidity, strength and resistance to distortion, abrasion and vibration
- Mesh porosity: 55% minimum
- Non-standard screen lengths are available upon request
- Multiple-layered design incorporates filtration and drainage layers into a single rigid cartridge



CoilFlo™ DB

TECHNICAL DATA

CoilFlo™ DB													
Base Pipe OD		Base Pipe ID		Screen OD		Screen Weight		Coupling OD		Standard Length			
inch	mm	inch	mm	inch	mm	lb/ft	kg/m	inch	mm	Total Length		Screen Length	
										ft	m	ft	m
1.315	33.40	1.049	26.6	1.7	43.2	2.9	4.3	1.66	42.2	11.25	3.43	8	2.44
1.66	42.16	1.38	35.1	2.05	52.1	3.8	5.6	2.054	52.2	11.25	3.43	8	2.44
1.9	48.26	1.61	40.9	2.3	58.4	4.4	6.5	2.2	55.9	11.25	3.43	8	2.44
2.094	53.19	1.751	44.5	2.49	63.3	5	7.4	2.5	63.5	11.25	3.43	8	2.44

Metallurgy: Mesh available in 316L or nickel alloy 20; base pipe available in a multitude of materials upon request. Nominal weave micron ratings: 75, 100, 125, 135, 150, 175, 200, 225, 250, 275.

REFERENCES

Wire-wrapped and premium well screens brochure

UniFlo™ HELICAL Inflow Control Technology

Superior Completions Services' **Uniflo™ Production/Injection Control Well Screens** balance and distribute the flow of fluid along horizontal wellbores. This screen system includes an integral helical design inflow control device (ICD). In producing wells, drawdown pressure is distributed along the wellbore length to achieve balanced production. In injection wells, the injection pressure is distributed along the wellbore to achieve balanced injection.

Fluid flow distribution is achieved by creating flow resistance at selected locations along the wellbore. Since energy is conserved in closed systems, reducing the flowing kinetic energy at one location can increase the potential energy at another location. The **UniFlo™ System** can utilize orifice and nozzle designs, labyrinth designs, long channel designs and combinations of the various methods to create this resistance in both fixed and adjustable configurations.

In applications requiring sand control, the screens are configured to retain either the formation material or the gravel pack sand. In more competent rock applications, the screens are configured as debris filters.

Superior Completion Services can provide custom designs according to the precise needs of the application. This is accomplished with an in-house design tool that considers the fluid properties, flowing properties, required size, required pressure setting and flow velocities. Since these ICD's are designed precisely, accuracy of the application is not jeopardized by having to best-fit a limited number of ICD designs to the well.

APPLICATIONS

- Sand control
- Horizontal wellbores; producing and injection wells
- High-rate gas wells to reduce heading due to water encroachment, passive choking of the water
- Oil viscosities $\leq 2\text{cP}$



UniFlo™ HELICAL Inflow Control Technology

Features and Benefits

- Can be manufactured with direct-wrap jackets or with premium mesh filtration cartridges offering customization
- Uniform production/injection by reducing inflow at the heel and increasing inflow at the toe by resistance to flow of fluids passing through the long channels of the Helix
- Prevention of early water and/or gas breakthrough is accomplished by equalizing the influx of fluids along the well-bores lateral length
- Increase in ultimate total recovery
- Uniform injectivity via resistance to injection by the Helical design delivering equalized out flow of fluids from tubular to well-bore

TECHNICAL DATA

UniFlo™ HELICAL Screen			
Base Pipe OD		Maximum OD	
inch	mm	lb/ft	kg/m
2.88	73.15	3.98	101.1
3.5	88.90	4.52	114.8
4	101.60	5.08	129
4.5	114.30	5.52	140.2
5.5	139.70	6.54	166.1
6.63	168.40	7.69	195.3

REFERENCES

Wire-wrapped and premium well screens brochure

UniFlo™ ROI for Consolidated Formations

Superior Completion Services' **UniFlo™ Production/Injection Control Device for Consolidated Formations**, balance and distribute the flow of fluid along horizontal consolidated formations. This product includes an integral Radial Orifice ICD, ROI and is quipped with a wire wrap jacket debris barrier. In a producing well, drawdown pressure is distributed along the wellbore length to achieve balanced production. In an injection well, the injection pressure is distributed along the wellbore to achieve balanced injection.

Fluid flow distribution is achieved by creating flow resistance at selected locations along the wellbore. Since energy is conserved in closed systems, reducing the flowing kinetic energy at one location can increase the potential energy at another location. **UniFlo™ ROI for Consolidated Formations** utilizes tungsten carbide nozzles with the capability of having four nozzles spaced every 90° around the circumference of the base pipe outside diameter. These nozzles provide options and the flexibility of adjusting the orifice sizes prior to actual run in hole operations.

In applications requiring sand control, filter media is configured to retain either the formation material or the gravel pack sand. In more competent rock applications, such as carbonates. The filter media is configured as a debris barrier.

Superior Completion Services can provide custom designs according to the precise needs of the application. This is accomplished with an industry available design tool that considers the fluid properties, flowing properties, required size, required pressure setting and flow velocities. Since these ICDs are designed precisely, accuracy of the application is not jeopardized by having to best-fit a limited number of ICD designs to the well.

APPLICATIONS

- Consolidated formations
- Horizontal wellbores; producing and injection wells



Features and Benefits

- Threaded nozzles and a removable housing deliver just-in-time field adjust-ability
- Equipped with a debris barrier, typically a 100 gauge wire wrap jacket, solids are kept out of the UniFlo ROI Housing
- Pseudo-Steady State software enables fit for purpose design

UniFlo™ ROI for Consolidated Formations Inflow Control Technology

TECHNICAL DATA

UniFlo™ ROI for Consolidated Formations				
Base Pipe OD		Screen OD		
inch	mm	lb/ft	kg/m	
2.375	60.33	3.47	88.14	
2.875	73.03	3.97	100.84	
3.50	88.90	4.61	117.09	
4.00	101.60	5.11	129.79	
4.50	114.30	5.61	142.49	
5.00	127.00	6.11	155.19	
5.50	139.70	6.63	168.40	
6.625	168.28	7.72	196.08	

REFERENCES

Wire-wrapped and premium well screens brochure

Internal Screen Communication System (SCS)

Superior Energy Services - Completion Services' patented **Screen Communication System (SCS)** utilizes the annular space between the OD of the screen base pipe and the ID of the screenwrap or laminate as a flow conduit for fluid returns during gravel pack operations and, later, production flow. The system interconnects this annular space among multiple screens with a special coupling to form a continuous flow path from the top of the screened interval to the bottom. This promotes efficient placement of the gravel pack media and can be optimized to facilitate uniform production or injection when flowing through a production sliding sleeve located beneath the screen.

APPLICATIONS

- Sand control
- Standalone screen with SelectFlo™ screen wrapped sleeves

Features and Benefits

- Allows circulation along the entire screen interval during gravel packing operations
- Allows gravel placement in the circulating mode using isolation screen systems
- Provides flow communication throughout entire screened interval during production

TECHNICAL DATA

Screen Communication System									
Base Pipe OD		Screen OD		Maximum System ID		Screen Communication ID		Minimum Area Flow	
inch	mm	inch	mm	inch	mm	inch	mm	inch ²	mm ²
2 3/8	60.33	3.25	82.55	2	50.80	2	50.80	1	645.2
		3.25	82.55	1.875	47.63	2	50.80	1	645.2
4	101.60	4.25	107.95	3	76.20	3	76.20	1.2	774.2
		4.25	107.95	2.813	71.45	3	76.20	1.2	774.2
4 1/2	114.30	5.11	129.79	3.5	88.90	3.5	88.90	1.8	1161.30
		5.11	129.79	3.313	84.15	3.5	88.90	1.8	1161.30
5	127.00	6.25	158.75	3.83	97.28	4.03	102.36	5	3225.80

REFERENCES

Complete™ MST System data sheet



SureFlo™ SCS

Superior's **SureFlo™ Screen Communications System** offers an innovative means of fluid leak-off at each blank section of screen across coupled connections, production sleeves, or circulating sleeves during pumping of gravel or frac-pack operations to eliminate void areas in the annular pack. The **SureFlo™** Screen Communications System consists of an external **SureFlo™** jacket and undercut end rings that are constructed of a single or multi-layered wire mesh filter bonded together with a perforated shroud creating a robust jacket. This jacket enables fluid passage from one screen to the next, external to the base pipe, in a Multizone Single-Trip (MST) application or in a standalone SelectFlo™ application when each screen does not have a sliding sleeve. This fluid path aids in creating a void free annular pack during a circulating pack or while taking returns at the end of a frac treatment. The jacket also serves as a filter mechanism during injection or production for those perforations located across from the blank sections of each screen assembly.

SureFlo™ Communication Jacket is temporarily secured in place on the pin end of each screen unit for shipping and handling purposes. Once each screen unit is properly torqued during installation, the jacket is then released and slid down over the connection and attaches to each screen unit at the undercut end ring locations. This results in a sand face completion with continuous filtering and fluid leak off capabilities along the entire perforated interval while also creating a continuous communication flow path underneath the screen jacket from top to bottom.

Features and Benefits

- System design maintains full screen base pipe ID
- Single or multi-layered filter across the coupling between screens provides a means for fluid communication which enables leak-off and dehydration ensuring a complete pack of the annulus
- Single or multi-layered filter jacket across the coupling between the screens allows enhanced production or injection flow at the perforations located across couplings eliminating convergent flow in the reservoir
- Extends the filtering and leak-off capability from one screen jacket to the next, creating one continuous screen filter from top to bottom maximizing perforation contact
- Innovative SureFlo™ Screen Communication System can incorporate production MSVs, (Multi-service Shifting Valve), base pipe and/or MS Circulating sleeves to provide maximum versatility and cost savings within the completion



SureFlo™ SCS

TECHNICAL DATA

SureFlo™ External SCS											
Base Pipe OD		ProWeld™ Precision TOP OD		DynaFlo™ DB OD		Vam TOP Box OD		SureFlo™ SCS with ProWeld™ Precision TOP OD		SureFlo™ SCS with DynaFlo™ DB OD	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
3 ½	88.9	4/07	103.4	4.2	106.7	3.907	99.2	4.4	111.8	4.47	119.4
4	101.6	4.57	116.1	4.68	118.9	4.526	115	4.9	124.5	4.95	125.7
4 ½	114.3	5.07	128.8	5.19	131.8	4.937	125.4	5.4	137.2	5.46	138.7
5 ½	139.7	6.07	154.2	6.2	157.5	6.071	154.2	6.78	172.2	6.47	164.3

REFERENCES

SelectFlo™ Screen Wrapped Sliding Sleeve

SelectFlo™ Screen-Wrapped Sliding Sleeve

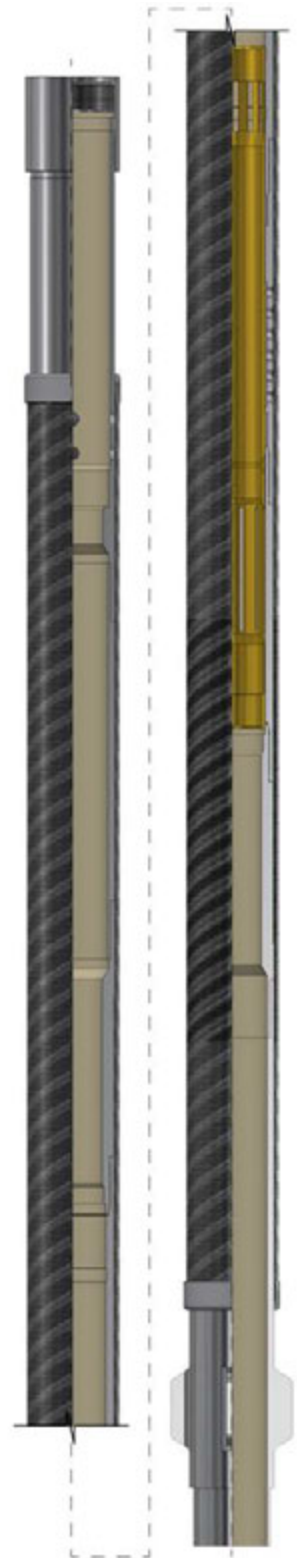
Superior Energy Services - Completion Services' screen-wrapped sleeves can be manufactured with any screen design in the portfolio including the ProWeld TOP (Tight On Pipe). The finished good may be equipped with the Multiservice Valve (MSV), Pressure Actuated Circulation Valve (PACV), or any other sliding sleeve or valve with dimensions that adapt to the respective screen design. The design maximizes the systems inside diameter while enabling the functionality for selective production control. When run in conjunction with a Screen Communication System (SCS), multiple joints can be coupled together with at least one valve/sliding sleeve to ensure proper pack placement and alternative flow path for production. The system can be used in slim-hole applications and is run exclusively with the **Complete™ Multizone Single-Trip (MST)** System.

APPLICATIONS

- Cased hole completions
- Slimhole completions
- Multizone single-trip completions
- Openhole completions
- Where zonal control is required
- Ultra-deep completions

Features and Benefits

- Integral sliding sleeve/valve enables selective production/injection control
- Open/Closed feature delivers positive zonal isolation
- Unique shifting profiles accommodates the use of multiple sleeves in a single wellbore
- When run with an SCS allows multiple screen joints run with a single sliding sleeve/valve



SelectFlo™ Screen-Wrapped Sliding Sleeve

TECHNICAL DATA

Available sizes 2 1/16 to 7 in. (52.4 to 177.8 mm)
 Differential pressure rating up to 15,000 psi (103.4 MPa)
 Temperature rating up to 350°F (177°C)

Screen Wrapped MSV							
Base Pipe OD		MSV Profile ID		Minimum Screen OD		Screen Joint Length	
inch	mm	inch	mm	inch	mm	ft	m
2 3/8	60.33	1.875	47.63	3.12	79.25	10-40	3.0-12.2
2 7/8	73.03	2.313	58.75	3.62	91.95	10-40	3.0-12.2
3 1/2	88.90	2.813	71.45	4.26	108.20	10-40	3.0-12.2
4	101.60	2.813	71.45	4.57	116.10	10-40	3.0-12.2
4 1/2	114.30	3.313	84.15	5.11	129.79	10-40	3.0-12.2
6	152.40	4.500	114.30	6.73	170.94	10-40	3.0-12.2

Screen Wrapped MSV for Multizone System							
Base Pipe OD		MSV Profile ID		Minimum Screen OD		Screen Joint Length	
inch	mm	inch	mm	inch	mm	ft	m
4	101.60	2.84	72.14	4.57	116.09	10-40	3.0-12.2
5	127.00	3.83	97.28	6.25	158.75	10-40	3.0-12.2
6 5/8	168.28	5.26	133.60	7.53	191.26	10-40	3.0-12.2

REFERENCES

- ComPlete™ MST System data sheet
- Multi-profile Multi-Service Valve data sheet
- Multi-Service Valve data sheet
- Screen Communication System data sheet
- Wire-wrapped and premium well screens brochure

AI Packer: Swellable Isolation System

Superior Energy-Completion Services **AI-Packer** provides a simple, effective, high integrity solution for cased and open hole zonal isolation.

Superior’s AI, Autonomously Instinctive, swellable packer enables isolation in open hole and cased hole environments. The swellable nature of the rubber allows it to conform to micro variations in the bore hole, which, in combination with long wellbore contact length, provides a high integrity seal in openhole without exerting excessive force on the wellbore.

The **AI-Packer** has no moving parts, and requires no setting tools making reliability of this packer exceptionally high.

The **AI-Packer** is autonomously energized by the fluid present in the well, whether that be oil or water-based. Naturally instinctive processes of absorption and diffusion assisted by the complex engineering of the rubber matrix draw fluid inside the packer which then swells to contact the wellbore and provide a seal.

The **AI-Packer** is bonded to the base pipe for the full length of the swellable rubber element. This reduces possible leak paths providing a high-pressure, high-integrity seal. It provides effective isolation with either ball-activated sleeves or plug and perf completion designs.

Superior’s **AI-Packer** provides annular isolation when run with ICD completions minimizing annular flow while offering segmentation of exposed shales.

APPLICATIONS

Superior’s **AI-Packers** are a simple more reliable means of isolations than alternatives such as inflatable packers and cementing in extended horizontal wells. Their robust design and simple operation mean they are a flexible solution in many situations where a pressure seal is required: Specific applications include:

- Isolation for hydraulic fracturing (particularly in horizontal wellbores)
- Wellbore segmentation
- Flow diversion
- Isolation of sustained casing pressure
- Cement integrity (micro-annuli and mud channelling)
- Straddle systems
- Used with Inflow Control Devices as barriers to minimize annular flow and isolate shale sections
- Between screen zonal isolations for gravel-packing and sand screens
- Through-tubing isolation of perforations for refracturing



AI Packer: Swellable Isolation System

Features and Benefits

- Single trip, no running tools, self setting
- No moving parts, fully-bonded element
- Self-healing, conforms to wellbore
- Effective isolation providing enhanced stimulation and production performance
- Reduced rig time and personnel - reduced cost
- Reduced failure modes - robust design - increased reliability
- Long-term, high integrity seal

SPECIFICATIONS

- Single element design providing a high-integrity seal
- High-performing oil and water swellable elastomers
- Anti-extrusion end rings that also protect the rubber element while running in hole
- Temperature range 32°F-392°F (0°C-200°C)
- Differential pressure rating up to 10,000 psi (dependent on packer length)
- Design contact time 24 to 72 hours
- Design setting time 7 to 14 days
- Standard element lengths of 3, 5, 10, and 20 ft.
- Base pipe sourced from mills around the globe
- Chemical resistance to majority of common downhole fluids

AI Packer: Swellable Isolation System

TECHNICAL DATA

AI Packer: Swellable Isolation System									
Hole Size		Mandrel Size		Element OD		Full Pressure Rating Up To		Reduced Pressure Rating Up To	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
3.476	88	2.375	60	3.200	81	3.650	93	3.900	99
4.000	102	2.875	73	3.750	95	4.200	107	4.450	113
4.892	124	3.500	89	4.600	117	5.100	130	5.400	137
OPEN HOLE									
Hole Size		Mandrel Size		Element OD		Full Pressure Rating Up To		Reduced Pressure Rating Up To	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
4.960	126	4	102	4.650	118	5.000	127	5.200	132
6.00	152	3.5	89	5.625	143	6.500	165	7.000	178
6.00	152	4.5	114	5.625	143	6.200	157	6.550	166
6.125	156	4	102	5.750	146	6.450	164	7.000	178
6.125	156	4.5	114	5.750	146	6.375	162	6.750	171
6.250	159	4.5	114	5.875	149	6.600	168	7.000	178
8.500	216	5.5	140	8.150	207	9.250	235	10.000	254
8.500	216	6.625	168	8.150	207	8.900	226	9.350	237
8.500	216	7	176	8.150	207	8.700	221	9.000	229
12.250	311	9.625	244	11.750	298	12.750	324	13.250	337
17.500	445	13.375	340	16.750	425	18.250	464	18.500	470

AI Slip-On: Swellable Isolation System

A short, slide-on packer designed for flexibility of use, while still providing a high integrity seal.

Superior Energy Services - Completion Services' **AI Slip-On** swellable system offers a slip-on feature delivering a flexible and practical solution for field installation to client-supplied equipment. They operate in the same manner as the AI Packer with the swellable nature of the rubber allowing it to conform to micro variations in the bore hole. This, in isolation or combined with multiple **AI Slip-Ons**, provides a high-integrity seal in open hole without exerting excessive force on the wellbore.

The **AI Slip-On** is energized by the fluid present in the well, whether that be oil or water-based. Natural processes of absorption and diffusion assisted by the complex engineering of the rubber matrix draw the fluid inside the **Slip-On**, which then swells to contact the wellbore and provide a seal. A series of **AI Slip-Ons** can be installed to increase the pressure rating of the seal. They provide effective isolation in a wide range of scenarios and can be manufactured to suit any base pipe or screen size.



APPLICATIONS

AI Slip-On Swellable System provides a simple, more reliable means of isolation than alternatives such as inflatable packers and can be used in conjunction with cement for well assurance. Their robust design and simple operation mean they are a flexible solution in many situations where a pressure seal or fluid and debris barrier is required. Specific applications include:

- Used with ICD's to eliminate annular flow and offer zonal isolation as required
- Between sleeve isolation for hydraulic fracturing
- Debris barrier
- Flow diversion
- Isolation of Sustained Casing Pressure
- Cement integrity (micro-annuli and mud channelling)
- Between screen zonal isolation for gravel packing and sand screens

AI Slip-On: Swellable Isolation System

Features and Benefits

- Slide-on design
- Single element (with integral end rings)
- Slim profile
- Operational flexibility due to in field installation
- Reduced cost option over packers
- Performance enhancement - the slim profile can be cemented around

SPECIFICATIONS

- Single element design providing a high-integrity seal
- Available in oil and water swellable elastomers
- Anti-extrusion end rings that also protect the rubber element while running in hole
- Temperature range 32°F-392°F (0°C-200°C)
- Differential pressure rating up to 3,000 psi
- Design contact time 24 to 72 hours
- Design setting time 7 to 14 days
- Standard element lengths of 1 ft. and 3 ft.
- Manufactured 100% in the USA
- Chemical resistance to majority of common downhole fluids

TECHNICAL DATA

AI Slip-On: Swellable Isolation System									
Hole Size		Mandrel Size		Element OD		Full Pressure Rating Up To		Reduced Pressure Rating Up To	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
4.960	126	4	102	4.65	118	5.000	127	5.200	132
6.000	152	3.5	89	5.625	143	6.500	165	7.000	178
6.000	152	4.5	114	5.625	143	6.200	157	6.550	166
6.125	156	4	102	5.75	146	6.450	164	7.000	178
6.125	156	4.5	114	5.75	146	6.375	162	6.750	171
6.250	157	4.5	114	5.875	149	6.600	168	7.000	178
8.500	216	5.5	140	8.15	207	9.250	235	10.00	254
8.500	216	6.625	168	8.15	207	8.900	226	9.350	237
8.500	216	7	178	8.15	207	8.700	221	9.000	229
12.250	311	9.625	244	11.75	298	12.750	324	13.250	337
17.500	445	13.375	340	16.75	425	18.250	464	18.500	470



COMPLETION SERVICES

SECTION 9

OmniFrac™ Systems



OMNIFRAC™ SYSTEMS

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OmniFrac MST™ Frac System

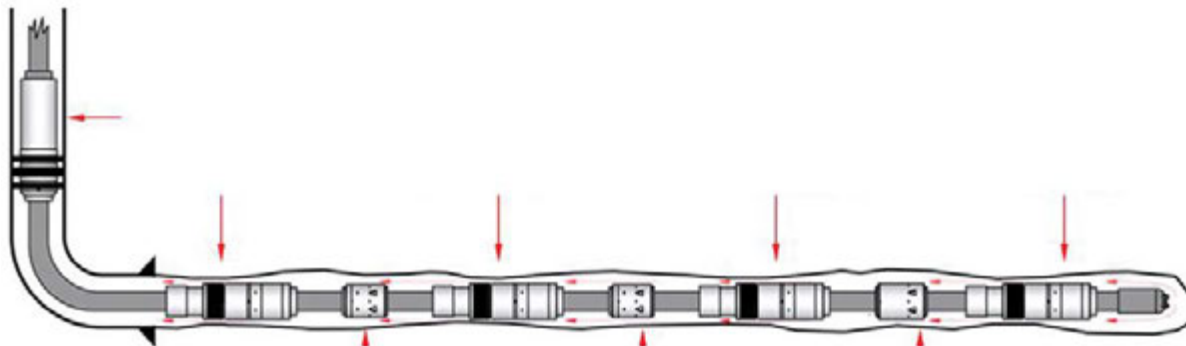
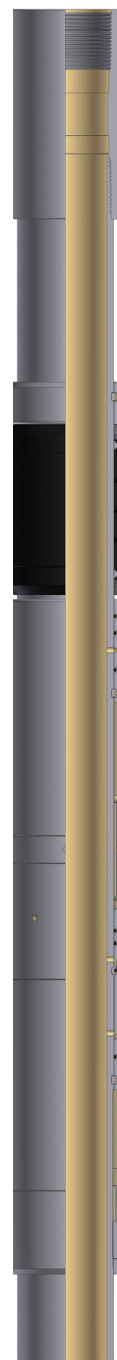
Superior Completion Services' **OmniFrac MST™ (Multizone Single Trip) Frac System** is engineered for use in multi-stage horizontal well completions. The OmniFrac MST™ System allows operators to decrease their pumping time and reduce over-displacement by eliminating coil and wireline trips for running guns and setting plugs. Superior Completion Services' OmniFrac MST™ saves time and money compared to plug-and-perf by eliminating the need for coil, eliminating cement jobs, and allowing continuous pumping. Superior's OmniFrac™ System can also enhance ultimate recovery by allowing the entire interval between packers to produce.

APPLICATIONS

- Tight Gas Sands
- Gas and Hydrate Shales
- Coal Bed Methane

HOW IT WORKS

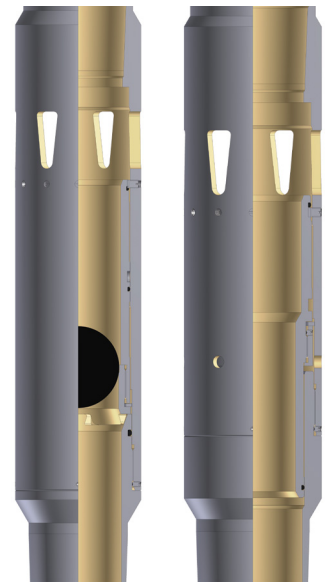
- After drilling the well to total depth, a set of reamers/mills are run to help ensure the condition of the open hole section is ready for liner installation. The casing is then run with frac sleeves, open hole isolation packers and a permanent hanger packer or a long string. A ball is circulated to the toe of the system, where the isolation valve is closed, allowing pressure to be built up internally, which sets all of the packers simultaneously. At this point, the work string and liner running tool are removed from the well and the drilling rig is released.
- Prior to the scheduled frac date, a pump truck can be rigged up on the wellhead. Pressure is applied to the well, opening the pressure-actuated frac sleeve and preparing the well for Stage 1 stimulation treatment. At this time, the well is open to the formation.
- The frac spread is rigged up on location. Operation commences with the stimulation of Stage 1. A predetermined sized ball is pumped down the well, which seals in the ball-actuated frac sleeve in Stage 2. Differential pressure opens the sleeve allowing treatment of Stage 2. The ball isolates the previous stage during the treatment. This procedure is repeated until all stages are treated. The well may be produced immediately following removal of potentially damaging frac fluids from the reservoir.



OmniFrac MST™ Frac System

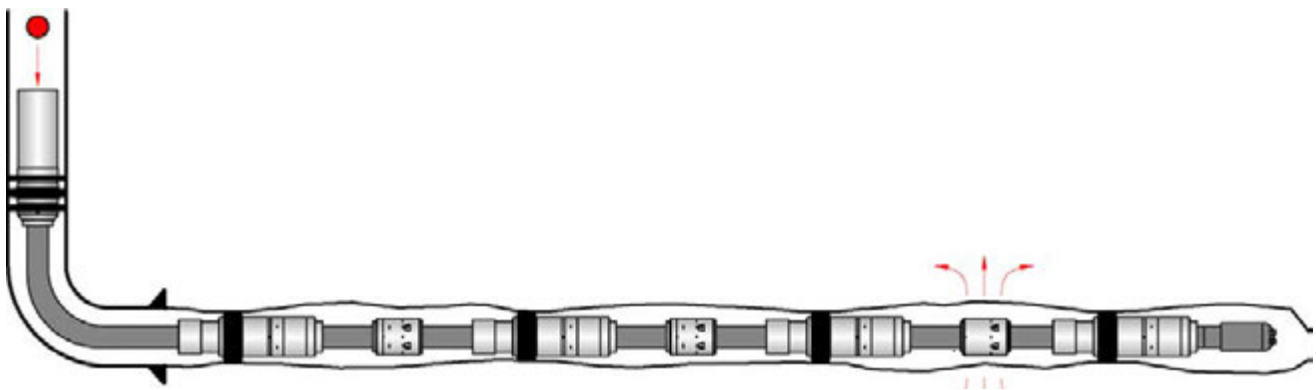
SYSTEM INCLUDES

- Ball-actuated isolation valve
- Pressure-actuated frac sleeve
- Ball-actuated frac sleeves with balls made of high-strength materials
- Single element open hole isolation packers with metal element support and interlock device that prevents packer from being set while running in the hole
- Permanent hydraulically set hanger packer with hydraulic running tool release



Features and Benefits

- Proven technology
- Entire system is rotationally locked in closed & open position
- System is run with 4 - 1/2" liner
- 6 - 6.25" and 6.75" open hole
- Pressure rating 350°F
- Torque rating 6,000 ft./lbs.
- Tensile loads up to 310,000 lbs.
- Saves time and money compared to plug-and-perf procedures
- Eliminates need for cementing
- Sleeves can be cemented
- Well is immediately ready for production after frac treatment
- No costly coiled tubing mill-out runs required



OmniFrac™ Permanent Liner Hanger Packer

Superior Completion Services' **OmniFrac™ Permanent Liner Hanger Packer** is designed to be run in conjunction with the **OmniFrac™ Open Hole Frac System**. It creates a permanent annular barrier in the intermediate casing. The permanent packer, liner, open hole packers and frac valves are conveyed into the hold on a hydraulic-setting tool. The packer is set by circulating a ball to the setting tool or the toe of the liner, where it shifts the isolation valve, creating a closed system. Pressure is then applied to stroke the setting tool, which sets the packer.

APPLICATIONS

- As a liner hanger packer in horizontal, deviated and vertical wellbores, where annular integrity is essential to the completed design.

Features and Benefits

- Slim line construction
- Full circle slips allow for fast run time
- 5' X 5.125" ID upper tie-back receptacle
- Rotational capability through packer
- Pressure rating 10,000 psi
- Temperature rating 300°F
- Torque rating 6,000 ft./lbs.



OmniFrac™ Permanent Liner Hanger Packer

TECHNICAL DATA

OmniFrac™ Permanent Liner Hanger Packer											
Casing Size		Model	Maximum OD		Minimum ID		Tie Back		Working Pressure	Working Temp	Tensile
inch	mm		inch	mm	inch	mm	inch	mm	psi	°F	lbs
7	177.80	309.705	6.07	154.18	4.00	101.60	5.125	130.18	10,000	300	310,000
7	177.80	309.706	5.89	149.61	4.00	101.60	5.125	130.18	10,000	300	310,000
7.625	193.68	309.763	6.437	163.50	4.00	101.60	5.125	130.18	10,000	300	310,000

OmniFrac™ Open Hole Packer

Superior Completion Services developed the **OmniFrac™ Open Hole (OH) Packer** to isolate intervals in uncased sections of horizontal, deviated and vertical wells. The compact design includes a unique mechanical interlock feature to reduce the risks of setting prior to reaching the objective setting depth. The packer is set with internal applied pressure. The interlock mechanism is deactivated upon reaching the predetermined shear pressure. Element energy is generated by directional-setting pistons and stored as the lock ring ratchets during the setting process. Applied or wellbore pressure assists the annular seal.

APPLICATIONS

- Horizontal, deviated and vertical wells, where multi-stage frac operations are required.

Features and Benefits

- Compact design for horizontal deployment
- 10,000 psi V-5 certified at 300°F
- Hydraulic interlock reduces deployment risks by locking the outer moving parts
- Directional setting piston to ensure setting energy is generated at lower setting pressures
- Wire mesh supported elastomer provides additional support
- Flowing pressure enhances annular seal
- No mandrel movement



OmniFrac™ Open Hole Packer

TECHNICAL DATA

OmniFrac™ Open Hole Packer									
Liner Size		Maximum OD		Minimum ID		Working Pressure	Working Temp	Tensile Strength	OH Size
inch	mm	inch	mm	inch	mm	psi	°F	lb	inch
4.5	114.30	5.750	146.05	3.92	99.57	10,000	300	310,000	6-6.25
4.5	114.30	6.375	161.93	3.81	96.77	8,000	300	362,000	6.75
5.5	139.70	8.125	206.38	4.59	116.58	10,000	350	600,000	8.5-8.75

OmniFrac™ Ball-Actuated Frac Valve

The **OmniFrac™ Ball-Actuated Frac Valve** is an integral component of the Superior Energy Multi-Stage Open Hole System. The valve is a sliding sleeve type and is used for selective stage stimulation in horizontal, deviated and vertical wells. Multiple valves can be installed in a liner, each placed between open hole packers or cemented in place. The number of valves used is determined by the number of stages to be treated.

The valves are actuated by dropping a specific size ball from surface, which lands on a respective sized seat. The valves are pinned to shift open with differential pressure above the ball. Once the valve opening pressure is reached, the sleeve shifts down and opens the frac ports.

The ball and seat combination is engineered to minimize the unseating pressure of the ball during flowback. This will minimize the risk of the ball getting stuck on seat and hindering production of the well.

The Ball-Actuated Frac Valve remains open with a locking device, which allows the balls to be flowed back to surface if production flow is sufficient.



APPLICATIONS

- Horizontal, deviated and vertical wells, where multi-stage frac operations are required.

Features and Benefits

- Minimal pressure to unseat ball on flowback
- Maximized flow through ID ports
- Compact design and minimal number of parts increases reliability
- Opening pressure can be adjusted on location
- Simple efficient design allows multiple stages to be simulated continuously
- Inner sleeve shifts completely past flowparts minimizing erosion and maximizing area for production
- Dissolvable ball applications available

OmniFrac™ Ball-Actuated Frac Valve

TECHNICAL DATA

OmniFrac™ Ball-Actuated Frac Valve									
Liner Size		Model	Maximum OD		Minimum ID		Working Pressure	Working Temp	Tensile Strength
inch	mm		inch	mm	inch	mm	psi	°F	lbs
4.5	114.30	BAV-450-01	5.625	146.05	3.920	99.57	10,000	300	310,000

OmniFrac™ Ball and Set		
Assembly No.	Ball Size/inch	Seat ID/inch
450-02	3.750	3.466
450-02	3.416	3.138
450-03	3.108	2.856
450-04	2.826	2.597
450-05	2.567	2.258
450-06	2.328	2.139
450-07	2.109	1.938
450-08	1.908	1.753
450-09	1.723	1.583
450-10	1.553	1.427
450-11	1.397	1.284
450-12	1.254	1.152
450-13	1.122	1.031
450-14	1.000	0.920

Frac Balls and Seats - 32 Zones		
Zone	Ball Size Tolerance (+/+ 0.002)	Seat Throat Diameter Tolerance (+ 0.005)
1	3.641	3.527
2	3.500	3.390
3	3.364	3.258
4	3.231	3.130
5	3.103	3.006
6	2.980	2.886
7	2.860	2.770
8	2.774	2.657
9	2.631	2.549
10	2.522	2.443
11	2.417	2.341
12	2.315	2.242
13	2.216	2.147
14	2.121	2.054
15	1.939	1.878
16	1.939	1.878
17	1.825	1.794
18	1.768	1.712
19	1.687	1.634
20	1.608	1.557
21	1.532	1.483
22	1.458	1.412
23	1.386	1.343
24	1.317	1.211
25	1.185	1.211
26	1.185	1.148
27	1.123	1.087
28	1.062	1.029
29	1.003	0.972
30	0.946	0.916
31	0.891	0.863

OmniFrac™ PolyFrac Valve

The **OmniFrac™ PolyFrac Valve** is an integral component of the Superior Energy OmniFrac Multi-stage System. The valve is a sliding sleeve valve that is used for selective stage stimulation in horizontal, vertical and deviated wells. Multiple valves can be installed in the liner, while using openhole packers or cement for zonal isolation. Since the system uses ball drop activation, the entire frac job can then be accomplished in a continuous pumping operation with no prep time between each individual stage. The number of valves used is determined by the desired number of stages to be treated.

The valves are actuated by dropping a designated sized ball from surface, which activates multiple valves in each zone. The valves are pinned to activate a shifting sleeve at a set differential pressure above the ball. Once the sleeve is activated, the ball is released to the next valve. Upon reaching the final valve in the stage, pressure is applied and all activated sleeves are shifted to the open position, simultaneously allowing communication to the formation.

The ball seat size combinations are engineered to minimize the unseating pressure of the ball during flowback. This will minimize the risk of the ball getting stuck on seat and hindering production of the well.

APPLICATIONS

- Horizontal, vertical and deviated wells in open hole and cemented applications where, matrix acidizing or multi-stage frac operations are required.



Features and Benefits

- Entire stage opens simultaneously, minimizing fluid loss
- Designed specifically for cemented applications
- Millable cast iron seats
- Minimal pressure to unseat ball on flowback
- Maximized flow through ID ports
- Compact design and minimal parts increase reliability
- Shifting pressure can be adjusted in the field
- Multiple stages per well
- Maximizes reservoir contact
- Dissolvable ball applications available

OmniFrac™ PolyFrac Valve

TECHNICAL DATA

OmniFrac™ PolyFrac Valve									
Liner Size		Model	Maximum OD		Minimum ID		Working Pressure	Working Temp	Tensile Strength
inch	mm		inch	mm	inch	mm	psi	°F	lbs
4.5	114.30	PFV-450-01	5.75	146.05	3.875	98.43	14,500	300	310,000
5.5	139.70	PFV-550-01	6.875	174.63	4.56	115.82	14,500	300	710,000

OmniFrac™ Ball and Seat					
Zone	Ball Size (inch)	Seat ID	4.5"	5.5"	Cementable
35	4.25	4.11		•	•
34	4.09	3.96		•	•
33	3.93	3.81		•	•
32	3.78	3.67		•	•
31	3.64	3.53	•	•	•
30	3.50	3.39	•	•	•
29	3.36	3.26	•	•	•
28	3.23	3.13	•	•	•
27	3.10	3.01	•	•	•
26	2.98	2.89	•	•	•
25	2.86	2.77	•	•	•
24	2.74	2.66	•	•	•
23	2.63	2.55	•	•	•
22	2.52	2.44	•	•	•
21	2.42	2.34	•	•	•
20	2.32	2.24	•	•	•
19	2.22	2.15	•	•	
18	2.12	2.05	•	•	
17	2.03	1.96	•	•	
16	1.94	1.88	•	•	
15	1.85	1.79	•	•	
14	1.77	1.71	•	•	
13	1.69	1.63	•	•	
12	1.61	1.56	•	•	
11	1.53	1.48	•	•	
10	1.46	1.41	•	•	
9	1.39	1.34	•	•	
8	1.32	1.28	•	•	
7	1.25	1.21	•	•	
6	1.19	1.15	•	•	
5	1.12	1.09	•	•	
4	1.06	1.03	•	•	
3	1.00	0.97	•	•	
2	0.95	0.92	•	•	
1	0.89	0.86	•	•	

OmniFrac™ Pressure-Actuated Frac Valve

The **OmniFrac™ Pressure-Actuated Frac Valve** is an integral component of the Superior Energy OmniFrac Multi-Stage Open Hole Frac System. The valve can be used in horizontal, deviated and vertical wells requiring zonal isolation during simulation. The valve is positioned above the Isolation Valve and is actuated by hydraulic pressure after the Isolation Valve is closed. Once activated, the valve will establish communication with the formation and the first stage can be fractured.

The **OmniFrac™ Pressure-Actuated Frac Valve** has a sleeve that remains closed as the liner is run in hole. When the applied pressure inside the liner reaches a certain limit, shear screws that pin the sleeve will shear. The sleeve will shift downwards and open the frac ports, establishing communication with the fracturing stage. Once open, the valve will remain positively locked in the open position.



APPLICATIONS

- Horizontal, deviated and vertical wells, where multi-stage frac operations are required.

Features and Benefits

- Large exit ports maximize flow area
- Internal shifting sleeve
- Safely locked in open position
- Rated to 6,000 ft./lbs. of torque
- Rated 10 ksi burst and collapse
- Activation pressure easily adjusted on location

OmniFrac™ Pressure-Actuated Frac Valve

TECHNICAL DATA

OmniFrac™ Pressure-Actuated Frac Valve										
Liner Size		Model	Maximum OD		Minimum ID		Flow Area	Working Pressure	Working Temp	Tensile Strength
inch	mm		inch	mm	inch	mm	inch ²	psi	°F	lbs
4.5	114.30	PAV-450-01	5.515	140.08	3.410	88.52	11.78	10,000	300	310,000

OmniFrac™ Non-Prep Toe Valve

The **OmniFrac™ Non-Prep Toe Valve** provides a flow path from the casing ID to the formation without the need for casing perforation. The valve is deployed at the toe of the well as part of the casing string. Activation is achieved by applying hydraulic pressure from the surface.

The **OmniFrac™ Non-Prep Toe Valve** operates solely by absolute casing pressure. The absolute pressure acts on a rupture disc that is engineered to rupture at a precise pressure. Once the disc is ruptured, the absolute pressure is applied over a hydraulic area and the ports of the valve open.

The **OmniFrac™ Non-Prep Toe Valve** can be run successfully in cemented or open hole applications in both horizontal and vertical wells. The **OmniFrac™ Non-Prep Toe Valve** can be used to establish communication with the formation, eliminating the need for tubing-conveyed perforations.

APPLICATIONS

- Horizontal, deviated and vertical wells
- Cemented or open hole
- Casing test to high pressures

Features and Benefits

- Allows casing formation communications without perforating
- Simple design with limited parts
- High activation accuracy $\pm 2\%$
- 16 ksi absolute pressure rating at 350°F



OmniFrac™ Non-Prep Toe Valve

TECHNICAL DATA

OmniFrac™ Non-Prep Toe Valve											
Liner Size		Model	Maximum OD		Minimum ID		Flow Area	Abs. Collapse	Abs. Burst	Temp	Tensile Strength
inch	mm		inch	mm	inch	mm	inch ²	psi	psi	°F	lbs
4.5	114.3	NPV-450-01	5.75	146.05	3.00	76.20	12.43	12,000	16,000	350	400,000
5.5	139.7	NPV-550-01	6.875	190.5	4.00	101.60	18.64	12,000	16,000	350	600,000

OmniFrac™ Pro Toe® Valve

The patented **OmniFrac™ Pro Toe® Valve** provides a flow path from the casing ID to the formation without the need for casing perforation. The valve is deployed in the closed position to the toe of the well as part of the casing string. Applying several hydraulic pressure cycles from the surface opens the valve. The valve design makes it possible for the casing to be pressure tested several times.

The **OmniFrac™ Pro Toe® Valve** operates by absolute (hydrostatic plus applied) casing pressure. The absolute pressure acts on a pressure-activated device that is engineered to rupture at a precise pressure. Once the pressure-activated device is ruptured, the absolute pressure is applied to hydraulic pistons that are attached to an indexing device. In order to open the valve, the casing applied pressure should be cycled several times, which gives the operator the option to conduct several casing pressure tests. The maximum applied pressure required for opening the valve is set to be lower than the casing test pressure. The number of cycles to open the valve can be set based on operator preference.

APPLICATIONS

- Horizontal, deviated and vertical wells
- Cemented or open hole
- Casing test to high pressures

Features and Benefits

- Allows casing formation communication without perforating
- Each valve function tested prior to shipping to the field
- Allows up to three casing tests prior to opening the valve
- Simple design with limited parts
- Each valve designed for individual well conditions
- Reliable function under severe debris and cement conditions
- Two pressure-activated devices installed at 180°F apart for the worst debris/cement scenario
- 18 ksi absolute burst pressure rating at 350°F
- U.S. Patent Number 9,752,412



OmniFrac™ Pro Toe® Valve

TECHNICAL DATA

OmniFrac™ Pro Toe® Valve										
Liner Size		Maximum OD		Minimum ID		Flow Area	Abs. Collapse	Abs. Burst	Temp	Tensile
inch	mm	inch	mm	inch	mm	inch ²	psi	psi	°F	lbs
4.5	114.3	5.75	146.05	2.62	66.54	13.74	16,000	18,000	350	350,000
5.5	139.7	6.875	174.625	3.00	76.20	13.74	16,000	18,000	350	650,000
5.5	139.7	7.56	194	3.75	95.25	13.74	16,000	18,000	350	650,000

OmniFrac™ Isolation Valve

The **OmniFrac™ Isolation Valve** is a component of the Superior Energy OmniFrac Multi-Stage Open Hole Frac System. It is run in the hole as part of a liner string for conducting selective multi-stage frac jobs. The valve can be used in horizontal, deviated and vertical wells requiring zonal isolation during stimulation. The valve is positioned at the toe of the well above normal float equipment and is actuated by a ball dropped from the surface, which closes the valve. Once activated, the valve will block communication with the formation allowing functioning of hydraulic equipment.

The **OmniFrac™ Isolation Valve** has a piston that remains open as the liner is run in hole. When the actuation ball reaches the seat in the piston, applied pressure inside the liner shears the screws that pin the piston. The piston will shift downwards and close the circulation path, blocking communication with the formation. Once closed, the valve will remain positively locked in the closed position.



APPLICATIONS

- Horizontal, deviated and vertical wells, where multi-stage frac systems are utilized.
- Any time hydraulic equipment needs to be functioned.

Features and Benefits

- Activation pressure easily adjusted on location
- Valve components protected while running in hole
- Seals protected from damage while shifting
- Safely locked in closed position
- Rated to 6,000 ft./lbs. of torque
- Rated 10 ksi burst and collapse

OmniFrac™ Isolation Valve

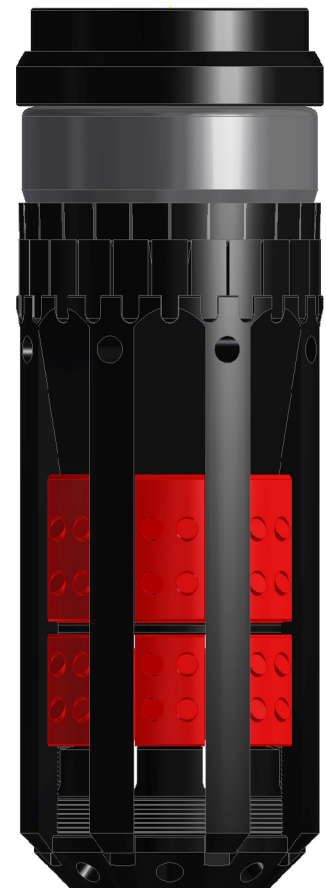
TECHNICAL DATA

OmniFrac™ Isolation Valve								
Liner Size		Model	Maximum OD		Flow Area	Working Pressure	Working Temp	Tensile Strength
inch	mm		inch	mm	inch ²	psi	°F	lbs
4.5	114.30	ISV-450-01	5.015	127.38	0.520	10,000	300	310,000

SCS Black Widow Degradable Frac Plug

SCS Black Widow Degradable Frac Plug is specifically designed to be degradable with wellbore fluids, eliminating the need for costly coiled tubing milling operations post-stimulation. The **SCS Black Widow Degradable Frac Plugs** are used for temporary isolation in multi-stage vertical or horizontal completion operations. The **SCS Black Widow Degradable Frac Plug** is designed as a degradable plug, not simply a material change to a composite plug. The surface area has been maximized to expose more material to fluids.

The unique design minimizes the risks of pre-setting and maximizes degradation rate. The **SCS Black Widow Degradable Frac Plug** allows flow to pass through the plug from above or below before dropping the ball from surface and isolating the zone for treatment. On wireline, the Black Widow is set using the Baker E-4 #10/#20 Wireline Pressure Setting Assembly. If deployed on threaded pipe or coiled tubing, the plugs are set utilizing the J-Hydraulic Setting Tool.



Features and Benefits

- Eliminates the need for costly milling operations to remove plugs
- Enhanced flowback ports maximize initial flowback
- Enhanced flowback ports maximize surface area creating faster degradation
- Exothermic reaction creates faster degradation
- Specific setting sequence creates superior anchoring force
- Specific setting sequence minimizes risk or pre-sets
- Unidirectional degradable slip segments with ceramic buttons
- Degradable packing element
- Ball Drop feature allows for flow back before isolation

SCS Black Widow Degradable Frac Plug

TECHNICAL DATA

SCS Black Widow - Degradable Frac Plug							
Casing OD	Plug OD	Casing Weight	Max Differential Pressure	Plug ID	Flow Back Area	Plug Length	Ball OD
inch	inch	ppf	psi	inch	inch ²	inch	inch
5.50	4.53	17-20	12,000	1.85	5.83	12.5	2.32
5.50	4.25	23-26	12,000	1.75	5.56	12.5	2.13
5.00	3.875	18-21.4	12,000	1.63	3.84	11.5	1.81
4.50	3.625	11.6-13.5	12,000	1.53	3.61	11.5	1.75

SCS-P2 Fully Composite Frac Plug

The **SCS-P2 Superior Fully Composite Frac Plug** utilizes a unique combination of composite components to provide a dependable, durable and cost-effective design for temporary zone isolation during frac stages in both vertical and horizontal wells. The **SCS-P2 Fully Composite Frac Plug** has a shorter length with fewer buttons on its upper slips. This type of design reduces the risk of breakage seen with ceramic slips commonly used with competitors' plugs. The setting sleeve and shear adapter are designed to be run on any wireline setting tool or tubing-run hydraulic setting tool, with Baker #10, Baker #20, or 3.500" G.O. connections. The three piece setting sleeve utilizes an adjuster nut that mates directly to the setting tool. The shear sleeve adapter is also designed to allow the drop ball to be placed inside the adapter. This gives the customer the choice to utilize the plug in the flow back configuration without having to drop and pump the ball down from the surface. The **SCS-P2 Fully Composite Frac Plug** may be quickly removed with conventional milling tools.



Features and Benefits

- Designed for use in horizontal or vertical applications
- Designed for hydraulic pump down deployment on wire line, coil tubing and threaded pipe
- 10,000 PSI pressure rating
- 275° temperature rating
- Integral anti-extrusion system
- Mill-out times of 10 minutes or less
- Has top and bottom full circular all ceramic slips
- Two piece packing element
- Ball Drop feature allows for flow back before isolation
- Ball Drop feature allows for additional tools to be pumped before isolation
- Can be run as frac ball in place type plug
- All composite material properties 100% fiber glass to maximize cutting removal efficiency
- Ball made from easily mill-able composite material
- Multiple plugs can be run to isolate multiple zones

SCS-P2 Fully Composite Frac Plug

TECHNICAL DATA

SCS-P2 Fully Composite Frac Plug										
Plug OD	Casing Weight	Casing OD	Min Casing ID	Max Casing ID	Max ΔP @275F	Max ΔP @250F	Plug ID	Plug Weight	Plug Length	Ball OD
inch	ppf	inch	inch	inch	inch	inch	inch	lb	inch	inch
3.61	11.6-13.5	4.50	3.92	4.00	8,000	10,000	0.75	15	16.5	2.00
3.5	15.1	4.5	3.82	3.83	8,000	10,000	0.75	15	17.6	2.00
3.87	18-21.4	5	4.12	4.27	8,000	10,000	0.75	18	18.2	2.00
4.300	17-23	5.50	4.67	4.892	8,000	10,000	1.00	20	18.60	2.00
4.15	26	5.5	4.54	4.54	8,000	10,000	1.00	20	18.4	2.00

Product Number	Casing OD (inch)	Casing Wt. T&C (lb/ft)	Maximum Pump Rate When Seating Ball (bbl/min)	Maximum Flow Rate Past Plug (bbl/min)
904.00052	4.50	11.6-13.5	10-15	10-17
SES0400	4.50	15.1	10-15	10-17
SES0500	5.0	18-21.4	10-15	10-17
904.0051	5.50	17-23	10-15	10-17
SES0300-V2	5.50	26	10-15	10-17