



KHERAD SANAT ARVAND

www.kheradsanat.com Email: info@kheradsanat.com

- Company Overview
- Completion Equipments
- Cementing Equipments
- Mud Line Suspension Equipments



KHERAD SANAT ARVAND

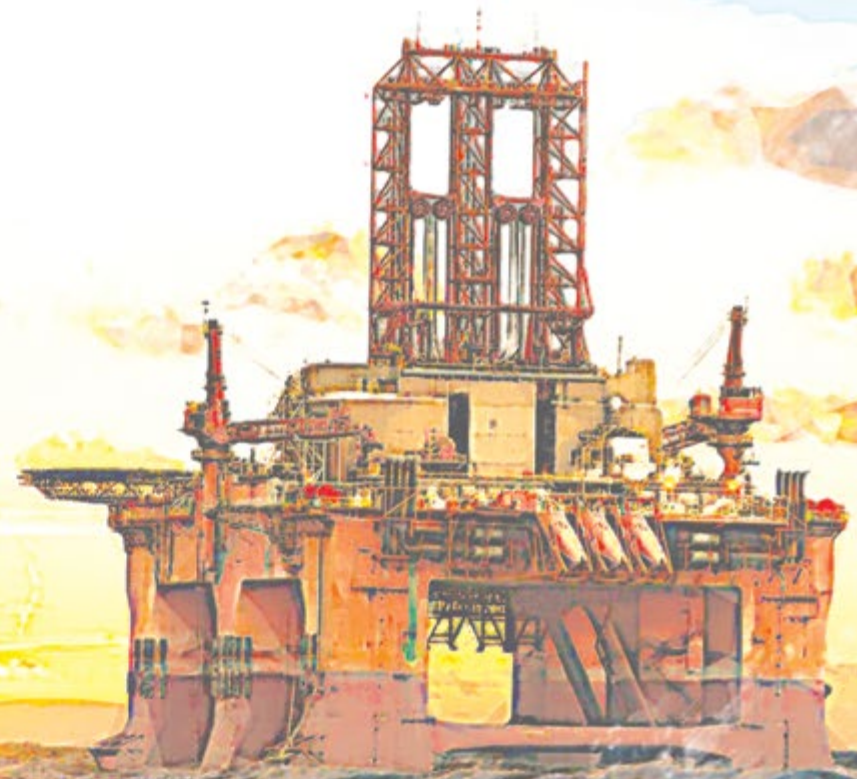
www.kheradsanat.com Email: info@kheradsanat.com

- Safety Equipments
- Flow Control Equipments
- Packer Equipments
- Sand Control Equipments
- Gas Lift Equipments



Contents

- Company Overview
- Safety Equipments
- Flow Control Equipments
- Packer Equipments
- sand Control Equipments
- Gas lift Equipments





Company Overview

Introduction

Kherad Sanat Arvand Company (K.S.A Co.) has been established in 2007, located in Arvand Free Zone attempted to Designing, Engineering & Production of Oil and Gas Equipment's according to a successful background in terms of goods and services, especially in the Oil & Gas industry.

K.S.A is one of the manufacturers of Down-Hole Completion products in the world and offers a complete line of Sand Control System, Cementing Equipment's, Mud-Line Suspension System & other accessories for Oil and Gas Drilling Industry. These product design and manufacturing expertise has been developed by experience, field knowledge & exposure to the technology throughout the world.

K.S.A is actively located in 3 cities in the country:

Arak: the main engineering & production site

Khoram-Shahr: the main raw material stock & conductor pipe production site

Ahwaz: the well operation & slick-line services site

K.S.A has managed to found a service company in 2014 to make any drilling slick-line & coiled tubing operations which is named Aria Hafaran Tolu-e Karoun (A.H.T.K). this company has been done over 400 successful job during the last 4 years.

K.S.A Co. also participating in the production of the following products which operates as a complementary product portfolio:

- All Types & Sizes of Down-Hole Completion
- All Types & Sizes of Down-Hole Accessories
- All Types & Sizes of Casing Accessories
- Whipstock Side-Tracking System
- Mud-Line Suspension System
- Sand Control Package (Fully Design & Production Has Been Done In K.S.A Co.)
- Casing Conductor Pipes

Vision

To be a leading company in engineering, designing and producing the well completion components in the country

Mission

To provide an excellence of goods & services and support on the growing markets in Iran and its neighborhood countries

SAFETY EQUIPMENTS



www.kheradsanat.com
Email: info@kheradsanat.com

Home

Contents

Tubing-Retrieveable Safety Valves	PAGE 1-2
Lock Out Tool	PAGE 3
Sealing Protection Sleeve	PAGE 3
Wireline-Retrieveable Safety Valves	PAGE 4
Safety Valve Landing Nipple	PAGE 5
Safety Valve Lock Mandrel	PAGE 6
Separation Sleeve For Wireline Retrieveable Safety Valve (DUMMY).....	PAGE 7
Hydraulic Control Lines	PAGE 8

[Home](#)

Tubing-Retrievable Safety Valves

K.S.A's Type Tubing Retrievable Safety Valves are self-equalizing, flapper type safety valves designed to shut in a well at a point below the surface. The safety valve is a surface controlled subsurface safety valve and is normally closed. The valve is held open by hydraulic control pressure and remains open until the control-line pressure is exhausted. The hydraulic control pressure is transmitted from a remote location through a control line to operate the valve. The valves are value engineered to provide long-lasting, safe, and reliable operation.

Rod Piston Safety Valves are designed and built for performance and reliability. The rugged hydraulic actuator of the safety valve provides durability and isolates the internal workings from well fluids through its unique construction. The metal-to-metal sealing integrity in the body joints and closure mechanism places it in a premium valve category while featuring an economical price. The simple, compact design enhances the valve's overall reliability and provides for trouble-free operation. Rod piston safety valves are available with working pressure rating to 10,000 Psi.

Single Rod Piston Safety Valves are used a single rod piston with reliable spring-energized, no-elastomer dynamic seals; a static, full-closed, metal to metal seal. The valves are designed for general production with enhanced reliability and long life. The valves provide reduced OD, premium piston system, deep set design and many other optional features. Single Rod piston safety valves are available with working pressure rating to 10000psi and always be used in the wells with extreme downhole conditions.

Features and Benefits

- Simple compact design
- Single Rod Piston type with Non-elastomer dynamic piston seals
- Rod Piston type with unique hydraulic actuation (single-piece piston/flow tube)
- Metal-to-metal seal in closed position
- Positive debris barrier at both ends of flow tube
- Flapper sealing verified to sand service (no resilient seal required)
- Minimized potential leak paths
- Optimum reliability
- Superior well containment and safety
- Low friction, smooth operation
- Critical component isolated from well environment
- Enhanced debris isolation and tolerance



Applications

General production completion
Hostile well environments in compatible
with elastomer

Tubing Size	Maximum OD		Internal Packing Bore		Lock Profile	Pressure Rating		Length	
in.	in.	mm	in.	mm		psi	bar	in.	mm
3 1/2	5.03*	128	2.562 - 2.813	65 - 71	AF, R, RQ	5,000	344.74	56.3	1430
	5.20	132				5,000	344.74		
	5.37	136				10,000	689.48		
	5.62	143				10,000	689.48		
4 1/2	6.62*	168	3.437 - 3.813	95 - 97	AF, R, RQ	5,000	344.74	63.5	1613
	6.73	171				5,000	344.74		
	6.97	177				7,500	516.75		
5 1/2	7.65-9.50	194.3 - 241.3	4.313 - 4.750	61.47	AF, R, RQ	7,500	516.75	71	1803

Lock Out Tool

The Lock-Out Tool is a mechanical and hydraulic device. It provides a means to permanently lock open a rod-piston tubing-retrievable safety valve (TRSV) when operating conditions dictate the necessity. The tool is installed and retrieved by using standard wireline methods. The lock-out procedure requires only a single wireline trip. The tool locates in the first matching nipple profile, which is in the top sub of the TRSV. The lock-out tool shifts the flow tube to the open position and raises a dimple on the top sub extension to lock the TRSV permanently open. This lock-out even provides control-line communication. The punching tool & lock open tool is integrated in one equipment. The TRSV control line can then be used to operate the wireline valve.

Sealing Protection Sleeve

Protects existing well infrastructure from TTRD operations and hostile well fluids. The K.S.A Sealing Protection Sleeve is used to isolate the critical components of a tubing-retrievable safety valve (TRSV) during acid stimulation, flowing and other well intervention activities.

Features and Benefits:

- Slimline design
- Positive location
- Versatility
- Telltale design
- Equalization feature
- Pressure relief protection



Wireline-Retrievable Safety Valves

K.S.A's Wireline-Retrievable Safety Valves offer premium features similar to a tubing retrievable safety valve and are landed in safety valve landing nipples that are equipped with a control line connected to the surface control system. This configuration enables the safety valve to be easily retrieved for repair or maintenance. When assembled to a wireline lock, the assembly can be installed in a safety valve nipple. Hydraulic control line connects the safety valve nipple to the surface emergency shut-down system. Loss of control line pressure will close the valve and shut-in the well. These wireline valves are premium valves due to the use of non-elastomeric seal material, metal-to-metal housing threads, high tensile strength metallurgy, and unique HP/HT packing and piston seal stacks when required by the application. These design features are imperative when considering applications for big bore, high temperature, high pressure, extremely corrosive, and hostile.

Features and Benefits

- Equalizing feature
- Large bore design
- Non-elastomeric dynamic seal assembly
- The lock profile enables completion optimization without restriction to standard sealbore sizes
- Easy field operation
- 10,000-Psi working pressure

Applications

Production and injection wells

SPECIFICATION GUIDE									
Tubing Size	Maximum OD		Internal Packing Bore		Lock Profile	Pressure Rating		Length	
in.	in.	mm	in.	mm		psi	bar	in.	mm
3 1/2	5.03*	128	2.562 - 2.813	65 - 71	AF, R,RQ	5,000	344.74	56.3	1430
	5.20	132				5,000	344.74		
	5.37	136				10,000	689.48		
	5.62	143				10,000	689.48		
4 1/2	6.62*	168	3.437 - 3.813	95 - 97	AF, R, RQ	5,000	344.74	63.5	1613
	6.73	171				5,000	344.74		
	6.97	177				7,500	516.75		
5 1/2	7.65-9.50	194.3 - 241.3	4.313 - 4.750	61.47	AF, R, RQ	7,500	516.75	71	1803



Safety Valve Landing Nipple

K.S.A's Safety Valve Landing Nipples are used to accommodate wireline retrievable sub surface safety valves. These nipples have a locking recess and a hydraulic communication port located between the two polished bores. This nipple features an integral control line connection port which operates Sub Surface Safety Valve. The nipple is a one-piece construction, manufactured from bar stock and contains the highly successful, field-proven lock profile.

Features and Benefits

- Large ID
- Offered in various combinations of lock profiles
- The lock profile enables completion optimization without restriction to standard seal bore sizes
- Manufactured from bar stock with an eccentric machine slug containing the control-line connection
- The nipple is constructed without welding, providing homogeneous material properties
- The 10,000-Psi (68.9-MPa) working pressure with standard materials 9Cr or 13Cr

Applications

Production and injection wells

Tubing Size	Tubing Weight	Valve ID	Nipple Seal Bore
in.	Lb/ft	in.	in.
3 1/2	9.2	1.52	2.812
	10.2		
4 1/2	12.6	2.12	3.812
	15.2	1.89	3.688
	18.9	1.73	3.437
7	35	3.268	5.963

SPECIFICATION GUIDE



Safety Valve Lock Mandrel

The LOCK MANDREL allows positive placement of wireline safety valves, retrievable in nipple system. SRQ No-Go Lock Mandrels are top no-go lock mandrels designed to land and lock subsurface safety valves in SRQ landing nipples.

Applications

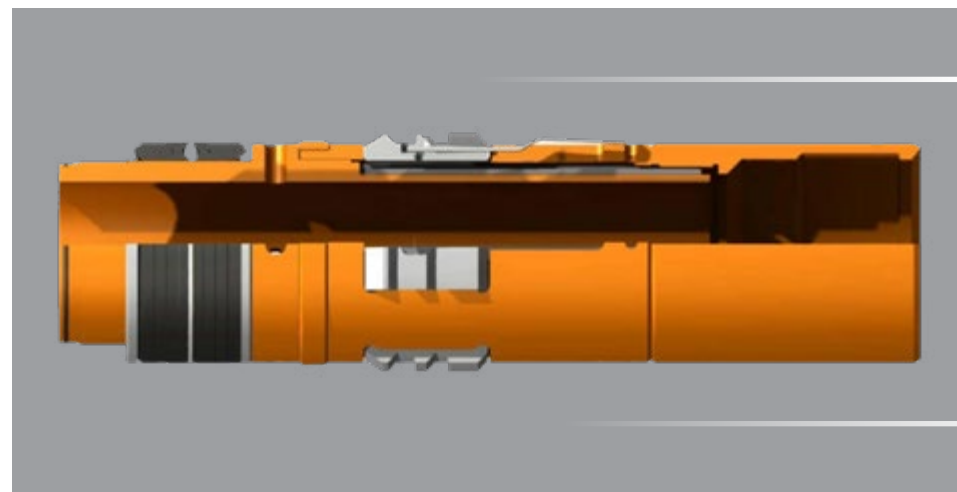
Designed to locate the wireline subsurface safety valve (WRSV) applications

Features and Benefits

- Positive no-go location prevents wireline misruns
- Installed and retrieved by standard slickline methods
- Redundant holddown features
- Teeth engage and become primary holddown when lock has pressure differential from below

SPECIFICATION GUIDE

Tubing Size	Max OD.	Min ID.	FISHNECK SIZE	Packing O.D	Length
in.	in.	in.	in	in.	in.
3 1/2	2.866	1.750	2.320	2.812	13.787
4 1/2	3.730	2.374	3.110	3.688	14.409
	3.791	2.519	3.110	3.751	14.795
	3.858	2.618	3.125	3.812	14.374
5	3.960	2.625	3.125	3.875	14.370
7	6.090	3.834	4.763	6	17.188



Separation Sleeve For WireLine Retrievable Safety Valve (DUMMY)

The separation sleeve (dummy) allows running of any wireline tool across the safety valve landing nipple, without any damage on the upper & lower seal bore. It consists of a wide range in the internal packing bore and profile.

Applications

Separating control line from tubing string while locating instead of wireline subsurface safety valve (WRSV) to avoid pressure leakage from ported nipple.

Features and Benefits

- Protects the seal bore from any damages
- Including a range of seal bore and profiles
- On requisition of client can be produced without profile
- Compatible with the safety valve lock mandrel

SPECIFICATION GUIDE

Tubing Size	L/N Packing Bore	Profile Size / Min Id.	Profile Type
in.	in.	in.	in.
3 1/2	2.812	1.752	NON-PROFILE
4 1/2	3.688	2.313 – 2.562	AF , RN , XN
	3.751		
	3.812		
5	3.812	2.750 – 3.688	AF , RN , XN
7	5.963		



Hydraulic Control Lines

K.S.A provides the accessory equipment to complete any surface controlled subsurface safety valve (SCSSV) installation. Control lines are assembled on reels filled with fluid and pressure tested. Reel spools are designed so pressure can be applied at any time during running to check control-line integrity. Our company offers hydraulic control lines made from two different manufacturing processes that conform to ASTM specifications:

- 1) seamless
- 2) welded and sunk.

1) Seamless

Tubing is fabricated from a solid rod. The process involves forcing a mandrel or punch through the solid rod to form a tube. The continuous lengths available from this process are limited.

2) Welded and Sunk

Tubing is fabricated from flat stock. The process involves rolling the stock into a cylinder and welding the seam. Once in tube form, it is drawn through a die to achieve the proper OD. This process is considerably less costly than the seamless method and yields lines available in continuous lengths with no butt-welded connections.

Installation

Control lines are attached to subsurface controls with appropriate tube fitting and pressure-tested before running into the wellbore. Line spools are hung in the derrick, and control line is paid out as tubing is run.

Applications

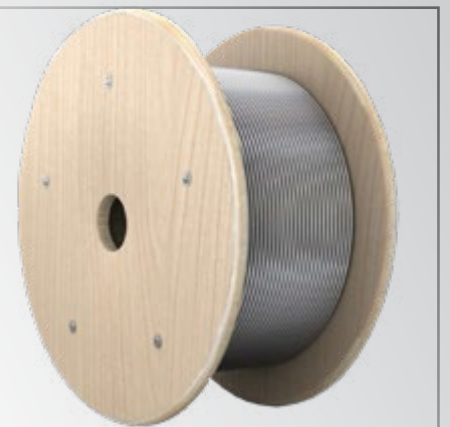
- For surface-controlled subsurface safety valves

Features

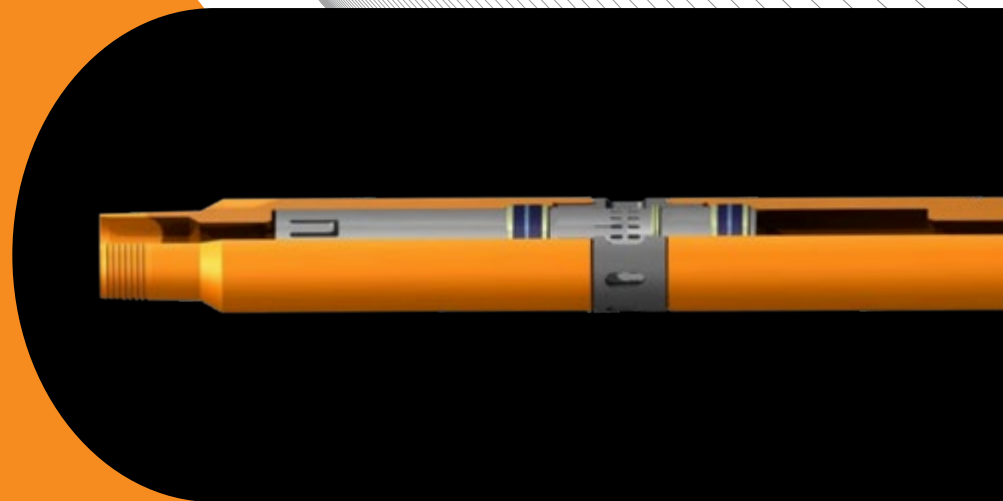
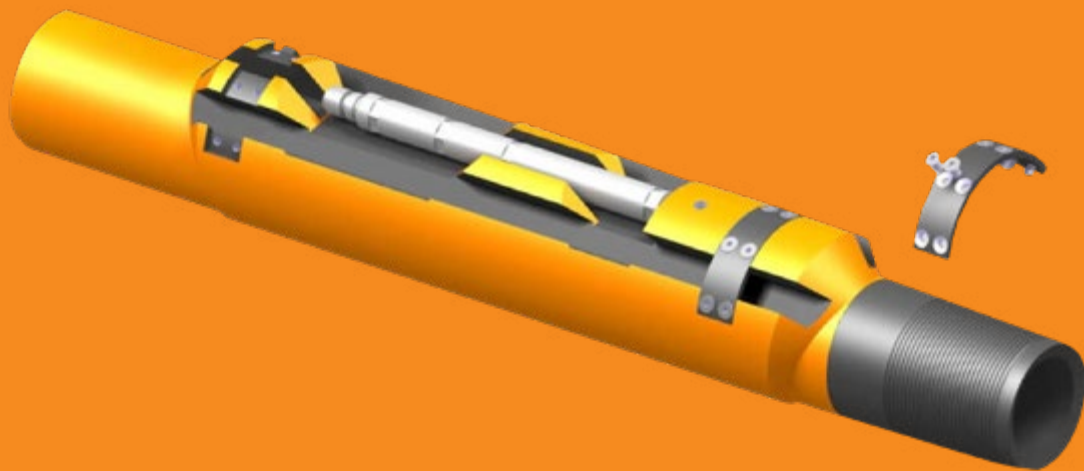
- Different lengths of control line in continuous coil
- Stainless and alloy 825 materials offered
- Control lines offered in various encapsulated options
- All control lines conform to ASTM specifications
- Lines available in other sizes on request

Benefits

- Wide assortment for almost every need



FLOW CONTROL EQUIPMENTS



www.kheradsanat.com
Email: info@kheradsanat.com

Home

Contents

Sliding side door	PAGE 9
Shifting Tool	PAGE 10
Seating Nipples	PAGE 11
Chemical Injection Mandrel	PAGE 12

[Home](#)

Sliding Side Door

K-CMD and K-CMU sliding sleeve provides a means of communication between the tubing and the annulus. It has internal honed seal bores located at the top and bottom housing for placement of flow control devices. The internal sleeve is shifted open or closed by using a B type wireline shifting tool. For KCMD, it is down shift to open & for KCMU it is up shift to open sliding sleeve.

The tool is designed such that any lock profile and compatible seal bores can be specified to accept a wide range of wireline locks, and accessories. The large area of the produced communication ports concludes to elimination of any restriction to the flow of liquids or gases while the sleeve is in open direction, So the area through the seal bores would be the only restriction in the sleeve.

FEATURES

- The high-strength thermoplastic specially designed diffuser ring which is located between the upper packing unit and the flow ports, prevents damage to the upper packing unit during shifting by controlling the rush of fluid or gas and even provides a slow equalization of high differentials proprietary, high-strength, non-elastomeric compounds that are chemically inert.
- Mill slots on the sleeve leads to the more flow area and reduce erosion and higher torque & tensile strength.
- Through a special coating technology by K.S.A, the risk of galling has been reduced. In addition the mentioned coating has the corrosion and erosion resistance characteristic.

SPECIFICATION GUIDE

Tubing Size	Seal Bore	Pressure Rating	Temperature Rating	Torque Limit
in.	in.	Psi	°F	Ft*lb
2-7/8	2.188	10,000	350	3,500
	2.250			
	2.313			
3-1/2	2.562	10,000	350	4,000
	2.750			
	2.812			
4-1/2	3.313	10,000	350	6,000
	3.313	5,000		
	3.437			
	3.562			
	3.688			
5-1/2	4.313	6,300	350	6,200
	4.437			
	4.562			



Shifting Tool

INTRODUCTION

The shifting tool is designed to selectively locate and shift the sleeve in sliding side doors which is accomplished by the shifting tool keys engaging the sliding side door insert and depending on the direction of tool running, up or down, the SSD is shifted.

The spring loaded shifting keys are run in the expanded position and will latch into the shifting profile in a sleeve of the correct size.

FEATURES

- Proof of completed shift
- Emergency shear release feature
- Open or close sleeves in one trip



Seating Nipples

Seating nipple is a top, bottom or selective no-go nipple which provides for the location of various wireline flow control devices in the production string. The location and number of seating nipples should be carefully considered in the completion planning stages to allow maximum versatility in the positioning of various flow control accessories.

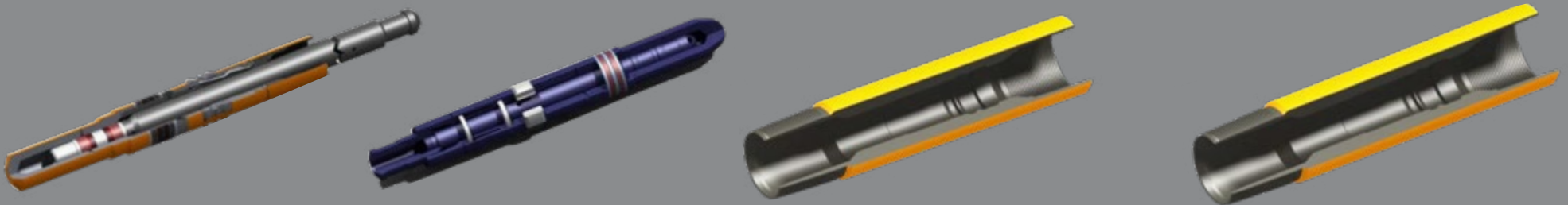
FEATURES

- Sealbore – contoured and polished to pass chevron packing without damage
- Integral locking groove
- OD same as coupling OD with properties corresponding to L80 or better
- Available in API and premium connections

APPLICATION

The seating nipples may be used for the following operations:

- Land blanking plugs to shut in well or to test the production tubing
- Land velocity type safety valves
- Land equalizing check valves
- Land circulating blanking plugs
- Land chokes to reduce surface flowing pressures or to have pressure drops downhole to prevent surface freezing in gas production
- Land instrument hangers with geophysical devices such as pressure and temperature recorders
- Prevent loss of wireline work string in some cases



Chemical Injection Mandrel

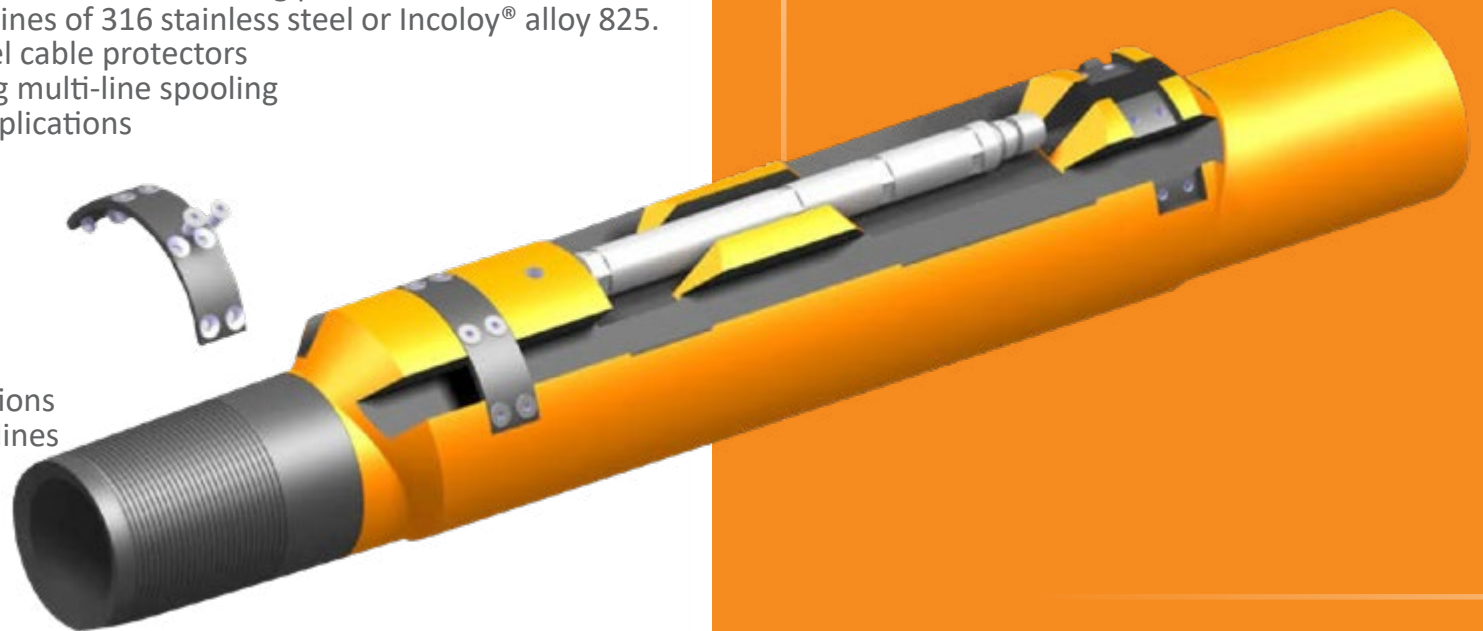
The K.S.A chemical injection system provides operators with precise wellbore chemical management to help optimize production as well as help reduce the need for costly interventions. The system features high- or low-profile mandrels, dual check valves, corrosion-resistant injection lines, and standard cast or pressed-steel cable protectors that secure control lines while running in-hole. The K.S.A chemical injection system enables operators to address asphaltines, corrosion, emulsions, foaming, hydrates, paraffin, scale, and scavengers.

FEATURES

- Custom mandrels for high- or low-profile applications
- Dual check valves available with different cracking pressures
- Corrosion-resistant injection lines of 316 stainless steel or Incoloy® alloy 825.
- Standard cast or pressed-steel cable protectors
- Installation services, including multi-line spooling
- Subsea, platform and land applications

KEY BENEFITS

- Maintains flow assurance
- Optimizes production
- Helps reduce costly interventions
- Corrosion-resistant injection lines
- Redundant checks



PACKER EQUIPMENTS



Home

www.kheradsanat.com
Email: info@kheradsanat.com

Contents

Material Selection	PAGE 13
Seal Stacks	PAGE 14
Elastomer Selection	PAGE 15
Packer Performance Definition	PAGE 16
Hydraulic-Set Permanent Packers	PAGE 17-19
K.S.A Permanent Packers with Aflas Element System.....	PAGE 20-21
Hydraulic-Set Retrievable Packers	PAGE 22
Twin Seal Electric Submersible Pump Packer	PAGE 23-24
Downhole Sealing Systems	PAGE 25
Locator Tubing Seal Assembly	PAGE 26
Anchor Tubing Seal Assembly.....	PAGE 27
Splined Expansion Joint	PAGE 28
KM Expansion Joint	PAGE 29
Adjustable Spacer Sub With Rotational Lock	PAGE 30
Telescoping Swivel Sub	PAGE 30
Safety Joints.....	PAGE 31
Shear-Out Safety Joint	PAGE 32
B Shear-Out Safety Joint.....	PAGE 32
C Rotationally Locked Shear-Out Safety Joint	PAGE33
Plugging Devices	PAGE 34
K.S.A-C Tubing Testing Sub.....	PAGE 35
Mill-Out Extension.....	PAGE 36
Seal- Bore Extention	PAGE 36
Blast Joint	PAGE 37
Flow Coupling	PAGE 37
Perforated Spacer Tube.....	PAGE 37
Wireline Entry Guide & Shear-Out Ball Seat Sub	PAGE 38

Material Selection

K.S.A's equipment is offered in various material configurations for a variety of well conditions. Our company employs leaders in the field of metallurgy and polymer chemistry to ensure superior material recommendations are made to our customers.

For corrosive wells, K.S.A's corrosion metallurgists and polymer scientists are available to provide expert material recommendations. To provide the most cost-effective recommendations, the well environment data form has been developed to aid in gathering the necessary well data. The following alloys and groups of alloys are currently the most common materials used for the construction of packers and related equipment:

- Standard, non-corrosive service—low alloy steels (e.g. 4140) with mechanical properties compatible with API P110 tubular
- Non-corrosive service containing H₂S—low alloy steels (e.g. NACE MR0175 compliant 4140) with mechanical properties compatible with API L80 tubular
- Corrosive CO₂ service with little or no H₂S—Martensitic and PH stainless steels (e.g. 9Cr, 13Cr, 17-4PH, alloy 450, Super 13Cr) with mechanical properties that vary from 80 ksi to 110 ksi minimum yield strength; the selection of the specific corrosion-resistant alloy(s) depends on the environment (pH, chlorides, temperature, H₂S, etc.,)

and strength requirements

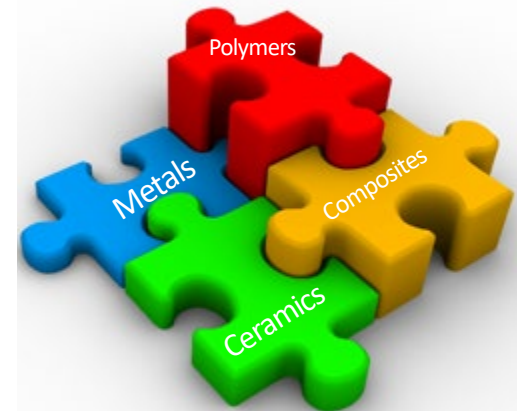
- Severely corrosive CO₂ and H₂S—nickel alloys such as 825, 925 and 718 at strength levels of 110 ksi minimum yield strength and higher

Severely corrosive CO₂, H₂S and free sulfur—nickel alloys such as 625 Plus, 725 and, less frequently, C-276 at strength levels of 120 ksi minimum yield strength and higher

- For equipment required to perform a temporary function and then allow quick removal by drilling or milling, an additional group of materials is used:

- Cast iron
- Reinforced polymer-based composites

Besides the more common materials, K.S.A manufactures packers and related equipment from other materials when raw material availability, quantities, delivery schedules, etc., permit. Example alloys include 316L austenitic, 22 Cr duplex, 25 Cr duplex, 25 Cr super duplex, alloy 20Cb3, 28 Cr super austenitic, K-500 Monel, alloy 2025, alloy 2535, alloy 2550, alloy G-3 and others.



Seal Stacks

Standard Seal Stacks—made up of nitrile chevron seals and steel spacer rings. Should remain in seal-bore during service.

Bonded Seal Stack—Two nitrile or Viton seals are bonded to each metal insert. These inserts are separated by steel spacers. Bonded seals should be used when seals cannot be prevented from moving out of the seal-bore while holding differential pressure. Also recommended for sealing low-pressure gas at low temperatures.

V-RYTE Seal Stack—Made up of Viton chevron seals with Teflon and Ryton* backup rings, Ryton front-up rings and steel separators. Should remain in seal-bore during service.

A-RYTE Seal Stack—Made up of Aflas chevron seals with Teflon and Ryton backup rings, Ryton front-up rings and steel separators. Should remain in seal-bore during service.

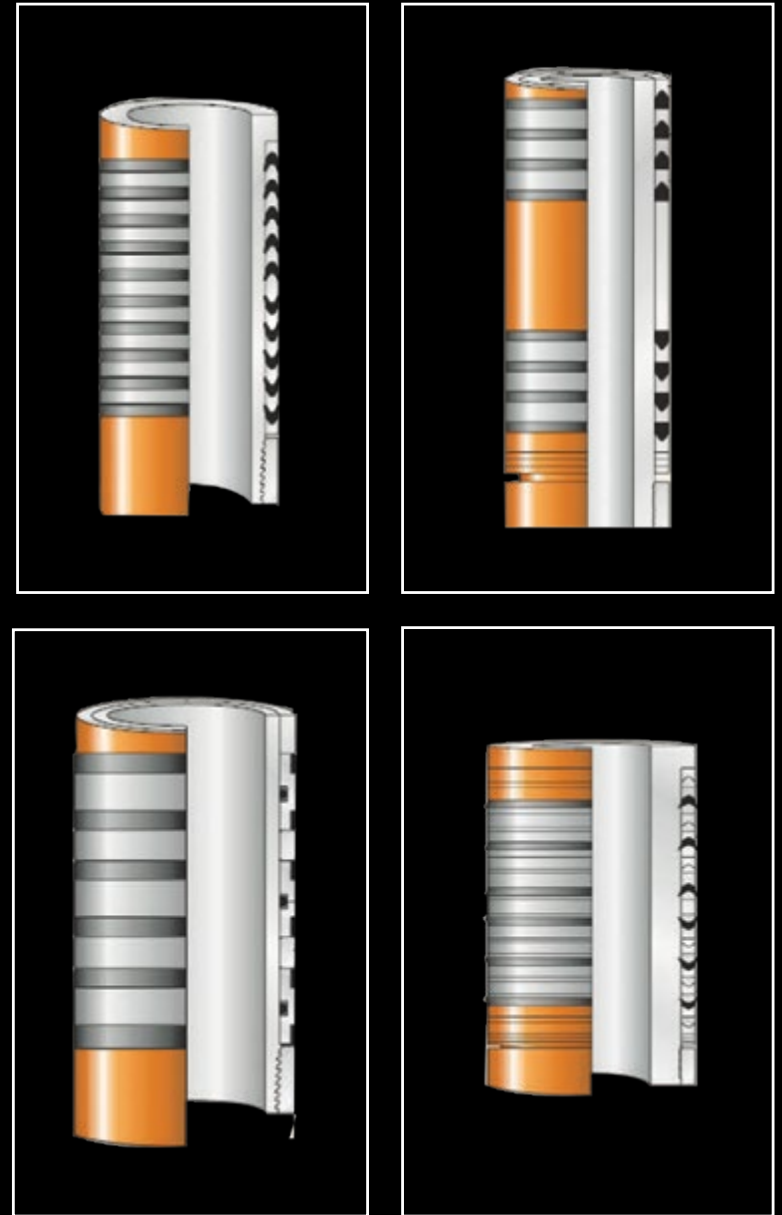
A-HEET Seal Stack—Made up of Aflas chevron seals with Teflon and HEET backup rings, HEET front-up rings and steel separators. Should remain in seal-bore during service.

RYTE Seal Stack—Made up of PS006 chevron seals with Teflon and Ryton backup rings, Ryton front-up rings and steel separators. Should remain in seal-bore during service.

Seal-RYTE Seal Stack—Made up of Perfluoroelastomer chevron seals with Teflon and Ryton backup rings, Ryton front-up rings and steel separators. Should remain in seal-bore during service.

K-RYTE and K-HEET Seal Stacks—Made up of KALREZ brand Perfluoroelastomer chevron seals with Teflon and Ryton or HEET backup rings, Ryton or HEET front-up rings and steel separators. Should remain in seal-bore during service.

Debris Barrier Stack—Made up of Teflon and Ryton backup rings and Ryton front-up rings and steel separators. Used as a wiper to prevent debris from damaging KRYTE, K-HEET, A-HEET or Seal-RYTE seal stacks when seals are moved after being placed in service.



Elastomer Selection

Ideally, seal materials have high strength and resiliency, and remain unaffected by thermal or chemical environments. However, there is no single material that offers adequate levels of these characteristics for all downhole applications. Effective sealing in downhole environments often requires a combination of materials to form a seal system. Several sets of identical seal systems can be combined to create a seal stack with redundant seals. Choosing the optimum seal stack requires knowledge of the application and downhole conditions.

Bonded seals are used in applications that require seals to be repeatedly inserted into and removed from the sealbore while holding differential pressure. This action is known as unloading. Bonded seals are composed of high-strength elastomers, usually nitrile or Viton™, which have limited operational capabilities.

Applications beyond the capabilities of bonded seals require more inert elastomers. Generally, these premium elastomeric materials have lower resistance to extrusion than nitrile or Viton* and require the protection of a containment system to prevent failures. Sealing systems using contained premium elastomers are offered as a chevron- or v-ring-type seal stack.

V-ring seal stacks can tolerate movement while holding high pressures, providing they are always contained within a sealbore. Therefore, while holding differential pressure, they must remain in the sealbore. Selecting the most appropriate seal stack can be simplified by referring to the seal stack service matrix shown below.

SELECTION GUIDE

Packer-to-Tubing Packing Unit

Seal Type	Pressure Differential				Temp. Range		H ₂ S	Environmental Compatibility *				
	Non-Unloading		Unloading		°F	°C		Oil Base Completion	Light Brine Completion	Bromide Completion	High pH Completion pH > 10	Amine Inhibitors
	PSI	MPa	PSI	MPa								
Nitrile Chevron	10,000	68.9	NO	NO	32-300	0-149	NO	OK	OK	CaBr ₂ /NaBr ₂ OK to 250°F ZnBr ₂ NO	NO pH >10 OK to 250°F pH <10	OK to 200°F
70 Hard Nitrile Bonded	5,000	34.4	5,000	34.4	32-200	0-93	NO	OK	OK			
90 Hard Nitrile Bonded	10,000	68.9	5,000	34.4	32-300	0-149	NO	OK	OK			
95 Hard Viton Bonded	10,000	68.9	5,000	34.4	32-250	0-121	5%	OK	OK	OK	NO	OK to 200°F
HN-Ryte™	10,000	68.9	NO	NO	32-350	0-177	2%	OK	OK	CaBr ₂ /NaBr ₂ OK to 250°F ZnBr ₂ NO	OK	OK
V-Ryte™	15,000	103.3	NO	NO	32-300	0-149	15%	OK	OK	OK	NO	OK to 200°F
					32-400	0-204	5%					
A-Ryte™	15,000	103.3	NO	NO	80-300	27-149	20%	NO	OK	OK	OK	OK
					80-450	27-232	7%					
A-HEET™	15,000	103.3	NO	NO	80-300	27-149	20%	NO	OK	OK	OK	OK
					80-450	27-232	15%					
K-Ryte™	15,000	103.3	NO	NO	100-450	38-232	7%	OK	OK	OK	OK	OK
K-HEET™	15,000	103.3	NO	NO	100-550	38-288	■	OK	OK	OK	OK	OK
Seal-Ryte™	15,000	103.3	NO	NO	40-450	4-232	7%	OK	OK	OK	OK	OK
Seal-HEET™	15,000	103.3	NO	NO	40-450	4-232	■	OK	OK	OK	OK	OK
R-Ryte™	10,000	68.9	NO	NO	325-450 ●	163-232	7%	OK	OK	OK	OK	OK
Molyglass	10,000	68.9	NO	NO	125-300	52-149	15%	OK	OK	OK	OK	OK

Explosive decompression is chemical and mechanical in nature related to solubility of gas in elastomer and strength of that elastomer. Under rapid decompression, the elastomeric seals in these units may be susceptible to explosive decompression; however, explosive decompression does not occur while seals are in service.

-There are no known H₂S limitations below 500°F (260°C).

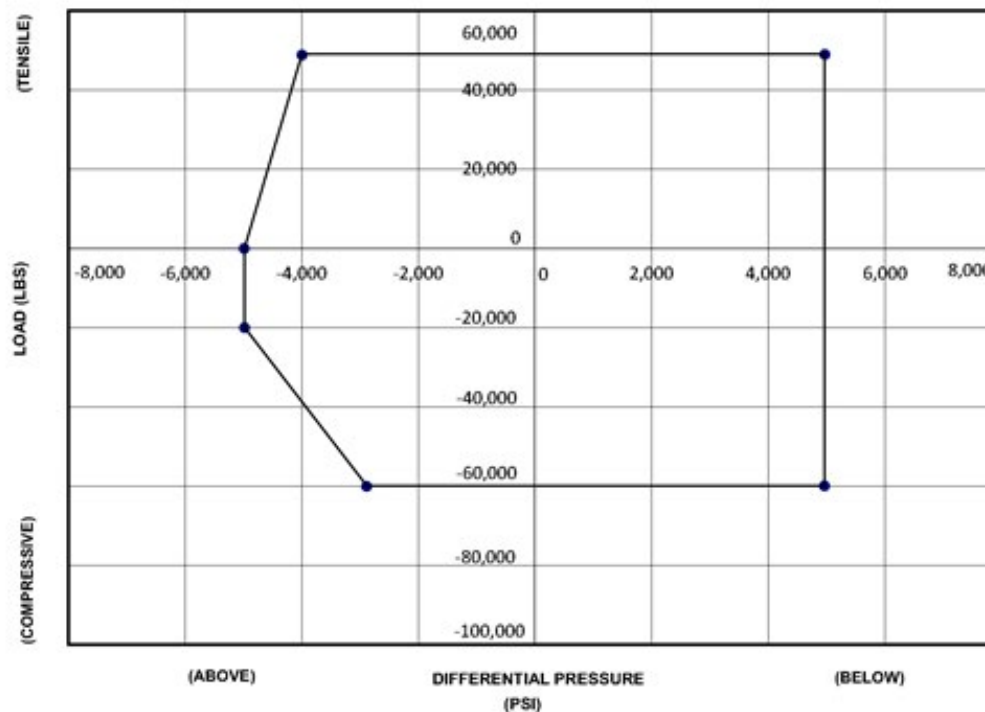
- Viton is a registered trademark of Dupont.

Packer Performance Definition

The successful performance of any packer includes recognizing that the combined effects of varying differential pressure or applied forces cannot be considered independently. Rating a production packer in terms of differential pressure alone does not sufficiently describe the packer's performance limits. To accurately measure and compare the performance of various packers, an understanding of the simultaneous effects of differential pressure and axial loading is required.

K.S.A has developed the industry's first means of describing a packer's performance capabilities, under all possible loading conditions. The analytical system combines computer modeling, sophisticated numerical stimulation techniques, including finite element analysis, exhaustive laboratory testing, and field verification. To apply this technology, a graphical solution is used to provide an accurate and useful definition of a packer's safe operating region.

The system, known as PERFORM™, is used to validate permanent and retrievable packers are compatible with the demands of today's critical completions. Ensuring all load combinations fall inside the region formed by the curves confirms that the equipment is adequate for the combined loading conditions. This area is called the “safe performance envelope” In those instances where one or more sets of loading conditions fall outside the safe performance envelope, a detailed evaluation of all aspects of the proposed completion system is required to upgrade its performance. Some conditions outside the safe performance envelope adversely affect the packer's ability to maintain its sealing integrity. Others may prevent the packer from functioning as designed, while retaining pressure integrity.



Hydraulic-Set Permanent Packers

APPLICATION

These packers feature the largest possible bore through combined packer and seal accessory. The packer is run to depth, connected to the tubing with an anchor tubing seal nipple and is set by applied tubing pressure. This makes the packer ideal for high-angle deviated wells, common in offshore operations.

Advantages

Slim-line design

Solid construction enables 50% faster run-in without fear of impact damage or premature setting, making significant rig-time savings possible

Two opposed sets of full-circle, full-strength slips ensure packer will remain properly set

Packing element resists swab-off and packs off securely when packer is set

Unique interlocking, expandable, metal backup rings contact casing, creating a positive barrier to packing element extrusion

Aflas™ packing element is available in select casing-weight ranges

Additional Information

These packers have been designed to give maximum strength, uniformity of setting pressure and standardization of all alloy materials for H2S service.

The KSAB-3 packers offer bores comparable to the other packers in their corresponding sizes.

The KSABL-3 (large-bore) packers offer larger bores as a result carry a lower-pressure rating than the KSAB-3 packer.

These packers are only available in standard sizes.

This advanced packer is designed and tested in accordance with API 11-D1 standard on design validation grade V2.

Packer Accessories

- Sealing systems
- Expansion joints
- Parallel flow systems
- Plugging devices
- Packer-bore receptacles



SPECIFICATION GUIDES

KSAB-3 Hydraulic-Set Permanent Packer

Casing			Packer *		Packer Sealing Bore							
OD		Weight •	Max OD		Upper				Lower ■			
			Seal Bore		Min Bore Thru Seals			Seal Bore	Min Bore Thru Seals			
in.	mm	lb/ft	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
5	127.0	15–21	3.968	100.7	3.000	76.2	2.390	60.7	1.968	49.9	.984	24.9
5-1/2	139.7	13–17	4.500	114.3	3.250	82.5	2.500	63.5	2.500	63.5	1.865	47.3
6-5/8	168.2	7–32	5.468	138.8	4.000	101.3	3.250	82.5	3.250	82.5	2.406	61.1
		17–20	5.687	144.4								
7	177.8	32–44	5.468	138.8	4.000	101.3	3.250	82.5	3.250	82.5	2.406	61.1
		20–32	5.687	144.4								
		17–20	6.187	157.1								
7-5/8	193.6	33.7–39	6.187	157.1	4.000	101.3	3.250	82.5	3.250	82.5	2.406	61.1
		24–39	6.375	161.9								
7-3/4	196.9	46.1–48.6	6.187	157.1	4.000	101.3	3.250	82.5	3.250	82.5	2.406	61.1
8-5/8	219.0	24–36	7.500	190.5	4.750	120.6	3.875	98.4	4.000	101.6	3.000	76.2
9-5/8	244.4	32.3 – 58.4	8.125	206.3	6.000	152.4	4.875	123.8 4.895 ‡	4.750 124.3	120.6	2.500	
										3.000	76.2	63.5
										3.875	98.4	
										-	-	
9-7/8	250.1	62.8	8.125	206.3	6.000	152.4	4.875	123.8 4.895 ‡	4.750	120.6	2.500	63.5
										3.000	76.2	
										3.875	98.4	
										124.3	-	

KSABL-3 Hydraulic-Set Permanent Packer

Casing			Packer *		Packer Sealing Bore							
OD		Weight ●	Max OD Seal Bore		Upper				Lower ■			
					Min Bore Thru Seals		Seal Bore		Min Bore Thru Seals			
in.	mm	lb/ft	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
5-1/2	139.7	20–23	4.450	113.0	3.625	92.0	2.780	70.6	2.780 ‡	70.6	-	-
6-5/8	168.2	17	5.875	149.2	4.750	120.6	3.875	98.4	3.875	98.4	2.500	63.5
7	177.8	26–29	5.875	149.2	4.875	123.8	4.125	104.7	4.125 ‡	104.7	-	-
7-5/8	193.6	24–33.7	6.500	165.1	4.750	120.6	3.875	98.4	3.885	98.6	2.500	63.5
8-5/8	219.0	24–36	7.500	190.5	6.000	152.4	4.875	123.8	4.750	120.6	3.000	76.2
9-5/8	244.4	47–58.4	8.250	209.5	7.375	187.3	6.000	152.4	6.000	152.4	4.875	123.8
							6.059	153.8	6.059 ‡	153.8	-	-
			8.125	206.3	4.000	101.6	3.250	82.5	3.250	82.5	2.406	61.1
					4.750	120.6	3.875	98.4	4.400	111.7	3.500	88.9
9-7/8	250.1	62.8	8.250	209.5	7.375	187.3	6.000	152.4	6.000	152.4	4.875	123.8
							6.059	153.8	6.059 ‡	153.8	-	-
			8.125	206.3	4.000	101.6	3.250	82.5	3.250	82.5	2.406	61.1
					4.750	120.6	3.875	98.4	4.400	111.7	3.500	88.9
10-3/4	273.0	32.75–60.7	9.437	239.7	7.375	187.3	6.000	152.4	6.000	152.4	4.875	123.8

● Includes some drillpipe and line pipe weights

Lower bore can be used as a seal bore, HOWEVER, strict dimensional analysis for compatibility of packer bore/sealing accessory configuration is required to assure desired performance. Compatibility is based on lower bore/seal nipple diametrical dimensions only. Final seating position of locating shoulder will vary between packer sizes. Anchor mechanisms are not recommended.

- When proposed for use in other than the casing-weight range shown, contact the company engineering affairs.
- This is not a honed seal bore.

K.S.A Permanent Packers with Aflas Element System

Permanent production packers with high-performance Aflas* element systems have been developed for aggressive well environments. Packers with Aflas element systems are service rated from 110°F to 450°F (43°C to 232°C).

Advantages

- Provides a reliable long-term seal
- Retains its mechanical and chemical properties better than nitrile in aggressive environments
- Dependable at temperatures above 300°F (149°C)

Can be used:

- When H₂S is present above 175°F (79°C) and at greater than 100 ppm below 175°F (79°C)
- In bromide completions
- In amine inhibitors above 175°F (79°C)
- In high-pH completion fluids

Additional Information

Restricted casing ranges:

Please carefully review the casing ranges shown in the specification guide; ranges are more restrictive than packers with nitrile elements.

Please note:

Permanent packers with Aflas element systems cannot be turned down and run in heavier-weight casing than specified in the specification guide.



KSAB-3Permanent Packers With Aflas

Casing							Packer					
OD		Weight	ID Range In Which Packer May Be Run				Size	Max OD	Required Setting Pres- sure		Max Acceptable Cool Down From Setting Temp	
		Min	Max						psi	bar	°F	°C
in.	mm	lb/ft	in.	mm	in.	mm						
6-5/8	168.3	17-28	5.675	144.1	6.135	155.8	82SAB40x32	5.468	4,000	276	340	171.1
7	177.8	32-41					82SAB32x25					
							82-32 SB-3					
6-5/8	168.3	17	6.049	153.6	6.366	161.7	84SAB40x32	5.687	4,000	276	290	143.3
							84SAB40x29					
							84SAB40x27					
							84-32 SB-3					
							194-47 SB-3					
							194-40 SB-3					
							194-32 SB-3					
7	177.8	23-32										

KSAB-3Permanent Packers With Aflas

Casing							Packer					
OD		Weight	ID Range In Which Packer May Be Run				Size	Max OD	Required Setting Pressure		Max Acceptable Cool Down From Setting Temp	
		Min	Max						psi	bar	°F	°C
in.	mm	lb/ft	in.	mm	in.	mm						
7	177.8	26-29	6.088	154.6	6.276	159.4	85SABL47x39	5.875	5,000	345	175	79.4
							85SABL47x38					
							85SABL47x36					
9-5/8	244.5	47-53.5	8.405	213.5	8.822	224.1	194SABL75x60	8.250	4,000	276	250	121.1
							194SABL73x60					
							194-60 SB-3					

Hydraulic-Set Retrievable Packers

KMRP Modular Retrievable Packer

Introduction

The K.S.A Modular Retrievable Packer (KMRP) is a hydraulically set, straight- pull shear-release retrievable packer for use in vertical and deviated well- bores or in applications in which single or multiple packers are set after the wellhead has been installed. A modular shell and body design for low- to medium-pressure differentials allows configuration as a single-string production packer. Its compact, modular design makes the KMRP an economical choice for production applications. The KMRP is installed with the completion tubing and is set by applying pressure to the tubing.

Retrieval of the KMRP is accomplished with a straight upward pull on the tubing. Once the tension on the tubing string exceeds the shear value of the release pins, the slips disengage the casing, and the element relaxes. Set at the factory to a standard value, the packer shear-release mechanism can be adjusted in the field just before installation. This advanced packer is designed and tested in accordance with API-11D1 standard on design validation grade V3.

Applications

- Single-string completions
- Zonal isolation
- Vertical, deviated, or horizontal wellbores

Benefits

- Simplified operations reduce rig costs
- Eliminates tubing movement during installation
- Prevents debris buildup above slips
- Facilitates circulating out debris before retrieval
- Positive casing grip secures packer

Features

- Ability to pressure test the system at the surface
- Slips located below the sealing element
- Equalization system above the element
- Adjustable shear release
- Straight-pull shear release
- Field-proven sealing element
- Bidirectional slips
- Minimized end effect on shear- release screws
- API-11D1 V3 qualified packer

Casing		Packer		
Size† (in. [mm])	Weight Range (lbm/ft)	Max. OD (in. [mm])	Min. Packer ID (in. [mm])	Max. Differential Pressure (psi [kP])
7.000 [177.8]	23.0–26.0	6.090 [154.7]	2.907 [73.8]	7,000 [48,265]
	26.0–29.0	6.000 [152.4]		
	32.0–35.0	5.910 [150.1]		
9.625 [244.5]	40.0–47.0	8.463 [215.0]	4.718 [119.8]	7,000 [48,265]
	47.0–53.5	8.315 [211.2]		



Twin Seal Electric Submersible Pump Packer

APPLICATION

The Twin Seal™ packer is a field-proven, high-performance packer specially designed for deployment of electric submersible pumps.

Advantages

- High-performance rating: 5,000 psi and 275°F (135°C)
- Twin packing elements protect slip system from debris, easing packer release
- Reliable hydraulic-setting mechanism simplifies running procedures
- Packer can be spaced out in neutral, compression or tension, providing completion flexibility
- Full-bore production mandrel reduces flow restrictions in high-volume wells

Additional Information

The packer is provided with a large-bore production mandrel and an electrical- cable feed-through that is adaptable to popular cable packoff systems. And, there are two smaller feed-throughs that may be used for an annular-gas vent valve and instrumentation and chemical-injection lines. There is no relative movement between the strings when setting or releasing the packer, eliminating unwanted cable strain.

The packer is set with hydraulic pressure and has a straight-pull release. The twin packing elements, above and below the slips, enable the packer to maintain the same pressure rating from either direction.



SPECIFICATION GUIDE

Twin Seal™ Electrical Submersible Pump Packer

Casing			Packer																
Casing		Weight	Packer Size	Max Gage Ring OD		Max Packing Element		Size		Secondary String					● Optional Vent Tubes			Optional Bypass Gas ●	
				.in	mm	lb/ft	.in	With BIW Penetrator mm	Less BIW Penetrator .in	mm	Std Thd Box x ▲ Pin	.Max Qty .in	mm	▲ Box x Pin	Std Thd Box x Pin	Std Box Up .in	mm		
7	177.8	32–29	47C2	5.943	150.9	5.938	150.8	x PEN 2-3/8	x 2-3/8 2-3/8	EU 2-3/8 8Rd x NU 2-3/8 10Rd or NU 2-7/8 10Rd x NU 2-7/8 10Rd	KV 4 / 100 AMP	2.062 1.521	52.3 38.6	NU 10 2-3/8 Rd x NU 10 2-3/8 Rd or NU 1.900 10Rd x NU 10 Rd 1.900	2	750.	19.0	3/4 NPT	■ NPT 1-1/4
		29–26	47C4	6.000	152.4														
		26–23	47C6	6.109	155.1	6.094	154.7	x PEN 2-7/8	x 2-7/8 1.900										
		23–20	47C8	6.203	157.5														
		20–17	47C10	6.250	158.7														
7-5/8	193.6	39–33.7	48D2	6.438	163.5	6.375	161.9	x PEN 2-7/8	x 2-7/8 2-3/8	EU 2-7/8 8Rd x NU 2-7/8 10Rd	KV 4 / 100 AMP	2.062	52.3	NU 10 2-3/8 Rd x NU 10 2-3/8 Rd	2	750.	19.0	3/4 NPT	NPT 1-1/4
		33.7–29.7	48D4	6.562	166.6														
		29.7–26.4	48D6	6.703	170.2	6.656	169.0												
		26.4–24	48D8	6.796	172.6														
8-5/8	219.0	49–44	49A2	7.312	185.7	7.411	189.0	x PEN 2-7/8	x 2-7/8 1.900	EU 2-7/8 8Rd x NU 2-7/8 10Rd	KV 4 / 125 AMP	1.521 2.015	38.6 51.1	NU 10 Rd 1.900 x NU 1.900 10Rd EU 8 Rd 2-3/8 x NU 10 2-3/8 Rd	3	1.000	25.4	1.00 NPT	NPT 1-1/4
		40–36	49A4	7.546	191.6														
9-5/8	244.4	58.4–53.5	51A2	8.265	209.9	8.203	208.3	x PEN 4-1/2	x 4-1/2 2-3/8 or x 3-1/2 ● 3-1/2	LTC 4-1/2 x LTC 4-1/2	KV / 4 125 AMP	1.521 2.015	38.6 51.1	NU 10 Rd 1.900 x NU 10 Rd 1.900 EU 8 Rd 2-3/8 x NU 10 Rd 2-3/8	3	1.000	25.4	NPT 1.00	NPT 1-1/4
		53.5–47	51A4	8.328	211.5														
		47–43.5	51A6	8.453	214.7	8.359	212.3												
		43.5–40	51A8	8.500	216.2														
		40–36	51A10	8.594	218.2														

- Available only on packers which are equipped with drop-in penetrators or cable feed-through.

● Optional feature, supplied on special request only.

- Connections shown before are "standard" for the respective packer sizes. Other connections are available on client request. Please specify thread when ordering.

NOTE: Repair kits, including such items as packing elements, seal rings, etc., are available for redressing retrievable pack

Downhole Sealing Systems

A variety of downhole sealing accessories are available for connecting tubing with packers. Each is designed to meet specific requirements of certain completion techniques. To select the proper packer-to-tubing seal system for any well completion, carefully consider present and future well conditions. Factors which must be considered include:

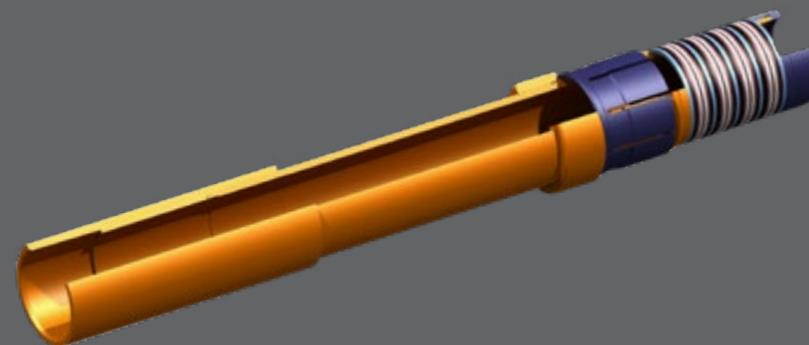
- Seal movement
- Maximum pressure differential
- Maximum and minimum temperatures
- Well fluids (H₂S, CO₂ or other corrosives and inhibitors)
- Workover frequency
- Hole geometry
- Required internal diameter for flow rate and access downhole
- Tensile forces (packer to tubing)
- Actuation and release mechanisms
- Packer design

As well design and completion techniques have advanced, so have the number and variation of specialized downhole-sealing systems.

The four main categories of downhole sealing systems are:

- Locators
- Anchors
- On-off tools
- polished-bore receptacle & expansion joints.

Each category has variations to handle special circumstances. For information, specifications and order information, contact to K.S.A's engineering affairs



Locator Tubing Seal Assembly

The locator tubing-seal assembly is the most basic packer-sealing system for packers incorporating a sealing bore. It is run in the well on the production tubing string until its no-go shoulder locates on the top of the packer. This positions one or more seal stacks in the packer's sealbore and establishes a seal between the packer and tubing. When a locator tubing-seal assembly is landed in a packer, the tubing is normally set in compression to compensate for any contraction of the tubing during treating operations.

However, it is not always possible or desirable to slack off sufficient weight, particularly in deep deviated wells. In such cases, additional length must be added to the packer's sealbore using sealbore extensions and to the locator tubing-seal assembly using a combination of spacer tubes and additional seal units.

APPLICATION

This locator tubing seal assembly is designed for installations requiring tubing movement, this seal assembly should only be used with packers that have sealbore extensions or with retrievable packer-bore receptacles. The basic assembly includes 8 seal stacks which is cocluding to the 16ft of sealing length. Any number of seal units or spacer tubes can be added for increased length. It is designed for use in single-bore sealbore packers. They are also compatible with the lower sealbore in most sizes of alternate-bore sealbore packers. Production tubes, tailpipe or other accessories with ODs compatible with packer bore can be attached to the bottom of this seal assembly. Like all locator tubing seal assemblies, it should be landed with sufficient set-down weight to prevent seal movement. When used in a properly designed system, this seal assembly will give long service life even if movement occurs.

Locator Tubing Seal Assembly Specification

Size	Max O.D (in.)	Min I.D (in.)	Pressure Rating (P.S.I)	Packer Packing Bore
7"	6.100	2.362	5,000	3.250
9-5/8"	8.400	3.562	5,000	4.750



Anchor Tubing Seal Assembly

The anchor tubing seal assembly is used as an alternative to set-down weight; it prevents seal movement or is used when it is preferable to land the tubing in tension. The anchor tubing seal assembly or anchor tubing seal nipple is run in on the production string. Set-down weight causes the anchor's threaded latch to engage the corresponding threads in the top of the packer. Once engaged, the anchor and tubing are securely locked in place. Any tubing contraction will cause a tensile load to be applied to the tubing string. Care must be taken to ensure tensile forces that develop will not part the tubing whenever an anchor is used. To release the anchor, it must be rotated to the right 10 to 12 turns at the packer.

APPLICATION

Anchor tubing seal nipples are used for sealing in the upper bore of alternate-bore sealbore packers. It is supplied with one seal stack and blank or half-mule shoe bottom sub, which will not accommodate tailpipe or production tubes. These anchors feature metal-to-metal internal connections for hostile environments.



Anchor Tubing Seal Specification

Packer Size	Max O.D (in.)	Min I.D (in.)	Pressure Rating (P.S.I)	Packer Packing Bore
7"	4.980	3.250	5,000	4.00
	5.500	4.125	5,000	4.875
9-5/8"	6.500	3.562	5,000	6.00



Expansion Joints

Splined Expansion Joint

APPLICATION

The K.S.A-N splined expansion joint is designed for use in both single and multiple-string completions to compensate for tubing movement. The tool provides 10 ft (3.045 mt) of movement and uses rugged bonded seals for reliable continuous service. The telescoping action permits the tool to be used as a bumper sub or jar when retrieving the installation.

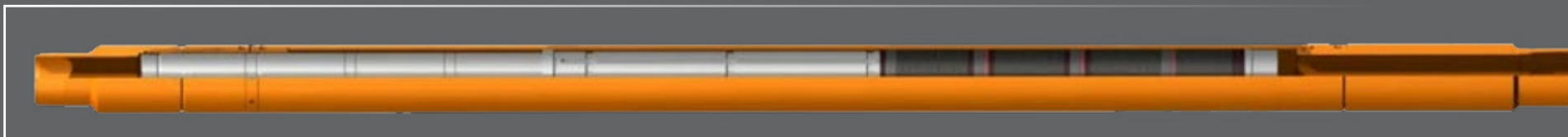
Advantages

- Shear screws easily added or removed to adjust shear value
- Tool locks in fully extended, fully collapsed or mid-stroke position with shear screws
- Full-length keys provide transmission of torque through full length of travel
- Metal goods suitable for H2S service per NACE Standard MR-01-75

Additional Information

Shear screws may be installed to initially position the expansion joint in its extended, collapsed, or mid-position. A rotation lock lets the operator rotate through the expansion joint in any position.

Tubing Size	Max OD		Min ID		Extended Length		Fully Collapsed Length		Torque Rating	
	in.	mm	in.	mm	in.	mm	in.	mm	ft-lb	kg-m
2-3/8	3.688	93.6	1.930	49.0	273	693.4	157	396.7	2,000	277
2-7/8	4.531	115.0	2.441	62.0	283	718.8	162	411.4	2,500	346
3-1/2	4.906	124.6	2.875	73.0	276	701.0	156	396.2	3,500	484
4-1/2	6.531	165.8	3.875	98.4	278	706.1	158	401.3	5,000	691



KM Expansion Joint

APPLICATION

The K.S.A-M expansion joints are slim-line tools primarily designed for use in dual-string completions. The M expansion joint does not permit pre-spacing.

Advantages

- Full opening ID compatible with tubing ID
- OD of tool compatible with dual-string applications
- Standard stroke lengths up to 20 ft (6.1 m), other lengths available upon request
- Functions as a swivel until stroked out; available with optional rotational clutch
- V-Ryte seals are standard, other sealing materials are available upon request
- Suitable for H2S Service as per NACE MR-01-75 Standard

SPECIFICATION GUIDE

Tubing Size		Max Tool OD		Min Tool ID	
in.	mm	in.	mm	in.	mm
2-3/8	60.3	3.250	82.5	1.939	49.2
2-7/8	73.0	3.765	95.6	2.374	60.3
3-1/2	88.9	4.260	108.2	2.890	73.4
4-1/2	114.3	5.390	136.9	3.895	98.9
5-1/2	139.7	7.070	179.5	4.830	122.6



Adjustable Spacer Sub With Rotational Lock

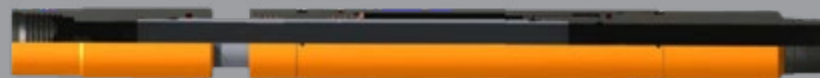
APPLICATION

The adjustable spacer sub with rotational lock is used below a dual packer to facilitate making tubing connections and spacing out between two retrievable packers. The spacer sub has 24 in. (609.6 mm) of travel and when adjusted to the desired length, it is locked to prevent telescoping or rotational movement.

Telescoping Swivel Sub

APPLICATION

The telescoping swivel sub was developed for use in multiple-string completions as a union to facilitate running additional tailpipe below a dual-string retrievable packer. The telescoping action of the sub provides 24 in. (609.6 mm) of travel to compensate for inaccuracies in measurement and to relieve the strain on threads while making up tailpipe between two dual packers. The swivel feature makes it possible to connect both long- and short-string tailpipe to the lower end of the packer. Even if the tailpipes are strapped together, it bears the weight of the tubing hanging in the slips, while the connection between tubing and packer is being made up.



SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
1.900	2.531	64.29	1.563	39.70
2-1/16	2.531	64.29	1.656	42.06
2-3/8	3.094	78.59	1.969	50.01
2-7/8	3.719	94.46	2.375	60.33
3-1/2	4.281	108.74	3.000	76.20

SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
1.315	1.906	48.41	1.000	25.40
1.660	2.250	57.15	1.313	33.35
1.900	2.531	64.29	1.563	39.70
2-3/8	3.094	78.59	1.969	50.01
2-7/8	3.719	94.46	2.375	60.33
3-1/2	4.281	108.74	3.000	76.20
4-1/2	5.281	134.14	3.938	100.03

Spacing Devices

SAFETY JOINT SELECTION GUIDE

	Rotational Re- lease	Shear Release	Short Stroke	Long Stroke	Rotationally Locked
Safety Joint	X				
Shear-Out Safety Joint		X		X	
B Shear-Out Safety Joint		X	X		
C Shear-Out Safety Joint		X		X	X

Safety Joint

APPLICATION

The safety joint provides an emergency disconnect for a portion of the tubing string, should it become necessary to abandon the equipment below. Precision left-hand square threads facilitate release of the joint by right-hand tubing rotation.

SAFETY JOINT SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
1.900	2.22	56.3	1.53	38.8
2-3/8	3.094	78.5	2.000	50.8
2-7/8	3.719	94.4	2.422	61.5
3-1/2	4.531	115.0	2.984	75.7



Shear-Out Safety Joint

APPLICATION

The shear-out safety joint is used between packers in dual completions and in selective completions using hydraulic/hydrostatic single-string packers. When run above the upper packer in a single-string completion, however, the shear value should be adjusted to compensate for any hydraulic conditions that exist when the string is landed or that are created by well treating operations.

B Shear-Out Safety Joint

APPLICATION

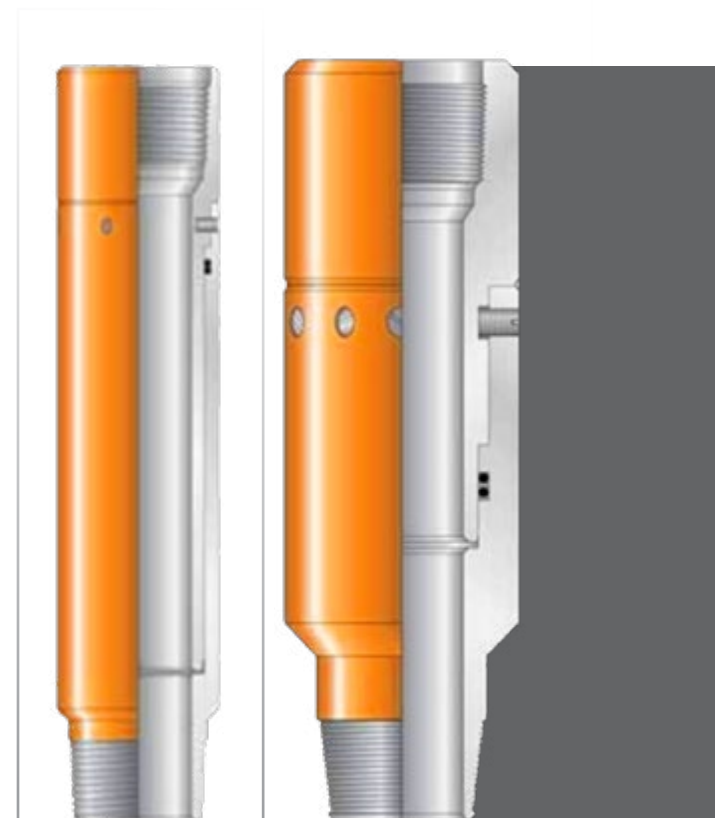
The B™ shear-out safety joint is designed for use between the packer and the sand screen to provide a means of releasing and retrieving the production string, should the screen become sanded in. It may also be used in any application that includes the use of an up strain-type releasing device.

SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
1.900	2.510	63.75	1.620	42.42
2-1/16	2.510	63.75	1.620	42.42
2-3/8	2.905	73.79	1.990	50.55
2-7/8	3.781	96.04	2.313	58.75
3-1/2	4.531	115.09	2.938	74.63

SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
2-3/8	3.094	78.59	1.929	49.00
2-7/8	3.719	94.46	2.438	61.93
3-1/2	3.844	98.55	3.064	77.72
4	4.340	110.24	3.428	87.12
4-1/2	5.031	127.79	3.900	99.03
7	8.531	216.69	6.250	158.75



C Rotationally Locked Shear-Out Safety Joint

APPLICATION

C Rotationally Locked Shear-Out Safety Joint

APPLICATION

The C™ rotationally locked shear-out safety joint is a long-stroke shear release, which transmits torque in its closed position. It has been specifically designed for use between packers in dual completions and in selective completions using hydraulic/hydrostatic single-string packers. When run above the upper packer in a single-string completion, the shear value should be adjusted to compensate for any hydraulic conditions that exist when the string is landed or that will be created by well-treating operations.

SPECIFICATION GUIDE

Size	Max OD		Nom ID	
	in.	mm	in.	mm
1.900	2.500	63.50	1.620	41.15
2-3/8	3.063	44.80	2.000	50.80
2-7/8	3.698	93.93	2.406	61.11
3-1/2	4.500	114.30	2.968	75.39
6-5/8	7.375	187.33	5.921	150.39



Plugging Devices

Hydro-Trip Pressure Sub

Description & Operation

To actuate a hydraulic-set packer, a ball is dropped or circulated to its seat in the hydro-trip sub. To set the packer, the appropriate pressure differential is applied to the tubing.

After setting the packer, continued pressure is applied to shear the pins retaining the collet seat. Once sheared, the collet in the sub moves down, allowing the collet fingers to expand.

The ball then passes through collet and out the end of the sub. Once activated, the collet OD expands into a recess & full tubing ID is maintained. Bronze and phenolic balls are available as an option to accommodate specific wellbore fluid characteristics.

The shear value of the hydro-trip sub is fully adjustable.

Once the hydro-trip sub is sheared and the ball is expended, the sub has a full tubing ID. This feature allows the sub to be placed virtually anywhere in the tubing string, since only the ball is discarded.

The hydro-trip sub is available in a wide variety of materials and tubing connections.

APPLICATION

- Temporary tubing plug for setting hydraulically actuated packers in single & dual completions

BENEFIT

- Can be run at any location in the tubing string

FEATURES

- Full tubing ID after shearing
- One body joint with anti-torque locking screws
- Adjustable shear value
- Reliable shear mechanism
- Allows circulation prior to dropping ball



K.S.A-C Tubing Testing Sub

APPLICATION

The K.S.A-C tubing testing sub, along with a Bakerlite ball, may be used to test any tubing string. The sub's design includes a machined, 45-degree, tapered ball seat. The Bakerlite ball may be reverse-circulated out of the tubing string after a test. In the event the tubing is faulty, the ball can be left in position and the tubing tested as it is withdrawn from the well. The C is available for use with 2-3/8-in. to 4-1/2-in. (60.3-mm to 114.3-mm) size tubing strings.

Size	Ball Size		Max OD		Nom ID	
	in.	mm	in.	mm	in.	mm
2-3/8	1-7/16	36.5	3.094	78.5	1.281	32.5
	1-3/4	44.4			1.500	38.1
	1-7/8	47.6			1.781	45.2
2-7/8	1-7/16	36.5	3.719	94.4	1.281	32.5
	1-3/4	44.4			1.500	38.1
	2-1/8	53.9			1.750	44.4
3-1/2	2-1/2	63.5	4.531	115.0	2.125	53.9
4-1/2	3-1/2	88.9	5.594	142.0	3.250	82.5



Packer Extension

Mill-Out Extension

APPLICATION

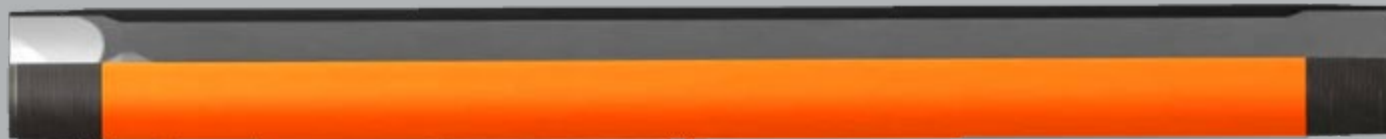
A mill-out extension can be run directly below a sealbore packer or sealbore extension. For permanent packers, the mill-out extension is required to accommodate the mandrel and catch sleeve of the K.S.A-CJ packer milling tool during packer milling. In the case of a retrievable sealbore packer, the mill-out extension will accommodate the mandrel and catch sleeve of the retrieving tool.



Seal-Bore Extension

APPLICATION

Sealbore extensions can be run below a sealbore packer. A sealbore extension is run to provide additional sealing when a long seal assembly is run to accommodate considerable tubing movement. The sealbore extension has the same ID as the corresponding packer sealbore it is run with, thus all seals of a long seal assembly seal off in the sealbore extension. If extreme tubing movement is anticipated, it is advisable to incorporate some blank sections in the seal assembly to minimize the friction of the seals inside the sealbore extension.



Production String Accessories

Blast Joint

APPLICATION

The blast joint, positioned opposite the perforations in the casing, is used in the tubing string of a flowing well to protect it from the abrasive action of the flowing well. It exposes the maximum of metal in the abrasive area, maintaining at the same time API tubing ID and coupling OD. It is available in 10-ft (3.05-m) or 20-ft (6.10-m) lengths and for use with 2-3/8-in. (60.3-mm) through 4-1/2-in. (114.3-mm) production strings.

Flow Coupling

APPLICATION

Flow couplings are used to protect the integrity of tubing from erosive turbulence. They are also used above and below a geometric restriction in the flow path, depending on the well conditions. API Recommended Practices 14B advises use of flow couplings above and below safety valves. Baker Hughes offers flow couplings in 4-ft. (1.22-m), 6-ft. (1.83-m), 8-ft. (2.45-m) and 10-ft. (3.05-m) lengths to suit the application.

Perforated Spacer Tube

APPLICATION

The perforated spacer tube is used at the end of a tubing string to provide an alternate flow path when wireline measuring devices are used.

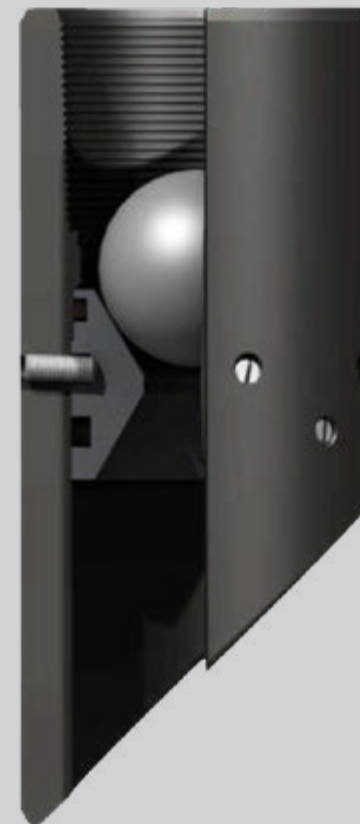
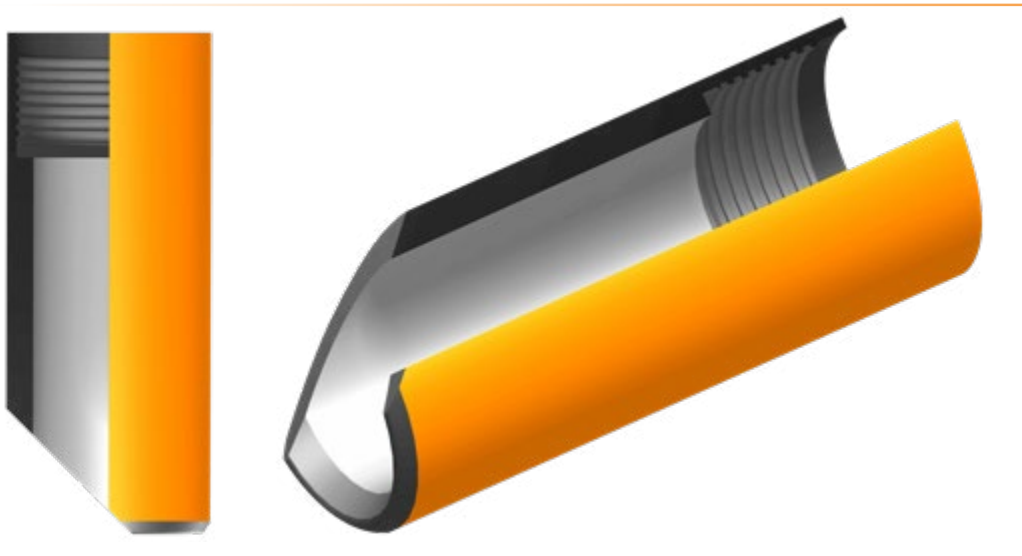


Wireline Entry Guide & Shear-Out Ball Seat Sub

APPLICATION

The wireline entry guide is designed to be run on the bottom of the tubing string. It will aid wireline tools' re-entry into the tubing. The wireline entry guide with pump-out plug, wireline entry guide with shear-out ball seat sub are installed on the bottom end of the tubing to allow the tubing string to be pressured. When the differential pressure at the tool reaches a pre-determined value, the plug or ball and seat, are pumped out of the tool. After the plug or ball seat have been pumped out, these subs allow unrestricted access from the tubing into the casing below the tubing string. These products are available in a variety of configurations.

Options include a muleshoe guide to facilitate easy entry when running the tubing through the top of a liner or into a sealbore packer and expendable check valves. The shear-out ball seat sub can be furnished in a box x pin configuration for those applications where it is necessary to run additional tubing or completion equipment below the shear-out ball seat sub. Since each of these tools expends a plug or ball & ball seat during their operation, it is necessary to ensure those parts will safely pass through all equipment that is located below them.



www.kheradsanat.com
Email: info@kheradsanat.com

SAND CONTROL EQUIPMENTS



Home

Contents

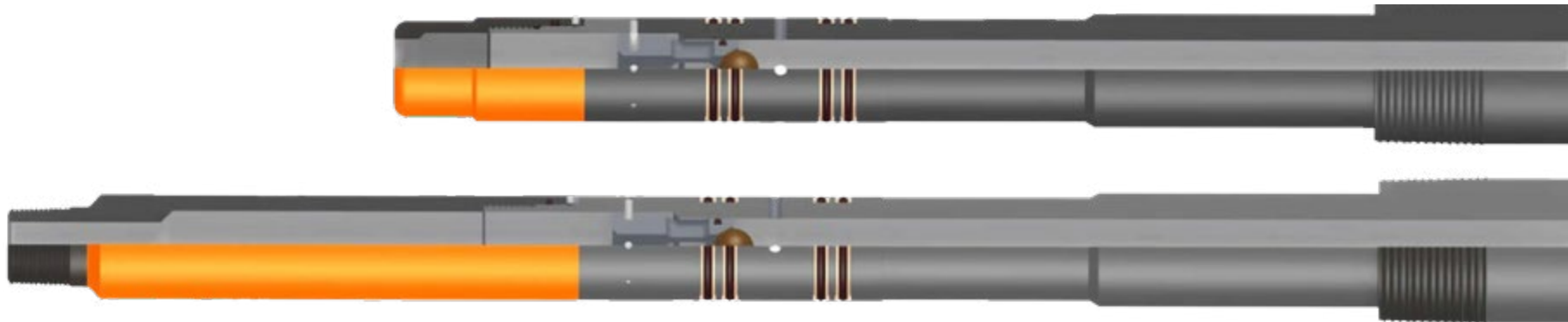
Hydraulic Setting Tool	PAGE 39
Double Poppet Wash-Down Shoe.....	PAGE 40
Pack-Off Bushing & Stinger.....	PAGE 41
Accessories.....	PAGE 42

[Home](#)

Hydraulic Setting Tool

The setting tool is equipment which is assembled to the packer seal bore (The sand control packer is single bore, in case of having seal bore for the anchor devices, setting tool will be placed in lower seal bore) and can be set on tubing or drillpipe using a hydraulic setting assembly. These setting assemblies are particularly useful for setting permanent packers in high-angle, deviated wells such as those drilled offshore. The hydraulic setting assembly and packer are run to setting depth on the tubing string and a ball is dropped to the ball seat in the setting tool. Sufficient tubing pressure is then applied to set and pack off the packer. Implying the extra pressure to the setting tool after the packer complete setting will lead to shear the screws in the setting tool, which is consequently release the pressure.

Setting tool will be disengaged from the packer by right-hand rotation. Before disengaging the setting tool from the packer, the annulus may be pressurized to confirm the packer has been set successfully. In addition the K.S.A designed setting tool is able to connect to the wash pipe by the client request.



Double Poppet Wash-Down Shoe

The wash-down shoe is a poppet, steel body, set-type shoe. It is running as the bottom tool on screen and liner assemblies, usually in open-hole completions. The wash-down shoe enables to complete circulation out the bottom of the open-hole sand control assembly. This can be important in the events that circulation is used to assist in working the assembly completely in the hole. In addition the wash-down shoe prevents fluid flow back while allowing fluid flow through the assembly.

This versatile tool simplifies completion operations and adds reliability and flexibility to sand control assembly placement in an open-hole completion. The shoe can help move loose formation material out of the way of the sand control assembly, and it allows the use of acid for open-hole filter-cake cleanup.

The wash-down shoes can be ordered either with or without fins welded onto the nose. When ordered with fins, the nose of the shoe assists with moving any loose fill material in the open-hole out of the way of the sand control assembly.

BENEFITS & FEATURES

- Dual-poppet design provides operational redundancy to enhance wellbore safety and protect reservoir productivity
- Durable and versatile sand control assembly nose prevents entry of sand and formation material into the sand control assembly.



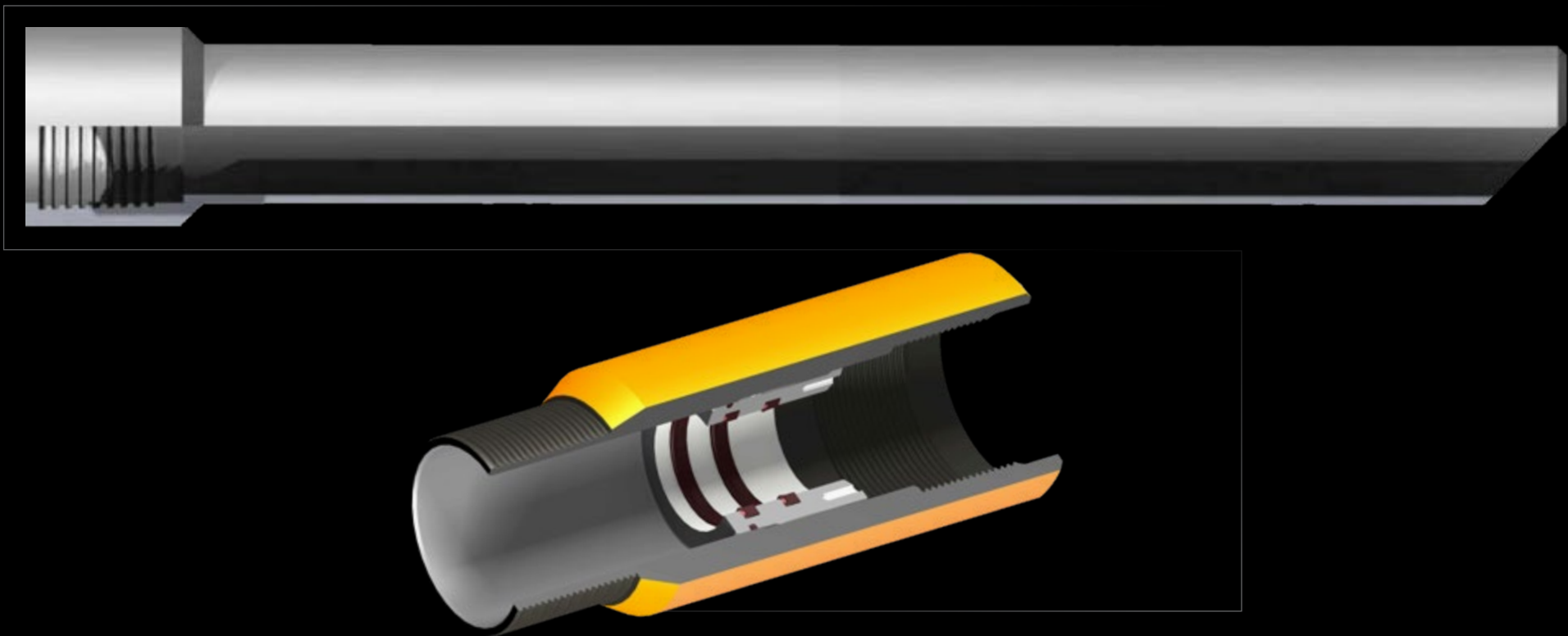
Pack-Off Bushing & Stinger

These completion accessories facilitate completion and grave-packing operations by providing pressure and fluid sealing at selected points in the completion assembly.

During sand control operation, these accessories normally play a roll of fluid flow direction in order to assist with effective fluid or gravel movement. They can be placed at the bottom of the screen assembly, just above a short telltale-circulating screen.

This helps insure treatment fluids are pumped all the way to the end or bottom of the production screens to promote complete screen coverage.

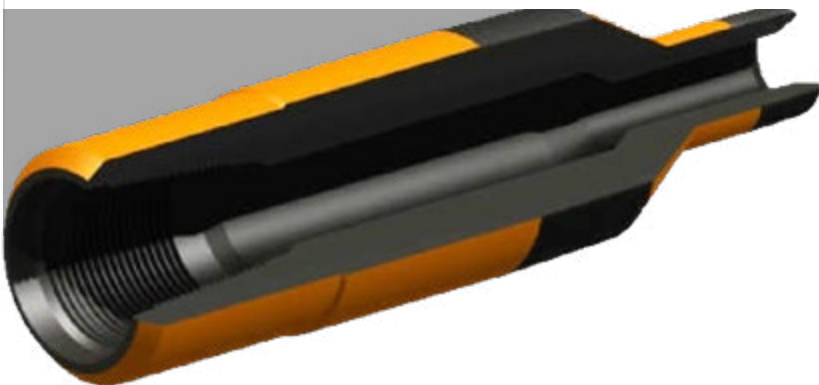
The polished stinger top connection could be changed based on the client request, according to the sand screen connection.



Accessories

There are some equipment's which are used to operate a sand control operation as an accessory as below:

3-WAY SAFETY CROSS OVER



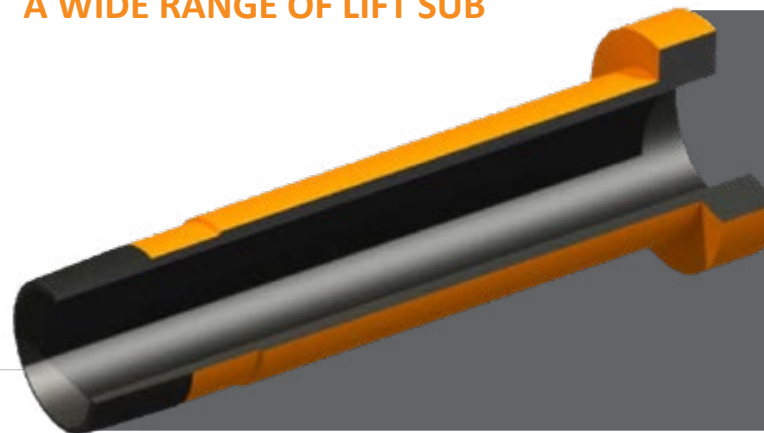
SCREEN TABLE & COMPLETE SET OF RAMS



WASH PIPE TABLE



A WIDE RANGE OF LIFT SUB



GAS LIFT EQUIPMENTS



Home

www.kheradsanat.com
Email: info@kheradsanat.com

Contents

Gas lift Systems.....	PAGE 43
Injection Pressure Operated Gas Lift Valve	PAGE 44
Orifice Valves	PAGE 45
Wireline Retrievable Dummy Valve	PAGE 45
Side Pocket Mandrel.....	PAGE 46
Kickover Tools	PAGE 46
'JD' Series Pulling Tool.....	PAGE 46

Home

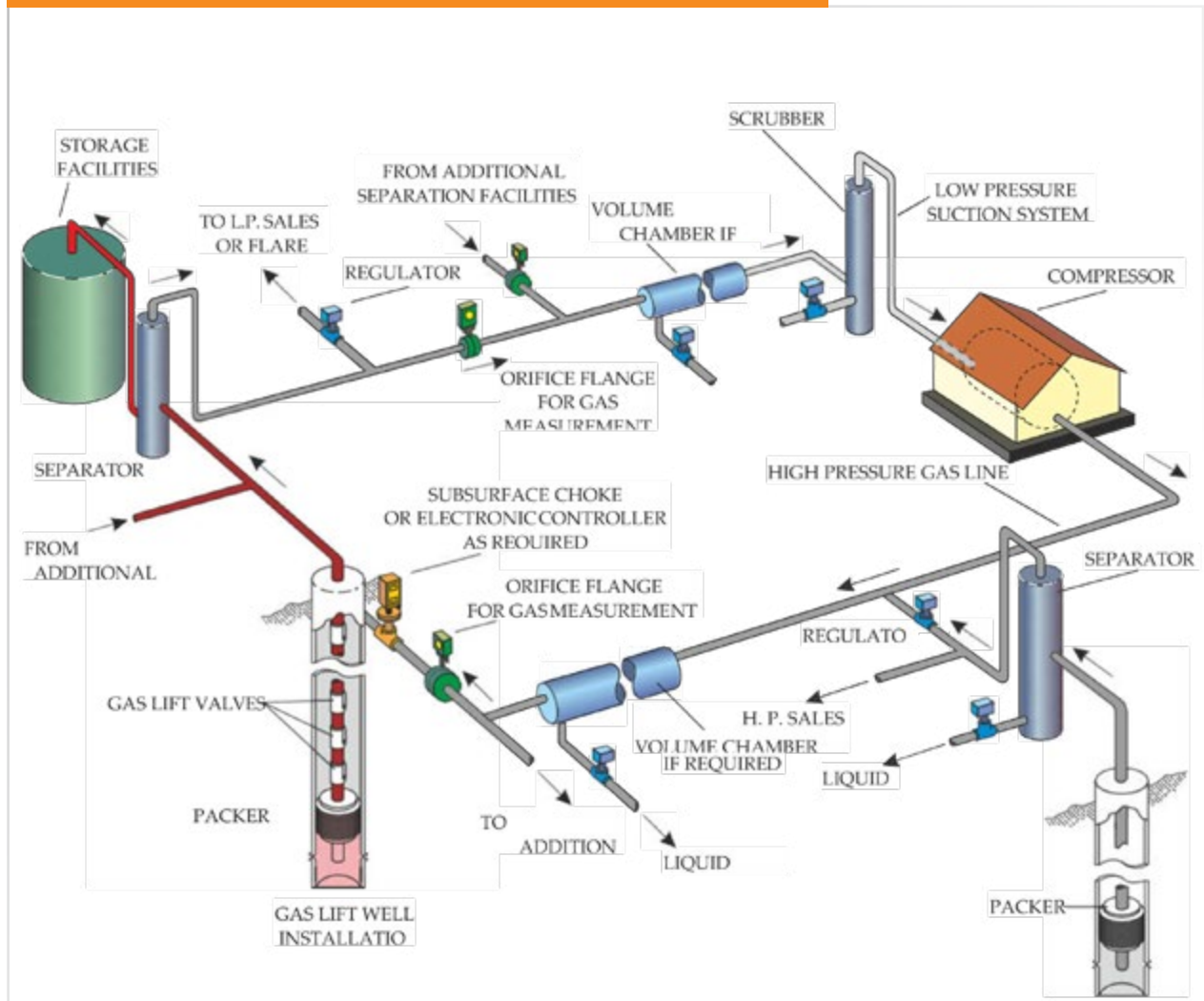
Gas lift Systems

In order to boost production from wells, which do not flow at all or do not flow at optimum level, artificial systems using a variety of methods are used. These methods use Gas Lift, Plunger Lift, Chamber Lift, Rod Pumps, Submersible Pumps and so on.

Which artificial method will be most effective for a particular well can be determined by evaluating several factors such as well's production potential, Gas/Oil ratios, well bore deviation and size as well as corrosion / erosion potential of produced fluids. Other factors include availability of power source such as compressed gas, electricity, surface facility, service availability, space limitation and personnel capabilities.

The diagram below provides the basic components of a Gas Lift System. In many fields, a high pressure well provides a readily available energy source. If sufficient gas pressure or volume is not available, a compressor can be utilized to operate a closed system. The Gas is re-circulated through a compressor facility. Only minor amount of make-up gas is needed to replenish gas lost in separation processing or as fuel for compressor facilities.

BASIC COMPONENTS FOR A GAS LIFT SYSTEM



Injection Pressure Operated Gas Lift Valve

DESCRIPTION

This series of valves utilize a nitrogen charged dome and bellow configuration designed for either continuous or intermittent flow applications. These are especially suitable for use as unloading and operating valves in areas where high gas lift pressures are available. Since the charge pressure above the bellows is affected by temperature, it is important that the operating temperatures at the valve be known. These valves are available in both wireline-retrievable and conventional installations.

BENEFITS

Vibration protected, 3-ply monel bellow are designed to withstand hydrostatic pressure up to 5,000 psi Nitrogen dome charge, acting on the O.D. of the bellow, permits bellows to expand uniformly without stacking, thus prolonging bellow's life. The multiple port size availability makes this valve series appropriate for a wide range of operating conditions. Reversible seat is also available in several different materials.

OPERATING PRINCIPLE

The dome nitrogen charge applied to the external area of the bellows provides the downward force, holding the valve on its seat. This dome pressure is preset at the reference temperature and corrected to operating temperature. The opening forces on the valve are the casing pressure acting on the internal area of the bellows (less the area of the seat) and the tubing pressure acting on the seat area. When the combined casing and tubing pressures are sufficient, the valve opens. Once the valve is open, it remains open until the casing pressure is reduced to the predetermined closing pressure. The spread (the difference between opening and closing casing pressure) is controlled by the tubing sensitivity of the valve. The larger the seat port area, the more tubing sensitive the valve is.

HIGH PRESSURE GAS LIFT VALVE

High Pressure Gas Lift Valve incorporates the concept of piston cylinder in the true sense, which was not present in old Gas Lift Valves available in the market. Below is protected in this new design against deformation and remains not only straight but its coil is also not over stressed against high pressure. Due to this the bellow's life gets increased and valve functions in a predetermined manner.



Orifice Valves

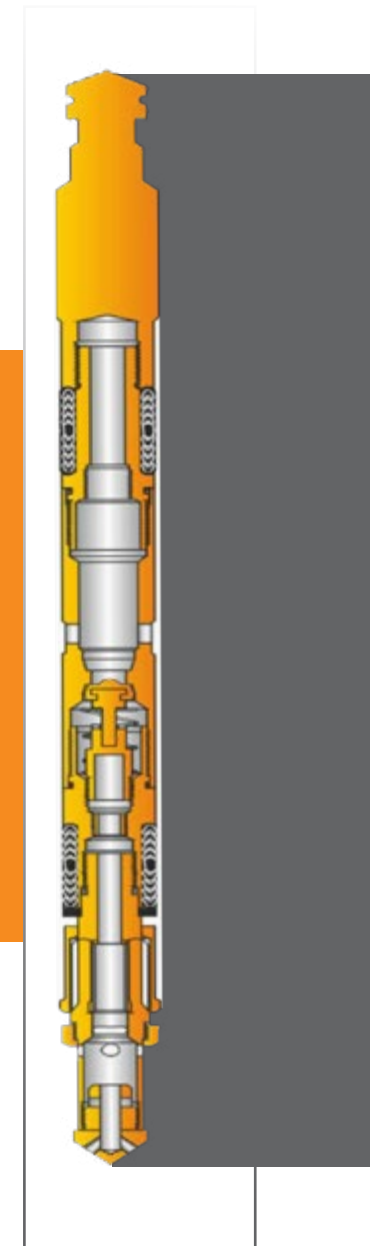
The retrievable single point injection gas lift orifice valves are used for continuous tubing flow gas lift installation. It is used to control the flow of gas between the casing annulus and the tubing at the valve depth. The valve has a check dart controlled by a spring which does not allow the back flow of gas or well fluids. If the injection gas pressure in casing & tubing annulus at the valve depth falls below the fluid tubing pressure, the fluid from tubing will try to flow back through the valve. Reverse flow through the valve is prevented by a check dart in the valve body. The check dart is closed by pressure from the tubing and will not allow passage of fluid until casing pressure is greater or equal than tubing pressure. This valve is available from 1/8" to 3/8" port sizes in 1/16" increments.

BENEFITS OF DESIGN PRINCIPLE

- CV values for each orifice size are determined with ISA procedures to provide accurate sizing for proper injection rates
- Efficiency of back check valve provides large flow capacities. Positive sealing feature of back check valve provides protection from intrusion of production fluids into casing annulus
- Various orifice materials (SS, monel, Inconel, tungsten carbide) available to meet application requirements

Wireline Retrievable Dummy Valve

Wireline retrievable dummy valves have 2 sets of packing which fit in the seal bore of side pocket mandrel and isolate the casing ports between tubing and casing annulus. In another words, the valves are used to prevent communication between the tubing and the casing.



Side Pocket Mandrel

The oval cross section side pocket mandrels are used with the 1" OD & 1.5" OD wireline retrievable gas lift valves. Oval structure reduces section area of the side pocket mandrel. The built-in guide block can assure the precise running & pulling of the wireline retrievable gas lift valve toward the pocket. Unique integral valve pocket improves the reliability, and size of valve pocket is designed according to the requirements of API 11-V1 to fit the standard gas lift valve.

FEATURES

- Equipped with integral pocket
- Various kinds of materials are available to meet customer's different well conditions
- Applicable for standard running & pulling tools for wireline operation



Kickover Tools

Kickover Tools are wireline service tools that are used to install side pocket subsurface control devices into side pocket mandrels, or to retrieve those devices as required. These tools must be used with either a running or a pulling tool. Especially suited for use in highly deviated wells, the K.S.A kickover tool consists of a fishing neck with a threaded pin connection on the upper end, a locating finger, kick springs, an arm assembly with a box thread connection on the lower end for attachment to a running or pulling tool and an arm housing with a nose on the lower end. An upward movement of the tool through the chosen mandrel will position the locating finger in the mandrel orienting sleeve and rotate the tool into alignment with the mandrel pocket. The kick springs then pivot the arm to kick the attached running tool and control device or pulling tool outward, directly above the mandrel pocket. The arm housing protects the arm and attached devices during installation and retrieval. These tools do not incorporate a knuckle joint; therefore one may be installed in the wireline tool string directly above the tool.

'JD' Series Pulling Tool

'JD' Series Pulling Tool is designed to engage external fishing necks on sub-surface devices within the well-bore. K.S.A 'JD' series pulling tools are available with various core lengths to permit retrieval of sub-surface devices with variable length fishing necks. 'JD' series pulling tools are categorized for easy reference; the first letter (J) indicates the pulling tool series, the second letter (D) indicates that downward jarring is required to shear the pin and release the tool. The third letter designates the effective reach, which depends upon the core length:

- "C" being a long core, short reach
- "S" being an intermediate core, medium reach
- "L" being a short core, long reach

Any letter or number following the first three letters indicates a variation of one or more of the following specifications:

maximum OD, core length and pin thread connection.

Most 'JD' series pulling tool cores are threaded to receive a prong, probe or shank.





KHERAD SANAT ARVAND



www.kheradsanat.com
Email: info@kheradsanat.com



KHERAD SANAT

ARVAND

CEMENTING EQUIPMENTS



Home

www.kheradsanat.com
Email: info@kheradsanat.com

Contents

Mechanical Stage Collar.....	PAGE 1
Cement Basket	PAGE 2
Duplex Cement Float Shoe & Collar	PAGE 2
Cement Float Shoe & Collar	PAGE 3
Reamer Shoe	PAGE 4
Standard Cementing Plugs	PAGE 4
Non-Rotating Cementing Plugs	PAGE 4
Welded Bow Centralizer	PAGE 5
Hinged Non Weld Bow Spring Centralizer.....	PAGE 6
Hinged Non Welded Positive Bow Centralizer	PAGE 7
Slip on Welded Bow Spring Centralizer	PAGE 7
Hinged Non Welded Semi Rigid Bow Centralizer.....	PAGE 8
Hinged Welded Semi Rigid Bow Centralizer	PAGE 8
Slip on Welded Semi Rigid Bow Centralizer	PAGE 9
Slip on Heavy Duty Welded Positive Spirolizer.....	PAGE 9
Roller Centralizers.....	PAGE 10
Hinged Set Screw Stop Collar.....	PAGE 10
Slip on set Screw Stop Collar.....	PAGE 10

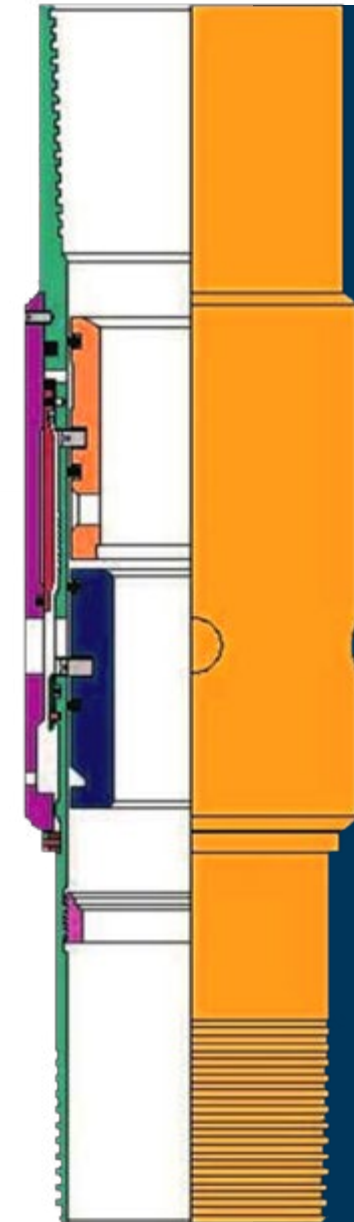
Mechanical Stage Collar

The Stage Cementing Collar is used to cement casing in two or more stages and allows operators greater flexibility in controlling flow rheology, cement chemistry, and down-hole hydrostatic pressures. Typically, the Stage Collar is used where a single stage cement job would result in breakdown of a weak formation causing cement losses and /or contamination of the producing zone.

FEATURES

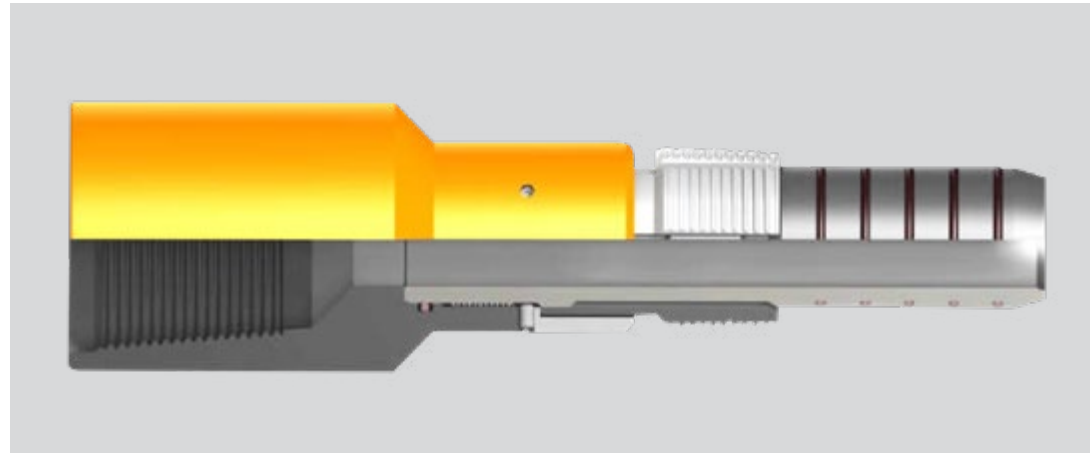
- Strong one-piece body construction
- Protected closing sleeve
- Inner sleeves locked against rotation
- Full, smooth bore after drill out

Tool Size	Opening Pressure (Psi)	Closing Pressure (Psi)
3-1/2" to 5-1/2"	700 – 1,000	1,500
6-5/8" to 10-3/4"	700 – 1,000	1,200
11-3/4" to 13-3/8"	700 – 1,000	1,000
16" to 20"	400 - 700	800



Cement Basket

Cement baskets protect weak formations from hydrostatic pressures exerted by the weight of cement columns. Baskets are run above weak formations on casing, tubing, and liner strings and can be used in single stage or multistage cement jobs. Each basket is made of a high-strength metal and features overlapping fins to provide maximum flexibility and fluid passage while maintaining optimum support. Cement baskets are available in latch-on or slip-on configurations and should be installed over stop collars to prevent axial movement.



DUPLEX CEMENT FLOAT SHOE & COLLAR

Duplex Shoes and Collars sizes 7 5/8" to 30" are furnished with heavy duty duplex connection. This heavy duty connection has the left hand threads and is capable of carrying 100,000 lbs.

The Tubing Seal Nipple has field proven Chevron Seals for positive sealing of the nipple in the seal bore. The Tubing Seal Nipple features an expandable left hand latch mechanism, allow the nipple to be "stabbed" into the duplex connection, and when up-strain is applied the latch is expanded to provide full engagement in duplex assembly. The nipple is released by rotating to the right unscrewing the latch mechanism of the duplex connection.

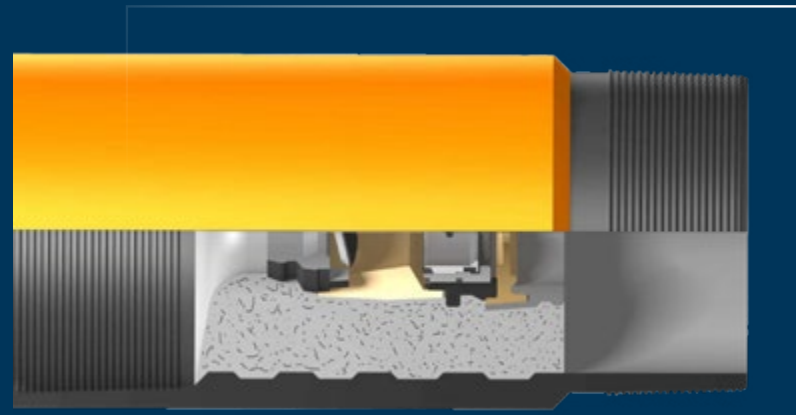
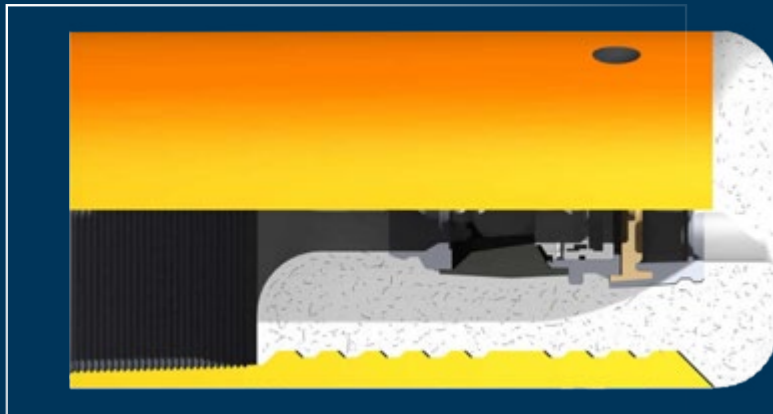
- Dual-poppet design provides operational redundancy to enhance wellbore safety and protect reservoir productivity
- Durable and versatile sand control assembly nose prevents entry of sand and formation material into the sand control assembly.

Cement Float Shoe & Collar

Cement ball-type Float Equipment offers dependable performance for all classes of oil and gas wells. The valves prevent cement back-flow, provide casing buoyancy during run-in, and act as internal BOPs during the process of running and cementing the casing. Float equipment is manufactured to match customer casing specifications. All ball type Cement Float Shoes and Float Collars are PDC drillable.

BENEFITS / FEATURES:

- Fast drill-out
- No metal parts-will not damage PDC bits
- Free-floating ball abrades evenly
- Operator controlled buoyancy-regulated by filling casing at surface
- No springs
- Cost effective



Reamer Shoe

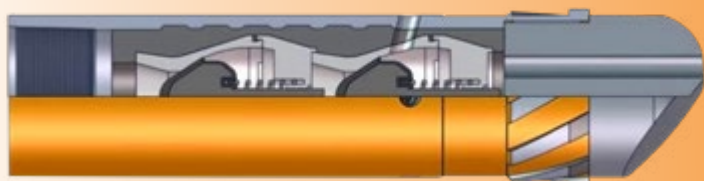
The Reamer Shoe is a kind of casing shoe, which is used to overcome the impede force of well and guide the casing or liner to presetting depth. The eccentric design of reamer shoe lead head can go through the convex effectively. The milling blade outside can modify the well. It can compate with all the casing or liner hanger system, and respond effectively to the down-hole known or unpredictable problems in running casing or liner.

FEATURES

- Valve made from phenolic material
- Single flow valve, effectively prevent the reverse flow of cement slurry
- Spring loaded plunger valve
- Large flow area
- High strength concrete
- Optional upward or downward facing jets

BENEFITS

- Aluminum lead head, Rock bit & PDC bit drillable
- Rigid gauge block with diamond cutting edge, for rigid on the casing or liner and centralizer when removing obstacles



Standard Cementing Plugs

K.S.A's Standard Bottom Cementing Plug wipes the casing clean of drilling mud, separating fluids, and prevents cement contamination. Standard Top Cementing Plug is the cement displacement plug. These cementing plugs have a phenolic core and are designed to be drilled out with PDC (Polycrystalline Diamond Compact) drill bits.

NON-ROTATING CEMENTING PLUGS

Non-Rotating Top Cementing Plugs and Non-Rotating Bottom Cementing Plugs are phenolic cored with integral teeth designed to prevent rotation of the plugs during drill out operations. The plugs can be drilled with either Tri-Cone or PDC drill bits.

Features:

- Phenolic core offers faster drill out than aluminum core plugs
- Wiping and sealing fins are designed to allow for proper wiping and sealing
- The standard wiping and sealing fins are moulded from Natural Rubber (Intermittent Service Temperature: -65 to 180°F)
- Hydrogenated Nitrile Butadiene Rubber (HNBR) (Intermittent Service Temperature: -40 to 300°F) is a high temperature option. Note: All HNBR Cementing Plugs (Top and Bottom) are black in color
- Differential pressure of up to 5,000 psi (size dependent)
- The bottom plug has a diaphragm rupture rating of 200-500 psi
- The plugs are designed to fit in most cementing heads
- The Non-Rotating plugs offer up to 95% reduction in drill out times can be achieved when compared to plugs without non-rotating features
- The Non-Rotating plugs are designed to fit in conventional cementing heads and can be run with any conventional Top-Co float equipment with a non-rotating plate in-stalled at time of manufacture



Welded Bow Centralizer

INTRODUCTION

The hinged welded bow centralizer is the standard welded centralizer for casing-hole size combination and it is a high quality welded product that meets or exceeds API specification 10D requirements. It offers a choice of different bow heights, available for any casing/open hole configuration. The end collars are available as latch-on or slip-on

FEATURES

- Rigid design: End bands are equipped with ribs to provide rigidity to the bands
- Integral hinge: Folded to the inside of the end bands so that, once installed, it won't unfold even under extreme condition
- Self-Locking Hinge Pins: Equipped with a positive safety locking device
- Clearance: Since bow springs are attached to the OD of the end collars, the centralizers may be installed over stop collars or casing collars



Size	Spring	Spring OD (in)	Buckle ID (in)	Total Length
4-1/2" x 6"	4	6.299	4.600	17.717
4-1/2" x 6-1/4"	4	6.575	4.600	17.717
4-1/2" x 7-7/8"	4	8.268	4.600	17.717
4-1/2" x 8-1/2"	4	9.055	4.600	17.717
5" x 6"	4	6.299	5.100	17.717
5" x 6-3/4"	4	7.087	5.100	17.717
5" x 7-7/8"	4	8.268	5.100	21.850
5-1/2" x 7-7/8"	5	8.268	5.610	21.850
5-1/2" x 8-1/2"	5	8.504	5.610	21.850
5-1/2" x 8-3/4"	5	8.740	5.610	21.850
5-1/2" x 9-7/8"	5	9.882	5.610	21.850
5-1/2" x 9-1/2"	5	9.528	5.610	21.850
6-5/8" x 8-1/2"	6	9.055	6.735	21.850
7" x 8-1/2"	6	9.055	7.120	21.850
7" x 8-3/4"	6	8.740	7.120	21.850
7" x 9-1/2"	6	9.528	7.120	21.850
7" x 9-7/8"	6	9.882	7.120	21.850
9-5/8" x 12-1/4"	8	12.583	9.755	22.047
9-5/8" x 13-3/8"	8	13.622	9.755	22.441
10-3/4" x 15-1/2"	9	15.945	10.950	22.441
13-3/8" x 17-1/2"	12	17.520	13.575	22.441
13-5/8" x 18"	12	17.480	13.575	22.441
20" x 26"	16	27.402	20.210	24.016

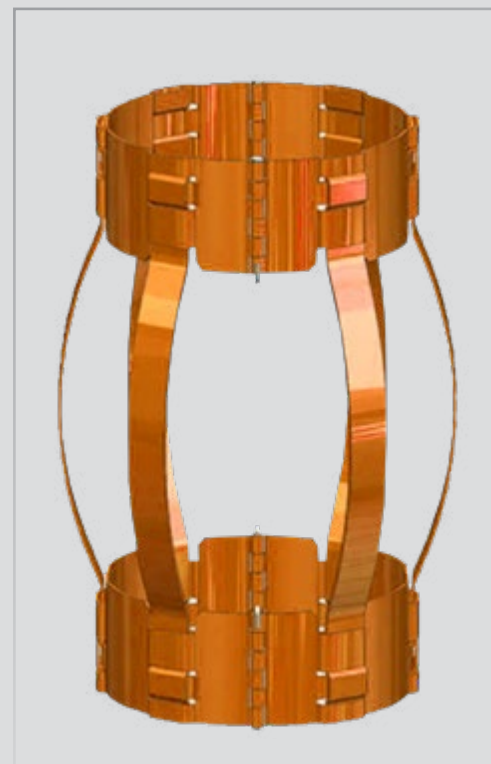
Hinged Non Weld Bow Spring Centralizer

The Standard 'Bow Spring' range are hinged non-welded bow-spring centralizers designed to centralize in less demanding well-bore applications where rotation is not a requirement. The hinge allows the centralizer to be fitted on larger bore casing where weld on connectors do not allow for a slip-on unit to be installed

FEATURES

- API certified – engineered and tested to exceed API-10D
- Low insertion & running forces
- High restoring forces
- Suitable for passing through wellbore / cased hole restrictions
- High quality spring steel grade

Size	13-3/8" x 17-1/2"	9-7/8" x 12-1/4"	9-5/8" x 12-1/4"	7" x 8-1/2"	4-1/2" x 6"
Material	According to the customer's requirements				
OD (in)	18.35	12.05	13.62	9.06	6.50
ID (in)	13.39	9.76	9.65	7.17	4.65
Length (in)	25.59	25	25.59	23.62	23.62
Connection	Hinge Joint				
Number of springs	10	8	8	6	6



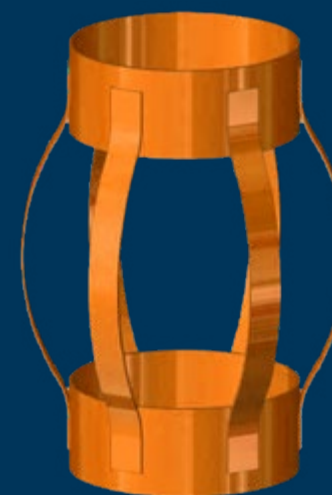
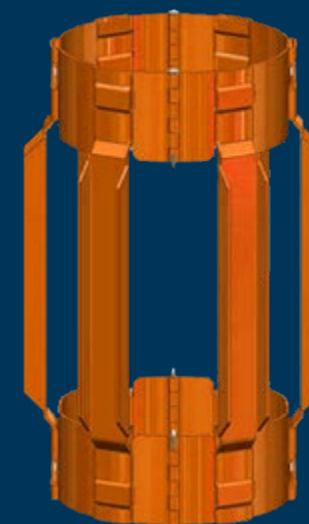
■ Hinged Non Welded Positive Bow Centralizer

It has been designed for positive centralization of casing pipe for highly deviated and horizontal wells fitted with specially designed U shaped bows for maximum fluid flow but retaining required rigidity for 100% standoff even in deviated & horizontal wells. Bows are of high quality alloy steel for consistent characteristics.

Compatibility of the bows with various end collar sizes reduce inventory requirements and provides tremendous flexibility of casing and hole size combinations. These centralizers undergo a special Iron Phosphate coating process to prevent from Rust then coated with special Polyester Powder. They are available in all sizes ranging from 3½" to 20".

■ Slip on Welded Bow Spring Centralizer

- Notched Collar design allows for a smaller minimum compressed OD of the bows required in close tolerance applications.
- Recommended for use with Slip on set screw Stop Collars
- Also available with integral set screws on stop collar



Hinged Non Welded Semi Rigid Bow Centralizer

Hinged Non Weld Semi-rigid bow centralizer withstands high lateral loads and is specially designed with a double bow profile, this design increases contact area for less bow penetration into the formation and aids in complete mud removal while cementing. Semi-Rigid Centralizers have the ability to withstand high lateral load encountered and High efficiency in casing jobs on Deviated and Horizontal wells.

FEATURES

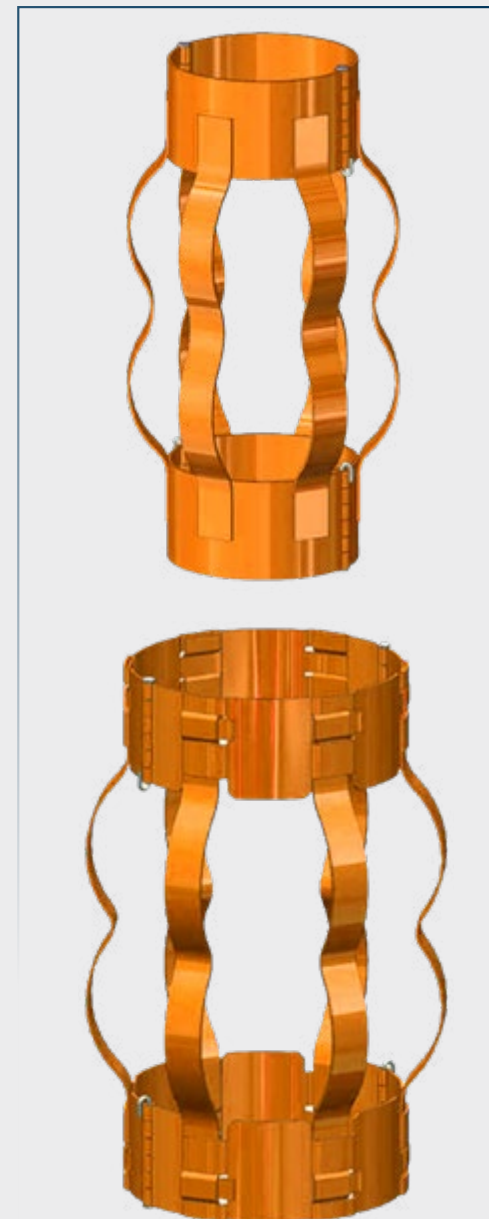
- It has high Restoring force and high Stand Off with low Running Force.
- Special Iron Phosphate coating process to prevent from Rust and insures stocking in the open for a long time.
- These are shipped in half assembled condition for economical in freight and storage costs.
- Supplied with stop collar and hinge pin.

Hinged Welded Semi Rigid Bow Centralizer

Hinged Welded Semi Rigid Centralizer ensures high efficiency in casing. Welded Centralizer has more Restoring Force as compare to Non Weld Centralizer. The Centralizers have double crested Bow Spring strongly welded to the End Collar under required temperature.

FEATURES

- It has high Restoring force and high Stand Off with low Running Force.
- Special Iron Phosphate coating process to prevent from Rust and insures stocking in the open for a long time.
- These are shipped in half assembled condition for economical in freight and storage costs.
- Supplied with stop collar and hinge pin.



Slip on Welded Semi Rigid Bow Centralizer

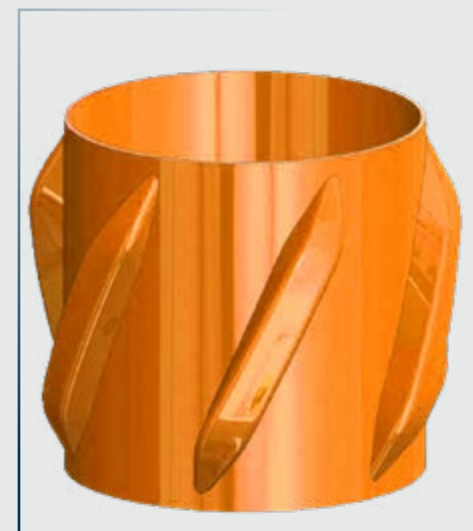
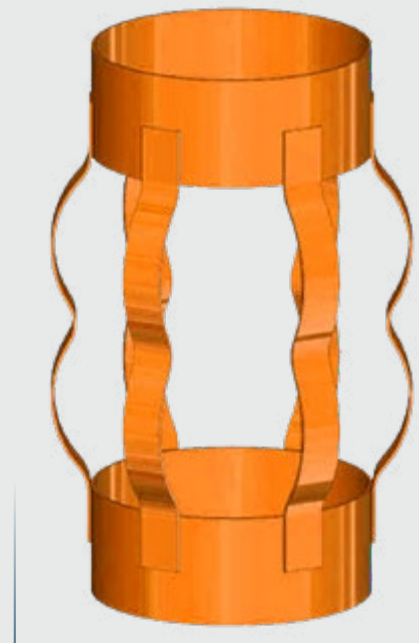
Slip On Welded Semi-Rigid Centralizers share many of the same design and operational features as Hinged Welded Centralizers. They can be directly installed onto pipe and are provided with set screw style Stop Collars to increase the holding force. The Collars are innovatively designed with roll formed peripheral ridges that provide extra rigidity. The Centralizers are available in a variety of Bows configured from a choice of four standard Bow heights.

Slip on Heavy Duty Welded Positive Spirolizer

Solid Rigid Centralizer is specially designed to minimize unwanted removal of well cake and to run the casing easily. It is ideal for highly deviated or horizontal wells. In other words, it is absolutely appropriate for Liner Hanger. These centralizers are made shock resistance and with optimum tensile and yield strength. Both types of solid rigid centralizer are available here: 'Straight Blade' and 'Spiral'. By running on the casing OD, they are used to centralize the casing. These centralizers are designed in such a way that it reduces the amount of friction created between hole and the casing.

FEATURES

- Hollow steel blades with a rounded smooth profile
- All steel design can withstand severe wellbore conditions.
- Can be used in well where casing reciprocation and/or rotation is required.
- Available with or without set screws.
- Available in right or straight vane orientation.



Roller Centralizers

Roller centralizers are mainly used for high deviated wells and horizontal wells to center casings. Roller Centralizers can also remove wellbore cake and improve mud replacement efficiency. Roller Centralizers provide superior wear resistance and have been proven to remain functional throughout the life of the well and can aid in casing/tubing retrieval.

FEATURES

- Reducing the friction resistance
- Increased casing depth
- Ensure the casing centered
- Improving liquid flow characteristics
- Improve grouting condition
- Improve grouting condition

Hinged Set Screw Stop Collar

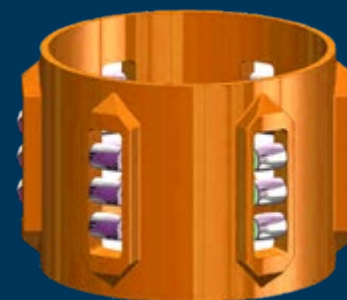
Designed to be latched on to the casing with set screws providing additional holding force This Stop Collar Offers superior holding capability with easy to install features. Easy installation with Allen wrench utilized in most cased and open-hole applications. Superior holding performance for most conditions

FEATURES

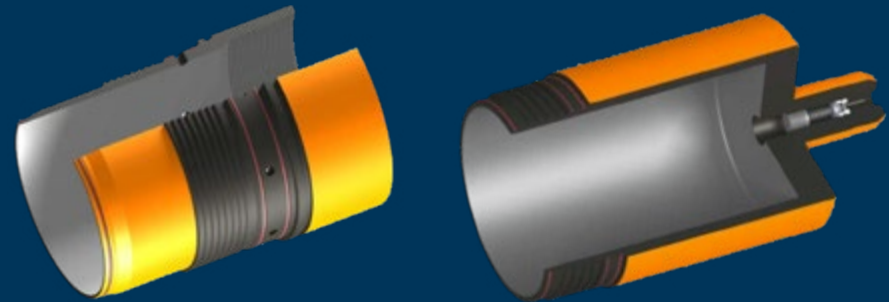
- Easily installed to casing
- Friction stop collar are used adequately when the condition of the well is normal.
- Used for increasing holding force. It is first places and centered on the pipe. Then through the open hinge, a nail is installed, followed by tightening the set screw uniformly.
- Used for increasing holding force. It is first places and centered on the pipe. Then through the open hinge, a nail is installed, followed by tightening the set screw uniformly.

Slip on set Screw Stop Collar

- Installed with set screws
- Designed for use where higher holding forces are required
- Easy Installation that can be achieved using an Allen wrench
- Onto the end of casing, slip-on set-screw stop collar is slipped to the desired location, up to the top of the joint
- Slip-on set-screw stop collar are then tightened around 35 ft-lb
- The force that slip-on set-screw stop collar can hold is up to 20,000 lb
- These are specifically designed for the installation of cement baskets and different designed centralizers as well as for close-tolerance liner jobs and are available in all casing sizes



MUD LINE SUSPENSION EQUIPMENTS



www.kheradsanat.com
Email: info@kheradsanat.com

Home

Contents

Introduction	PAGE 1
Conductor Landing Ring.....	PAGE 2
Casing Running Phase.....	PAGE 3-4
Running/TieBack Tool.....	PAGE 5
Corrosion Caps.....	PAGE 6
Corrosion Cap Running Tool.....	PAGE 7
Casing Tieback Phase	PAGE 8
Strengths & Dimensions	PAGE 9
Conductor Pipe.....	PAGE 10

Home

Introduction

K.S.A's Mudline Suspension System is a series of casing hangers that support the weight of each casing string at or near the mudline. Designed for use with bottom-supported drilling vessels and platforms, the system allows disconnect from and reconnect to the well at the mudline.

OVERVIEW

- Designed for high-capacity casing hang-off loads and high-pressure STD and H2S wells
- Features a series of hangers with landing/load rings positioned on load shoulders
- Transfers the weight of each casing string to conductor and seabed while drilling from a jack-up rig
- Applicable for exploratory wells and numerous development wells

FEATURES

- Stack-down system configuration eliminates debris traps and provides washout point below previous sealing area
- Fluted or drilled load rings on the initial casing strings with expanded load rings on smaller diameters
- High casing hang-off load capacity, allowing operators to run casings to deeper depths
- Metal-to-metal sealing on both running and tieback tools to seal against high pressures and retains seal integrity
- Separate running and tieback threads are protected during drilling and temporary abandonment
- Large flow-by areas for maximum cementing circulation
- Generous washout ports in the running tool, eliminating tool contamination
- Long lead-in stab guidance
- Design allows for self-alignment and easy stabbing
- Working pressure up to 10,000 psi for STD and H2S applications
- Standard casing configuration:
30" x 20" x 13 3/8" x 9 5/8"
26" x 18 5/8" x 13 3/8" x 10 3/4" x 7" (OPTIONAL)

BENEFITS

- Improves reliability and efficiency of tieback operations
- Transfers weight of the well to the seabed
- Ideal for exploratory wells
- Allows for quick disconnection without need to cut casings
- Minimizes tool contamination and corrosion
- Accommodates deeper depths



The standard set of system consists of the following equipment's:

Conductor Landing Ring

The conductor landing ring has an internal 45° landing shoulder profile designed to support the next mudline hanger. This ring is welded into the joint of casing and is positioned in the string so as to land at the appropriate position relative to the mudline.



LANDING RING DATA	
SIZE	30"
MATERIAL	80 KSI
MAXIMUM OD	30.03"
MINIMUM ID	26.110"
MAXIMUM BIT SIZE	26"

Casing Running Phase

Mudline Casing Hanger

The 20" casing hanger is equipped with an external load ring that lands on the 45° shoulder provided in the 30" landing ring. The top connection is a one pitch left hand beveled square thread provided to receive the standard running/tieback tool or the optional latch and lock tieback tool. The external load ring is, in most cases, designed to be removable. If, after jetting or driving the initial conductor string into place, the landing ring is not positioned at or below at the mudline, the load ring can be removed from the casing hanger. This will allow the 20" hanger to be set at the appropriate depth. The internal profile of the 20" casing hanger has a 45° load shoulder for the 13-318" casing hanger.

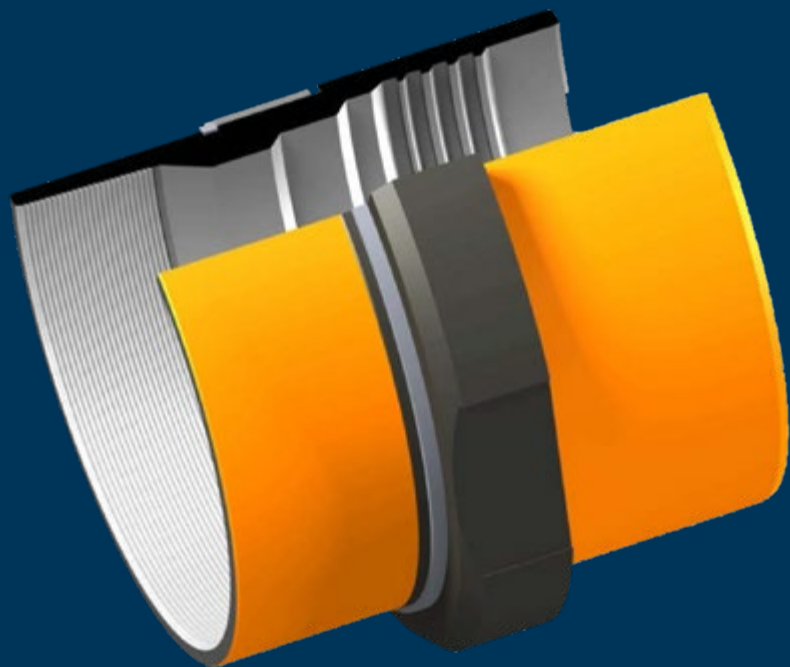
The 13-3/8" hanger is equipped with an external removable fluted load ring that lands on a 45° shoulder provided in the 20" casing hanger. The internal profile of the casing hanger has a serpentine collet landing profile for the 9-518" casing hanger. The top connection is a two-pitch modified left hand beveled square thread, to receive the running tool. The lower top connection is a three-pitch modified right hand beveled square thread to receive the tieback tool.

The 9-5/8" & 7" hanger is equipped with a serpentine collet-type landing ring and engages the mating profile on the preceding hanger. The hanger is slotted to provide flowby. The top box connection is a two-pitch modified left hand beveled square thread for engaging the running tool. The internal diameter of casing hanger can be smooth bore or including internal collet landing profile for the 7" casing hanger as extra option.

The bottom connection in all size will be a casing thread box designed to meet customer requirements.

- No springs
- Cost effective

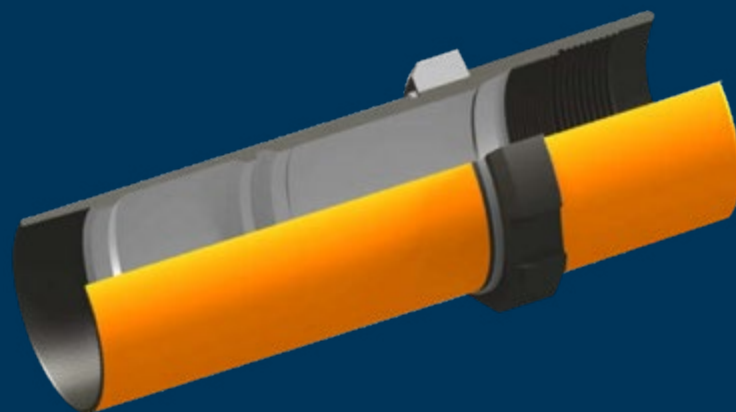
CASING HANGER DATA				
SIZE	20"	13-3/8"	9-5/8"	7"
TYPE	LOAD SHOULDER	LOAD SHOULDER	COLLET	COLLET
SERVICE	STANDARD	H2S	H2S	H2S
MAXIMUM OD	27.220"	18.542"	13.225"	8.473"
MINIMUM ID	17.599"	12.318"	8.568"	6.068"
MAXIMUM BIT SIZE	17-1/2"	12-1/4"	8-1/2"	6"
PRESSURE RATING	1,500 PSI	5,000 PSI	10,000 PSI	10,000 PSI
CAPACITIES & FLOW BY WHEN USED INSIDE CASING HANGER				
RUNNING CAPACITY	2,260,000 LBS	1,170,000 LBS	870,000 LBS	510,000 LBS
HANGING CAPACITY	2,900,000 LBS	1,490,000 LBS	1,140,000 LBS	510,000 LBS
FLOWBY RUNNING	32 SQ. IN.	20 SQ. IN.	4 SQ. IN.	4 SQ. IN.
FLOWBY LANDED	12 SQ. IN.	16 SQ. IN.	7 SQ. IN.	4 SQ. IN.



20" CASING HANGER



9-5/8" & 7" CASING HANGER



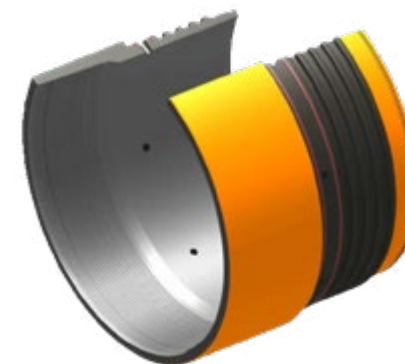
13-3/8" CASING HANGER

Running / Tieback Tool

The 20" tool has a one-pitch modified left hand beveled square thread pin down with a casing thread box up per customer requirements. The tool uses elastomer seals and includes ports for annulus washout.

The running & tieback tools for the size range of 7" to 13-3/8" are two distinct tools. The running tool has a two-pitch modified left hand beveled square thread pin down with a customer specified casing thread box up. It uses elastomer seals and has wash ports for annulus washout.

RUNNING TOOL DATA				
SIZE	20"	13-3/8"	9-5/8"	7"
SERVICE	STANDARD	H2S	H2S	H2S
MAXIMUM OD	21.510"	14.780"	11.280"	7.800"
MINIMUM ID	18.720"	12.410"	8.568"	6.068"
MAXIMUM BIT SIZE	17-1/2"	12-1/4"	8-1/2"	6"
PRESSURE RATING	1,500 PSI	5,000 PSI	10,000 PSI	10,000 PSI
AXIAL CAPACITY	2,260,000 LBS	1,170,000 LBS	870,000 LBS	510,000 LBS
THREAD TYPE	LEFT HAND – 1TPI	LEFT HAND – 2 TPI	LEFT HAND – 2 TPI	LEFT HAND – 2 TPI
NUMBER OF TURNS TO MAKE-UP	3 to 3-1/2	7 to 8	7 to 8	6 to 7
RECOMMENDED MAKE-UP TORQUE	1,500 – 2,500 Ft-Lbs	1,500 – 2,500 Ft-Lbs	1,500 – 2,500 Ft-Lbs	2,500 – 4,000 Ft-Lbs
NUMBER OF TURNS TO OPEN WASH PORTS	1-1/2	3-1/2 TO 4	3-1/2 TO 4	N/A



20" RUNNING / TIEBACK



7" – 13-3/8" RUNNING TOOL

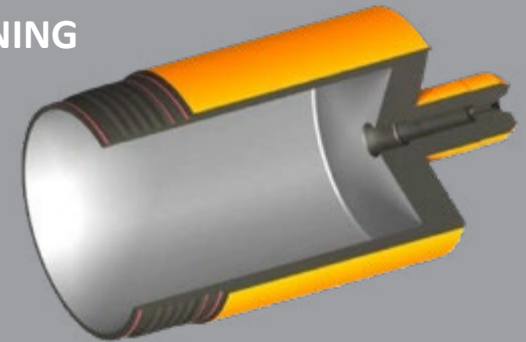
Corrosion Caps

Mudline corrosion caps provide protection for hanger threads, seal areas, and offer pressure containment when the check valve is installed in the stem (size 9-5/8" & 7" only). The corrosion cap makes up into the left hand running threads in the hanger and has elastomer seals above and below the threads. The corrosion cap running tool opens the check valve preventing pressure lock when installing the corrosion cap in the casing hanger.

PRESSURE CONTAINING



NON-PRESSURE CONTAINING

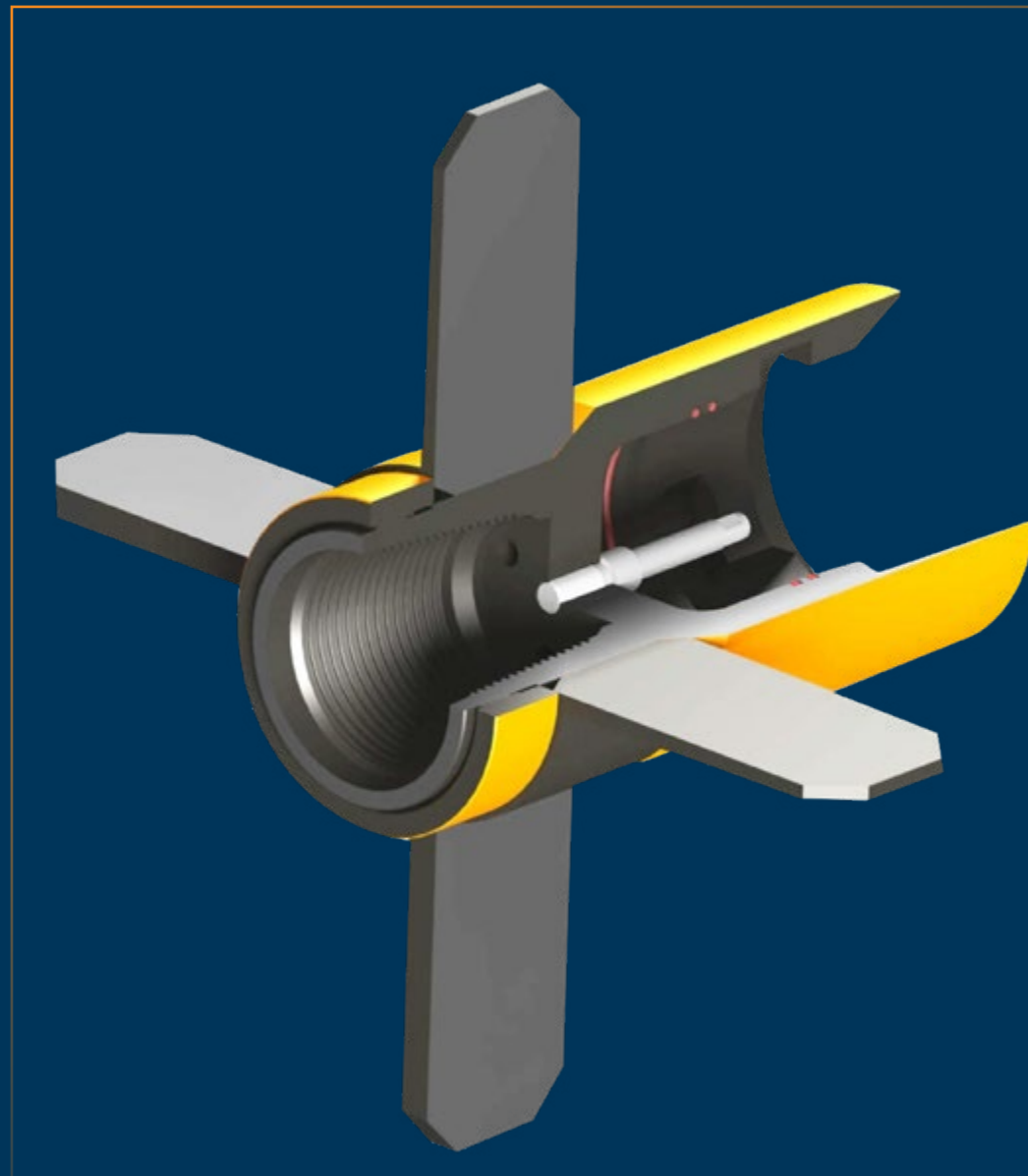


CORROSION CAP DATA				
SIZE	20"	13-3/8"	9-5/8"	7"
SERVICE	STANDARD	H2S	H2S	H2S
MAXIMUM OD	21.280"	14.780"	11.280"	7.840"
PRESSURE RATING	N/A	N/A	10,000 PSI	10,000 PSI
THREAD TYPE	LEFT HAND – 1TPI	LEFT HAND – 2 TPI	LEFT HAND – 2 TPI	LEFT HAND – 2 TPI
NUMBER OF TURNS TO MAKE-UP	3 to 3-1/2	7 to 8	7 to 8	6 to 7
RECOMMENDED MAKE-UP TORQUE	1,500 – 2,500 Ft-Lbs	1,500 – 2,500 Ft-Lbs	1,500 – 2,500 Ft-Lbs	2,500 – 4,000 Ft-Lbs

Corrosion Cap Running Tool

The mudline corrosion cap running tool is a drill pipe "overshot" device with a drill pipe box up and a cylinder bottom. Internal J-slots engage the drive pins on the mudline corrosion cap with a right hand rotation. An internal stinger, located inside the bottom of the tool, engages with and opens the corrosion cap check valve, if installed, as the running tool sets down over the corrosion cap stem. In the bore of the running tool are elastomer seals which provide a seal between the running tool and corrosion cap stem when the running tool is stabbed over the mandrel.

In addition, there is different size of the centralizer rings to make sure the alignment of the top of the corrosion cap and the running tool in the engagement process, which is vary according to the size of the casing.



CASING TIEBACK PHASE

TieBack Tool

The stack-down configuration and unique design features of the Mudline Suspension System make it an excellent choice for production wells. The K.S.A's Tie-Back Tools reconnect the mudline hanger to the surface for completion. For subsea completion, the tools tie the well back to a tubing head.

Centralizing shoulders on each hanger body help establish concentricity around the centerline of the well. Centralized tie-back tools incorporate an alignment profile that forces full alignment between the tool and the hanger body prior to any thread engagement. The Stab-In Tie-Back Tool offers a simple, weight-set design that provides an easy way to tie back to the well when platform misalignment is a problem. It includes a threaded split lock ring that engages the tie-back threads in the top of each mudline hanger.

SYSTEM FEATURES

- Fully aligned prior to make-up
- System stacks down to fully expose tie-back threads
- High pressure containment provided by metal-to-metal primary seal and resilient backup seals
- Sized to match each mudline casing hanger
- Threaded tie-back tool makes up with just six right-hand turns for metal-to-metal seal with resilient backup
- Stab-in tie-back tool's resilient seals are weight set; metal-to-metal seals energize with ½ to 1 right-hand rotations
- Tie-back threads and sealing areas are unused and protected during drilling
- Hangers have left-hand running threads, right-hand tie-back threads
- All strings tie back using right-hand rotation



TIEBACK TOOL DATA				
SIZE	20"	13-3/8"	9-5/8"	7"
SERVICE	STANDARD	H2S	H2S	H2S
MAX OD	21.510"	14.760"	11.260"	8.465"
MIN ID	18.720"	12.400"	8.583"	6.068"
MAX BIT SIZE	17-1/2"	12-1/4"	8-1/2"	6"
PRESSURE RATING	1,500 PSI	5,000 PSI	10,000 PSI	10,000 PSI
HANGING CAPACITY	2,260,000 LBS	900,000 LBS	750,000 LBS	510,000 LBS
THREAD TYPE	LEFT HAND – 1TPI	RIGHT HAND – 3 TPI	RIGHT HAND – 3 TPI	RIGHT HAND – 3 TPI
NUMBER OF TURNS TO MAKE-UP	3 to 3-1/2	9-1/2 to 10-1/2	9-1/2 to 10-1/2	7 to 8
RECOMMENDED MAKE-UP TORQUE	1,500 – 2,500 Ft-Lbs	2,500 – 4,000 Ft-Lbs	2,500 – 4,000 Ft-Lbs	2,500 – 4,000 Ft-Lbs

Strengths & Dimensions

K.S.A manufactures and stocks a wide variety of mudline suspension systems to match most casing programs. The typical casing programs are as counted below:

- 30" x 20" x 13-3/8" x 95/8" x 7 "
- 30" x 16" x 10-3/4" x 7-5/8" (or 7")
- 30" x 13-3/8" x 9-5/8" x 7" (21-1/4" BOP)
- 36" x 26" x 20" x 13-3/8" x 9-5/8" x 7"
- 36" x 24" x 18-5/8" x 13-3/8" x 9-5/8" x 7"

For any further program which is not found in the casing programs mentioned above, please contact to the engineering affairs of K.S.A Co.

Conductor Pipe

The Conductor Pipe is a large diameter pipe that is set into the ground to provide the initial stable structural foundation for a borehole or oil well. Conductor pipe's purpose is to protect shallow sands from being contaminated by drilling fluids, and to help prevent washouts (which occur near the surface due to loose and unconsolidated top soils, gravel beds, etc.)

In the offshore drilling industry, the conductor pipe is set in the seabed, and is a key structural foundation for the subsea wellhead. When drilling an offshore well, a marine riser is connected to the well, and this is subjected to large environmental forces such as current and waves which are transferred to the conductor. The forces can be large and also cyclical which can potentially cause fatigue damage to the conductor, especially in harsh environmental conditions.



**Automatic Metal Powder
Welding Machine**

