CME Product Catalog

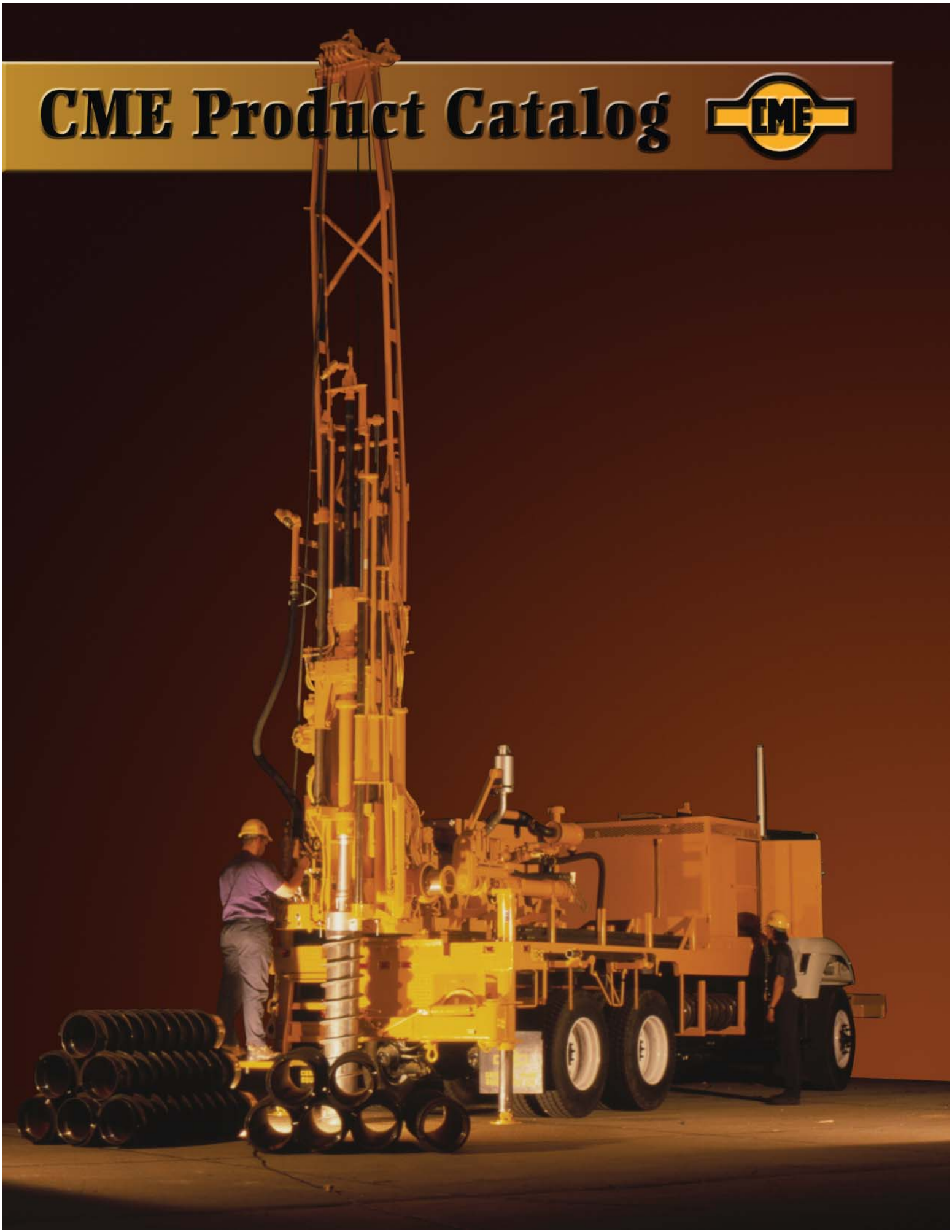


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Central Mine Equipment Company was founded in St Louis, Missouri in 1928. Our initial product line included augers, cutters and related accessories for the coal mining industry. In 1962, we introduced our first drill rig, the CME-55.

Today, we design and manufacture a complete line of drilling equipment for the geotechnical, environmental, mineral exploration, and construction industries. We also build a complete line of hollow-stem and continuous flight augers, auger accessories, sampling systems, and all-terrain and rough-terrain carriers.

In addition to our line of quality-manufactured products, CME is a leading provider of tools, equipment, and supplies for core and rotary drilling, soil sampling, and ground water monitoring.

The key to our success has been product innovation and service after the sale. Central Mine Equipment Company holds patents covering everything from auger connections and sampling systems to drill rig safety features, including an emergency spindle brake that can stop rotation in less than a revolution. This system is standard on all CME drill rigs.

In order to best serve the needs of our customers, all manufacturing, warehouse, and office operations are consolidated at our 210,000 square foot, state-of-the art facility located in St. Louis, Missouri.







Central Mine Equipment Company
4215 Rider Trail North • Earth City, MO 63045 • Ph: 314.291.7700 • 800.325.8827 • Fax: 314.291.4880
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Safety...it's a habit you can live with

Performance ratings are based on engineering specifications, calculations and accepted industry standards. Capacities may vary according to drilling conditions.
CME reserves the right to amend these specifications at any time, without notice.
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Drill Rigs



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Truck, Trailer, and Skid Mounted Drills



CME-45C

This is one of our most versatile drill rigs, It can be mounted on a truck, trailer, skid, ATV or the CME-300 tracked carrier. It can even be helicopter-portable. A skid/trailer configuration is also available. This application gives you two options. You can use the drill as a conventional trailer mounted unit, or you can easily remove the drill from the trailer and skid it up or down steep slopes, or through narrow openings.

The CME-45C has the same drilling capabilities as the CME-45B but can also be equipped for angle drilling.





CME-45B

The CME-45B is an economical, efficient drill that can be mounted on a truck, trailer or ATV carrier. Power is provided by a deck mounted diesel engine. Available optional equipment includes in-out and sideways slide bases, automatic SPT hammer, direct push hammer, hydraulic rod holder and breakout wrench, cathead, water tank, a variety of hydraulic hoists, and much more.

The CME-45B will drill holes up to 13 inches (33 cm) in diameter using conventional or hollow-stem augers.



CME-55

The CME-55 has been the standard of its class for over 40 years. It can be mounted on a truck, trailer, ATV, or the CME-300 tracked carrier. A low-clearance model is also available that allows you to drill under service station canopies or other overhead obstructions.

With 28,275 pounds (12,826 kg) of retract force and up to 9,400 foot pounds (12,784 Nm) of rotary torque, the CME-55 is capable of drilling holes up to 14.75 inches (32.5 cm) in diameter using conventional or hollow-stem augers. Fast retract is now standard.



CME-75

The CME-75 has earned a reputation second to none for outstanding performance and reliability. It can be mounted on a single or tandem rear axle truck or ATV carrier.

Fast retract rates mean quick cycle times when adding augers or tripping out of the hole.

The dependable mechanical rotary drive is available with up to 12,950 foot pounds (17,612 Nm) of torque for auger drilling holes up to 18.5 inches (47 cm) in diameter.

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4215 Rider Trail North • Earth City, MO 63045 • Ph: 314.291.7700 • 800.325.8827 • Fax: 314.291.4880
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CME-85

This rig has big power. And it was built to handle that power. There are no compromises. Everything is heavy-duty. The right angle drive, the rotary box, the frame, every component was specifically designed to take the forces this drill can produce, and then some.

Like all CME drills, the CME-85 is designed with many features for easy operation. A patented hydraulic kelly bar lift system, for instance, makes coupling and uncoupling the kelly bar to the right angle drive virtually effortless.

The transmission has six forward gears so there's a rotation speed and torque combination for just about any situation, from large diameter auger drilling to deep rotary jobs. With 22,900 foot pounds (31,144 Nm) of torque, the CME-85 can handle hole sizes up to 18.5 inches (47 cm) in diameter using hollow-stem augers.

CME-95

Equip the CME-95 with a string of CME extra-heavy-duty augers and you've got the ultimate combination for really big drilling jobs. No other drill is going to do the job for you faster or more efficiently. The rugged mechanical rotary drive is available with up to 36,100 foot pounds (49,096 Nm) of torque for turning large diameter augers.

The power shift transmission, with four gears in both forward and reverse, provides a rotation speed and torque combination for any situation. And an independent, hydraulically actuated low speed drive system gives you infinite regulation of spindle rotation from 0 to 100 rpm. It makes lining up auger connections and making or breaking drill rod connections easy. It also works exceptionally well in down-the-hole hammer drilling operations.

In auger drilling applications, the standard CME-95 can drill up to 18.5 inch (47 cm) diameter holes. It can also be equipped for drilling up to 25 inch (63.5 cm) diameter holes.



Truck, Trailer, and Skid Mounted Drill Specifications

		CME-45B	CME-45C	CME-55	CME-75	CME-85	CME-95
Standard	Rotary Torque (max)	3,380 ft lbs (4,597 Nm)	3,380 ft lbs (4,597 Nm)	7,700 ft lbs (10,472 Nm)	10,230 ft lbs (13,913 Nm)	22,900 ft lbs (31,144 Nm)	30,200 ft lbs (41,072 Nm)
	Rotary Speed (max)	698 rpm	698 rpm	800 rpm	740 rpm	530 rpm	544 rpm
High Torque	Rotary Torque (max)	4,800 ft lbs (6,528 Nm)	4,800 ft lbs (6,528 Nm)	9,400 ft lbs (12,784 Nm)	12,950 ft lbs (17,612 Nm)		36,100 ft lbs (49,096 Nm)
	Rotary Speed (max)	492 rpm	492 rpm	665 rpm	580 rpm		454 rpm
High Speed	Rotary Torque (max)	3,105 ft lbs (4,223 Nm)	3,105 ft lbs (4,223 Nm)		8,180 ft lbs (11,125 Nm)	18,000 ft lbs (24,480 Nm)	
	Rotary Speed (max)	760 rpm	760 rpm		930 rpm	670 rpm	
	Retract Force	19,600 lbs (8,891 kg)	19,600 lbs (8,891 kg)	28,275 lbs (12,826 kg)	30,000 lbs (13,608 kg)	48,105 lbs (21,816 kg)	62,830 lbs (28,500 kg)
	Pulldown Force	13,650 lbs (6,192 kg)	13,650 lbs (6,192 kg)	18,650 lbs (8,460 kg)	20,000 lbs (9,072 kg)	28,225 lbs (12,800 kg)	33,135 lbs (15,030 kg)
	Mounting Applications	Truck, Trailer, ATV	Skid, Truck, Trailer, Skid on Trailer, Skid on truck, ATV	Truck, Trailer, ATV	Truck, Trailer, ATV	Truck	Truck

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Rubber-tired ATV Drills



CME-550X

Since the carrier was designed as an integral part of the overall rig, we were able to mount the drill on the carrier frame, in between the tires. That puts the center of gravity as low as possible. No-spin differentials give you true 4-wheel pulling power. And planetary axles put gear reduction at the wheels. That means less stress on all drivetrain components.

With 28,275 pounds (12,826 kg) of retract force and up to 11,300 foot pounds (15,398 Nm) of rotary torque, the CME-550X is capable of drilling holes up to 14.75 inches (37.5 cm) in diameter using hollow-stem augers.

CME-750X



The CME-750X is the culmination of 20 years of experience in ATV drill technology. It's been designed and refined from the ground up to provide the best combination of mobility and drilling performance you can get with a rubber-tired all-terrain drill rig.

The dependable mechanical rotary drive is available with up to 12,950 foot pounds (17,612 Nm) of torque for auger drilling holes up to 18.5 inches (47 cm) in diameter.



CME-1050

The CME-1050 combines big drilling power with the off-road mobility of a rubber-tired ATV. It can get to remote, rough-terrain locations that are inaccessible to even all-wheel drive truck mounted drills. And once at the job, it has the power to turn big augers. The CME-1050 has many standard features including angle drilling capability.

With up to 24,700 foot pounds (33,592 Nm) of torque, the CME-1050 can drill holes up to 18.5 inches (47 cm) in diameter with hollow-stem augers.

		RUBBER-TIRED ATV MOUNTED DRILLS			*TRACK-MOUNTED DRILLS*		
		CME-550X	***CME-750X***	***CME-1050***	***CME-45C***	***CME-55***	***CME-850***
Standard	Rotary Torque (max)	9,075 ft lbs (12,342 Nm)	10,230 ft lbs (13,913 Nm)	24,700 ft lbs (33,592 Nm)	3,380 ft lbs (4,597 Nm)	7,700 ft lbs (10,472 Nm)	14,925 ft lbs (20,298 Nm)
	Rotary Speed (max)	690 rpm	740 rpm	435 rpm	698 rpm	800 rpm	725 rpm
High Torque	Rotary Torque (max)	11,300 ft lbs (15,368 Nm)	12,950 ft lbs (17,612 Nm)		4,800 ft lbs (6,528 Nm)	9,400 ft lbs (12,784 Nm)	
	Rotary Speed (max)	550 rpm	580 rpm		492 rpm	665 rpm	
High Speed	Rotary Torque (max)	6,800 ft lbs (9,248 Nm)	8,180 ft lbs (11,125 Nm)	19,460 ft lbs (26,466 Nm)	3,105 ft lbs (4,223 Nm)		11,945 ft lbs (16,245 Nm)
	Rotary Speed (max)	920 rpm	930 rpm	550 rpm	760 rpm		910 rpm
	Retract Force	28,275 lbs (12,826 kg)	30,000 lbs (13,608 kg)	48,105 lbs (21,816 kg)	19,600 lbs (8,891 kg)	28,275 lbs (12,826 kg)	28,275 lbs (12,826 kg)
	Pulldown Force	18,650 lbs (8,460 kg)	20,000 lbs (9,072 kg)	28,225 lbs (12,800 kg)	13,650 lbs (6,192 kg)	18,650 lbs (8,460 kg)	18,650 lbs (8,460 kg)

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4215 Rider Trail North • Earth City, MO 63045 • Ph: 314.291.7700 • 800.325.8827 • Fax: 314.291.4880
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Track Mounted Drills



CME-850X

The CME-850X can get you to locations that are inaccessible to any other type of drill rig. The 33 inch wide tracks spread the surface contact area of this all-terrain track drill over more than 8,800 square inches. Ground bearing pressure is only 2.9 psi. That's less than the average man's footstep. The CME-850x can go places you can't even walk. The high flotation allows you to negotiate soft mud, deep snow, or sand. And the walking beam suspension easily climbs over rocks and fallen logs. This rig has a very low center of gravity which provides the stability you need in off-road conditions. Angle drilling capability is standard.

With 28,275 pounds (12,826 kg) of retract force and up to 14,925 foot pounds (20,298 Nm) of rotary torque, the CME-850X is capable of drilling holes up to 14.75 inches (37.5 cm) in diameter using hollow-stem augers.



CME-55
on CME-300 Carrier

CME-850XR

CME-850XR is a rough-terrain drill that features full rubber tracks that won't damage most pavement. It has the same drilling performance specifications as the CME-850X and is available with all the same options.



CME-300 Tracked Carrier

The CME-45C, CME-55 and Low Clearance CME-55 are available mounted on the remote controlled CME-300 tracked carrier. This machine can climb hills, traverse mud, sand, rocks, and snow...all while your operator's feet are planted firmly on the ground.

The rubber tracks will not damage most pavement, so you can also use this rig anywhere you might use a truck mounted drill.



Low Clearance CME-55 on CME-300 Carrier



CME-45C on CME-300 Carrier

Since the CME-300 tracked carrier is designed specifically for carrying drill rigs, there are no compromises. It has the best center of gravity for both driving and drilling. And you won't find a more rugged carrier in its class.

Drills mounted on the CME-300 carrier are available with all the features you need to get the job done as efficiently as possible. You can equip them with in/out and sideways slide bases, angle drilling, automatic SPT hammer, auger racks, tool boxes, and more.

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Efficient Control Panel

Control commonality - A key to operator productivity

Do your drillers find themselves working with a CME-45C one day and a CME-75 the next? No problem. Almost all of our drills have essentially the same control panel layout. That means your operators can work with maximum efficiency, no matter which rig they are using. There's no hesitancy or confusion on where to find the right control when using retract, feed, hoists, etc.

Drilling and set-up controls are logically arranged for maximum efficiency. The most frequently used controls, such as the feed, hydraulic hoists and sliding base levers, are staggered for easier identification and operation.

All hydraulic hoses have JIC fittings which are extremely dependable and readily available.



*Optional Features**



Automatic SPT hammer

Our 140-pound (63.5 kg) automatic hammer gives you extremely consistent and accurate Standard Penetration Test results, meeting all ASTM-D-1586-99 requirements. There are no ropes or cables to impede the free-fall of the weight. A viewing slot allows you to verify the 30 inch (76.2 cm) fall height.

The hammer swings on a hydraulic cylinder, from the stored position to on-hole position. And the six foot vertical travel also allows you to use the hammer to drive casing or probes. Since raising and lowering is done hydraulically, set-up is quick and almost effortless.

To improve safety, all moving parts are enclosed, including the impact area between weight and anvil. A 340 pound (154 kg) hammer is also available.

Direct Push Hammer



When job specifications demand, you can easily convert your auger rig to a direct push sampling machine. Simply hoist the hammer from its convenient storage rack, mount it on the feed system, connect the two quick-disconnect hydraulic hoses, and you're ready to go to work.



Hydraulic rod holder and breakout wrench

The hydraulic rod holder makes your job quicker and safer. It not only pivots from on-hole to off-hole positions, but also hydraulically telescopes in and out. For efficient operation, the breakout wrench is mounted at the pivot point of the rod holder arm. This gives you a direct, in-line pull to help prevent rod bending when loosening connections.

* Not all optional features are available on all models

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*More Optional Features**

Angle drilling system for special applications



This unique system is especially effective for drilling underneath ponds, storage tanks, or other structures. When used with our patented Continuous Sample Tube System, you can even take soil samples while drilling angle holes.

The angle drilling system will also allow you to drill vertically with the rig positioned on an uphill slope. That can eliminate the time-consuming job of leveling an area on which to place the rig.

And, since the kelly drive is directly connected to the right angle drive box, you can raise or lower the mast with the drivetrain already connected and ready to go. The angle drilling system is standard on CME-850X(R) and CME-1050 drills and available as an option for all other models except the CME-45B.



Auger storage racks

Several under body auger rack configurations are available, including hydraulically operated racks that slide in and out for easy access to augers.

Water tank / tool box combinations



Numerous water tank/tool box configurations are available, including models with rod storage capacity underneath and an expanded metal rack on top.



Quick mast disconnect

This feature allows you to quickly disconnect the optional mast when working inside buildings, underneath bridges or in other low overhead drilling locations. Since the mast is completely separated from the uprights, it doesn't interfere with other drill functions such as the optional slide bases.

With the mast in a horizontal position, you simply clamp it to its storage rack and extend the drill's in-out slide base. This pulls the sockets on the upright drill frame away from the large tapered pins on the mast.

Fluted kelly and chuck assembly



If your drilling operations include a substantial amount of core or rotary drilling, the CME fluted kelly and chuck assembly can save you a lot of time. The 5 foot stroke of the kelly, combined with the 6 foot stroke of the feed system, gives you a total stroke of 11 feet. You can use 10 foot drill rods, which means fewer rod connections and less rod handling.

The kelly has two vertical slots and two horizontal slots which are engaged by the chuck to provide rotary torque and thrust. The CME fluted kelly can even be rotated without engaging the thrust plungers. This gives you the option of using the weight of the drill string to provide down pressure on the bit.

The 2-5/8 inch fluted kelly and chuck assembly is available in either manual or hydraulically actuated configurations. Or, if you're using 2-3/8 inch API rods for larger diameter holes, a 3-1/2 inch O.D. fluted kelly and hydraulic chuck assembly is available.

* Not all optional features are available on all models

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CME All-terrain carrier



The CME-800X all-terrain tracked carrier has proven itself in some of the roughest environments imaginable. It is designed to accept just about any piece of equipment normally mounted on a truck, such as digger derricks, man lifts, brush hogs, tree trimmers, or wild-land fire fighting apparatus. The CME-800X has a payload capacity of up to 16,000 pounds (7,258 kg). Ground bearing pressure of a fully loaded vehicle is less than 3 psi. That's less than the average man's footstep. It can negotiate soft mud, deep snow or sand. And the walking beam suspension easily climbs over rocks and fallen logs.



A rough-terrain model, the CME-800XR, is also available that features full rubber tracks that won't damage most pavement.

Drilling Tools, equipment and supplies

We've got all the tooling and drilling supplies you'll need to get the job done. One toll free phone call can put you in touch with our experienced in-house sales department. It's not only easier than calling multiple sources, it also simplifies billing and accountability. And you'll always get competitive pricing and the highest quality items.







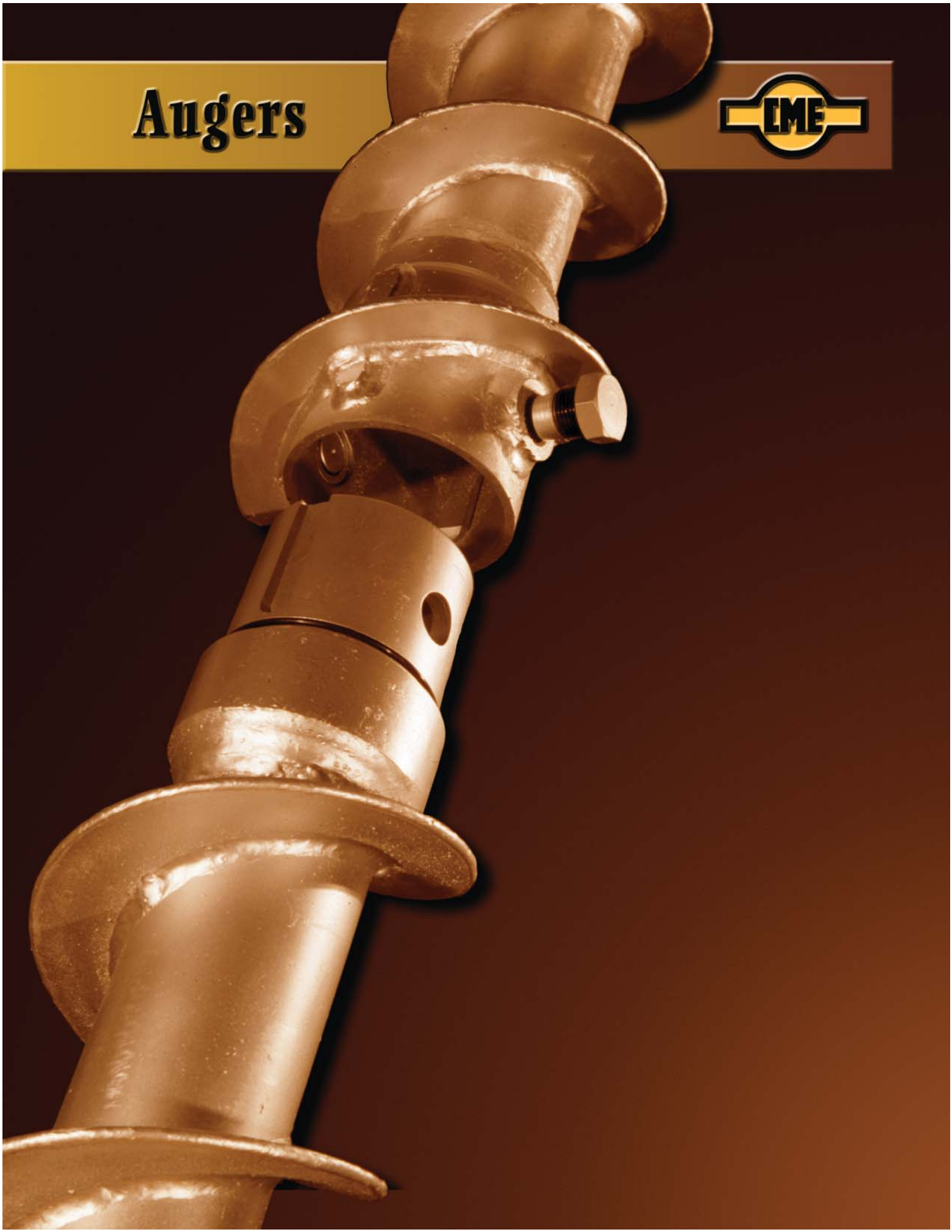
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Augers



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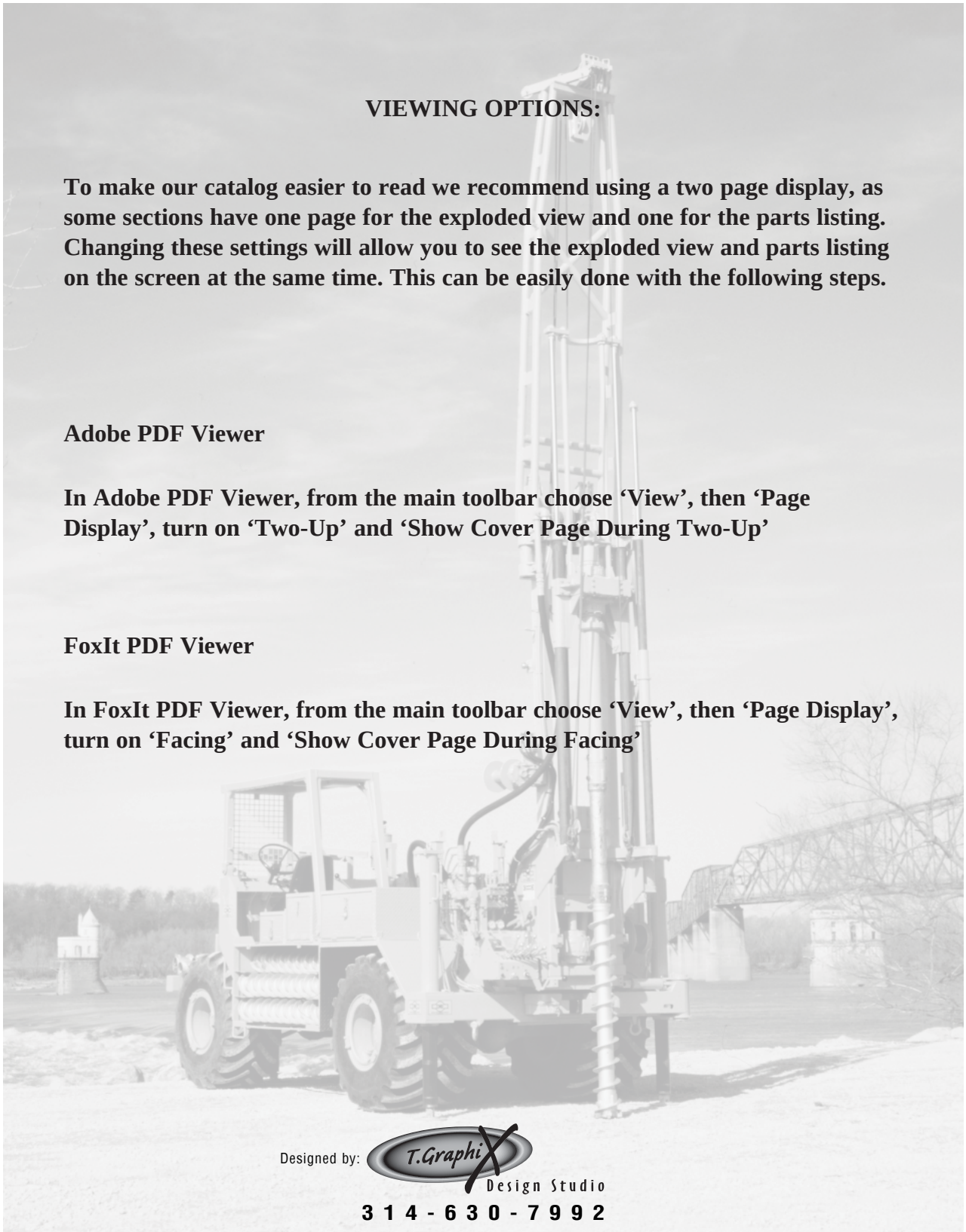
To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

Adobe PDF Viewer

In Adobe PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Two-Up' and 'Show Cover Page During Two-Up'

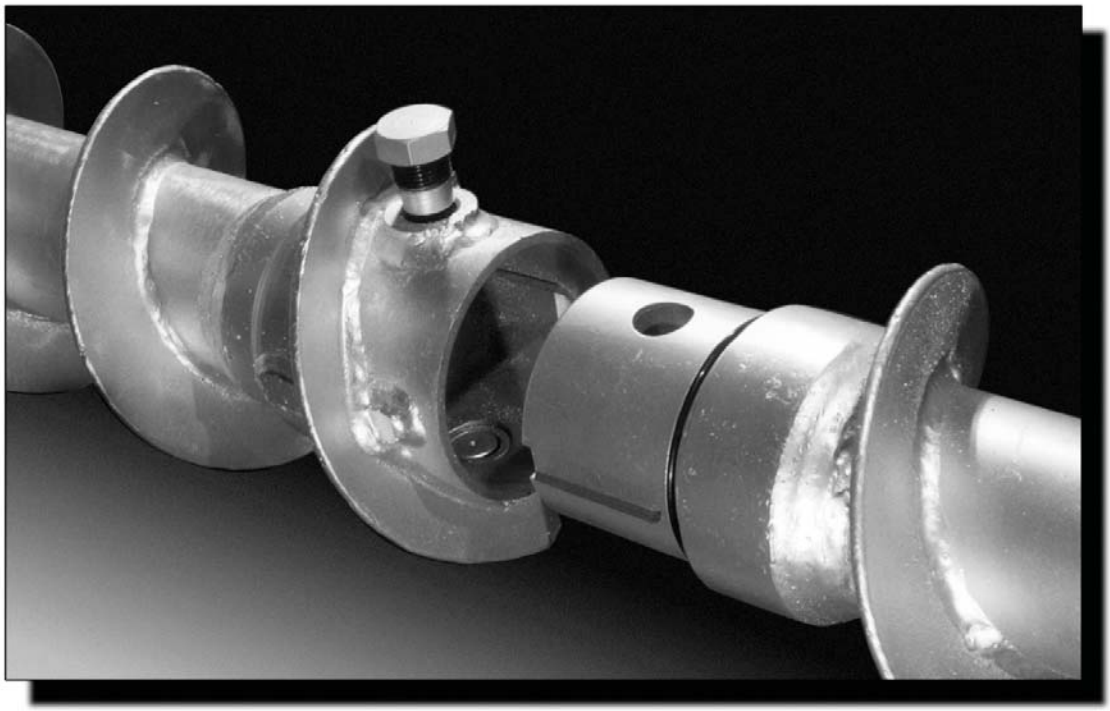
FoxIt PDF Viewer

In FoxIt PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Facing' and 'Show Cover Page During Facing'



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Central Mine Equipment Company
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E-mail: info@cmeco.com • Website: www.cmeco.com



CME Hollow Augers

CME key-type hollow augers have a patented coupling design. This unique key-type design permits the augers to be reversed in the hole without coming apart. The augers are easily connected by sliding the joints together and inserting a cap screw. Uncoupling only involves removing the cap screw and sliding the joints apart. An "O" ring seal is provided at each joint to make the augers water tight.

CME hollow augers are lightweight and easy to handle, yet are able to withstand the most rugged drilling conditions. The outside diameter is held to a minimum hole size resulting in less cuttings to shovel and less torque required to advance the augers in the hole.

Flight Augers **3.44**
Flight Auger Accessories **3.47**
Flight Auger Heads **3.45**
Hex Subs & Adapters **3.49**
Hollow Stem Augers **3.02**
Hollow Stem Accessories **3.30**
Hollow Stem Auger Heads **3.35**

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CME Hollow Stem Augers

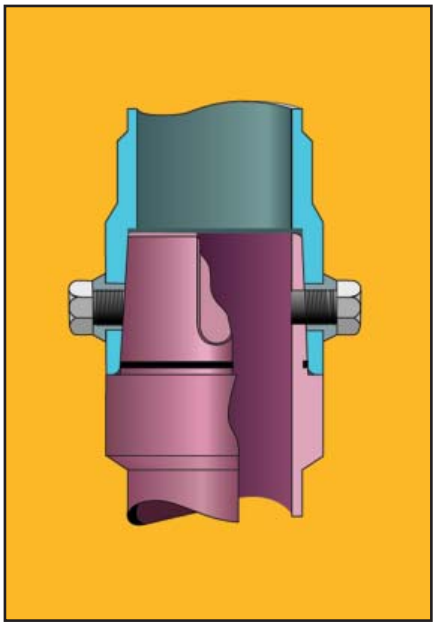
Strength, Simplicity and Durability

The key is in the coupler

The two most important features of an auger coupling are strength and simplicity. CME gives you both.

Our field-proven dual key coupler provides a strong connection you can depend on. The simplicity of the design means quicker connections for greater overall drilling efficiency. The dual key coupler also allows you to reverse the augers in the hole without worrying about joints coming apart.

Connections are quickly and easily made by simply sliding the joints together and screwing in the auger connector bolts. To uncouple, just unscrew the bolts and slide the joints apart. Since the connector bolts are the only external parts, you won't find yoursel spending valuable production time cleaning mud and dirt from complex coupling devices.



Patented O-ring seal helps isolate the annulus of the auger column

Each connection features a patented O-ring seal which provides two major benefits. First, the seal helps prevent material on the outside of the auger column from leaking into the annulus of the auger column. That means your samples are less likely to be contaminated by material from outside the targeted sampling zone.

Secondly, in fluid circulation drilling applications, the seal helps contain drilling mud or water inside the auger column.

Field-proven design and construction

CME augers are tough enough to tackle the most challenging drilling conditions. That's because we use only premium grade steel for all components. We also hardsurface the outside edge of the entire auger flight for maximum durability.

Auger flighting dimensions, including outside diameter and pitch, are designed to efficiently convey soil cuttings with a minimum amount of drilling torque.

Heavy-duty and extra-heavy-duty augers give you an extra edge

CME heavy-duty and extra-heavy-duty augers give you the extra edge you need for today's highly competitive drilling industry. The heavy-duty augers feature larger keys and larger auger connector bolts. The couplings have thicker walls and are tapered so they slide together and apart even easier. This is especially advantageous when you're drilling in fine sands or silts.

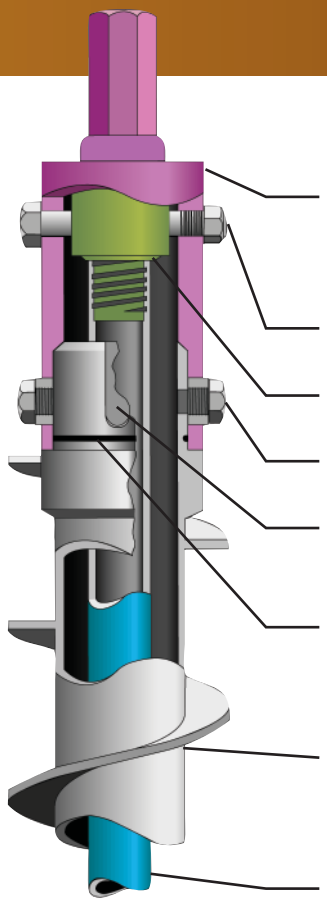
CME extra-heavy-duty augers have all the features of our heavy-duty augers, plus even thicker tube walls and thicker flighting for maximum strength. These augers are designed for high-torque rigs. They'll handle the most demanding job with confidence.

Custom augers can solve special drilling problems

When a drilling job presents unique problems, we can supply unique solutions. We will be happy to work with you to fulfill your specific needs. Plus we have numerous custom designs currently available. For example, our double and triple flight lead augers provide extra strength and weight for starting holes in abrasive or cobble filled formations where maintaining initial hole diameter can be difficult.

If your rig has especially high torque and retract capabilities, you might be interested in our 4 1/4" or 6 1/4" XHDS hollow augers. They have oversized connector bolts which provide more surface contact area for greater strength and rigidity to the auger column.

These are just a few examples of things we can do for you to help make your drilling program more efficient and therefore more profitable.



Drive cap - The CME hollow auger drive cap has a shank to fit the drill spindle adaptor assembly and a keyed auger box coupling that fits over a hollow auger pin coupling.

Drive cap bolt and nut - Connects drive cap to rod-to-cap adaptor.

Rod-to-cap adaptor - Connects top center rod to drive cap.

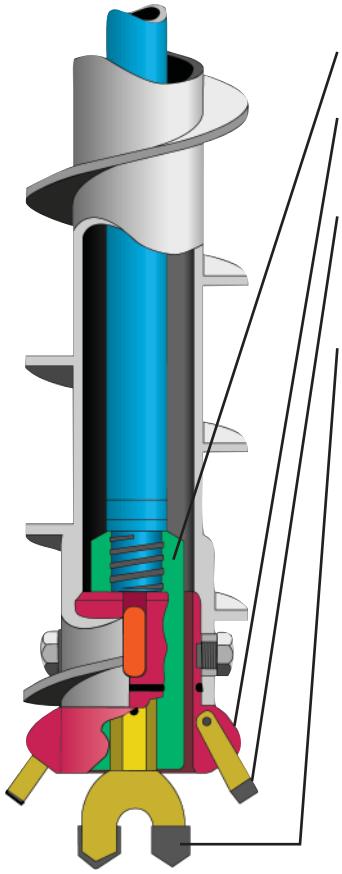
Auger connector bolt - Secures each hollow auger connection.

Key-way - Allows augers to be rotated in forward or reverse under full rotary power while applying down pressure or retract forces to the auger column.

Patented O-ring seal - O-ring seal installed in groove on auger pin helps prevent contaminates from leaking into the auger column and drilling fluids from leaking out.

Hollow stem auger section - Auger flighting diameters and pitch are designed for maximum conveyance of soil cuttings with minimum drilling torque. Entire length of flighting is hardsurfaced for long-term abrasive wear resistance.

Drill rods - Threaded drill rods connect rod-to-cap adaptor to pilot assembly with center head.



Pilot assembly - Includes center head and connects to first center rod.

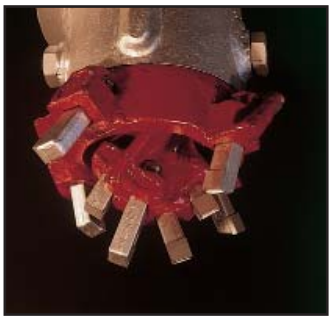
Auger head - Multi-use hollow auger head with replaceable forged steel, tungsten carbide tipped teeth.

Replaceable carbide insert tooth - Easily changeable forged steel, tungsten carbide tipped teeth are designed with the ultimate combination of hardness, durability and size for optimum cutting efficiency and long life.

Center head - Center heads used with 2 1/4″ (5.7 cm) through 3 3/4″ (9.5 cm) ID hollow augers are completely replaceable. Center heads used with 4 1/4″ (10.8 cm) ID hollow augers can be either completely replaceable or have replaceable teeth. Center heads used with larger hollow augers have replaceable teeth.



Completely replaceable center head



Center head with replaceable teeth

Center Hexagon Drive System



For large diameter holes and tough drilling conditions

If your drilling operations include large diameter auger jobs…or, if you're frequently drilling in especially difficult formations, CME's center hexagon drive system can save you time and money.

Large diameter auger drilling or tough drilling conditions can over-torque threaded connections on center drill rods. Over-torqued connections can be extremely difficult and time consuming to break-out. Excessive torque can also shorten the life of threaded drill rod connections.

CME's center hexagon drive system has no threaded connections. You simply slide the box and pin hex ends together and install the drive pin. When coming out of the hole, a slide connector allows you to separate the hollow auger connection and access the hexagon rod connection inside. You simply knock out the drive pin and slide the rods apart.

A big advantage in wet sands

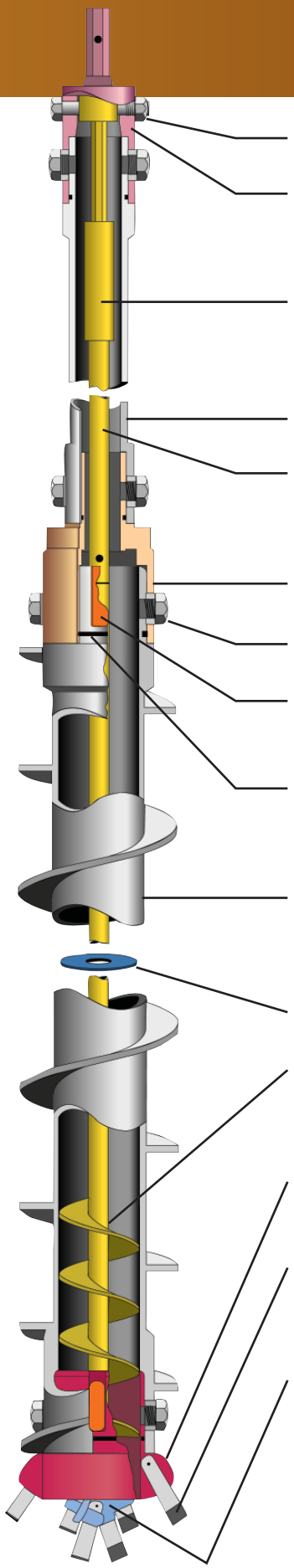
Drilling and sampling in wet sands can be a real challenge. During drilling operations, sand tends to pass between the pilot assembly and the inside diameter of the hollow auger. The sand can bridge the annulus of the auger above the pilot assembly and form a plug.

This plug will not only make it difficult to pull the center rod string, it will also cause a vacuum to form below the center head. As you raise the center rod string, even more sand will be drawn up inside the center of the augers.

CME's center hexagon drive system with reverse flighting lead stem provides an open area between the center head and the inside wall of the hollow auger. This helps to prevent sand from bridging in the annulus of the auger. The reverse flighting on the lead center stem also works against sand trying to move up inside the auger column.

Special alloy steel for maximum durability

CME's hexagon rods are made from special alloy steel and are heat treated for maximum strength and durability. Center hexagon rod systems are available for use with all CME hollow stem augers 3 1/4″ (8.3 cm) I.D. and larger.



Drive cap bolt and nut - *Connects drive cap to slide connector.*

Drive cap - *The CME hollow auger drive cap has a shank to fit the drill spindle adaptor assembly and a keyed auger box coupling that fits over a hollow auger pin coupling.*

Slide connector - *Connects drive cap to internal hex rod assembly. When an auger coupling is disconnected, the slide connector allows you to raise the auger above the joint and access the internal hex rod connection.*

Auger stem - *Extension which connects the drive cap to the auger sub.*

Hex rod drill stem - *Drill stem with hexagon pin and box connections which are secured with a drive pin. Since it has no threads, hexagon connection will not unscrew during reverse rotation.*

Auger sub - *Adapts auger stem to larger diameter hollow auger.*

Auger connector bolt - *Secures hollow auger connections.*

Key-way - *Allows augers to be rotated in forward or reverse under full rotary power while applying down pressure or retract forces to the auger column.*

Patented O-ring seal - *O-ring seal installed in groove on auger pin helps prevent contaminates from leaking into the auger column and drilling fluids from leaking out.*

Hollow stem auger section - *Auger flighting diameters and pitch are designed for maximum conveyance of soil cuttings with a minimum of drilling torque. Entire length of flighting is hardsurfaced for long-term abrasive wear resistance.*

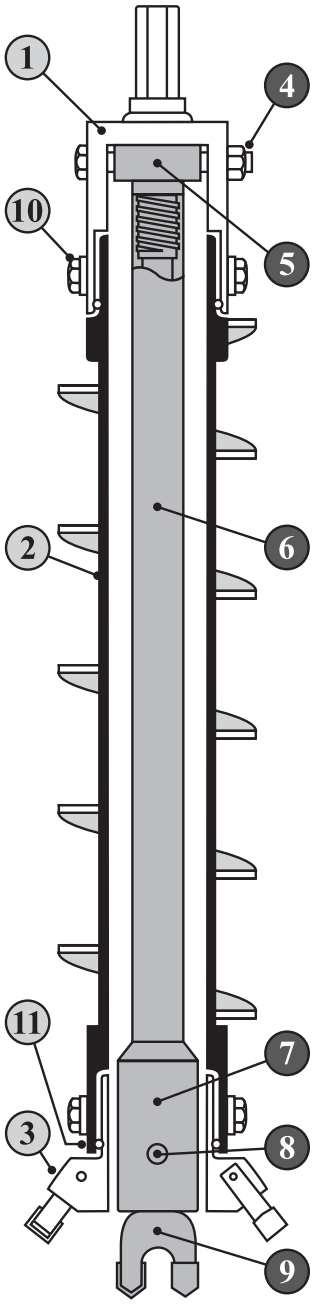
Guide ring - *Keeps drill stem centered inside hollow stem auger column.*

Lead center stem - *Drill stem with unique reverse flighting helps prevent cuttings from plugging the bottom of the auger column. If cuttings do enter the auger column, reverse flighting allows you to rotate and easily pull out.*

Auger head - *Multi-use hollow auger head with replaceable forged steel, tungsten carbide tipped teeth.*

Replaceable carbide insert tooth - *Easily changeable forged steel, tungsten carbide tipped teeth feature the best combination of hardness and durability for optimum cutting efficiency and long life.*

Center head - *Center heads used with 2 1/4" (5.7 cm) through 3 3/4" (9.5 cm) ID hollow augers are completely replaceable. Center heads used with 4 1/4" (10.8 cm) ID hollow augers can be either completely replaceable or have replaceable teeth. Center heads used with larger hollow augers have replaceable teeth.*

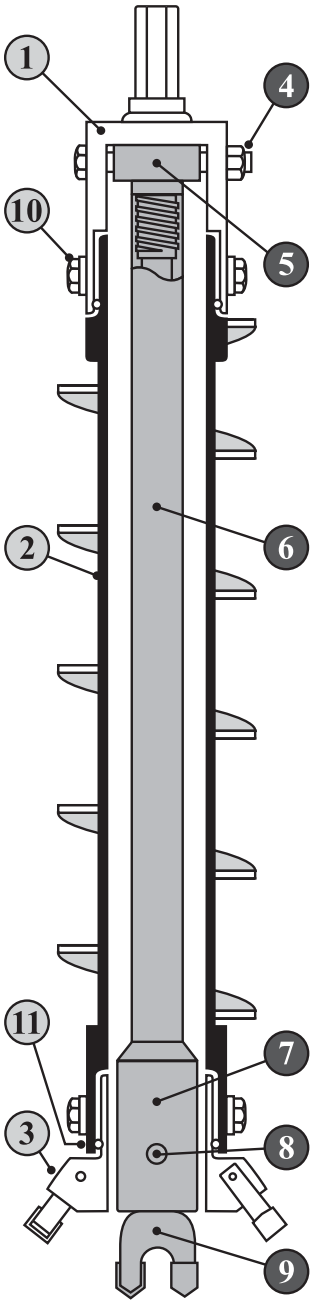


CME 2.25" ID HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21001	Drive cap 2.25" 1.625" hex
2	21007	Hollow stem auger, 2.25" ID x 5.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector
3	21010	Hollow auger head, 2.25" ID x 6.25" OD with CME keyed coupling, including four 5T teeth
4	21011	Bolt with nut 2.25", for Rod to cap adapter
5	21014	Rod to cap adapter, 2.25", AWJ pin
6	30038	Drill rod, AWJ, 5' ***Note: Other rod sizes available.***
7	21019	Pilot assembly with center head, 2.25", AWJ
8	21023	Center head pin for pilot assembly
9	21022	Center head for pilot assembly
10	21025	Auger connector
11	21024	Auger seal, 2.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21039	Auger holding fork
	21037	Rod slips, AWJ
	21042	Insert tap
	19021	Auger tooth 5T
	21062	Repair pin, 2.25"
	21065	Repair box, 2.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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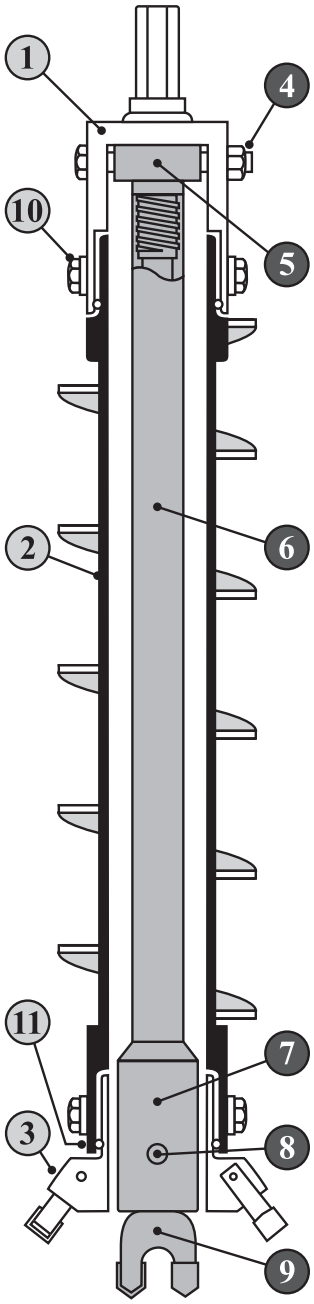


CME 2.75” ID HOLLOW STEM AUGER TOOLS

Ref. #	Part No.	Description
1	21089	Drive cap 2.75″ 1.625″ hex
2	21095	Hollow stem auger, 2.75″ ID x 6.125″ OD x 5′ length with CME keyed coupling, hardsurfaced, including auger seal and auger connector
3	21098	Hollow auger head, 2.75″ ID x 6.75″ OD with CME keyed coupling including four 5T teeth
4	21099	Bolt with nut 2.75″, for Rod to cap adapter
5	21102	Rod to cap adapter, 2.75″, AWJ pin
6	30038	Drill rod, AWJ, 5′ ***Note: Other rod sizes available.***
7	21111	Pilot assembly with center head, 2.75″, AWJ
8	21119	Center head pin for pilot assembly
9	19001	Center head for pilot assembly
10	21025	Auger connector
11	21120	Auger seal, 2.75″
	21824	Auger connector wrench
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21135	Auger holding fork
	21132	Rod slips, AWJ
	21042	Insert tap
	19021	Auger tooth 5T
	21161	Repair pin, 2.75″
	21164	Repair box, 2.75″
	21066	Repair shank, 1.625″ hex for drive cap
	21067	Auger key
	21068	Threaded insert

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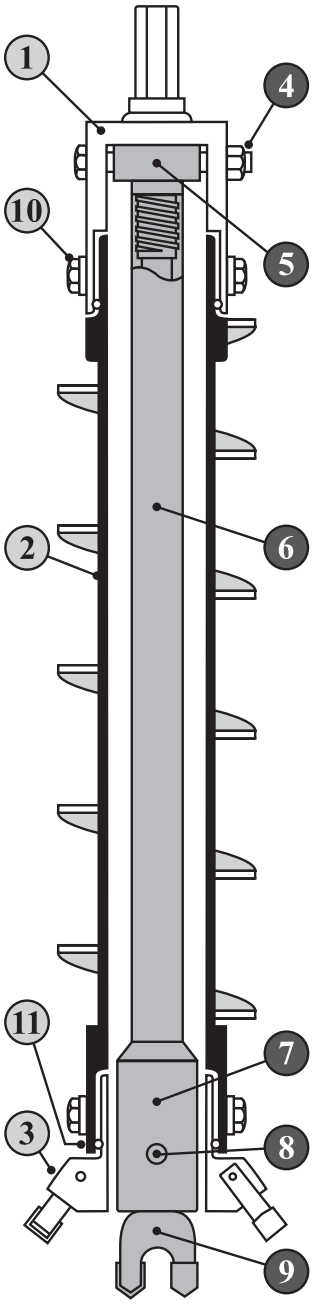


CME 3.25" ID HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21263	Drive cap 3.25" 1.625" hex
2	21191	Hollow stem auger, 3.25" ID x 6.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector ***Note: 2 Bolt Auger Available (21269)***
3	21194	Hollow auger head, 3.25" ID x 7.25" OD with CME keyed coupling, including four 5T teeth
4	21195	Bolt with nut 3.25", for Rod to cap adapter
5	21198	Rod to cap adapter, 3.25", AWJ pin
6	30038	Drill rod, AWJ, 5' ***Note: Other rod sizes available.***
7	21207	Pilot assembly with center head, 3.25", AWJ
8	21215	Center head pin for pilot assembly
9	21214	Center head for pilot assembly
10	21025	Auger connector
11	21216	Auger seal, 3.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21233	Auger holding fork
	21228	Rod slips, AWJ
	21042	Insert tap
	19021	Auger tooth 5T
	21259	Repair pin, 3.25"
	21262	Repair box, 3.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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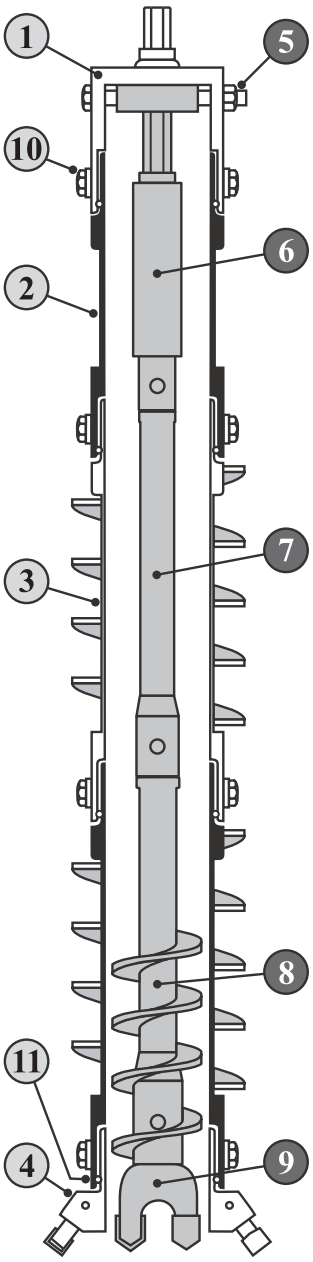


CME 3.25” ID HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21900	Drive cap 3.25″ HD 1.625″ hex
2	21908	Hollow stem auger, 3.25″ ID x 6.625″ OD x 5′ length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	21911	Hollow auger head, 3.25″ ID x 7.25″ OD with CME HD keyed coupling, including four 5T teeth
4	21195	Bolt with nut 3.25″, for Rod to cap adapter
5	21198	Rod to cap adapter, 3.25″, AWJ pin
6	30038	Drill rod, AWJ, 5′ ***Note: Other rod sizes available.***
7	21207	Pilot assembly with center head, 3.25″, AWJ
8	21215	Center head pin for pilot assembly
9	21214	Center head for pilot assembly
10	21913	Auger connector HD
11	21912	Auger seal, 3.25″ HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21233	Auger holding fork
	21228	Rod slips, AWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	21959	Repair pin, 3.25″ HD
	21960	Repair box, 3.25″ HD
	21066	Repair shank, 1.625″ hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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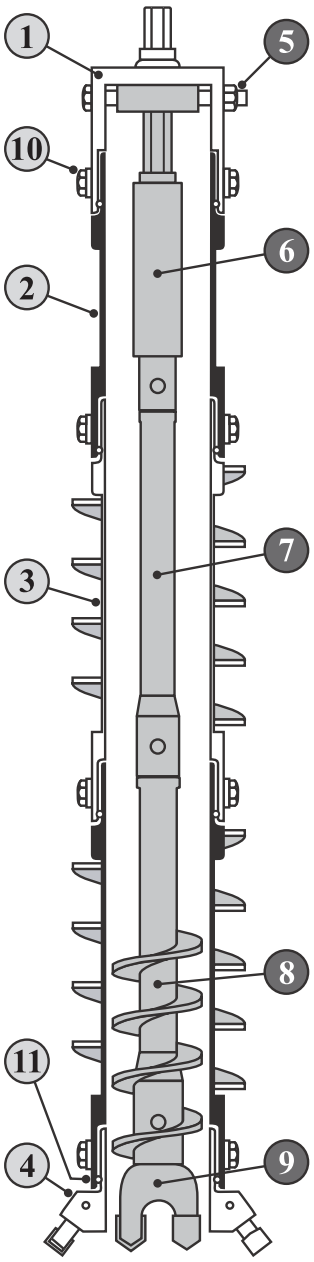


CME 3.25" HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21263	Drive cap 3.25" 1.625" hex
2	21275	Hollow auger stem 3.25" x 2.0'
3	21191	Hollow stem auger, 3.25" ID x 6.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector ***Note: 2 Bolt Auger Available (21269)***
4	21194	Hollow auger head, 3.25" ID x 7.25" OD with CME keyed coupling, including four 5T teeth
5	21195	Bolt with nut 3.25", for Slide connector
6	15302	Slide connector 3.25" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15305	Lead center stem 3.25" LH 1.625" hex
9	21214	Center head for lead center stem
10	21025	Auger connector
11	21216	Auger seal, 3.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21233	Auger holding fork
	21042	Insert tap
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	21259	Repair pin, 3.25"
	21262	Repair box, 3.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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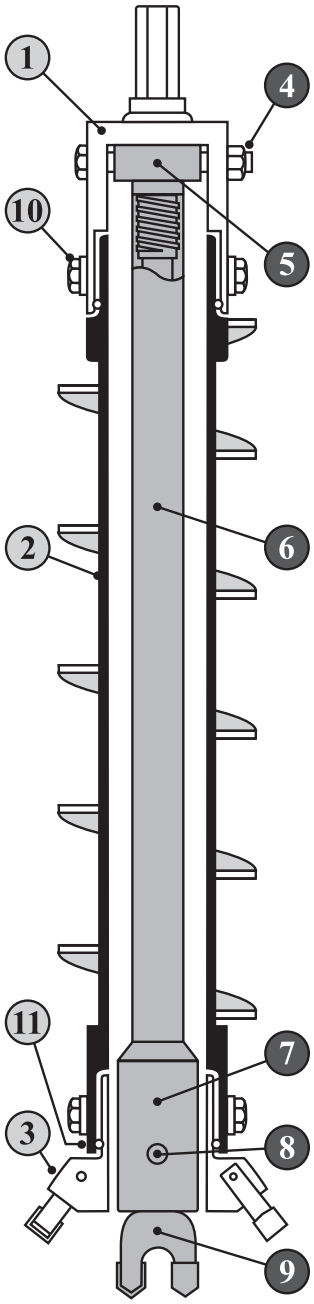


CME 3.25" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21900	Drive cap 3.25" HD 1.625" hex
2	21920	Hollow auger stem 3.25" HD x 2.0'
3	21908	Hollow stem auger, 3.25" ID x 7.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
4	21911	Hollow auger head, 3.25" ID x 8.00" OD with CME HD keyed coupling, including four 5T teeth
5	21195	Bolt with nut 3.25", for Slide connector
6	15302	Slide connector 3.25" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15305	Lead center stem 3.25" LH 1.625" hex
9	21214	Center head for lead center stem
10	21913	Auger connector HD
11	21912	Auger seal, 3.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21233	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	21959	Repair pin, 3.25" HD
	21960	Repair box, 3.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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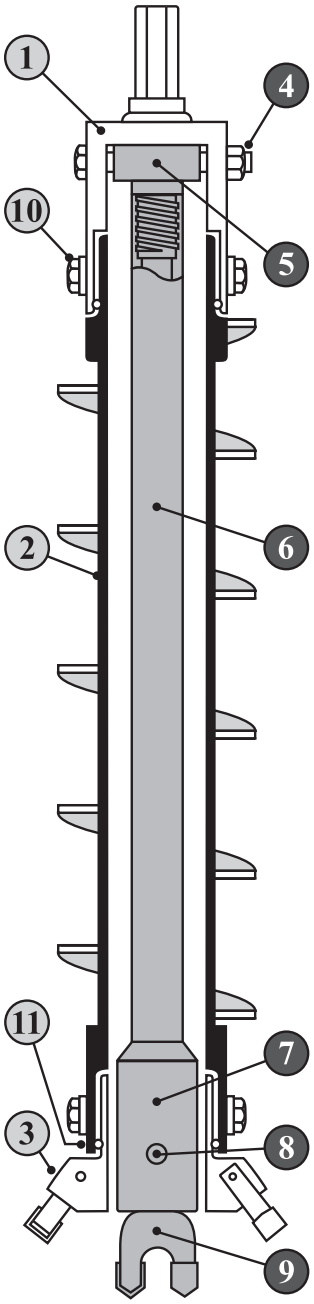


CME 3.75" ID HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21410	Drive cap 3.75" 1.625" hex
2	21338	Hollow stem auger, 3.75" ID x 7.125" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector ***Note: 2 Bolt Auger Available (21416)***
3	21341	Hollow auger head, 3.75" ID x 7.75" OD with CME keyed coupling, including four 5T teeth
4	21342	Bolt with nut 3.75" for Rod to cap adapter
5	21345	Rod to cap adapter, 3.75", AWJ pin
6	30038	Drill rod, AWJ, 5' ***Note: Other rod sizes available.***
7	21354	Pilot assembly with center head, 3.75", AWJ
8	21362	Center head pin for pilot assembly
9	21214	Center head for pilot assembly
10	21025	Auger connector
11	21363	Auger seal, 3.75"
	21824	Auger connector wrench
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21380	Auger holding fork
	21375	Rod slips, AWJ
	21042	Insert tap
	19021	Auger tooth 5T
	21406	Repair pin, 3.75"
	21409	Repair box, 3.75"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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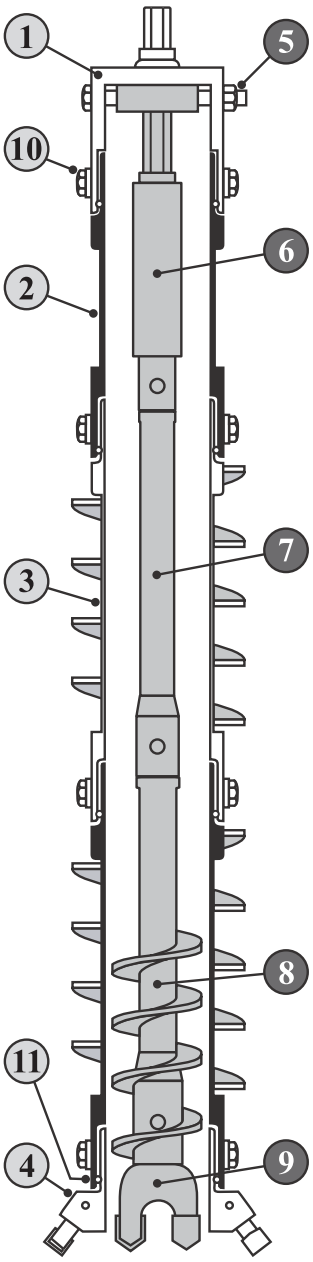


CME 3.75" ID HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21976	Drive cap 3.75" HD 1.625" hex
2	21984	Hollow stem auger, 3.75" ID x 7.125" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	21987	Hollow auger head, 3.75" ID x 7.75" OD with CME HD keyed coupling, including four 5T teeth
4	21342	Bolt with nut 3.75" for Rod to cap adapter
5	21345	Rod to cap adapter, 3.75", AWJ pin
6	30038	Drill rod, AWJ, 5' ***Note: Other rod sizes available.***
7	21354	Pilot assembly with center head, 3.75", AWJ
8	21362	Center head pin for pilot assembly
9	21214	Center head for pilot assembly
10	21913	Auger connector HD
11	21988	Auger seal, 3.75" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32270	Hoisting swivel, Drill rod, AWJ
	21380	Auger holding fork
	21375	Rod slips, AWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	22031	Repair pin, 3.75" HD
	22030	Repair box, 3.75" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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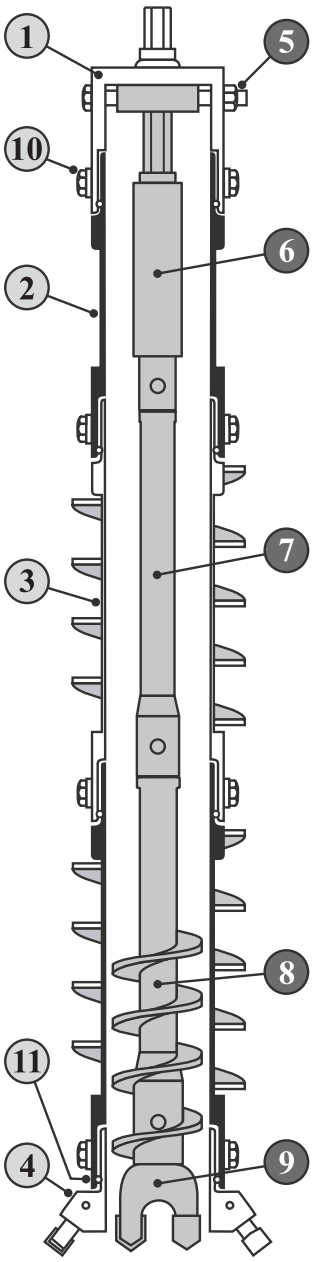


CME 3.75" HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21410	Drive cap 3.75" 1.625" hex
2	21422	Hollow auger stem 3.75" x 2.0'
3	21338	Hollow stem auger, 3.75" ID x 7.125" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector ***Note: 2 Bolt Auger Available (21416)***
4	21341	Hollow auger head, 3.75" ID x 7.75" OD with CME keyed coupling, including four 5T teeth
5	21342	Bolt with nut 3.75", for Slide connector
6	15308	Slide connector 3.75" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15310	Lead center stem 3.75" LH 1.625" hex
9	21214	Center head for lead center stem
10	21025	Auger connector
11	21363	Auger seal, 3.75"
	21824	Auger connector wrench
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21380	Auger holding fork
	21042	Insert tap
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	21406	Repair pin, 3.75"
	21409	Repair box, 3.75"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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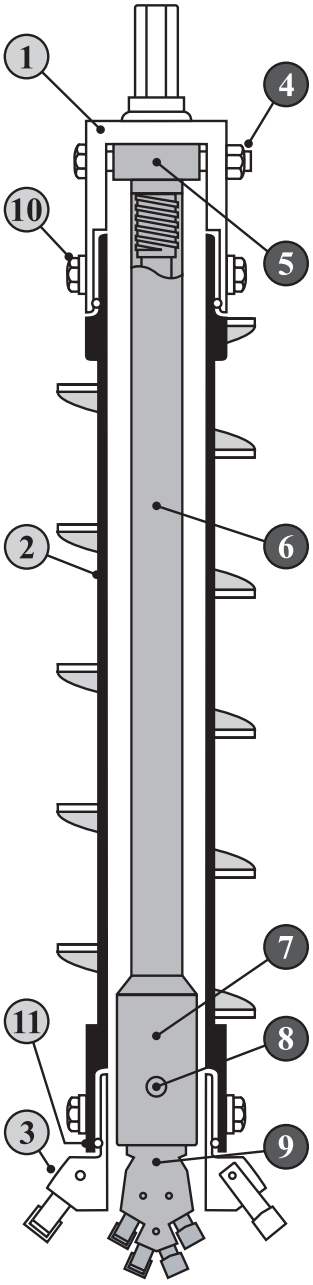


CME 3.75" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21976	Drive cap 3.75" HD 1.625" hex
2	21991	Hollow auger stem 3.75" HD x 2.0'
3	21984	Hollow stem auger, 3.75" ID x 7.75" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
4	21987	Hollow auger head, 3.75" ID x 8.50" OD with CME HD keyed coupling, including four 5T teeth
5	21342	Bolt with nut 3.75", for Slide connector
6	15308	Slide connector 3.75" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15310	Lead center stem 3.75" LH 1.625" hex
9	21214	Center head for lead center stem
10	21913	Auger connector HD
11	21988	Auger seal, 3.75" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21380	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	22031	Repair pin, 3.75" HD
	22030	Repair box, 3.75" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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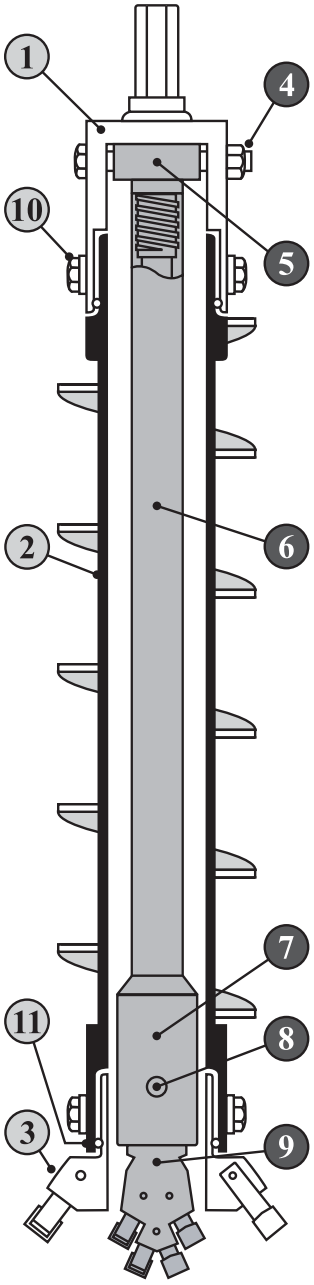


CME 4.25" ID HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21469	Drive cap 4.25" 1.625" hex
2	21475	Hollow stem auger, 4.25" ID x 7.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	21478	Hollow auger head, 4.25" ID x 8.25" OD with CME keyed coupling, including four 5T teeth
4	21479	Bolt with nut 4.25" for Rod to cap adapter
5	21488	Rod to cap adapter, 4.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21497	Pilot assembly with center head, 4.25", NWJ
8	21499	Center head pin for pilot assembly
9	21498	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard ***Note: 2 Prong Center Head Available (Pg. 3.34)***
10	21025	Auger connector
11	21500	Auger seal, 4.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21517	Auger holding fork
	21515	Rod slips, NWJ
	21042	Insert tap
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	21543	Repair pin, 4.25"
	21546	Repair box, 4.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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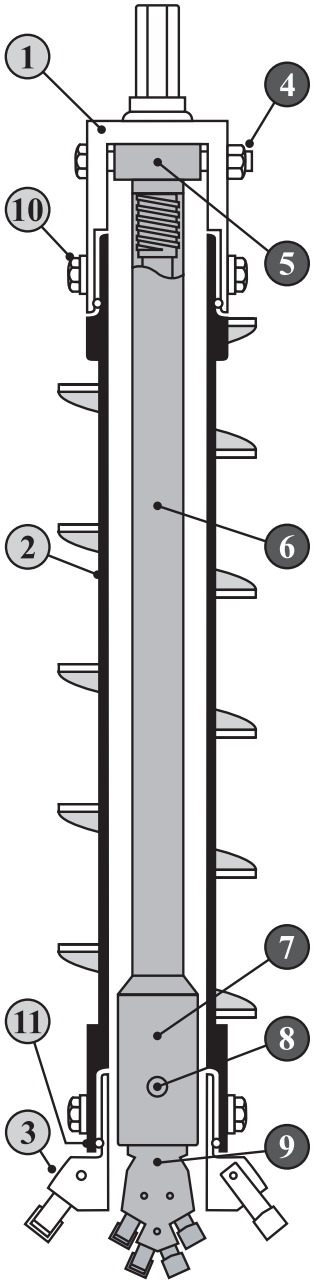


CME 4.25" ID HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22055	Hollow stem auger, 4.25" ID x 8.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	22058	Hollow auger head, 4.25" ID x 9.00" OD with CME HD keyed coupling, including four 5T teeth
4	21479	Bolt with nut 4.25" for Rod to cap adapter
5	21488	Rod to cap adapter, 4.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21497	Pilot assembly with center head, 4.25", NWJ
8	21499	Center head pin for pilot assembly
9	21498	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard ***Note: 2 Prong Center Head Available (Pg. 3.34)***
10	21913	Auger connector HD
11	22059	Auger seal, 4.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21517	Auger holding fork
	21515	Rod slips, NWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	22102	Repair pin, 4.25" HD
	22103	Repair box, 4.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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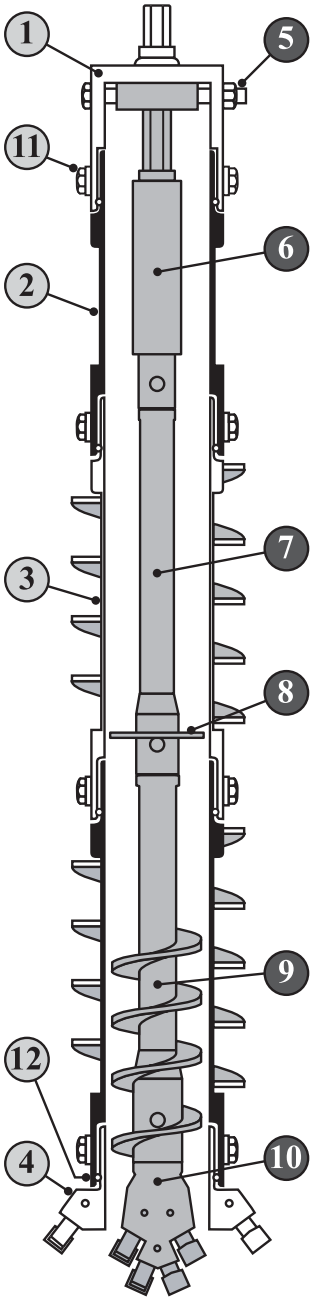
CME 4.25" ID EXTRA HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22085	Hollow stem auger, 4.25" ID x 8.25" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	22058	Hollow auger head, 4.25" ID x 9.00" OD with CME HD keyed coupling, including four 5T teeth.
4	21479	Bolt with nut 4.25" for Rod to cap adapter
5	21488	Rod to cap adapter, 4.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***NOTE: Other rod sizes available.***
7	21497	Pilot assembly with center head, 4.25", NWJ
8	21499	Center head pin for pilot assembly
9	21498	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard ***Note: 2 Prong Center Head Available (Pg. 3.34)***
10	21913	Auger connector HD
11	22059	Auger seal, 4.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21517	Auger holding fork
	21515	Rod slips, NWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	22098	Repair pin, 4.25" XHD
	22097	Repair box, 4.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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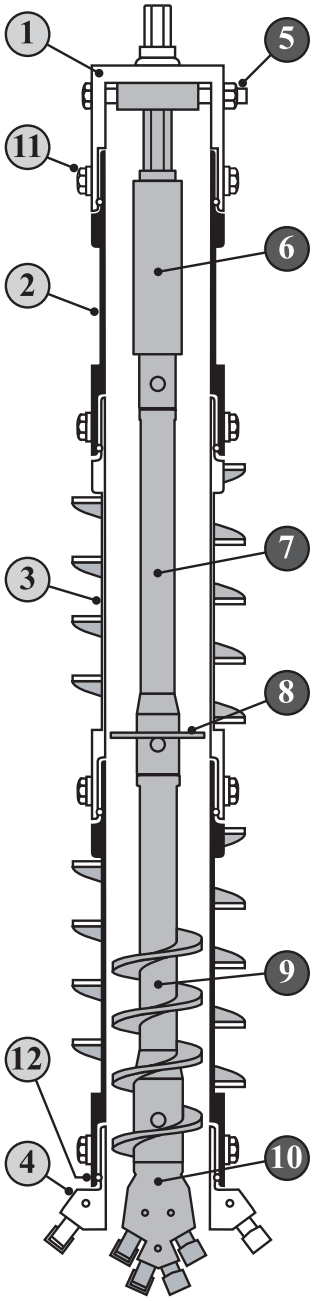


CME 4.25” HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21469	Drive cap 4.25″ 1.625″ hex
2	21503	Hollow auger stem 4.25″ x 2.0′
3	21475	Hollow stem auger, 4.25″ ID x 7.625″ OD x 5′ length with CME keyed coupling, hardsurfaced, including auger seal and two auger connectors
4	21478	Hollow auger head, 4.25″ ID x 8.25″ OD with CME keyed coupling, including four 5T teeth
5	21479	Bolt with nut 4.25″, for Slide connector
6	15313	Slide connector 4.25″ 1.625″ hex
7	19240	Drill stem with drive pin 1.625″ hex x 5′
8	15536	Guide Ring 4.25″
9	15705	Lead center stem 4.25″ LH 1.625″ hex
10	21573	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard
11	21025	Auger connector
12	21500	Auger seal, 4.25″
	21824	Auger connector wrench
	21041	Auger handling hook
	19264	Hoisting socket 1.625″ hex
	21517	Auger holding fork
	21042	Insert tap
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	15036	Drive pin DP2000 short
	21543	Repair pin, 4.25″
	21546	Repair box, 4.25″
	21066	Repair shank, 1.625″ hex for drive cap
	21067	Auger key
	21068	Threaded insert

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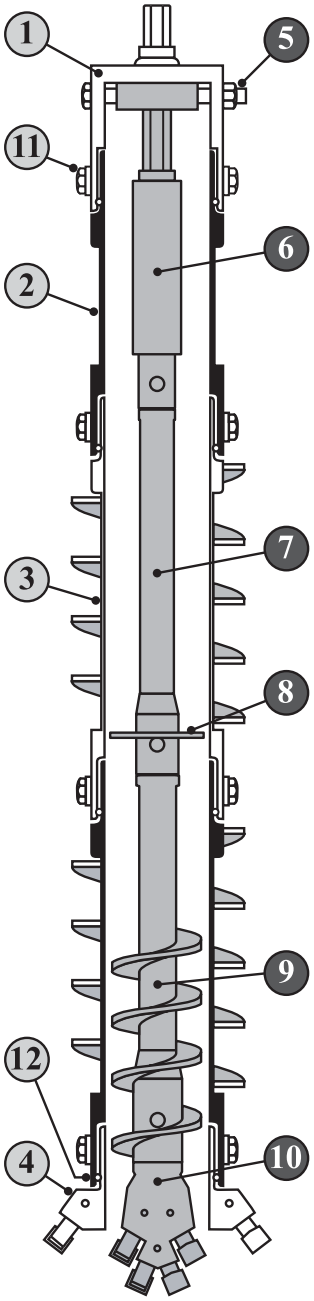
CME 4.25" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22062	Hollow auger stem 4.25" HD x 2.0'
3	22055	Hollow stem auger, 4.25" ID x 8.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
4	22058	Hollow auger head, 4.25" ID x 9.00" OD with CME HD keyed coupling, including four 5T teeth
5	21479	Bolt with nut 4.25", for Slide connector
6	15313	Slide connector 4.25" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15536	Guide Ring 4.25"
9	15705	Lead center stem 4.25" LH 1.625" hex
10	21573	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard
11	21913	Auger connector HD
12	22059	Auger seal, 4.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21517	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	15036	Drive pin DP2000 short
	22102	Repair pin, 4.25" HD
	22103	Repair box, 4.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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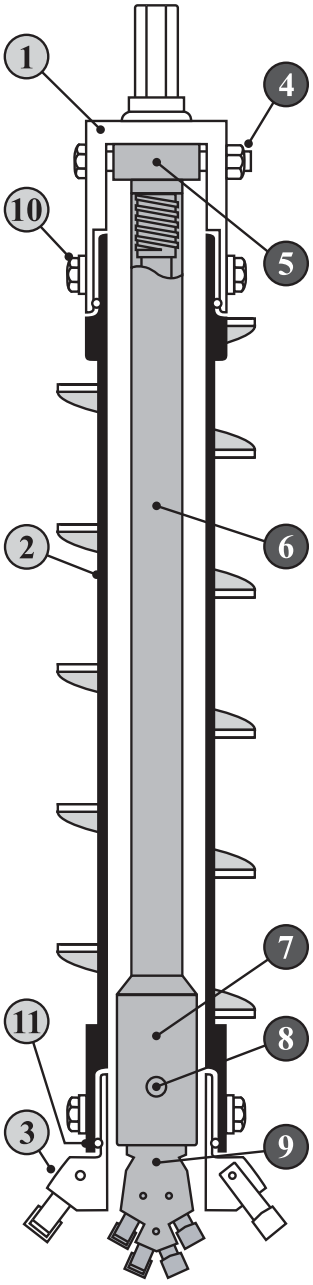
CME 4.25" EXTRA HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22062	Hollow auger stem 4.25" XHD x 2.0'
3	22085	Hollow stem auger, 4.25" ID x 8.25" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
4	22058	Hollow auger head, 4.25" ID x 9.00" OD with CME HD keyed coupling, including four 5T teeth
5	21479	Bolt with nut 4.25", for Slide connector
6	15313	Slide connector 4.25" 1.625" hex
7	19240	Drill stem with drive pin 1.625" hex x 5'
8	15536	Guide Ring 4.25"
9	15705	Lead center stem 4.25" LH 1.625" hex
10	21573	Center head for lead center stem with four 5T auger teeth, 2 short, 2 standard
11	21913	Auger connector HD
12	22059	Auger seal, 4.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21517	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	19022	Auger tooth 5T short
	15036	Drive pin DP2000 short
	22098	Repair pin, 4.25" XHD
	22097	Repair box, 4.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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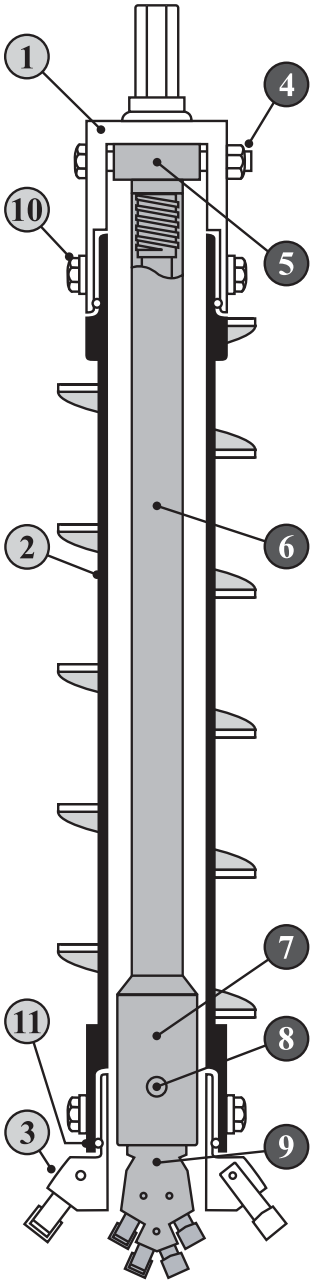


CME 6.25" ID HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21674	Drive cap 6.25" 1.625" hex
2	21680	Hollow stem auger, 6.25" ID x 9.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	21683	Hollow auger head, 6.25" ID x 10.50" OD with CME keyed coupling, including six 5T teeth
4	21684	Bolt with nut 6.25" for Rod to cap adapter
5	21693	Rod to cap adapter, 6.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21702	Pilot assembly with center head, 6.25", NWJ
8	21703	Center head pin for pilot assembly
9	19007	Center head for lead center stem with four 5T auger teeth
10	21025	Auger connector
11	22201	Auger seal, 6.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21721	Auger holding fork
	21519	Rod slips, NWJ
	21042	Insert tap
	19021	Auger tooth 5T
	21734	Repair pin, 6.25"
	21737	Repair box, 6.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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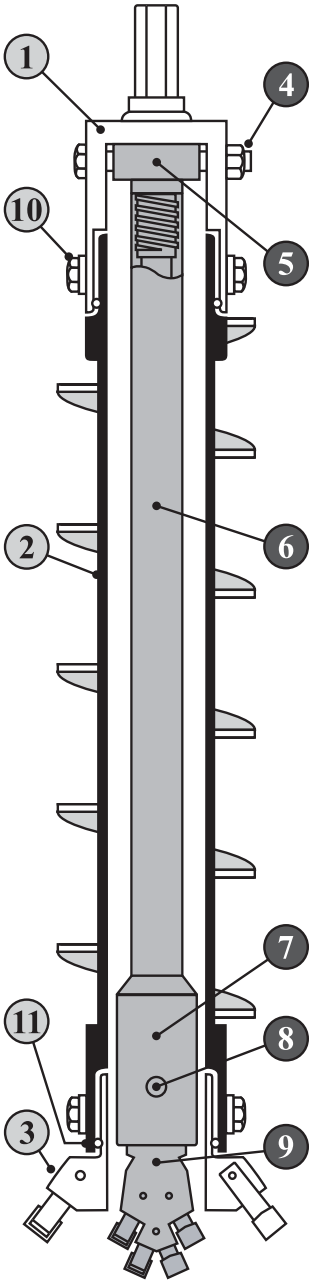


CME 6.25" ID HEAVY DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	22189	Drive cap 6.25" HD 1.625" hex
2	22197	Hollow stem auger, 6.25" ID x 10.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	22200	Hollow auger head, 6.25" ID x 11.00" OD with CME HD keyed coupling, including six 5T teeth
4	21684	Bolt with nut 6.25" for Rod to cap adapter
5	21693	Rod to cap adapter, 6.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21702	Pilot assembly with center head, 6.25", NWJ
8	21703	Center head pin for pilot assembly
9	19007	Center head for lead center stem with four 5T auger teeth
10	21913	Auger connector HD
11	22201	Auger seal, 6.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21721	Auger holding fork
	21719	Rod slips, NWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	22244	Repair pin, 6.25" HD
	22246	Repair box, 6.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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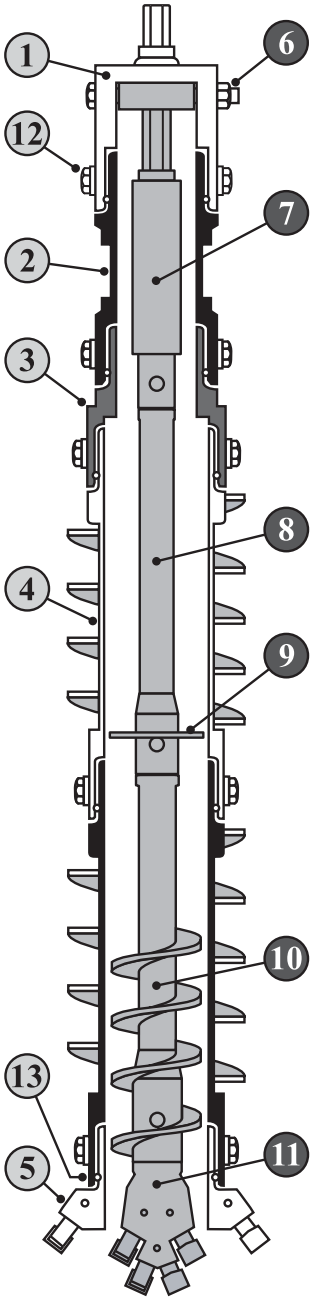
CME 6.25" ID EXTRA HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	22189	Drive cap 6.25" HD 1.625" hex
2	22227	Hollow stem auger, 6.25" ID x 10.25" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	22200	Hollow auger head, 6.25" ID x 11.00" OD with CME XHD keyed coupling, including six 5T teeth
4	21684	Bolt with nut 6.25" for Rod to cap adapter
5	21693	Rod to cap adapter, 6.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21702	Pilot assembly with center head, 6.25", NWJ
8	21703	Center head pin for pilot assembly
9	19007	Center head for lead center stem with four 5T auger teeth
10	21913	Auger connector HD
11	22201	Auger seal, 6.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21721	Auger holding fork
	21719	Rod slips, NWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	22240	Repair pin, 6.25" XHD
	22239	Repair box, 6.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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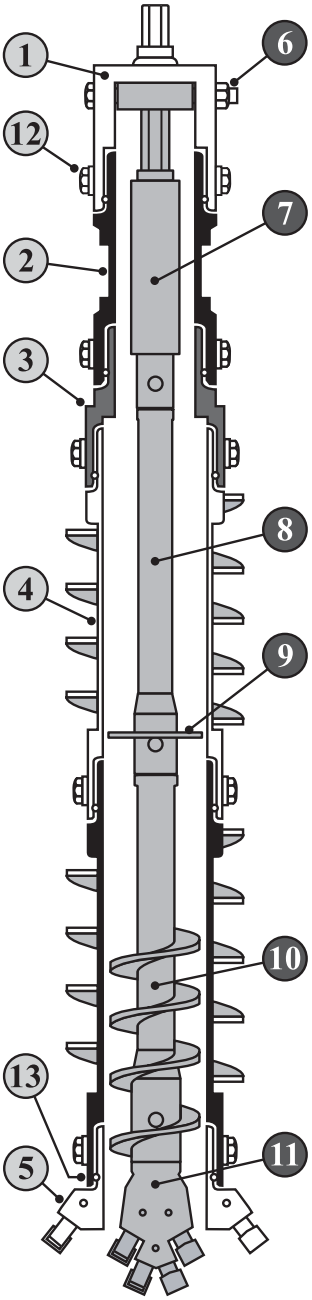


CME 6.25" HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	21469	Drive cap 4.25" 1.625" hex
2	21502	Hollow auger stem 4.25" x 1.5'
3	15248	Sub 6.25" box 4.25" pin
4	21680	Hollow stem auger, 6.25" ID x 9.625" OD x 5' length with CME keyed coupling, hardsurfaced, including auger seal and auger connector
5	21683	Hollow auger head, 6.25" ID x 10.50" OD with CME keyed coupling, including six 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15397	Guide Ring 6.25"
10	15320	Lead center stem 6.25" LH 1.625" hex
11	19007	Center head for lead center stem with four 5T auger teeth
12	21025	Auger connector
13	22201	Auger seal, 6.25"
	21824	Auger connector wrench
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21721	Auger holding fork
	21042	Insert tap
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	21734	Repair pin, 6.25"
	21737	Repair box, 6.25"
	21066	Repair shank, 1.625" hex for drive cap
	21067	Auger key
	21068	Threaded insert

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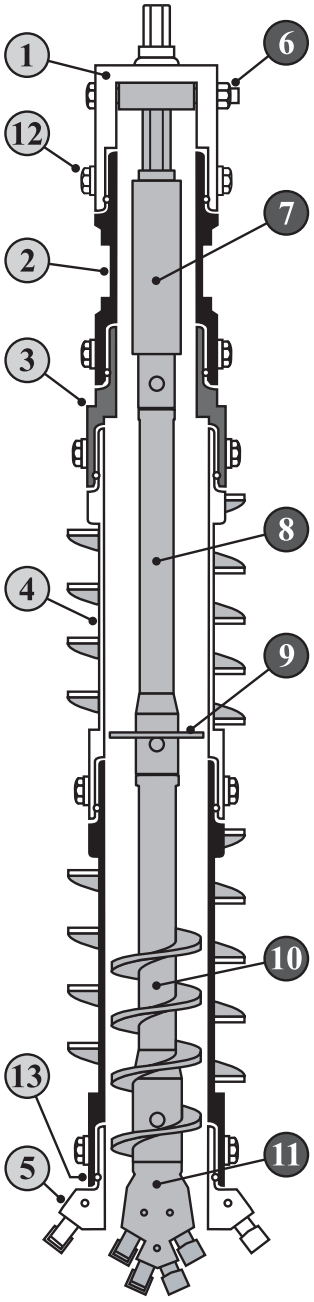
CME 6.25" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22061	Hollow auger stem 4.25" HD x 1.5'
3	15371	Sub 6.25" HD box 4.25" HD pin
4	22197	Hollow stem auger, 6.25" ID x 10.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	22200	Hollow auger head, 6.25" ID x 11.00" OD with CME HD keyed coupling, including six 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15397	Guide Ring 6.25"
10	15320	Lead center stem 6.25" LH 1.625" hex
11	19007	Center head for lead center stem with four 5T auger teeth
12	21913	Auger connector HD
13	22201	Auger seal, 6.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21721	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	22244	Repair pin, 6.25" HD
	22246	Repair box, 6.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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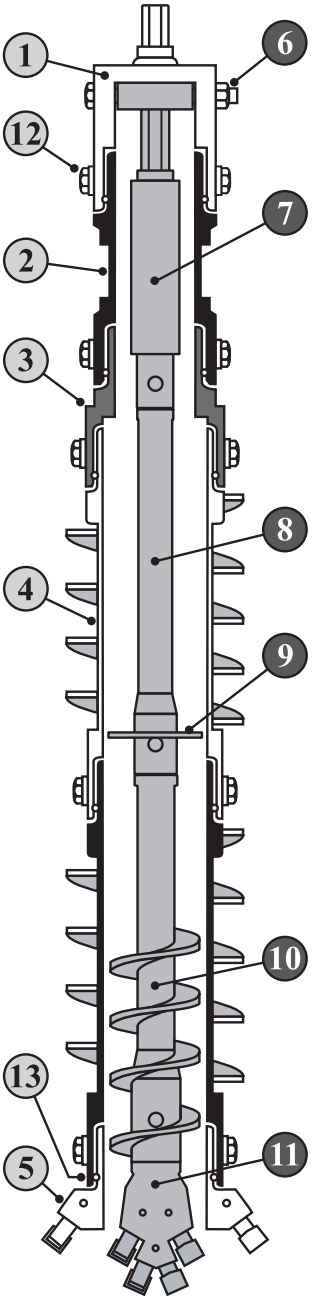
CME 6.25" EXTRA HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22089	Hollow auger stem 4.25" XHD x 1.5'
3	15371	Sub 6.25" HD box 4.25" HD pin
4	22227	Hollow stem auger, 6.25" ID x 10.25" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	22200	Hollow auger head, 6.25" ID x 11.00" OD with CME HD keyed coupling, including six 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15397	Guide Ring 6.25"
10	15320	Lead center stem 6.25" LH 1.625" hex
11	19007	Center head for lead center stem with four 5T auger teeth
12	21913	Auger connector HD
13	22201	Auger seal, 6.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21721	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	22240	Repair pin, 6.25" XHD
	22239	Repair box, 6.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

NOTE: This Auger available in Super XHD Series.

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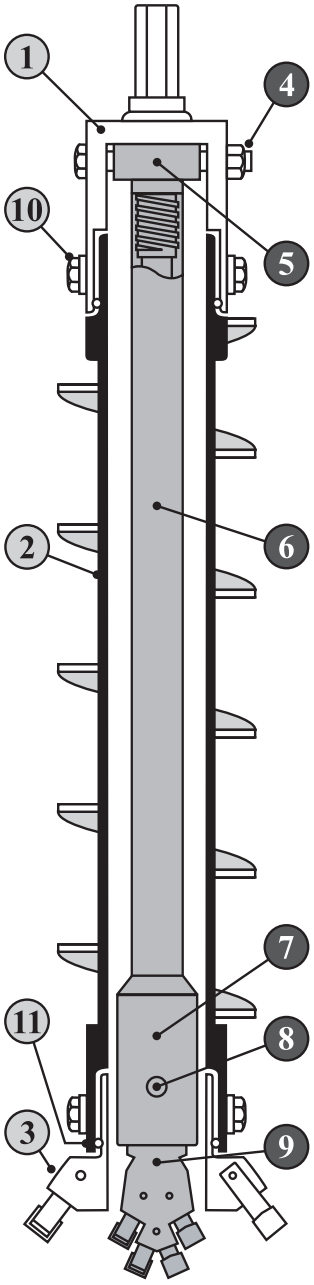


CME 7.25" EXTRA HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22089	Hollow auger stem 4.25" XHD x 1.5'
3	15382	Sub 7.25" HD box 4.25" XHD pin
4	22298	Hollow stem auger, 7.25" ID x 11.25" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	22271	Hollow auger head, 7.25" ID x 12.00" OD with CME HD keyed coupling, including six 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15396	Guide Ring 7.25"
10	15383	Lead center stem 7.25" LH 1.625" hex
11	19010	Center head for lead center stem with six 5T auger teeth
12	21913	Auger connector HD
13	22272	Auger seal, 7.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	22314	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	22311	Repair pin, 7.25" XHD
	22310	Repair box, 7.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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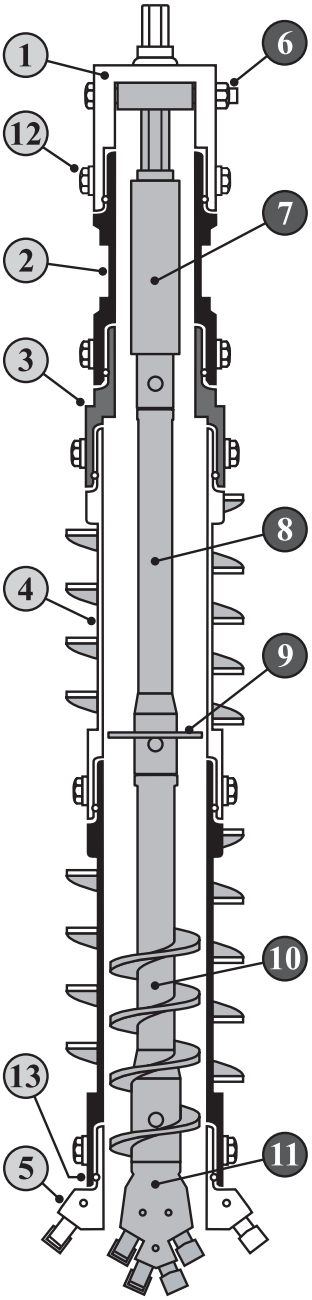


CME 8.25" ID HEAVY-DUTY HOLLOW STEM AUGER TOOLS

Ref. No.	Part No.	Description
1	21769	Drive cap 8.25" HD 1.625" hex
2	21775	Hollow stem auger, 8.25" ID x 12.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
3	21778	Hollow auger head, 8.25" ID x 13.00" OD with CME HD keyed coupling, including six 5T teeth
4	21779	Bolt with nut 8.25" for Rod to cap adapter
5	21783	Rod to cap adapter, 8.25", NWJ pin
6	30729	Drill rod, NWJ, 5' ***Note: Other rod sizes available.***
7	21787	Pilot assembly with center head, 8.25", NWJ
8	21703	Center head pin for pilot assembly
9	19010	Center head for lead center stem with six 5T auger teeth
10	21913	Auger connector HD
11	21789	Auger seal, 8.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	32275	Hoisting swivel, Drill rod, NWJ
	21803	Auger holding fork
	21801	Rod slips, NWJ
	21916	Insert tap HD
	19021	Auger tooth 5T
	21835	Repair pin, 8.25" HD
	21836	Repair box, 8.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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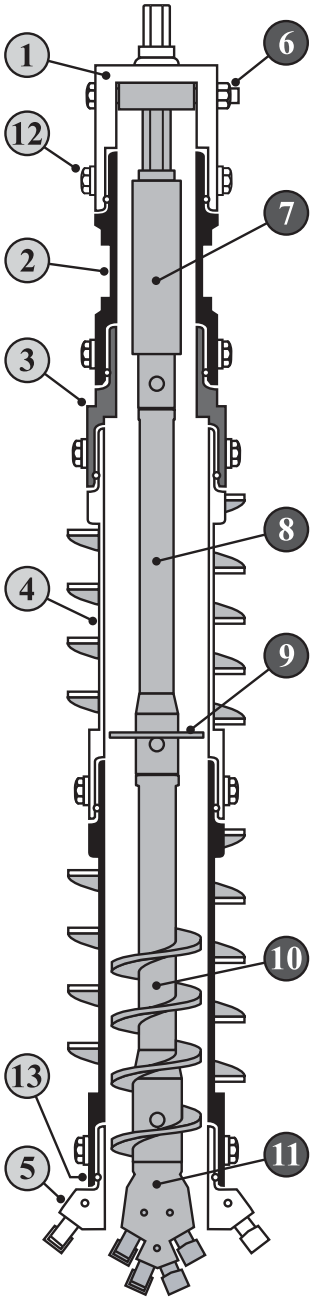


CME 8.25" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22061	Hollow auger stem 4.25" HD x 1.5'
3	15372	Sub 8.25" HD box 4.25" HD pin
4	21775	Hollow stem auger, 8.25" ID x 12.25" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	21778	Hollow auger head, 8.25" ID x 13.00" OD with CME HD keyed coupling, including six 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15489	Guide Ring 8.25"
10	15326	Lead center stem 8.25" LH 1.625" hex
11	19010	Center head for lead center stem with six 5T auger teeth
12	21913	Auger connector HD
13	21789	Auger seal, 8.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	21803	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive pin DP2000 short
	21811	Repair pin, 8.25" HD
	21814	Repair box, 8.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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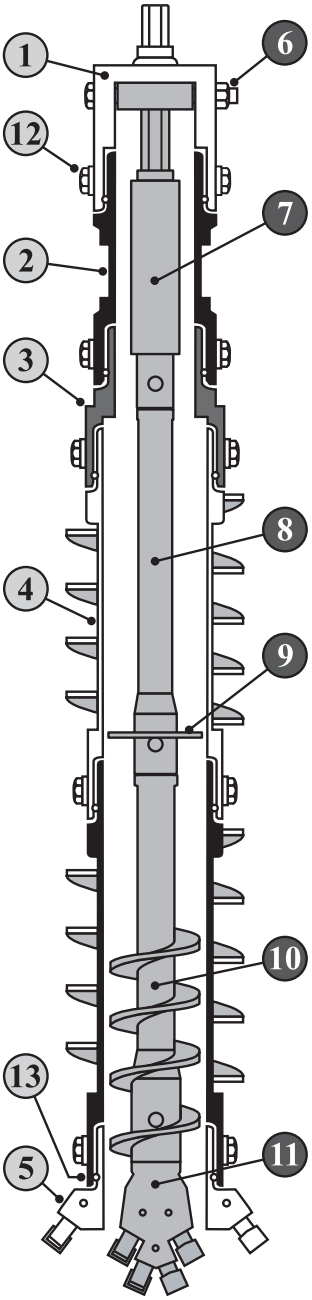


CME 10.25" HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE SYSTEM

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22061	Hollow auger stem 4.25" HD x 1.5'
3	15373	Sub 10.25" HD box 4.25" HD pin
4	22340	Hollow stem auger, 10.25" ID x 14.00" OD x 5' length with CME HD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	22343	Hollow auger head, 10.25" ID x 14.75" OD with CME HD keyed coupling, including ten 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15514	Guide Ring 10.25"
10	15388	Lead center stem 10.25" LH 1.625" hex
11	19338	Center head for lead center stem with eight 5T auger teeth
12	21913	Auger connector HD
13	22344	Auger seal, 10.25" HD
	21825	Auger connector wrench HD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	22384	Auger holding fork
	21916	Insert tap HD
	19021	Auger tooth 5T
	15036	Drive Pin DP2000 Short
	22397	Repair pin, 10.25" HD
	22398	Repair box, 10.25" HD
	21066	Repair shank, 1.625" hex for drive cap
	21917	Auger key HD
	21915	Threaded insert HD

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CME 12.25" EXTRA HEAVY DUTY HOLLOW STEM AUGER WITH CENTER HEXAGON DRIVE

Ref. No.	Part No.	Description
1	22047	Drive cap 4.25" HD 1.625" hex
2	22089	Hollow auger stem 4.25" XHD x 1.5'
3	15562	Sub 12.25" XHD box 4.25" HD pin
4	22507	Hollow stem auger, 12.25" ID x 17.50" OD x 5' length with CME XHD keyed coupling, hardsurfaced, including auger seal and two auger connectors
5	22510	Hollow auger head, 12.25" ID x 18.50" OD with CME XHD keyed coupling, including twelve 5T teeth
6	21479	Bolt with nut 4.25", for Slide connector
7	15313	Slide connector 4.25" 1.625" hex
8	19240	Drill stem with drive pin 1.625" hex x 5'
9	15719	Guide Ring 12.25"
10	15582	Lead center stem 12.25" LH 1.625" hex
11	19338	Center head for lead center stem with eight 5T auger teeth
12	22590	Auger connector XHD
13	22512	Auger seal, 12.25" XHD
	22602	Auger connector wrench XHD
	21041	Auger handling hook
	19264	Hoisting socket 1.625" hex
	22537	Auger holding fork
	22595	Insert tap XHD
	19021	Auger tooth 5T
	15036	Drive Pin DP2000 Short
	22524	Repair pin, 12.25" XHD
	22523	Repair box, 12.25" XHD
	21066	Repair shank, 1.625" hex for drive cap
	22592	Auger key XHD
	22591	Threaded insert XHD

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HOLLOW STEM AUGER - TWO FOOT

Part No.	Description	Part No.	Description
21003	2.25″	22051	4.25″ HD
21091	2.75″	22081	4.25″ XHD
21187	3.25″	21676	6.25″
21265	3.25″ (2-Hole)	22193	6.25″ HD
21904	3.25″ HD	22223	6.25″ XHD
21334	3.75″	21771	8.25″
21412	3.75″ (2-Hole)	22336	10.25″
21980	3.75″ HD	22503	12.25″
21471	4.25″		



HOLLOW STEM DOUBLE FLIGHT LEAD AUGER - FIVE FOOT

Part No.	Description	Part No.	Description
22862	2.25″	21569	4.25″
21180	2.75″	22108	4.25″ HD
21200	3.25″	22884	4.25″ XHD
22946	3.25″ (2-Hole)	21761	6.25″
21974	3.25″ HD	22251	6.25″ HD
21347	3.75″	22957	6.25″ XHD
21458	3.75″ (2-Hole)	21842	8.25″
22037	3.75″ HD		

NOTE: Triple Flight Augers available upon request.



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DRIVE CAPS

Series

ID	1.625" Hex	2" Hex	HSA Pin
2.25″	21001	21074	N/A
2.75″	21089	21171	N/A
3.25″	21263	21311	15407
3.25″ HD	21900	21902	15450
3.75″	21410	21448	15398
3.75″ HD	21976	21978	15252
4.25″	21469	21557	15538
4.25″ HD	22047	22049	15381
6.25″	21674	21748	N/A
6.25″ HD	22189	22191	N/A
7.25″ XHD	22260	22262	N/A
8.25″ HD	21769	21820	N/A
10.25″ HD	22332	22334	N/A
12.25″ HD	N/A	N/A	N/A

REPAIR SHANK

	21066	21070	N/A



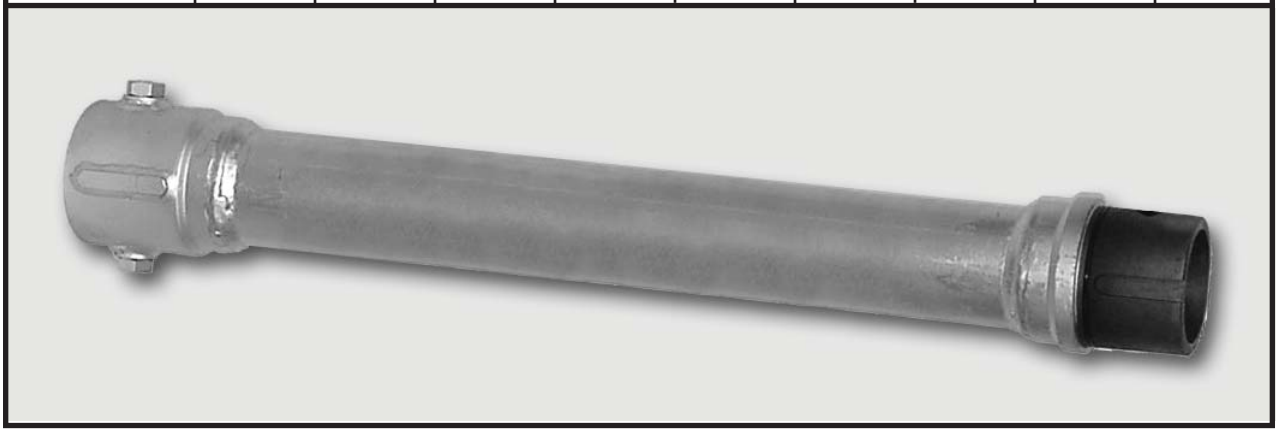


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HOLLOW AUGER STEM

ID	12″	18″	24″	30″	36″	42″	48″	54″	60″
2.25″	21026	21027	21028	21029	21030	21031	21032	21033	21034
2.75″	21121	21122	21123	21124	21125	21126	21127	21128	21129
3.25″	21273	21274	21275	21276	21277	21278	21279	21280	21281
3.25″ HD	21918	21919	21920	21921	21922	21923	21924	21925	21926
3.75″	21420	21421	21422	21423	21424	21425	21426	21427	21428
3.75″ HD	21989	21990	21991	21992	21993	21994	21995	21996	21997
4.25″	21501	21502	21503	21504	21505	21506	21507	21508	21509
4.25″ HD	22060	22061	22062	22063	22064	22065	22066	22067	22068
4.25″ XHD	22088	22089	22090	22091	22092	22093	22094	22095	22096
6.25″	21705	21706	21707	21708	21709	21710	21711	21712	21713
6.25″ HD	22202	22203	22204	22205	22206	22207	22208	22209	22210
6.25″ XHD	22230	22231	22232	22233	22234	22235	22236	22237	22238
7.25″ XHD	22301	22302	22303	22304	22305	22306	22307	22308	22309
8.25″ HD	21790	21791	21792	21793	21794	21795	21796	21797	21798
10.25″ HD	22345	22346	22347	22348	22349	22350	22351	22352	22353
12.25″ HD	22513	22514	22515	22516	22517	22518	22519	22520	22521



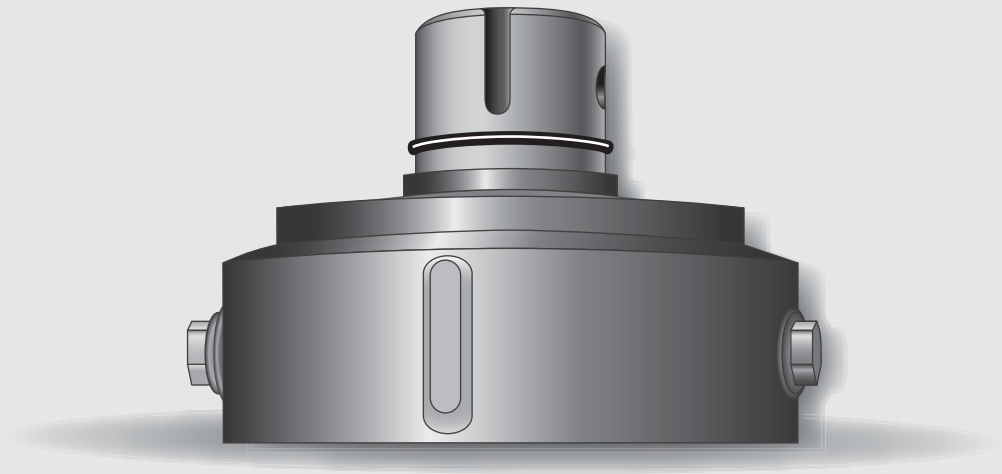
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HOLLOW AUGER SUB

Box	Pin					
	3.25″	3.25″ HD	3.75″	3.75″ HD	4.25″	4.25″ HD
2.25″	15061	15294	15136	15347	15354	15362
2.75″	15077	15295	15243	15348	15355	15363
3.25″	15137	15251	15344	15349	15262	15364
3.25″ HD	15250	15296	15345	15350	15356	15365
3.75″	15124	15297	15338	15351	15357	15366
3.75″ HD	15339	15340	15337	15352	15358	15367
4.25″	15089	15298	15090	15353	15267	15368
4.25″ HD	15292	15299	15257	15259	15359	15369
6.25″	15099	15341	15100	15253	15248	15370
6.25″ HD	15256	15266	15258	15260	15360	15371
7.25″ HD	15644	15645	15646	15647	15648	15382
8.25″ HD	15111	15342	15112	15264	15263	15372
10.25″ HD	15293	15343	15346	15261	15361	15373
12.25″ HD	N/A	N/A	N/A	15617	15655	15562

NOTE: Other HSA sizes available



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ROD TO CAP ADAPTERS

Size	AW	AWJ	NW	NWJ
2.25″	21013	21014	N/A	N/A
2.75″	21101	21102	N/A	N/A
3.25″	21197	21198	21203	21204
3.75″	21344	21345	21350	21351
4.25″	21481	21482	21487	21488
6.25″	21686	21687	21692	21693
8.25″	N/A	N/A	21782	21783
10.25″	N/A	N/A	N/A	N/A
12.25″	N/A	N/A	N/A	N/A

NOTE: Other rod connections available



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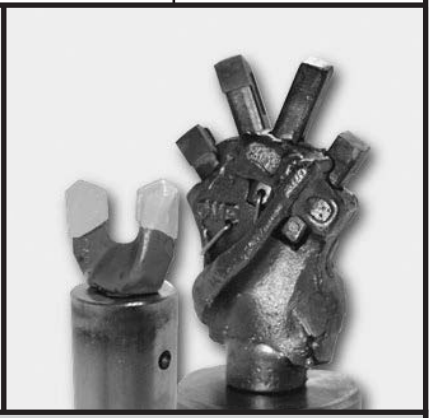
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PILOT ASSEMBLIES

Size	AW	AWJ	NW	NWJ
2.25″	21018	21019	N/A	N/A
2.75″	21110	21111	N/A	N/A
3.25″	21206	21207	21212	21213
3.75″	21353	21354	21359	21360
4.25″ 4 Tooth	21490	21491	21496	21497
4.25″ 2 Prong	21660	21661	21662	21663
6.25″	21695	21696	21701	21702
8.25″	N/A	N/A	21786	21787
10.25″	N/A	N/A	N/A	N/A
12.25″	N/A	N/A	N/A	N/A







CENTER HEAD PINS

Description	Part No.	Description	Part No.
2.25″	21023	**6.25″**	21703
2.75″	21119	**8.25″**	21703
3.25″	21215	**10.25″**	N/A
3.75″	21362	**12.25″**	N/A
4.25″	21499		



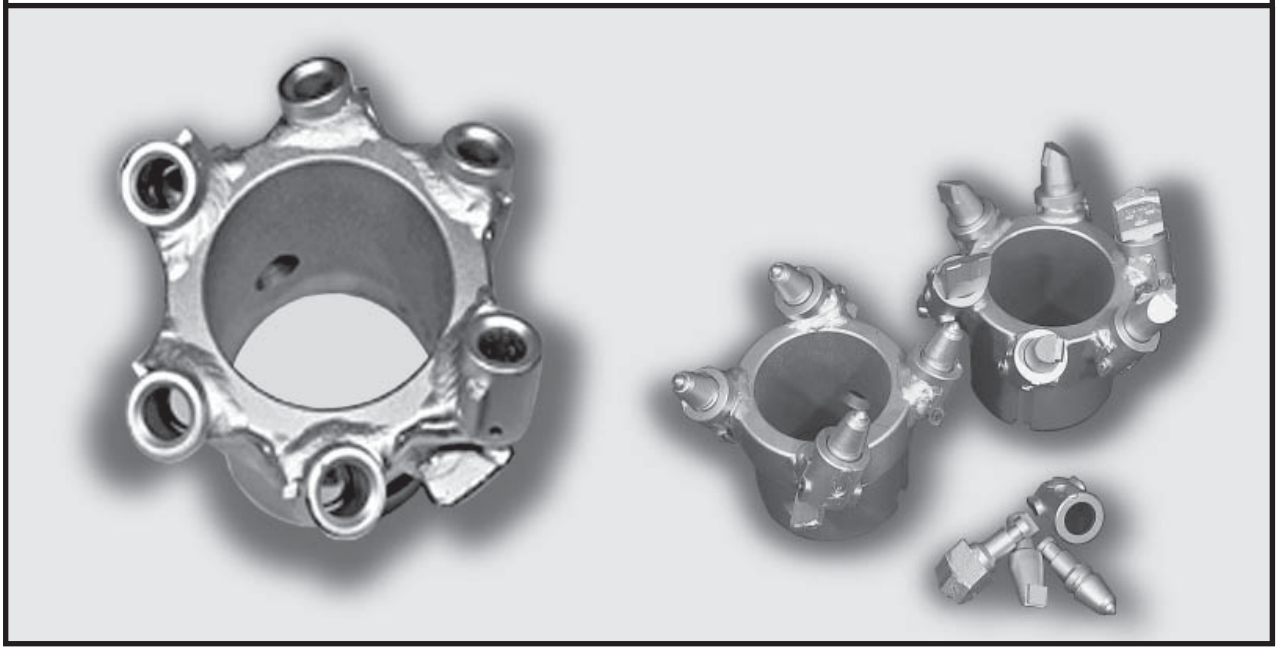
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REFLEX EXHIBIT 1017 - 58/280

S - SERIES HOLLOW AUGER HEADS

Size	Pockets	STD	HD	STD F/Disc	HD F/Disc
2.25″	4	12734	N/A	12762	N/A
2.75″	4	N/A	N/A	N/A	N/A
3.25″	4	12766	12693	12767	12772
3.75″	4	12769	12671	12770	12773
4.25″	4	12779	12669	12781	12780
4.25″	6	12755	12715	12771	12774
6.25″	8	12760	12682	12761	12775
7.25″	N/A	N/A	N/A	N/A	N/A
8.25″	10	N/A	12700	N/A	12776
10.25″	12	N/A	12726	N/A	N/A
12.25″	N/A	N/A	N/A	N/A	N/A

The S-series heads feature replaceable shields that cover and protect the bit pockets. After normal wear, the shields can be replaced before wear damage occurs to the bit pockets themselves. This system will increase cutter head life substantially. Another benefit of these S-series cutter heads is their interchangeable teeth. Depending on the material being drilled, conical, spade or 5S teeth can be used in any combination. This versatility also allows teeth to be changed as the formation changes.



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REFLEX EXHIBIT 1017 - 59/280

S-SERIES HEAD COMPONENTS

Ref. No.	Part No.	Description
1	12744	Conical Tooth
2	12759	5S Tooth
3A	19396	Large Conical Tooth
3B	19394	Bit Skirt *(for Large Conical Tooth-3A)*
4	19390	Spade Tooth
5	19373	Hard Surfaced Shield
6	19381	Carbide Tipped Shield
	12747	Bit Retainer



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REFLEX EXHIBIT 1017 - 60/280

5T HOLLOW AUGER HEADS

Size	STD	HD	STD F/Disc	HD F/Disc
2.25″	21010	N/A	21043	N/A
2.75″	21098	N/A	21136	N/A
3.25″	21194	21911	21234	21933
3.75″	21341	21987	21381	22004
4.25″	21478	22058	21518	22075
6.25″	21683	22200	21749	22217
7.25″	N/A	22271	N/A	22289
8.25″	N/A	21778	N/A	21826
10.25″	N/A	22343	N/A	22361
12.25″	N/A	22510	N/A	N/A



5T HEAD COMPONENTS

Part No.	Description
19021	5T Tooth
21069	Bit retainer





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REFLEX EXHIBIT 1017 - 61/280

EXPENDABLE DISCS AND PLUGS

Size	Stainless Steel Disc	Stainless Steel Spring	Steel Disc	Steel Spring	HDPE Plug	Wood Plug
2.25″	21076	21077	21044	21045	212349	212348
2.75″	21167	21168	21137	21138	212369	212368
3.25″	21314	21315	21235	21236	212356	212350
3.75″	21451	21452	21382	21383	212357	212351
4.25″	21565	21566	21519	21520	212358	212352
6.25″	21759	21760	21750	21751	212359	212353
7.25″	22317	22318	22321	22322	212371	212370
8.25″	21833	21834	21827	21828	212360	212354
10.25″	N/A	N/A	22387	22388	212361	212355
12.25″	N/A	N/A	22540	22541	212362	N/A



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REFLEX EXHIBIT 1017 - 62/280

CONICAL HOLLOW AUGER HEADS

Size	STD	HD	STD F/Disc	HD F/Disc
2.25″	21082	N/A	N/A	N/A
2.75″	21170	N/A	N/A	N/A
3.25″	21321	21961	21320	21963
3.75″	21456	22032	N/A	22035
4.25″	21567	22105	21570	22109
6.25″	21764	22248	21765	22250
7.25″	N/A	22319	N/A	N/A
8.25″	N/A	21838	N/A	21839
10.25″	N/A	22597	N/A	22598
12.25″	N/A	22593	N/A	N/A



CONICAL COMPONENTS

Ref. No.	Part No.	HSA	Description
1	22182	2.25″	Conical Tooth
2	22107	2.75″ - 12.25″	Conical Tooth
3	22183	N/A	Bit Removal Tool

1



3



2



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REFLEX EXHIBIT 1017 - 63/280

WATER TEES FOR HSA

Part No.	Description	Part No.	Description
21038	2.25″	22074	4.25″ XHD
21134	2.75″	21720	6.25″
21232	3.25″	22216	6.25″ HD
21932	3.25″ HD	22216	6.25″ XHD
21379	3.75″	22287	7.25″ XHD
22003	3.75″ HD	21802	8.25″ HD
21516	4.25″	22359	10.25″ HD
22074	4.25″ HD	22536	12.25″ XHD



AUGER HOLDING FORKS

Part No.	Description	Part No.	Description
21039	2.25″	21517	4.25″ XHD
21135	2.75″	21721	6.25″
21233	3.25″	21721	6.25″ HD
21233	3.25″ HD	21721	6.25″ XHD
21380	3.75″	22314	7.25″ HD
21380	3.75″ HD	21803	8.25″ HD
21517	4.25″	22384	10.25″ HD
21517	4.25″ HD	22537	12.25″ HD



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AUGER HANDLING HOOK

Part No.	Description
21041	Auger Handling Hook
	NOTE: Not designed for pulling Augers from Bore Hole



HOISTING ASSEMBLY FOR HSA

Part No.	Description	Part No.	Description
22816	4.25″ - 10.25″	22820	Replacement Lock Pin
22821	12.25″	22826	Replacement Lock Pin





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REFLEX EXHIBIT 1017 - 65/280

ROD SLIPS FOR HSA

	A	AW/AWJ	BW	N	NW/NWJ
2.25″	21036	21037	N/A	N/A	N/A
2.75″	21131	21132	21133	N/A	N/A
3.25″	21227	21228	21229	21230	21231
3.75″	21374	21375	21376	21377	21378
4.25″	21511	21512	21513	21514	21515
6.25″	21715	21716	21717	21718	21719
8.25″	N/A	N/A	21829	21800	21801



HOISTING SWIVEL - H.D. - BALL BEARING TYPE

	A	AW	AWJ	N4	N3	NW	NWJ
Part No.	32268	32269	32270	32272	32273	32274	32275





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HOLLOW AUGER RETRIEVER FOR STANDARD HSA

	2.25”	2.75”	3.25”	3.75”	4.25”	6.25”
Part No.	21035	21130	21282	21429	21510	21714



HOLLOW AUGER RETRIEVER FOR HEAVY-DUTY HSA

	3.25”	3.75”	4.25”	6.25”	8.25”	10.25”
Part No.	21927	21998	22069	22211	21799	22354



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FLIGHT AUGERS

1500 Series

Hole Size	Auger O.D.	Hex Size	Spiral Pitch	Plain Part No.	Hardsurfaced Part No.	Auger Head
3″	2.5″	1.125″	2.75″	19090	19091	
3.125″	3″	1.125″	3″	19100	19101	19003
4.5″	4″	1.125″	3″	19110	19111	19004
5″	4.5″	1.125″	4″	19120	19121	19006
6″	5.5″	1.125″	5″	19130	19131	19008

Augers listed are 60″ long - others lengths available upon request

2000 Series

Hole Size	Auger O.D.	Hex Size	Spiral Pitch	Plain Part No.	Hardsurfaced Part No.	Auger Head
4.5″	4″	1.625″	3″	19140	19141	19005
5″	4.5″	1.625″	4″	19150	19151	19007
6″	5.5″	1.625″	5″	19160	19161	19009
6.75″	6″	1.625″	5″	19170	19171	19010
8.25″	7″	1.625″	6″	19180	19181	19359

Augers listed are 60″ long - others lengths available upon request

2875 Series

Hole Size	Auger O.D.	Hex Size	Spiral Pitch	Plain Part No.	Hardsurfaced Part No.	Auger Head
9″	7.875″	1.625″	6″	19300	19301	19014
10″	8.875″	1.625″	6″	19190	19191	19338
12″	11″	1.625″	9″	19200	19201	19336

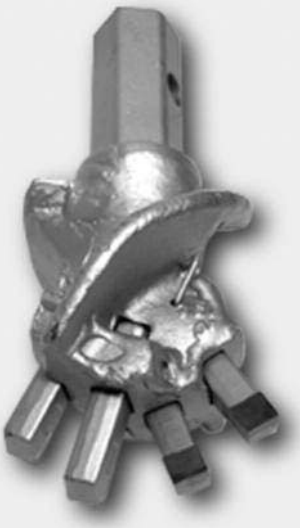
Augers listed are 60″ long - others lengths available upon request

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REFLEX EXHIBIT 1017 - 68/280

FLIGHT AUGER HEADS

Part No.	Head O.D.	Hex Size	Tooth Type	No. Req.	#34 Wedge Required	#37 Wedge Required
21214	3.125″	1.125″	CARBIDE	N/A	N/A	N/A
19004	4.5″	1.125″	5T	4	N/A	N/A
19005	4.5″	1.625″	5T	4	N/A	N/A
19006	5″	1.125″	5T	4	N/A	N/A
19007	5″	1.625″	5T	4	N/A	N/A
19008	6″	1.125″	5T	6	N/A	N/A
19009	6″	1.625″	5T	6	N/A	N/A
19010	6.75″	1.625″	5T	6	N/A	N/A
19359	8.25″	1.625″	5T	6	N/A	N/A
19014	9″	1.625″	5T	8	N/A	N/A
19338	10″	1.625″	5T	8	N/A	N/A
19336	12″	1.625″	5T	10	N/A	N/A



AUGER TEETH

Part No.	Tooth Type
19021	5T
19024	72T
19025	72F
19026	72FB
19028	74F
19029	74FB

5T



72T



72FB



WEDGES

Part No.	Wedge Type
19033	34
19034	37

#34



#37



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FISHTAIL AUGER HEADS

Complete Assembly

Assembly Part No.	O.D.	Hex
19037	2.5″	1.125″
19038	3″	1.125″
19039	3.5″	1.125″
19041	4.5″	1.125″
19042	4.5″	1.625″
N/A	5″	1.125″
19044	5″	1.625″
N/A	6″	1.125″
19046	6″	1.625″
19047	7″	1.625″
19048	8″	1.625″
19049	9″	1.625″
19050	10″	1.625″



Assy.

Components

Head Part No.	Lug Part No.
19051	19062
19052	19062
19053	19063
19054	19063
19054	19065
N/A	N/A
19055	19066
N/A	N/A
19056	19066
19057	19066
19058	19066
19059	19066
19060	19066

Lug



Head



DRIVE PINS

	Series			
	1500	2000S	2000	2875
Part No.	19242	15036	19244	19245
Pointed Hammer				
Part No.	19276			





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HOISTING SOCKETS

Part No.	Hex Size
19262	0.8125″
19263	1.125″
19264	1.625″
19279	2.000″



AUGER FORKS

	Series		
	1500	2000	2875
Part No.	19247	19248	19249



DRILL STEMS

	Series			
	1500	2000	X2000	3500
	1.125” Hex	1.625” Hex	1.625” Hex	2” Hex
Length	Part No.			
6″	15005	15028	N/A	19280
12″	15131	15132	19224	19281
18″	15006	15029	19225	19282
24″	19233	19237	19226	19283
30″	15007	15030	19227	19284
36″	19234	19238	19228	19285
42″	15008	15031	19229	19286
48″	19235	19239	19230	19287
54″	19333	N/A	19231	19288
60″	19236	19240	19232	19289
24″ - 36″ *	N/A	19294	N/A	N/A



Note: * Adjustable from 24″ to 36″

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FLIGHT AUGER RETRIEVERS

Part No.	Hex Size	Pitch
19250	0.8125″	2.25″
19251	0.8125″	2.75″
19252	1.125″	3″
19253	1.125″	4″
19254	1.125″	5″
19255	1.625″	3″
19256	1.625″	4″
19257	1.625″	5″
19258	1.625″	6″
19259	1.625″	9″



FLIGHT AUGER REPAIR PARTS

Series	Hex Size	Repair Pin Part No	Repair Box Part No.
1500	1.125″	19268	19269
2000	1.625″	19270	19271
2875	1.625″	19272	19273

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REFLEX EXHIBIT 1017 - 72/280

AUGER SUBS

HEX BOX to HEX BOX



Part No.	Description
30580	**1.125HX - 1.125HX**
30248	**1.125HX - 1.625HX**
30622	**1.125HX - 2.0HX**
30248	**1.625HX - 1.125HX**
30249	**1.625HX - 1.625HX**
30637	**2.0HX - 1.625HX**



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AUGER SUBS

HEX PIN to HEX BOX



Part No.	Description
30440	**1.125HX - 1.625HX**
30442	**1.125HX - 2.0HX**
30438	**1.625HX - 1.125HX**
30443	**1.625HX - 2.0HX**
30439	**2.0HX - 1.125HX**
30441	**2.0HX - 1.625HX**

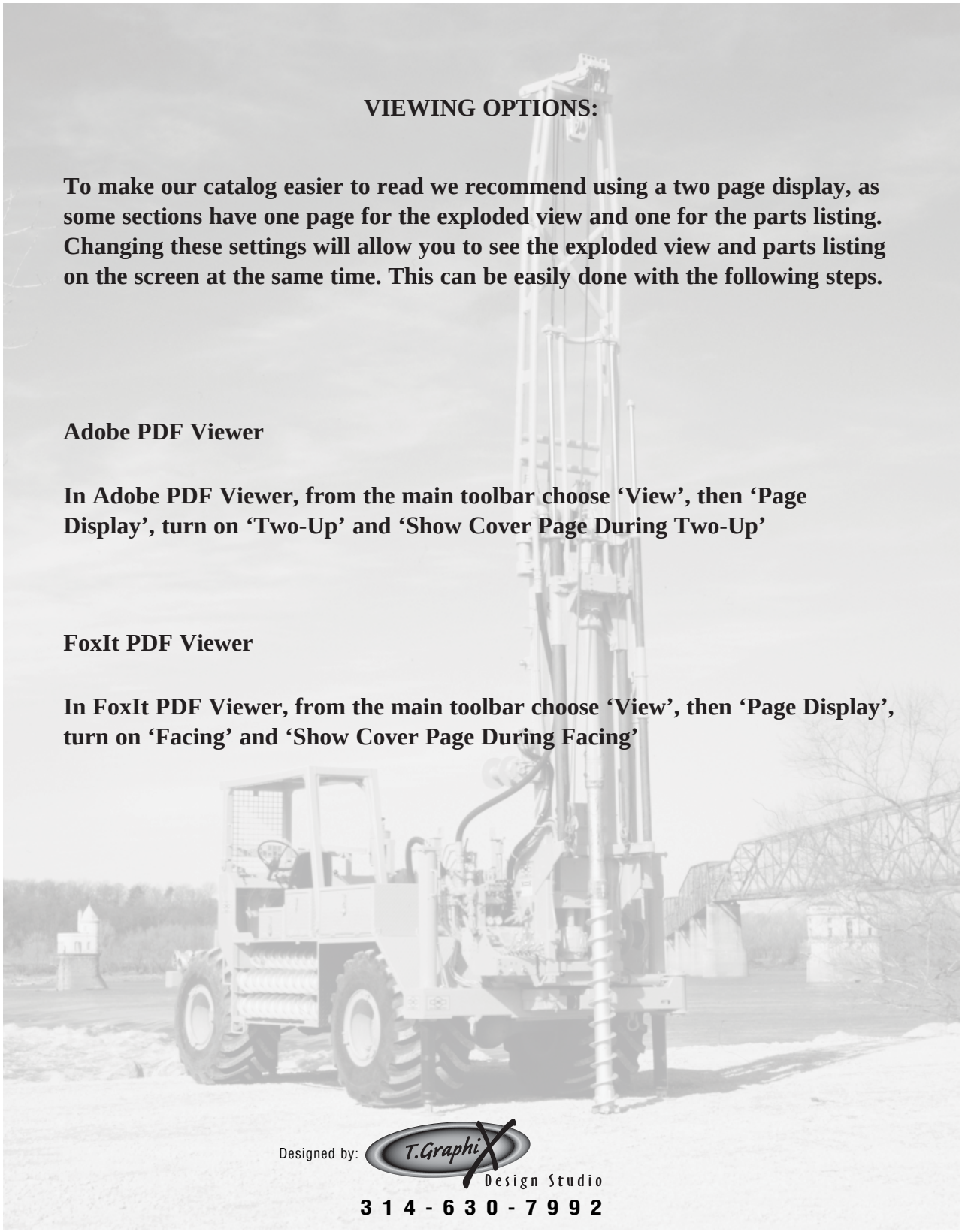


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Soil Sampling





VIEWING OPTIONS:

To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

Adobe PDF Viewer

In Adobe PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Two-Up' and 'Show Cover Page During Two-Up'

FoxIt PDF Viewer

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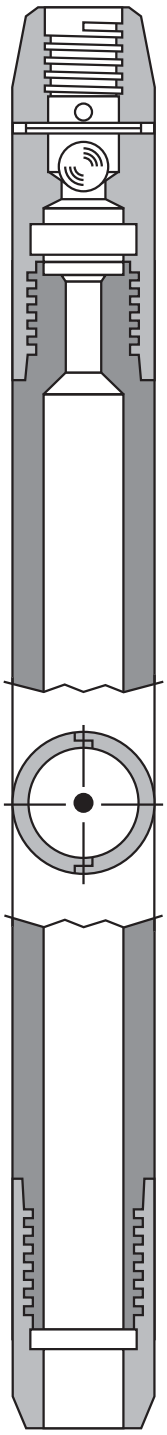
CME Soil Sampling

Continuous Sample Tube Systems
- **Bearing Head (ASTM D 4700) 4.15**
- **Stabilized (ASTM D 4700) 4.23**

Expendable Point Penetrometer 4.08
Pocket Penetrometer 4.08
Safety Type Drive Hammer (ASTM D 1586) 4.09
2” Split Spoon Sampler - Heavy Duty (ASTM D 1586) 4.02
2” Split Spoon Sampler - Standard (ASTM D 1586) 4.03
2.5” Split Spoon Sampler (ASTM D 1586) 4.03
3” Split Spoon Sampler (ASTM D 1586) 4.04
Split Spoon Sampler Parts & Accessories 4.05
Stationary Piston Sampler (ASTM D 1587 & 4700) 4.12
Thin Wall Shelby Tube Heads 4.10
Thin Wall Shelby Tubes & Accessories (ASTM D 1587) 4.11

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REFLEX EXHIBIT 1017 - 77/280



SPLIT SPOON SAMPLER
LYNAC - HEAVY DUTY, 2”

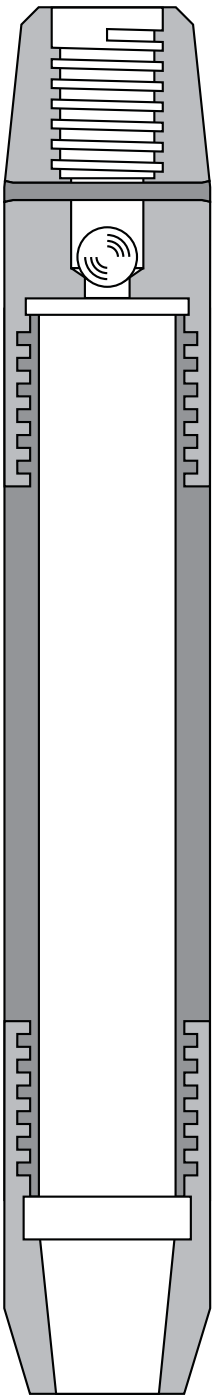
Part No.	Conn	Description
34462	AW	Split spoon sampler, HD, 2″ x 18″ (8)*
34460	AW	Split spoon sampler, HD, 2″ x 18″ (4)*
34465	AWJ	Split spoon sampler, HD, 2″ x 18″ (8)*
34463	AWJ	Split spoon sampler, HD, 2″ x 18″ (4)*
34461	AW	Split spoon sampler, HD, 2″ x 24″ (8)*
34382	AW	Split spoon sampler, HD, 2″ x 24″ (4)*
34464	AWJ	Split spoon sampler, HD, 2″ x 24″ (8)*
34384	AWJ	Split spoon sampler, HD, 2″ x 24″ (4)*
34381	AW	Split spoon sampler head assembly
34383	AWJ	Split spoon sampler head assembly
34149		Split barrel, HD, 2″ x 1.5″ x 18″ (8)*
34367		Split barrel, HD, 2″ x 1.5″ x 18″ (4)*
34150		Split barrel, HD, 2″ x 1.5″ x 24″ (8)*
34368		Split barrel, HD, 2″ x 1.5″ x 24″ (4)*
34144		Shoe, 2″ blunt, 1.375″ ID (8)*
34350		Shoe, 2″ sharp (ASTM) 1.375″ ID (8)*
34366		Shoe, 2″ blunt, 1.375″ ID (4)*
34148		Shoe, 2″ sharp (ASTM) 1.375″ ID (4)*
34195		Spacer, 2″

NOTE: ***(8) = 8 threads per inch shoe.**

***(4) = 4 threads per inch shoe.**

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SPLIT SPOON SAMPLER STANDARD, 2” OD

Part No.	Conn	Description
34121	AW	Split spoon sampler, std, 2″ x 18″
34124	AW	Split spoon sampler, std, 2″ x 24″
34122	AWJ	Split spoon sampler, std, 2″ x 18″
34125	AWJ	Split spoon sampler, std, 2″ x 24″
34184	AW	Split spoon sampler head assembly
34185	AWJ	Split spoon sampler head assembly
34161		Split barrel, std, 2″ x 18″
34162		Split barrel, std, 2″ x 24″
34144		Shoe, 2″
34350		Shoe, 2″ sharp
34195		Spacer, 2″
34455		Trash barrel, 2″ x 6″

NOTE: **1) All samplers are 8 T.P.I**
2) Also available in stainless steel

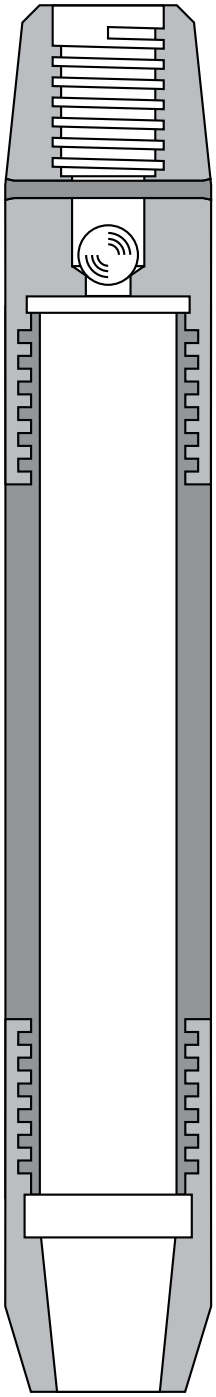
SPLIT SPOON SAMPLER STANDARD, 2.5” OD

Part No.	Conn	Description
34127	AW	Split spoon sampler, std, 2.5″ x 18″
34130	AW	Split spoon sampler, std, 2.5″ x 24″
34128	AWJ	Split spoon sampler, std, 2.5″ x 18″
34131	AWJ	Split spoon sampler, std, 2.5″ x 24″
34187	AW	Split spoon sampler head assembly
34188	AWJ	Split spoon sampler head assembly
34163		Split barrel, std, 2.5″ x 18″
34164		Split barrel, std, 2.5″ x 24″
34145		Shoe, 2.5″
34356		Spacer, 2.5″
34437		Trash barrel, 2.5″ x 6″

NOTE: **1) All samplers are 8 T.P.I.**

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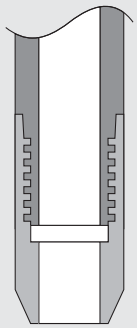
SPLIT SPOON SAMPLER STANDARD, 3” OD

Part No.	Conn	Description
34133	NW	Split spoon sampler, std, 3″ x 18″
34135	NW	Split spoon sampler, std, 3″ x 24″
34371	NWJ	Split spoon sampler, std, 3″ x 18″
34373	NWJ	Split spoon sampler, std, 3″ x 24″
34190	NW	Split spoon sampler head assembly
34374	NWJ	Split spoon sampler head assembly
34165		Split barrel, std, 3″ x 18″
34166		Split barrel, std, 3″ x 24″
34146		Shoe, 3″
34355		Spacer, 3″
34428		Trash barrel, 3″ x 6″
	NOTE:	**1) All samplers are 8 T.P.I.**

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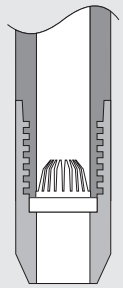
REFLEX EXHIBIT 1017 - 80/280

HEAT - TREATED SHOES SPLIT SPOON SAMPLER



Blunt			Sharp		
Size	TPI	Part No.	Size	TPI	Part No.
2″	4 Thread	34366	2″	4 Thread	34148
2″	8 Thread	34144	2″	8 Thread	34350
2.5″	8 Thread	34145	2.5″	8 Thread	N/A
3″	8 Thread	34146	3″	8 Thread	N/A

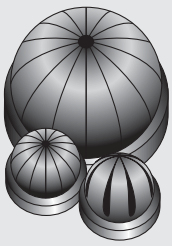
NOTE: 2.5″ & 3″ Shoes available in 4 TPI



SPRING TYPE SAMPLE RETAINERS

For 2” O.D. Samplers

Size	Springs	Adapter
2″	34201	34202

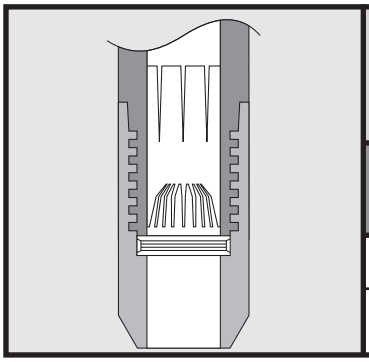


BASKET RETAINER FOR USE IN SPLIT SPOON SAMPLER

Steel Spring Type		Plastic Type	
Size	Part No.	Size	Part No.
2″	34203	2″	34208
2.5″	34204	2.5″	34472
3″	34205	3″	34372

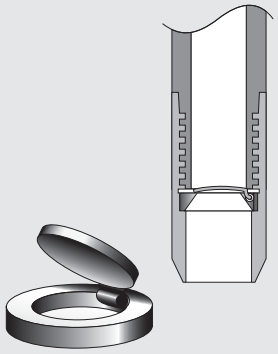
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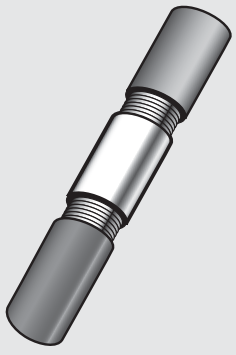
L.A.D. SAMPLE RETAINER WITH POLYETHYLENE SLEEVE

Size	Assembly	Spring	Retainer Ring Set		Sleeve Bag Pack of 50
			Top Adapter	Bottom Adapter	
2″	34211	34201	34209	34210	34212
2.5″	34274	34213	34271	34272	34273



TRAP VALVES

Used w/ Sampler O.D.	Part No.
2″	34214
2.5″	34215
3″	34216



EXTENSION COUPLING

Used w/ Sampler O.D.	Part No.
2″	34196
2.5″	34197
3″	34198

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REFLEX EXHIBIT 1017 - 82/280

LINER SPLIT SPOON SAMPLER



Part No.	Description
34228	Brass 1.5″ x 6″ - for 2″ sampler
34229	Brass 2″ x 6″ - for 2.5″ sampler
34230	Brass 2.5″ x 6″ - for 3″ sampler
34430	Brass 2.5″ x 1″ - .042 wall - for 3″ sampler
34432	Soil sample can w/lid - for 2.5″ x 1″ liner ***Note: Holds six 1″ liners.***
34231	Stainless steel 1.5″ x 6 - for 2″ sampler
34232	Stainless steel 2″ x 6″ - for 2.5″ sampler
34233	Stainless steel 2.5″ x 6″ - for 3″ sampler
34224	Plastic 1.5″ x 18″ - for 2″ sampler
34225	Plastic 2″ x 18″ - for 2.5″ sampler
34226	Plastic 2.5″ x 18″ - for 3″ sampler
34234	Plastic 1.5″ x 24″ - for 2″ sampler
34227	Plastic 2″ x 24″ - for 2.5″ sampler
34237	Plastic 2.5″ x 24″ - for 3″ sampler

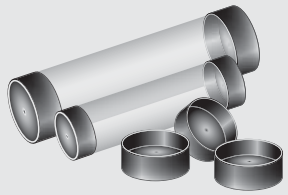
NOTE: Other lengths available on special order.

These liners are used for quickly removing the sample from the sampler. Each end of the liner is covered with plastic caps to keep the sample intact.

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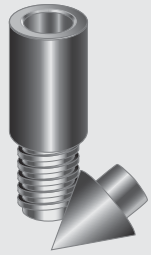
REFLEX EXHIBIT 1017 - 83/280

PLASTIC END CAPS



Part No.	Description
34235	1.5″ plastic cap
34327	2″ plastic cap
34332	2.5″ plastic cap
34236	4″ Teflon squares (100 ct.)

NOTE: These caps are for split spoon sampler liners.
See "Thin Wall Shelby Tube and Accessories" for additional caps. (Pg.58)



EXPENDABLE POINT PENETROMETER

Conn.	Point Diameter		Point Only Part No.	Coupling Only Part No.
	Inches	mm		
AW	2″	50.8	34411	34412

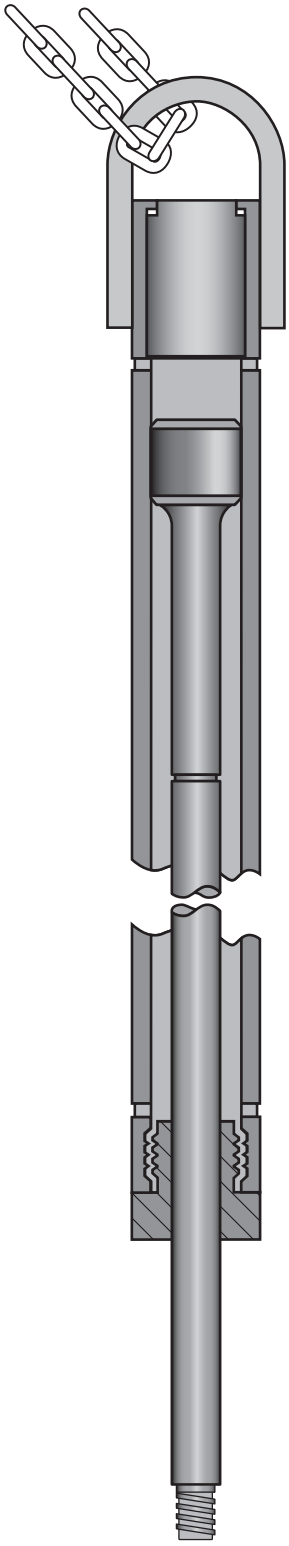


POCKET PENETROMETER

Part No.	Description
214045	Pocket penetrometer

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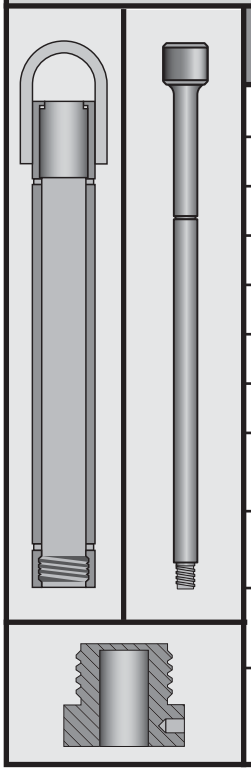
REFLEX EXHIBIT 1017 - 84/280



DRIVE HAMMER SAFETY TYPE

Part No.	Conn	Description
34001	AW	140 pound safety hammer
34005	AW	300 pound safety hammer
34009	AW	350 pound safety hammer
34003	NW	140 pound safety hammer
34007	NW	300 pound safety hammer
34011	NW	350 pound safety hammer

SAFETY HAMMER PARTS



Part No.	Conn Size	Description
34016	AW	Impact rod (same for 140#, 300#, 350#)
34018	NW	Impact rod (same for 140#, 300#, 350#)
34020	AW	End cap
34021	NW	End cap
34013	140#	Safety hammer barrel
34014	300#	Safety hammer barrel
34015	350#	Safety hammer barrel
30679	-	Heat treated Hammer Subs, Solid (AW Box to AW Pin)
30680	-	Heat treated Hammer Subs, Solid (AW Box to AWJ Pin)
30696	-	Heat treated Hammer Subs, Solid (NW Box to NW Pin)
30697	-	Heat treated Hammer Subs, Solid (NWJ Box to NWJ Pin)

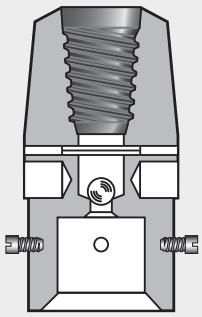
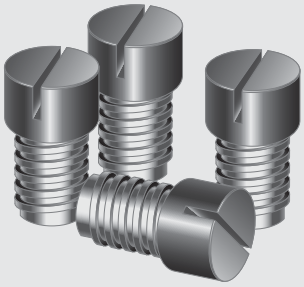
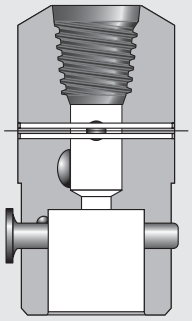
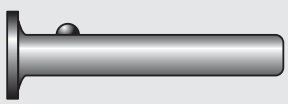
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THIN WALL "SHELBY" TUBE HEADS

Part No.	Conn.	Description
34240	AW	2″ head assembly, cap screw style
34241	AWJ	2″ head assembly, cap screw style
34281	AW	2″ head assembly, click pin style
34282	AWJ	2″ head assembly, click pin style
34243	AW	3″ head assembly, cap screw style
34244	AWJ	3″ head assembly, cap screw style
34247	NW	3″ head assembly, cap screw style
34248	NWJ	3″ head assembly, cap screw style
34284	AW	3″ head assembly, click pin style
34285	AWJ	3″ head assembly, click pin style
34288	NW	3″ head assembly, click pin style
34289	NWJ	3″ head assembly, click pin style
34330	-	Cap screw 2″ head (4 req'd.)
34331	-	Cap screw 3″ head (4 req'd.)
34321	-	Click pin 2″ head (1 req'd.)
34322	-	Click pin 3″ head (1 req'd.)

NOTE: Heads include four cap screws or one click pin.

Cap Screw Head	Cap Screw	Click Pin Head	Click Pin
			

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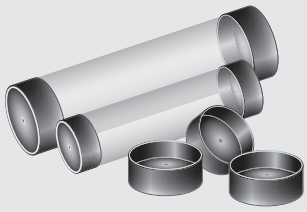
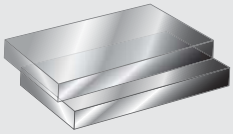
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THIN WALL "SHELBY" TUBES AND ACCESSORIES

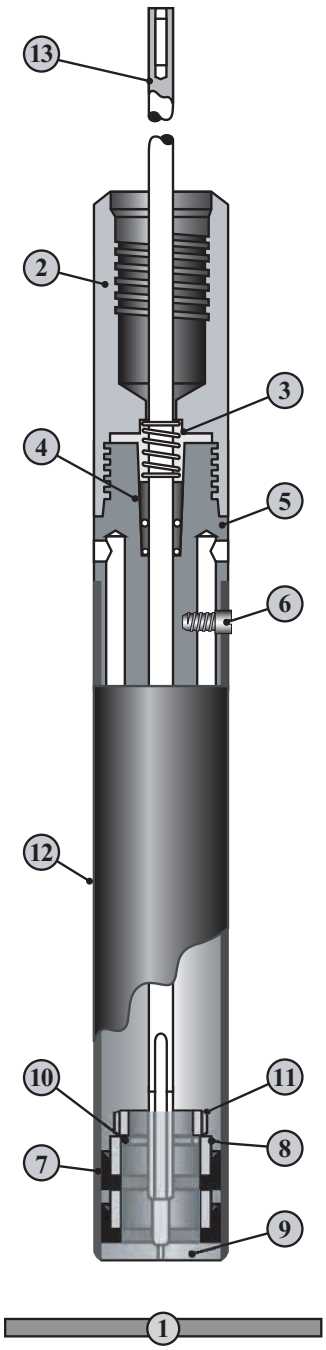
Part No.	Description
34253	Tube, steel, 2″ x 30″
34254	Tube, galvanized, 2″ x 30″
34456	Tube, steel, 3″ x 24″
34457	Tube, galvanized, 3″ x 24″
34256	Tube, steel, 3″ x 30″
34257	Tube, galvanized, 3″ x 30″
34266	Tube, galvanized, 3″ x 36″
34327	Plastic cap 2″
34328	Plastic cap 3″
34417	Vinyl cap 2″
34418	Vinyl cap 3″
34325	Soil seal 3″
34410	Sealing wax, 10 pound

NOTE: Other sizes available on special order.

Plastic Caps	Soil Seal	Sealing Wax
		

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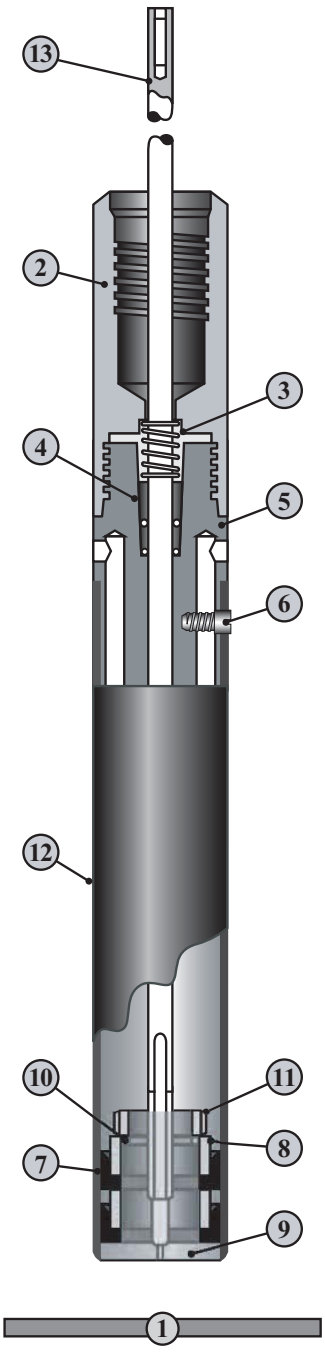


STATIONARY PISTON SAMPLER - 2 INCH OPTIONS AND SPARE PARTS

Ref. No.	2″ O.D. AW Part No.	Description
1	37203	Stationary Piston Sampler Assembly 2″ OD x 1.875″ ID (50.8 x 47.6mm) with 30″ (762.0 mm) Sample Tube
2	37204	Head
3	37205	Clamp Spring
4	37206	Cone Clamp Assembly
5	37207	Plug
6	34330	Socket Head Cap Screw (4 req'd.)
7	37209	Packing Cup (2 req'd.)
8	37210	Piston Spacer (2 req'd.)
9	37211	Piston
10	37212	Lock washer
11	37213	Lock nut
12	34253	Steel Tube - 30″
12	34254	Galvanized Tube - 30″
13	37214	Piston Rod - Master
	37215	Actuating Rod - 2 Ft.
	37216	Actuating Rod - 5 Ft.
	37217	Actuating Rod - 10 Ft.
	37249	Eye Bolt w/shoulder

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REFLEX EXHIBIT 1017 - 88/280



STATIONARY PISTON SAMPLER - 3 INCH OPTIONS AND SPARE PARTS

Ref. No.	3″ O.D. NW Part No.	Description
1	37218	Stationary Piston Sampler Assembly 3″ OD x 2.875″ ID (76.2 x 73.0mm) with 30″ (762.0 mm) Sample Tube
2	37219	Head
3	37205	Clamp Spring
4	37206	Cone Clamp Assembly
5	37220	Plug
6	34331	Socket Head Cap Screw (4 req'd.)
7	37222	Packing Cup (2 req'd.)
8	37223	Piston Spacer (2 req'd.)
9	37224	Piston
10	37225	Lock washer
11	37226	Lock nut
12	34256	Steel Tube - 30″
12	34257	Galvanized Tube - 30″
13	37214	Piston Rod - Master
	37215	Actuating Rod - 2 Ft.
	37216	Actuating Rod - 5 Ft.
	37217	Actuating Rod - 10 Ft.
	37249	Eye Bolt w/shoulder

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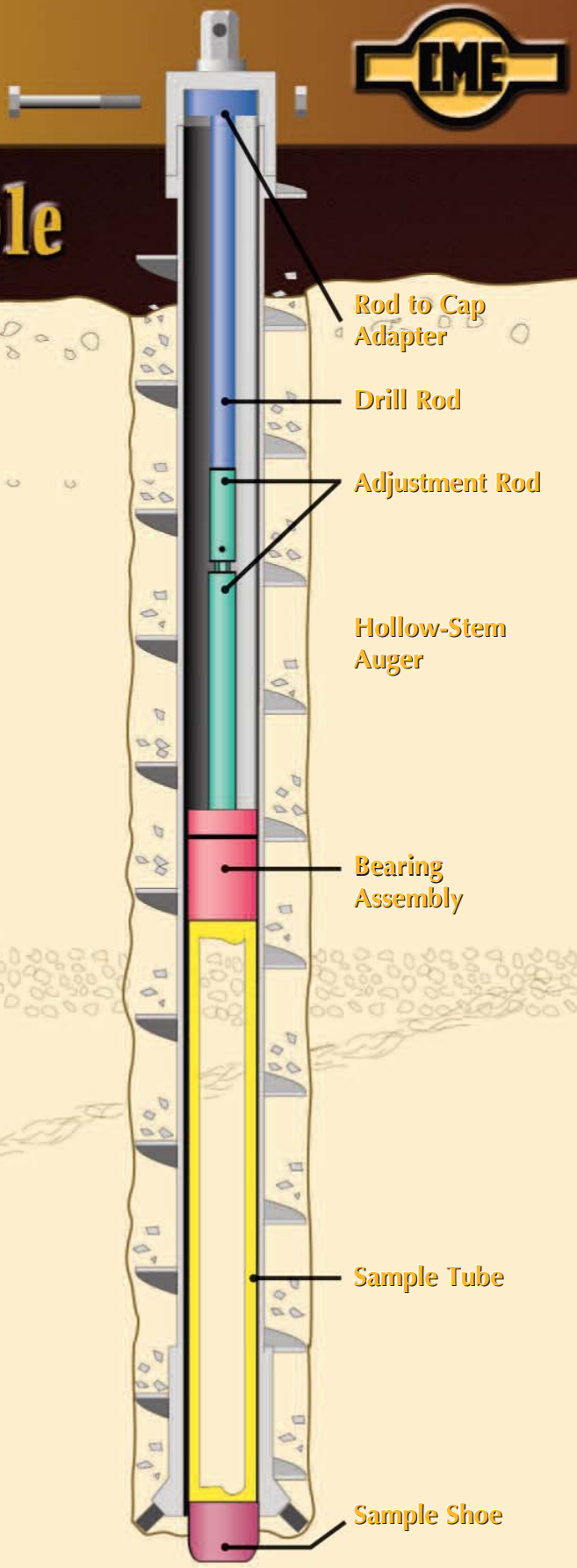
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REFLEX EXHIBIT 1017 - 90/280

Bearing Head

Continuous Sample Tube System



Bearing Head

Continuous Sample Tube System provides an efficient method for sampling soil and weak rock simultaneously while drilling with hollow augers.

High Quality Samples



This system consistently recovers high quality samples in many augerable materials such as glacial till, hard clays, shales, mine tailings, lignite, peat and loess. The sealed bearing assembly conveys thrust during drilling to the tube and sampler shoe while isolating them from rotation of the center stem and augers.The undisturbed specimen enters the sample barrel as the augers are advanced. No drilling fluid or air is required.

A bearing head sampler system is available for 2 1/4″, 2 3/4″, 3 1/4″, 3 3/4″, 4 1/4″ and 6 1/4″ I.D. CME hollow-stem augers. System components include a drill rod to drive cap adapter and 5 foot sections of AW or NW threaded drill rod. An adjustment rod connects the drill rod to the bearing assembly and 5 foot capacity sample tube. This center stem string positions a solid or spit-tube sampler within the lead auger.

Adjustable Sample Tube Extension



Sampler retracted for hard material | Sampler extended for soft material

The adjustment rod allows you to adjust the extension of the sample tube. For sampling soft materials, the tube can be positioned beyond the auger teeth. In harder materials, such as shales, it can be positioned behind the auger teeth.

Clear Plastic Liners Available



Clear plastic liners can be run inside split tube samplers. Upon removal from the sample tube, the liners containing samples can be sealed with plastic end-caps. These liners allow visual inspection of the sample in the field, while keeping it intact for transport to a lab for further analysis.

Sample Shoe with Basket Retainer



A sample shoe with basket retainer is also available. The basket helps contain the specimen within the sampler as it is withdrawn from the borehole.

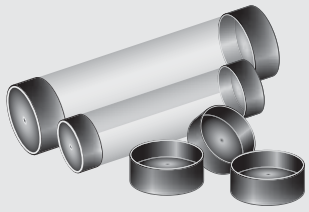
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CME 2" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 2.25" HSA

Ref. No.	Part No.	HSA	Description
1	- -	2.25"	Adjustment rod, (see pg. 4.22 for connections)
2	15506	2.25"	Bearing head, 2" OD AW RH
2	15806	2.25"	Bearing head, 2" OD AWJ RH
3	15509	2.25"	Split tube, 2" OD x 5' RH
4	15511	2.25"	Sample Shoe, 2" OD 1.25" ID RH
4	15711	2.25"	Sample Shoe for liner, 2" OD 1.062" ID RH
	15712	2.25"	Plastic liner, 1.5" OD x 30"
	15713	2.25"	Plastic Cap for 1.5" OD liner
4	15717	2.25"	Sample Shoe for basket retainer, 2" OD 1.25" ID RH
	34195	2.25"	Spacer for 15717 shoe
	34208	2.25"	Basket retainer, 2" OD - Plastic
	34203	2.25"	Basket retainer, 2" OD - Steel





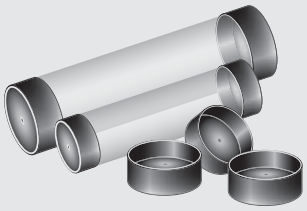
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CME 2.5" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 2.75" HSA

Ref. No.	Part No.	HSA	Description
1	- -	2.75″	Adjustment rod, (see pg. 4.22 for connections)
2	15507	2.75″	Bearing head, 2.5″ OD AW RH
2	15553	2.75″	Bearing head, 2.5″ OD AWJ RH
3	15510	2.75″	Split tube, 2.5″ OD x 5′ RH
3	15735	2.75″	Solid tube, 2.5″ OD x 5′ RH
4	15512	2.75″	Sample shoe, 2.5″ OD 1.75″ ID RH
4	15741	2.75″	Sample Shoe for liner, 2.5″ OD 1.5″ ID RH
	15149	2.75″	Plastic liner, 2″ OD x 30″
	34327	2.75″	Plastic Cap for 2″ OD liner
4	15627	2.75″	Sample Shoe for basket retainer, 2.5″ OD 1.75″ ID RH
	34356	2.75″	Spacer for 15627 shoe
	34204	2.75″	Basket retainer, 2.5″ OD - Steel





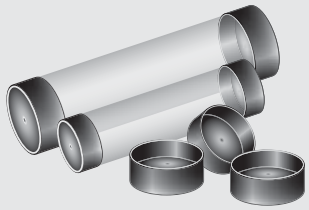
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REFLEX EXHIBIT 1017 - 94/280



CME 3" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.25" HSA

Ref. No.	Part No.	HSA	Description
1	- -	3.25"	Adjustment rod, (see pg. 4.22 for connections)
2	15436	3.25"	Bearing head, 3" OD AW RH
2	15606	3.25"	Bearing head, 3" OD AWJ RH
3	15437	3.25"	Split tube, 3" OD x 5' RH
3	15441	3.25"	Solid tube, 3" OD x 5' RH
4	15438	3.25"	Sample shoe, 3" OD 2.25" ID RH
4	15440	3.25"	Sample Shoe for liner, 3" OD 2" ID RH
	15026	3.25"	Plastic liner 2.5" OD x 30"
	34332	3.25"	Plastic cap for 2.5" OD liner
4	15475	3.25"	Sample Shoe for basket retainer, 3" OD 2.19" ID RH
	15242	3.25"	Spacer for 15475 shoe
	34205	3.25"	Basket retainer, 3" OD - Steel
	34372	3.25"	Basket retainer, 3" OD - Plastic





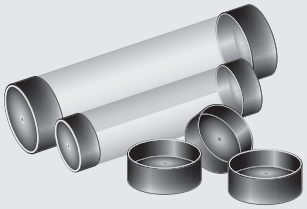
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REFLEX EXHIBIT 1017 - 95/280



CME 3.5" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.75" HSA

Ref. No.	Part No.	HSA	Description
1	- -	3.75″	Adjustment rod, (see pg. 4.22 for connections)
2	15400	3.75″	Bearing head, 3.5″ OD AW RH
2	15595	3.75″	Bearing head, 3.5″ OD AWJ RH
3	15401	3.75″	Split tube, 3.5″ OD x 5′ RH
3	15405	3.75″	Solid tube, 3.5″ OD x 5′ RH
4	15402	3.75″	Sample shoe, 3.5″ OD 2.75″ ID RH
4	15403	3.75″	Sample shoe for liner, 3.5″ OD 2.5″ ID RH
	15054	3.75″	Plastic liner 3″ OD x 30″
	34328	3.75″	Plastic cap for 3″ OD liner
4	15404	3.75″	Sample Shoe for basket retainer, 3″ OD 2.63″ ID RH
	15135	3.75″	Spacer for 15404 shoe
	34206	3.75″	Basket retainer, 3.5″ OD - Steel





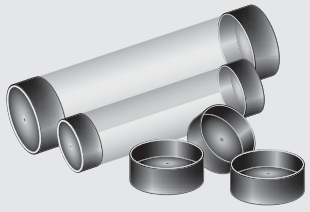
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REFLEX EXHIBIT 1017 - 96/280



CME 4" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 4.25" HSA

Ref. No.	Part No.	HSA	Description
1	- -	4.25"	Adjustment rod, (see pg. 4.22 for connections)
2	15458	4.25"	Bearing head, 4" OD NW RH
2	15612	4.25"	Bearing head, 4" OD NWJ RH
2	15633	4.25"	Bearing head, 4" OD AWJ RH
3	15460	4.25"	Split tube, 4" OD x 5' RH
3	15540	4.25"	Solid tube, 4" OD x 5' RH
4	15461	4.25"	Sample shoe, 4" OD 3.25" ID RH
4	15462	4.25"	Sample shoe for liner, 4" OD 3" ID RH
	15209	4.25"	Plastic liner 3.5" OD x 30"
	34333	4.25"	Plastic cap for 3.5" OD liner
4	15463	4.25"	Sample Shoe for basket retainer, 4" OD 3.25" ID RH
	15246	4.25"	Spacer for 15463 shoe
	15245	4.25"	Basket retainer, 4" OD - Steel





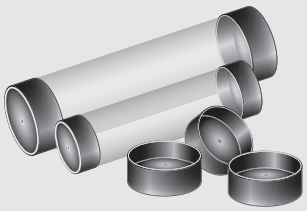
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CME 4" HEAVY DUTY BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 4.25" HSA

Ref. No.	Part No.	HSA	Description
1	- -	4.25"	Adjustment rod, (see pg. 4.22 for connections)
2	15802	4.25"	Bearing head, 4" OD NW RH
2	15803	4.25"	Bearing head, 4" OD NWJ RH
3	15800	4.25"	Split tube, 4" OD x 5' RH
4	15801	4.25"	Sample Shoe for basket retainer, 4" OD 2.63" ID RH
	34206	4.25"	Basket retainer, 4" OD - Steel





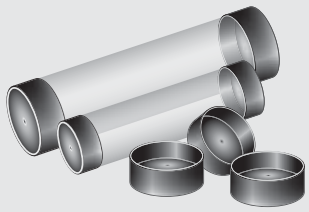
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CME 6" BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 6.25" HSA

Ref. No.	Part No.	HSA	Description
1	- -	6.25"	Adjustment rod, (see pg. 4.22 for connections)
2	15443	6.25"	Bearing head, 6" OD NW RH
3	15447	6.25"	Split tube, 6" OD x 5' RH
4	15445	6.25"	Sample shoe, 6" OD 5.13" ID RH
4	15464	6.25"	Sample shoe for liner, 6" OD x 4.88 ID RH
	15229	6.25"	Plastic liner 5.38" OD x 30"
	34334	6.25"	Plastic cap for 5.38" OD liner
4	15446	6.25"	Sample Shoe for basket retainer, 6" OD 5.13" ID RH
	15255	6.25"	Spacer for 15446 shoe
	15254	6.25"	Basket retainer, 6" OD - Steel





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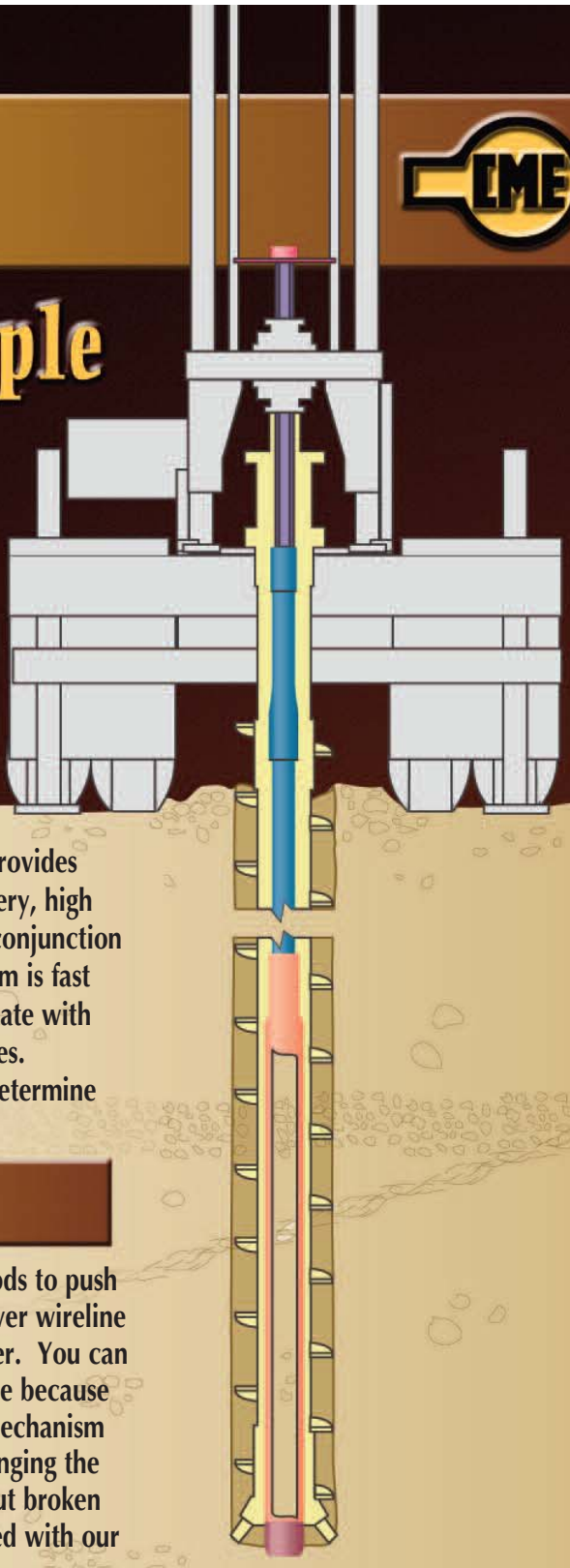
ADJUSTMENT ROD BEARING HEAD CONTINUOUS SAMPLE TUBE SYSTEM

Pin Connection	Box Connection			
	AW	AWJ	NW	NWJ
AW	15399	15539	15544	15508
AWJ	- -	15563	- -	- -
NW	15603	15546	15448	15564
NWJ	- -	- -	- -	15611

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REFLEX EXHIBIT 1017 - 100/280

Stabilized Continuous Sample Tube System



High Quality Samples

The patented CME Continuous Sample Tube System provides an extremely positive method for obtaining full recovery, high quality soil samples. Since sampling is performed in conjunction with the hollow stem auger drilling process, this system is fast and efficient. The sample tube positively does not rotate with the augers, so you get excellent, representative samples. You can even document the sample orientation and determine directional trends of fractures or contaminates.

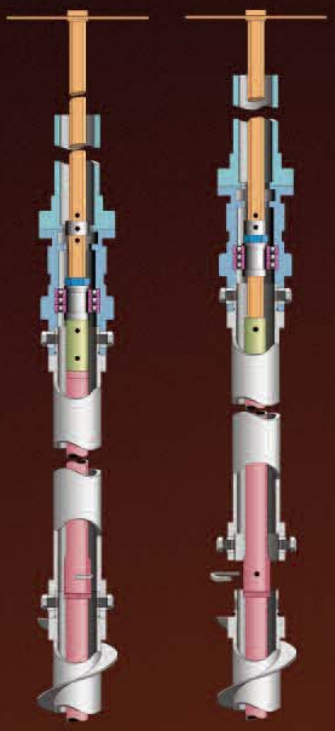
Positive Sample Retrieval

The CME Continuous Sample Tube System uses hex rods to push and retrieve the sampler. It has several advantages over wireline sampling systems that use cable to retrieve the sampler. You can always tell the precise depth of the sampler in the hole because of the rigidity of the rods. Also, there's no latching mechanism to cause problems. And if you get in a bind while bringing the sampler out of the hole, you don't have to worry about broken cables and lost samples. The hex rods can also be used with our hollow stem auger, center hexagon drive system.

Effective in Difficult Formations

The CME Continuous Sample Tube System works well in many difficult formations such as glacial drift, hard clays and shales, lignite, peat, coal, mine tailings and loess.

Continuous Sample Tube System



Positively Prevents Sampler from Rotating



The sample tube is connected to a string of hex rods that extends up through the augers and the bearing assembly. A locking rod at the top of the string is attached to a horizontal locking plate. This plate fits between the feed pull-down rods and positively prevents the sample tube from rotating as the augers turn.

Downward pressure is transferred from the drill rotary box through a bearing assembly attached to the bottom of the spindle. The locking rod, which extends through this bearing assembly, can slide approximately 6 inches (15.2 cm) axially.

As drilling advances and augers and rods must be added, you simply uncouple an auger connection and raise the feed system 6 inches (15.2 cm). The auger connection will separate, giving you access to the hex rod connection inside the auger column.

Adjustable Sample Tube Extension

A 5 foot (1.5 m) capacity solid or split-tube sample barrel fits within the lead auger of the hollow auger column. The extension of the sample tube is adjustable. For sampling soft materials, the tube can be positioned beyond the auger teeth. In harder materials, such as shales, it can be positioned behind the auger teeth.

The positioning is accomplished through an adjustment rod that connects the sampler to the hex rods. A drive pin locks the parts together at the desired length. Adjustments are available in one inch (2.5 cm) increments.



Sampler retracted for hard material

Sampler extended for soft material

Clear Plastic Liners Available

Clear plastic liners can be run inside split tube samplers. Upon removal from the sample tube, the liners containing samples can be sealed with plastic end-caps. These liners allow visual inspection of the sample in the field, while keeping it intact for transport to a lab for further analysis.



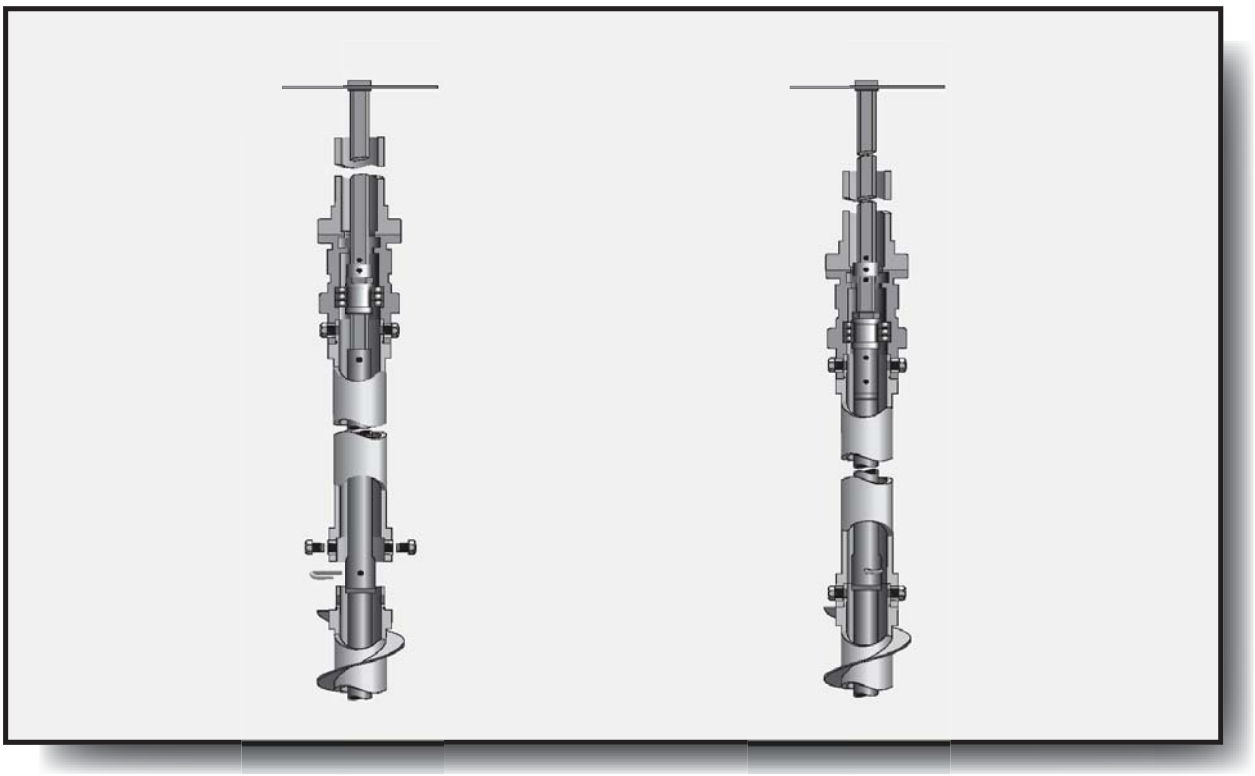
Sample Shoe with Basket Retainer

A sample shoe with basket retainer is also available. The basket helps contain the specimen within the sampler as it is withdrawn from the borehole.



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CME Stabilized Continuous Sample Tube System

The patented CME Continuous Sample Tube System is a sampling device that was developed to provide continuous sampling when drilling with hollow-stem augers. The specimen enters the sampler barrel as the augers are advanced. Drilling fluids or air are not required.

The CME Continuous Sample Tube System consists of a 5 foot sample tube with a cutting shoe that extends below the auger cutter head. The sample tube is operated on a hexagonal shank-and-socket drill stem column. The shank-and-socket drill stems are connected through a bearing assembly to the drill rig feed system and to a stabilizer plate to positively prevent rotation of the sample tube with rotation of the hollow stem augers. The first drill stem in the column has an adjustable length for varying the amount the sampler protrudes below the auger cutter head.

The stabilization of the sample tube, the tube extension adjustments and the clearance ratio of the cutting shoe with the sample tube are all important to sample recovery and sample quality. Tube stabilization has proven to be very important in providing the most consistent and highest quality sample.

The sampler tube is available in several sizes according to the size of the CME hollow augers it is used with. Both clear plastic liners and steel liners can be used inside the sample tube to retain the sample. The use of the clear plastic liners allows you to visually examine the sample in the field and yet keep it contained for transport to a lab and later testing. The clear plastic liners can be reused several times.

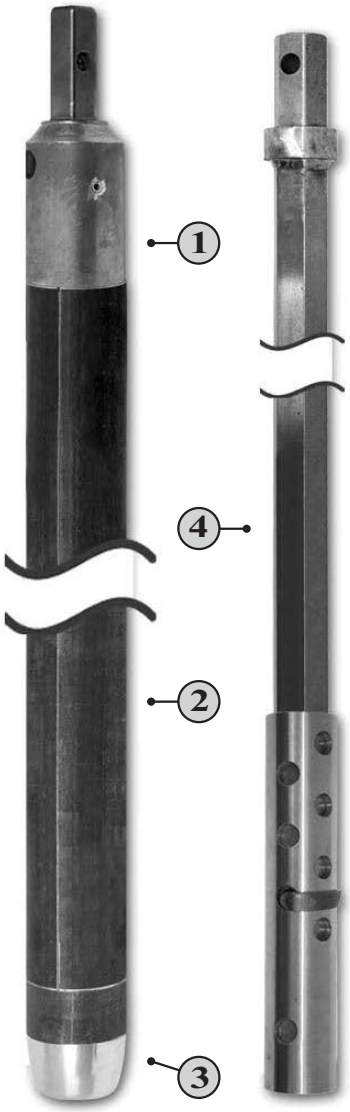
The CME Continuous Sample Tube System has been used very successfully on many projects for various purposes in a variety of soil types. With this sample system, very efficient continuous sampling can be performed to provide a complete soil profile. Obtaining 95 to 100 percent recovery is more the rule than the exception. The variety of materials that can be sampled include silt, clay, some granular soils, glacial till, coal, shale, mine tailings and others.

One type of project where the continuous sample is used extensively is environmental projects where chemical or radiological contamination is suspected. Most of these projects desire or require high quality continuous samples and this can be achieved very adequately with the continuous samplers.

Drill Rig specific, consult factory for additional information.

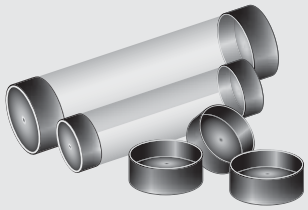
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REFLEX EXHIBIT 1017 - 103/280



CME 3" STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.25" HSA

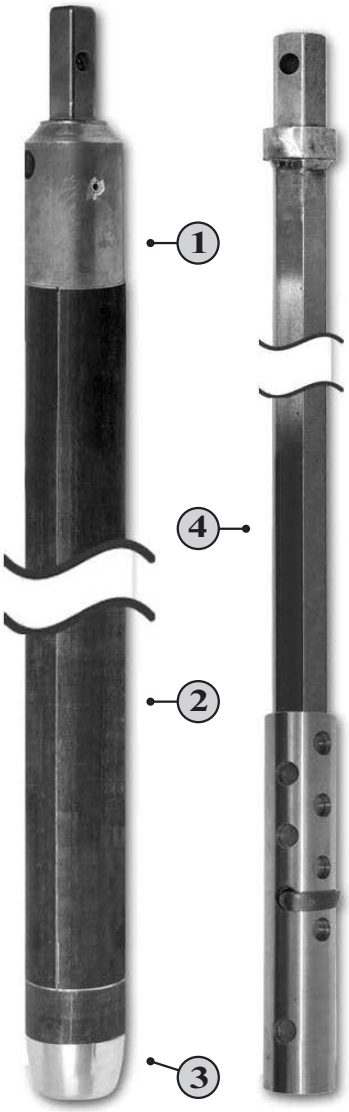
Ref. No.	Part No.	HSA	Description
1	15038	3.25"	Sample tube head assembly, 3" OD 1.625" hex
2	15023	3.25"	Split tube, 3" OD 2.5" ID x 5' LH
2	15560	3.25"	Solid tube, 3" OD 2.5" ID x 5' LH
3	15024	3.25"	Sample Shoe, 3" OD 2.25" ID LH
3	15125	3.25"	Sample Shoe for liner, 3" OD 2" ID LH
	15026	3.25"	Plastic liner 2.5" OD x 30"
	34332	3.25"	Plastic cap for 2.5" OD liner
3	15241	3.25"	Sample Shoe for basket retainer, 3" OD 2.19" ID LH
	34205	3.25"	Basket retainer, 3" OD - Steel
	34372	3.25"	Basket retainer, 3" OD - Plastic
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	19264	-	Hoisting socket 1.625" hex





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REFLEX EXHIBIT 1017 - 104/280



CME 3" HEAVY DUTY STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.25" HSA

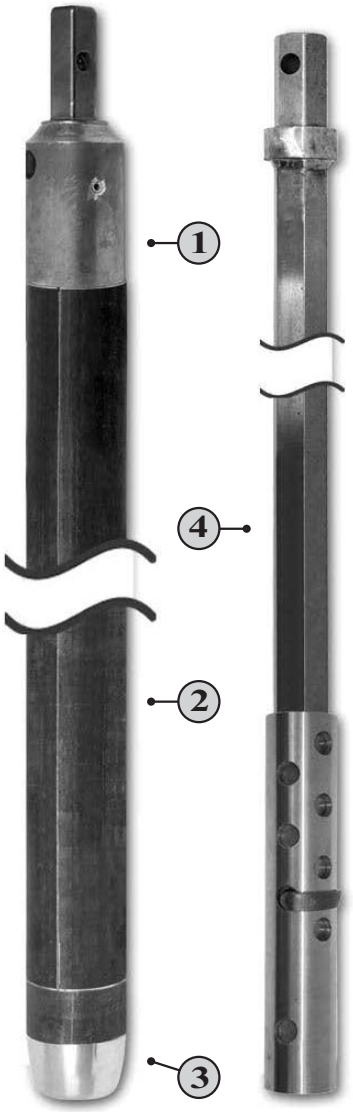
Ref. No.	Part No.	HSA	Description
1	15767	3.25"	Sample tube head assembly, HD 3" OD 1.625" hex LH
2	15768	3.25"	Split tube, HD 3" OD 2" ID x 5' LH
3	15769	3.25"	Sample Shoe, HD 3" OD 1.75" ID LH
3	15770	3.25"	Sample Shoe, HD 3" OD 1.5" ID LH
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	19264	-	Hoisting socket 1.625" hex





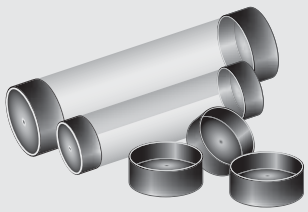
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CME 3.5" STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.75" HSA

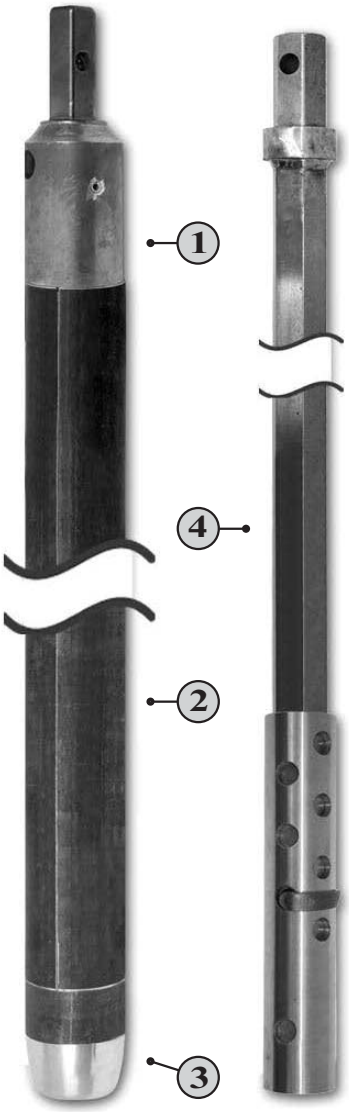
Ref. No.	Part No.	HSA	Description
1	15059	3.75"	Sample tube head assembly, 3.5" OD 1.625" hex
2	15051	3.75"	Split tube, 3.5" OD 3" ID x 5' LH
2	15476	3.75"	Solid tube, 3.5" OD 3" ID x 5' LH
3	15052	3.75"	Sample Shoe, 3.5" OD 2.75" ID LH
3	15126	3.75"	Sample Shoe for liner, 3.5" OD 2.5" ID LH
	15054	3.75"	Plastic liner 3" OD x 30"
	34328	3.75"	Plastic cap for 3" OD liner
3	15133	3.75"	Sample Shoe for basket retainer, 3.5" OD 2.63" ID LH
	34206	3.75"	Basket retainer, 3" OD - Steel
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	19264	-	Hoisting socket 1.625" hex





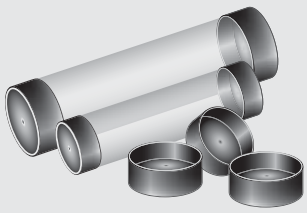
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REFLEX EXHIBIT 1017 - 106/280



CME 3.5" HEAVY DUTY STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 3.75" HSA

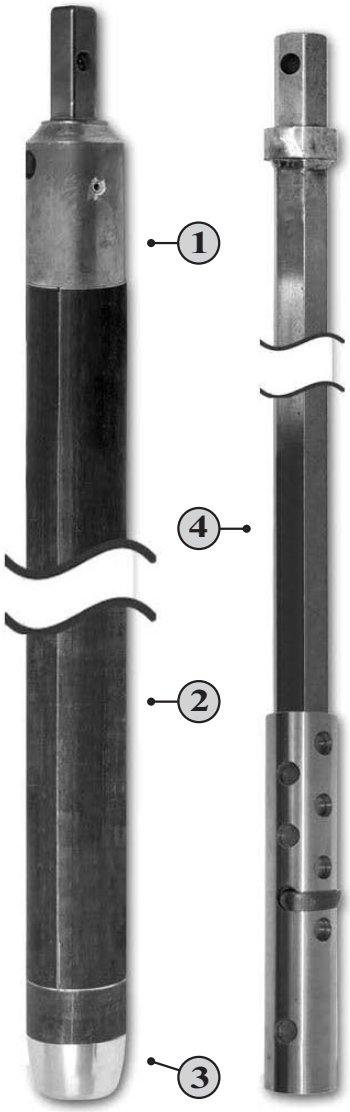
Ref. No.	Part No.	HSA	Description
1	15696	3.75"	Sample tube head assembly, HD 3.5" OD 1.625" hex LH
2	15697	3.75"	Split tube, HD 3.5" OD 2.5" ID x 5' LH
3	15698	3.75"	Sample Shoe, HD 3.5" OD 2.25" ID LH
3	15700	3.75"	Sample Shoe HD for liner, 3.5" OD 2" ID LH
	15026	3.75"	Plastic liner 2.5" OD x 30"
	34332	3.75"	Plastic cap for 2.5" OD liner
3	15699	3.75"	Sample Shoe HD for basket retainer, 3.5" OD 2.25" ID LH
	34205	3.75"	Basket retainer, HD 3.5" OD - Steel
	34372	3.75"	Basket retainer, HD 3.5" OD - Plastic
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	19264	-	Hoisting socket 1.625" hex





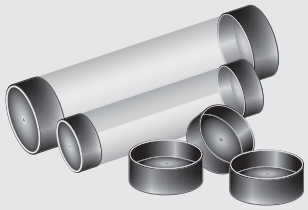
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CME 4" STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 4.25" HSA

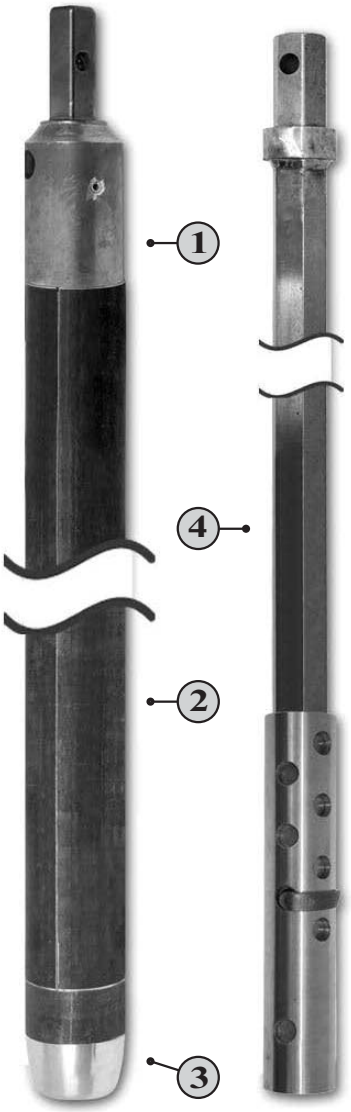
Ref. No.	Part No.	HSA	Description
1	15128	4.25"	Sample tube head assembly, 4" OD 1.625" hex
2	15034	4.25"	Split tube, 4" OD 3.5" ID x 5' LH
2	15558	4.25"	Solid tube, 4" OD 3.5" ID x 5' LH
3	15081	4.25"	Sample Shoe, 4" OD 3.25" ID LH
3	15247	4.25"	Sample Shoe for liner, 4" OD 3" ID LH
	15209	4.25"	Plastic liner 3.5" OD x 30"
	34333	4.25"	Plastic cap for 3.5" OD liner
3	15244	4.25"	Sample Shoe for basket retainer, 4" OD 3.25" ID LH
	15245	4.25"	Basket retainer, 4" OD - Steel
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	15536	4.25"	Guide Ring
	19264	-	Hoisting socket 1.625" hex





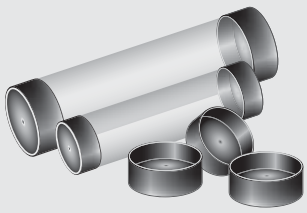
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REFLEX EXHIBIT 1017 - 108/280



CME 4" HEAVY DUTY STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 4.25" HSA

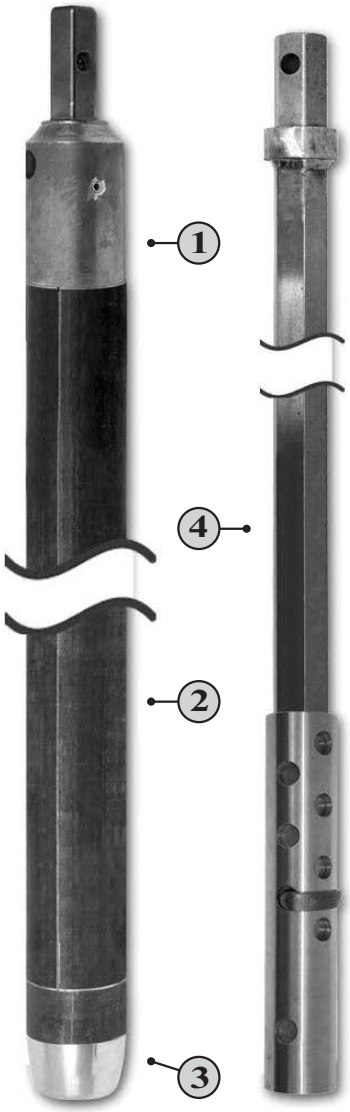
Ref. No.	Part No.	HSA	Description
1	15598	4.25"	Sample tube head assembly, HD 4" OD 1.625" hex
2	15599	4.25"	Split tube, HD 4" OD 3" ID x 5' LH
3	15600	4.25"	Sample Shoe, HD 4" OD 2.75" ID LH
3	15601	4.25"	Sample Shoe HD for liner, 4" OD 2.5" ID LH
	15054	4.25"	Plastic liner 3" OD x 30"
	34328	4.25"	Plastic cap for 3" OD liner
3	15613	4.25"	Sample Shoe HD for basket retainer, 4" OD 2.63" ID LH
	34206	4.25"	Basket retainer, 4" OD - Steel
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	15536	4.25"	Guide Ring
	19264	-	Hoisting socket 1.625" hex





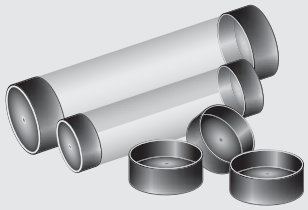
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REFLEX EXHIBIT 1017 - 109/280



CME 6" STABILIZED CONTINUOUS SAMPLE TUBE SYSTEM FOR USE IN 6.25" HSA

Ref. No.	Part No.	HSA	Description
1	15328	6.25"	Sample tube head assembly, 6" OD 1.625" hex
2	15330	6.25"	Split tube, 6" OD 5.38" ID x 5' LH
2	15580	6.25"	Solid tube, 6" OD 5.38" ID x 5' LH
3	15329	6.25"	Sample Shoe, 6" OD 5.13" ID LH
3	15334	6.25"	Sample Shoe for liner, 6" OD 4.88" ID LH
	15229	6.25"	Plastic liner 5.375" OD x 30"
	34334	6.25"	Plastic cap for 5.375" OD liner
3	15335	6.25"	Sample Shoe for basket retainer, 6" OD 5.13" ID LH
	15254	6.25"	Basket retainer, 6" OD - Steel
	15134	-	Locking chain wrench
4	15032	-	Adjustment Rod
	19240	-	Drill stem with drive pin, 1.625" hex x 5'
	15036	-	Drive pin DP2000 short
	15397	6.25"	Guide Ring 4.25"
	19264	-	Hoisting socket 1.625" hex

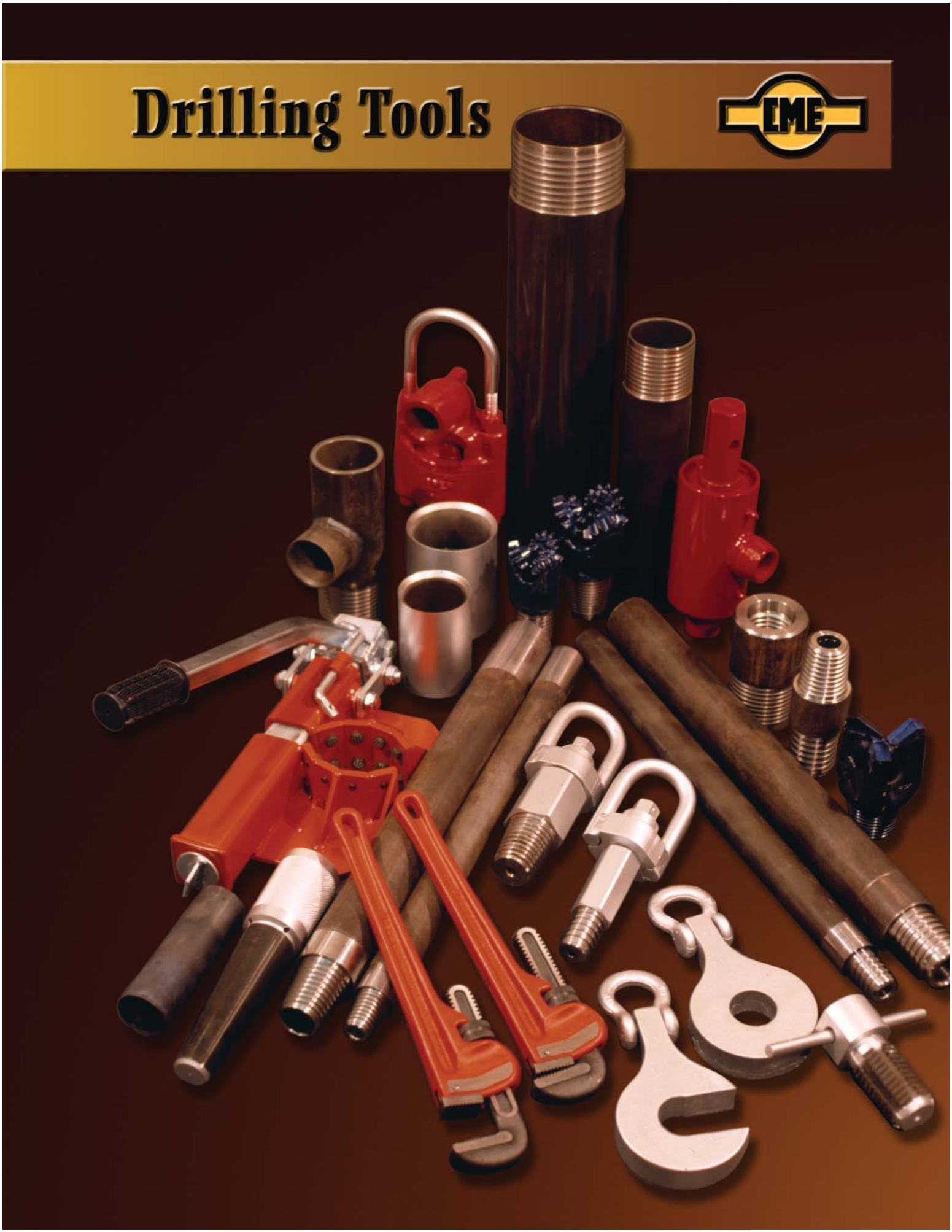


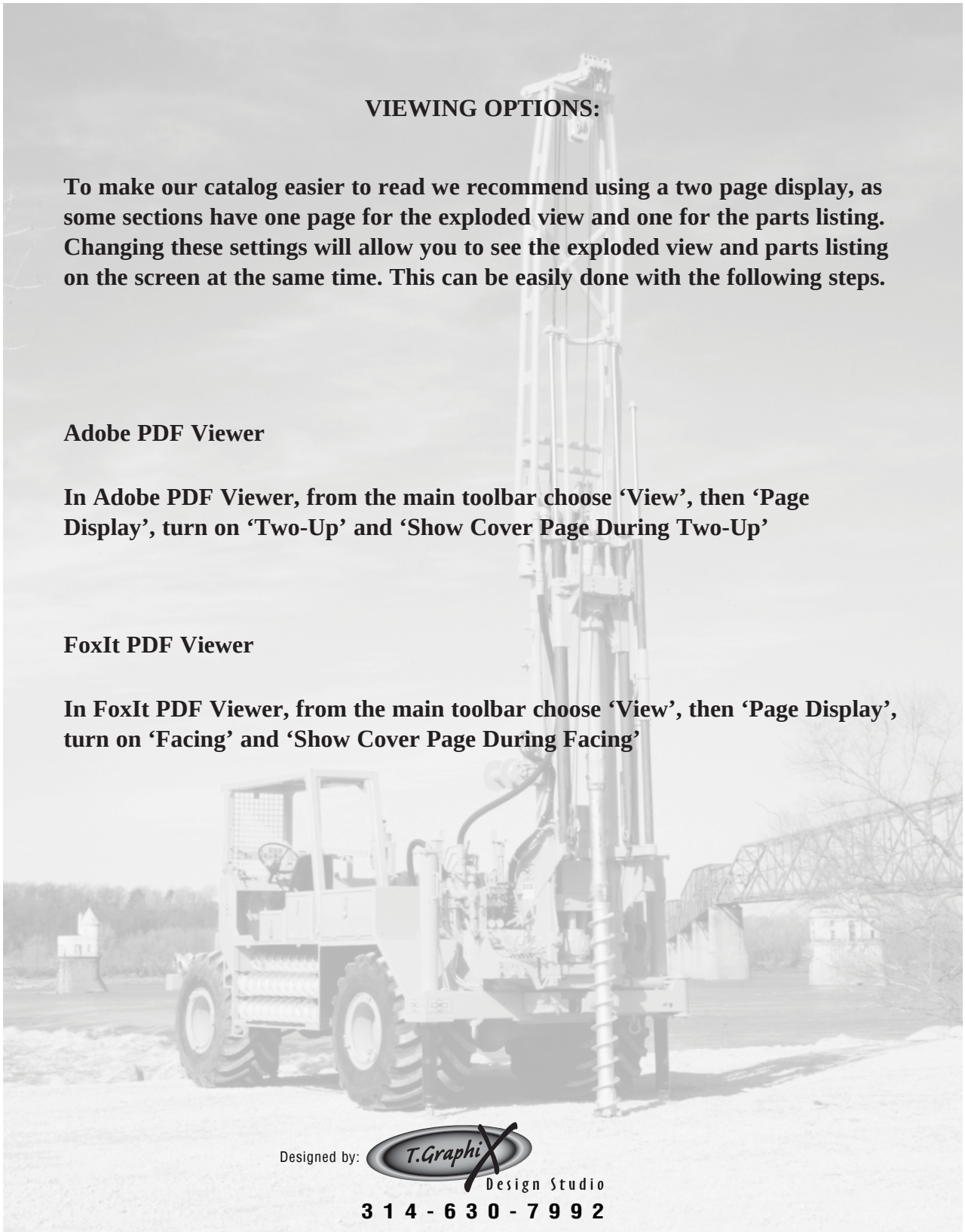


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Drilling Tools





VIEWING OPTIONS:

To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

Adobe PDF Viewer

In Adobe PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Two-Up' and 'Show Cover Page During Two-Up'

FoxIt PDF Viewer

In FoxIt PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Facing' and 'Show Cover Page During Facing'

Designed by: T.GraphiX Design Studio
314-630-7992



CME Drilling Tools

Drilling Tools **5.01**
Casing - W Series Flush Joint **5.06**
Casing Advancer **5.08**
Casing Accessories **5.12**
Drag Bits **5.21**
Drill Rods **5.02**
Drill Rod Clean Out Taps **5.35**
Drill Rod Recovery Taps **5.34**
Drill Rod Wipers **5.35**
Hoisting Swivels **5.34**
Kwik Klamps **5.32**
Roller Rock Bits **5.20**
Slip Rings & Holding Iron **5.33**
Subs & Adapters **5.14**
Water Swivels, Side Feed & Bail Type **5.22**

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DRILL ROD (DCDMA) W SERIES - COUPLED

AW			NW		
	Part No.	Weight		Part No.	Weight
1 Ft.	30009	5.4 lb / 2.4 KG	1 Ft.	30025	11.4 lb / 5.2 KG
2 Ft.	30010	9.4 lb / 4.3 KG	2 Ft.	30026	18.7 lb / 8.5 KG
5 Ft.	30011	21.6 lb / 9.8 KG	5 Ft.	30027	32.2 lb / 14.6 KG
10 Ft.	30012	41.9 lb / 19 KG	10 Ft.	30028	80.3 lb / 36.4 KG

DRILL ROD COUPLING

AW		NW	
Part No.	Weight	Part No.	Weight
30031	2 lb / .9 KG	30035	5.5 lb / 2.5 KG

W SERIES SPECIFICATIONS*

AW			
OD Tube	Tube Wall Thickness	ID Coupling	Treads Per Inch
1.75″ / 44.5 mm	.250″ / 6.35 mm	.625″ / 15.9 mm	3
NW			
OD Tube	Tube Wall Thickness	ID Coupling	Treads Per Inch
2.625″ / 66.7 mm	.313″ / 7.95 mm	1.375″ / 34.9 mm	3

*** NOTE: All AW & NW Drill Rods are parallel walls.**

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REFLEX EXHIBIT 1017 - 114/280



DRILL ROD (DCDMA)
W SERIES - SPECIFICATIONS

EW

OD Of Drill Rod	Tube Wall Thickness	ID Of Drill Rod	Treads Per Inch	Weight of Drill Rod / per ft.
1.375" / 34.9 mm	.218" / 5.5 mm	.9375" / 23.8 mm	3	2.8 lb / 4.2 KG

ID Of Coupling	Weight Of Coupling
.4375" / 11.1 mm	1 lb. / .45 KG

AW

OD Of Drill Rod	Tube Wall Thickness	ID Of Drill Rod	Treads Per Inch	Weight of Drill Rod / per ft.
1.75" / 44.5 mm	.250" / 6.3 mm	1.25" / 31.8 mm	3	4.3 lb / 6.4 KG

ID Of Coupling	Weight Of Coupling
.625" / 15.8 mm	2 lb. / .90 KG

BW

OD Of Drill Rod	Tube Wall Thickness	ID Of Drill Rod	Treads Per Inch	Weight of Drill Rod / per ft.
2.125" / 53.9 mm	.187" / 4.7 mm	1.75" / 44.4 mm	3	4.3 lb / 6.4 KG

ID Of Coupling	Weight Of Coupling
.75" / 19 mm	3.5 lb. / 1.6 KG

NW

OD Of Drill Rod	Tube Wall Thickness	ID Of Drill Rod	Treads Per Inch	Weight of Drill Rod / per ft.
2.625" / 66.6 mm	.187" / 4.7 mm	2.25" / 57.1 mm	3	5.5 lb / 8.2 KG

ID Of Coupling	Weight Of Coupling
1.375" / 34.9 mm	5.5 lb. / 2.5 KG

HW

OD Of Drill Rod	Tube Wall Thickness	ID Of Drill Rod	Treads Per Inch	Weight of Drill Rod / per ft.
3.5" / 88.9 mm	.218" / 5.5 mm	3.062" / 77.8 mm	3	8.8 lb / 13.1 KG

ID Of Coupling	Weight Of Coupling
2.375" / 60.3 mm	7.6 lb. / 3.4 KG

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DRILL ROD (DCDMA)
WJ SERIES - JOINTED

AWJ			NWJ		
	Part No.	Weight		Part No.	Weight
1 Ft.	30036	4.6 lb / 2.1 KG	1 Ft.	30727	9.7 lb / 4.4 KG
2 Ft.	30037	8.8 lb / 4.0 KG	2 Ft.	30728	14.5 lb / 6.5 KG
3 Ft.	30048	15 lb / 6.8 KG	3 Ft.	30049	19 lb / 8.6 KG
5 Ft.	30038	21.1 lb / 9.6 KG	5 Ft.	30729	30 lb / 13.6 KG
10 Ft.	30039	41 lb / 18.6 KG	10 Ft.	30730	51.5 lb / 23.4 KG

WJ SERIES SPECIFICATIONS

AWJ			
OD Tube	Tube Wall Thickness	ID Pin	Treads Per Inch
1.75" / 44.5 mm	.250" / 6.35 mm	.625" / 15.9 mm	5
NWJ			
OD Tube	Tube Wall Thickness	ID Pin	Treads Per Inch
2.625" / 66.7 mm	.188" / 4.78 mm	1.125" / 28.6 mm	4

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DRILL ROD - HEAVY DUTY (3.5” OD)

	Part No.	Weight		Part No.	Weight
1 Ft.	-	-	5 Ft.	37229	61.7 lb / 28.0 KG
2 Ft.	37230	26.4 lb / 12.0 KG	10 Ft.	37228	114.5 lb / 52.0 KG

HEAVY DUTY DRILL ROD SPECIFICATIONS

Rod Size	OD Tube	Tube Wall Thickness	ID Pin	Treads Per Inch	Flat Box End
3.5″	3.5″ 88.9 mm	.337″ 8.56 mm	1.75″ 44.5 mm	4	2″x2.75 51x69.85 mm

SUBS - 2.375 API IF

BOX to PIN



Part No.	Description
37231	**NW Box - 2.375 API IF Pin 6″**
37232	**NW Box - 2.375 API IF Pin**
37233	**NWJ Box - 2.375 API IF Pin**

BOX to BOX



Part No.	Description
37234	**2.375 Reg. Box - 2.375 API IF Box**
37235	**2.875 Reg. Box - 2.375 API IF Box**
37236	**3.5 Reg. Box - 2.375 API IF Box**
37237	**4.5 Reg. Box - 2.375 API IF Box**

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CASING
W SERIES - FLUSH JOINT

BW

	Part No.	Weight
1 Ft.	30072	7.0 lb / 3.1 KG
2 Ft.	30073	14.0 lb / 6.3 KG
5 Ft.	30074	35.0 lb / 15.9 KG
10 Ft.	30075	70.0 lb / 31.8 KG

NW

	Part No.	Weight
1 Ft.	30076	9.0 lb / 4.1 KG
2 Ft.	30077	17.0 lb / 7.7 KG
5 Ft.	30078	43.0 lb / 19.5 KG
10 Ft.	30079	86.0 lb / 39.1 KG

HW

	Part No.	Weight
1 Ft.	30080	12.0 lb / 5.4 KG
2 Ft.	30081	23.0 lb / 10.4 KG
5 Ft.	30082	58.0 lb / 26.3 KG
10 Ft.	30083	117.0 lb / 53.1 KG

PW

	Part No.	Weight
1 Ft.	30000	15.0 lb / 6.8 KG
2 Ft.	30001	29.0 lb / 13.1 KG
5 Ft.	30002	70.0 lb / 31.8 KG
10 Ft.	30003	144.0 lb / 65.4 KG

SW

	Part No.	Weight
1 Ft.	30088	20.0 lb / 9.1 KG
2 Ft.	30089	40.0 lb / 18.1 KG
5 Ft.	30090	100.0 lb / 45.4 KG
10 Ft.	30091	200.0 lb / 90.9 KG

UW

	Part No.	Weight
1 Ft.	30092	23.0 lb / 10.4 KG
2 Ft.	30093	46.0 lb / 20.9 KG
5 Ft.	30094	117.0 lb / 53.1 KG
10 Ft.	30095	234.0 lb / 106.3 KG

ZW

	Part No.	Weight
1 Ft.	30096	24.0 lb / 10.9 KG
2 Ft.	30097	48.0 lb / 21.8 KG
5 Ft.	30098	119.0 lb / 54.0 KG
10 Ft.	30099	238.0 lb / 108.1 KG

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CASING
W SERIES - SPECIFICATIONS

BW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
2.875" / 73.0 mm	.250" / 12.7 mm	2.375" / 60.3 mm	4

NW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
3.5" / 88.9 mm	.250" / 12.7 mm	3.0" / 76.2 mm	4

HW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
4.5" / 114.3 mm	.250" / 12.7 mm	4.0" / 101.6 mm	4

PW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
5.5" / 139.7 mm	.250" / 12.7 mm	5.0" / 127.0 mm	3

SW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
6.625" / 168.3 mm	.312" / 15.9 mm	6.0" / 152.4 mm	3

UW

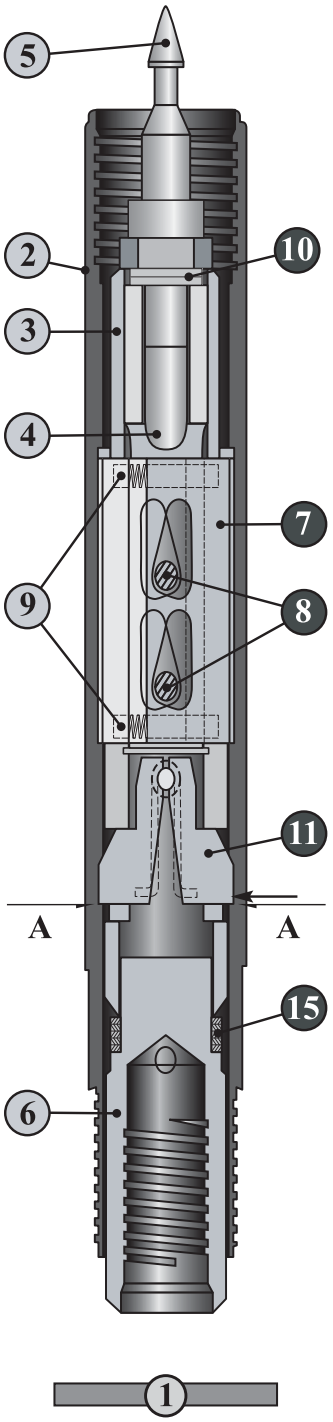
OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
7.625" / 193.7 mm	.312" / 15.9 mm	7.0" / 177.8 mm	2

ZW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
8.625" / 219.1 mm	.312" / 15.9 mm	8.0" / 203.2 mm	2

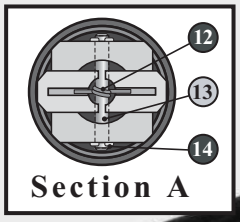
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NW Casing Advancer

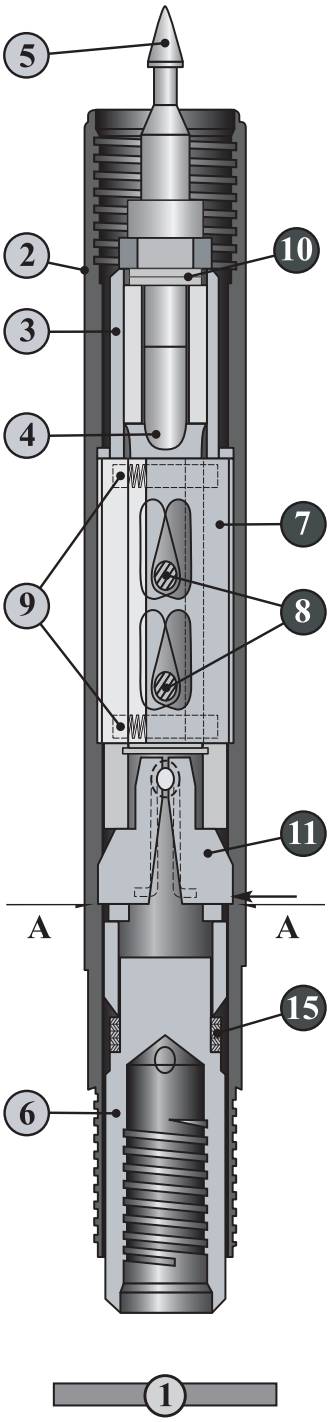
Ref. No.	Part No.	Description
1	37100	Assembly NW Casing Advancer
2	37101	Driver NW Casing Advancer
3	37102	Latch Body NW Casing Advancer
4	37103	Release Shaft NW Casing Advancer
5	37104	Spear Head NW Casing Advancer
6	37105	Bit Sub NW Casing Advancer
7	37106	Latch Shoe Set NW Casing Advancer
8	37107	Locating Pin NW Casing Advancer (2 req'd.)
9	37108	Spring NW Casing Advancer (2req'd.)
10	37109	Disk Loc Washer NW Casing Advancer
11	37110	Stop Latch Set NW Casing Advancer
12	37111	Stop Latch Spring NW Casing Advancer
13	37112	Stop Latch Pin NW Casing Advancer
14	37113	Split Cotter NW Casing Advancer (2 req'd.)
15	37114	Spacer Set NW Casing Advancer
	37115	Loading Sleeve NW Casing Advancer (included in assembly)



*** NOTE: Casing Shoe and Rock Bit not included.**

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HW/HWT Casing Advancer

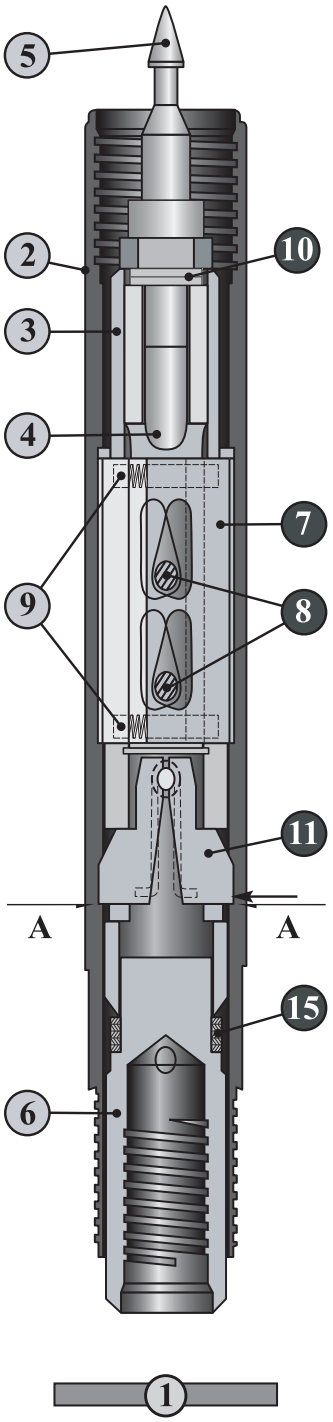
Ref. No.	Part No.	Description
1	37117	Assembly HW Casing Advancer
1	37128	Assembly HWT Casing Advancer
2	37118	Driver HW Casing Advancer
2	37129	Driver HWT Casing Advancer
3	37119	Latch Body HW Casing Advancer
4	37103	Release Shaft HW Casing Advancer
5	37104	Spear Head HW Casing Advancer
6	37120	Bit Sub HW Casing Advancer
7	37121	Latch Shoe Set HW Casing Advancer
8	37107	Locating Pin HW Casing Advancer (2 req'd.)
9	37108	Spring HW Casing Advancer (2req'd.)
10	37109	Disk Loc Washer HW Casing Advancer
11	37122	Stop Latch Set HW Casing Advancer
12	37111	Stop Latch Spring HW Casing Advancer
13	37123	Stop Latch Pin HW Casing Advancer
14	37113	Split Cotter HW Casing Advancer (2 req'd.)
15	37114	Spacer Set HW Casing Advancer
	37125	Loading Sleeve HW Casing Advancer (included in assembly)
	37130	Loading Sleeve HWT Casing Advancer (included in assembly)



*** NOTE: Casing Shoe and Rock Bit not included.**

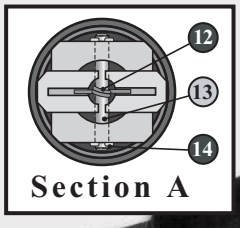
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PW/PWT Casing Advancer

Ref. No.	Part No.	Description
1	37139	Assembly PW Casing Advancer
1	37147	Assembly PWT Casing Advancer
2	37138	Driver PW Casing Advancer
2	37148	Driver PWT Casing Advancer
3	37140	Latch Body PW Casing Advancer
4	37103	Release Shaft PW Casing Advancer
5	37104	Spear Head PW Casing Advancer
6	37141	Bit Sub PW Casing Advancer
7	37142	Latch Shoe Set PW Casing Advancer
8	37107	Locating Pin PW Casing Advancer (2 req'd.)
9	37108	Spring PW Casing Advancer (2req'd.)
10	37109	Disk Loc Washer PW Casing Advancer
11	37143	Stop Latch Set PW Casing Advancer
12	37111	Stop Latch Spring PW Casing Advancer
13	37144	Stop Latch Pin PW Casing Advancer
14	37113	Split Cotter PW Casing Advancer (2 req'd.)
15	37145	Spacer Set PW Casing Advancer
	37146	Loading Sleeve PW Casing Advancer (included in assembly)
	37150	Loading Sleeve PWT Casing Advancer (included in assembly)



*** NOTE: Casing Shoe and Rock Bit not included.**

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REFLEX EXHIBIT 1017 - 123/280

CASING - DRIVE SHOES

	BW	NW	HW	HWT
Part No.	30124	30125	30126	30127





WATER TEES - FLUSH JOINT CASING

	BW	NW	HW	HWT
Part No.	29995	29996	29997	29994





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REFLEX EXHIBIT 1017 - 124/280

SUBS - FLUSH JOINT CASING

BOX to PIN



Part No.	Description
30274	AW Rod - NW Casing
30299	AWJ Rod - NW Casing
30377	NW Rod - NW Casing
30407	NWJ Rod - NW Casing
30378	NW Rod - HW Casing
30408	NWJ Rod - HW Casing
30379	NW Rod - HWT Casing
30380	NWJ Rod - HWT Casing

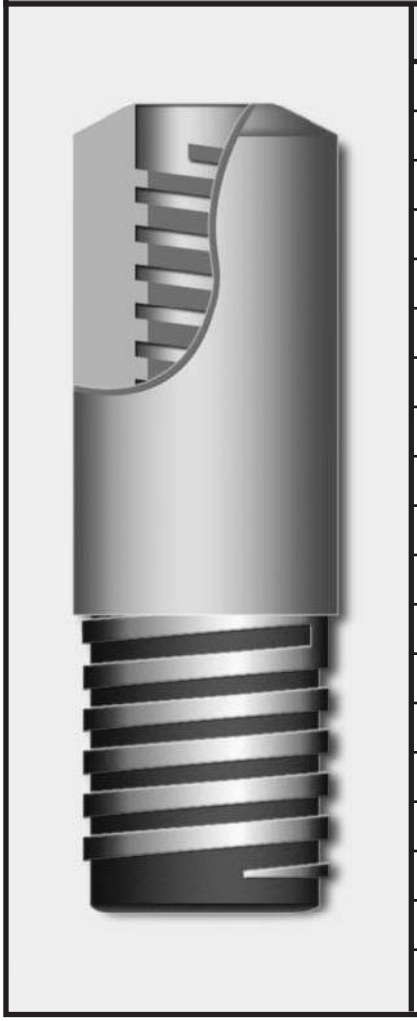
Note: HWT Casing is not interchangeable with HW series casing.
HWT rod/casing is used as the Drill Rod for the P W/L Core Barrel.

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SUBS - ADAPTERS

BOX to PIN



Part No.	Description	Part No.	Description
30252	A - AW	30294	AWJ - N4
30253	A - AWJ	30295	AWJ - N3
30254	A - BW	30296	AWJ - NW
30256	A - N4	30297	AWJ - NWJ
30257	A - N3	30311	AWJ - 1.125 Hex
30258	A - NW	30312	AWJ - 1.625 Hex
30259	A - NWJ	30725	AWJ - 1.25-7 UNC
30265	AW - A	30314	BW - A
30266	AW - AWJ	30315	BW - AW
30267	AW - BW	30316	BW - AWJ
30269	AW - N4	30318	BW - N4
30270	AW - N3	30319	BW - N3
30271	AW - NW	30320	BW - NW
30272	AW - NWJ	30321	BW - NWJ
30286	AW - 1.125 Hex	30339	N4 - A
30287	AW - 1.625 Hex	30340	N4 - AW
30755	AW - 1.25-7 UNC	30341	N4 - AWJ
30290	AWJ - A	30342	N4 - BW
30291	AWJ - AW	30344	N4 - N3

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SUBS - ADAPTERS

BOX to PIN



Part No.	Description	Part No.	Description
30345	N4 - NW	30370	NW - N4 *
30346	N4 - NWJ	30371	NW - N3 *
30349	N4 - 1.125 Hex	30372	NW - NWJ *
30350	N4 - 1.625 Hex	30392	NW - 1.125 Hex
30352	N3 - A	30393	NW - 1.625 Hex
30353	N3 - AW	30395	NWJ - A
30354	N3 - AWJ	30396	NWJ - AW
30355	N3 - BW	30397	NWJ - AWJ
30357	N3 - N4	30398	NWJ - BW
30358	N3 - NW	30400	NWJ - N4
30359	N3 - NWJ	30401	NWJ - N3
30362	N3 - 1.125 Hex	30402	NWJ - NW
30363	N3 - 1.625 Hex	30422	NWJ - 1.125 Hex
30365	NW - A *	30423	NWJ - 1.625 Hex
30366	NW - AW *	37231	NW Box - 2.375 API IF Pin 6″
30606	NW - AWJ *	37232	NW Box - 2.375 API IF Pin
30368	NW - BW *	37233	NWJ Box - 2.375 API IF Pin

Note: Other combinations & sizes of subs available.

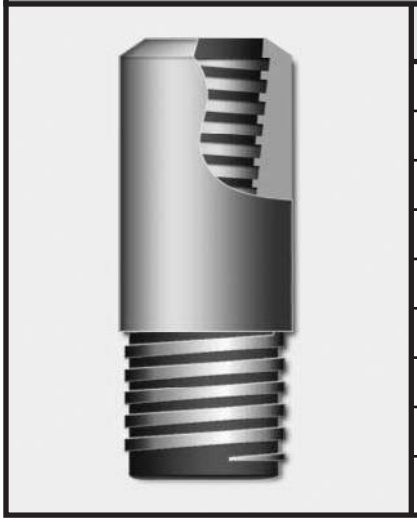
*** 6″ Body length.**

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REFLEX EXHIBIT 1017 - 127/280

CME 3.5 KELLY SUBS - 2.375 API IF

BOX to PIN



Part No.	Description
30356	**2.375 API IF Box - N W/L Pin**
30779	**2.375 API IF Box - H W/L Pin 5 Lg.**
30608	**2.375 API IF Box - NWJ Pin 5 Lg.**
30609	**2.375 API IF Box - NW Pin 5 Lg.**
30611	**2.375 API IF Box - N3 Pin 5 Lg.**
30612	**2.375 API IF Box - N4 Pin 5 Lg.**
30613	**2.375 API IF Box - AW Pin 5 Lg.**
30614	**2.375 API IF Box - AWJ Pin 5 Lg.**

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REFLEX EXHIBIT 1017 - 128/280

SUBS - ADAPTERS

PIN to PIN



Part No.	Description	Part No.	Description
30446	A - AW	30476	AWJ - 1.625 Hex
30447	A - AWJ	30479	BW - N4
30448	A - BW	30480	BW - N3
30450	A - N4	30481	BW - NW
30451	A - N3	30482	BW - NWJ
30452	A - NW	30484	BW - 1.125 Hex
30453	A - NWJ	30485	BW - 1.625 Hex
30454	A - 1.125 Hex	30495	N4 - N3
30455	A - 1.625 Hex	30496	N4 - NW
30457	AW - AWJ	30497	N4 - NWJ
30458	AW - BW	30499	N4 - 1.125 Hex
30460	AW - N4	30500	N4 - 1.625 Hex
30461	AW - N3	30502	N3 - NW
30462	AW - NW	30503	N3 - NWJ
30463	AW - NWJ	30505	N3 - 1.125 Hex
30465	AW - 1.125 Hex	30506	N3 - 1.625 Hex
30466	AW - 1.625 Hex	30508	NW - NWJ
30470	AWJ - N4	30515	NW - 1.125 Hex
30472	AWJ - NW	30516	NW - 1.625 Hex
30473	AWJ - NWJ	30519	NWJ - 1.125 Hex
30475	AWJ - 1.125 Hex	30520	NWJ - 1.625 Hex

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REFLEX EXHIBIT 1017 - 129/280

SUBS - ADAPTERS

BOX to BOX



Part No.	Description	Part No.	Description
30132	A - AW	30193	N4 - NW
30133	A - AWJ	30194	N4 - NWJ
30134	A - BW	30195	N4 - 2.375 API
30140	A - 1.125 Hex	30196	N4 - 2.875 API
30141	A - 1.625 Hex	30199	N4 - NXWL
30144	AW - AWJ	30201	N4 - NW/L
30145	AW - BW	30204	N4 - 1.125 Hex
30147	AW - N4	30205	N4 - 1.625 Hex
30148	AW - N3	30208	N3 - NW
30149	AW - NW	30209	N3 - NWJ
30150	AW - NWJ	30210	N3 - 2.375 API
30156	AW - 1.125 Hex	30211	N3 - 2.875 API
30157	AW - 1.625 Hex	30215	N3 - 1.125 Hex
30151	AW - 2.375 API	30216	N3 - 1.625 Hex
30152	AW - 2.875 API	30219	NW - NWJ
30162	AWJ - N4	30220	NW - 2.375 API
30164	AWJ - NW	30221	NW - 2.875 API
30165	AWJ - NWJ	30222	NW - 3.500 API
30171	AWJ - 1.125 Hex	30226	NW - 1.125 Hex
30172	AWJ - 1.625 Hex	30227	NW - 1.625 Hex
30166	AWJ - 2.375 API	30230	NWJ - 2.375 API
30167	AWJ - 2.875 API	30231	NWJ - 2.875 API
30176	BW - N4	30232	NWJ - 3.500 API
30178	BW - NW	30236	NWJ - 1.125 Hex
30179	BW - NWJ	30237	NWJ - 1.625 Hex
30180	BW - 1.125 Hex	34415	NW/L - 2.375 API
30181	BW - 1.625 Hex	34416	NW/L - 2.875 API
30192	N4 - N3		

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REFLEX EXHIBIT 1017 - 130/280

ROLLER/DRAG BIT - SUBS

BOX to BOX



Part No.	Description
30147	**AW - N4**
30162	**AWJ - N4**
30193	**N4 - NW**
30194	**N4 - NWJ**
30199	**N4 - NXWL**
30201	**N4 - NW/L**
30151	**AW - 2.375 API**
30166	**AWJ - 2.375 API**
30152	**AW - 2.875 API**
30167	**AWJ - 2.875 API**
30220	**NW - 2.375 API**
30221	**NW - 2.875 API**
30222	**NW - 3.500 API**
30230	**NWJ - 2.375 API**
30231	**NWJ - 2.875 API**
30232	**NWJ - 3.500 API**
34415	**NW/L - 2.375 API**
34416	**NW/L - 2.875 API**
37234	**2.375 Reg. Box - 2.375 API IF Box**
37235	**2.875 Reg. Box - 2.375 API IF Box**
37236	**3.5 Reg. Box - 2.375 API IF Box**
37237	**4.5 Reg. Box - 2.375 API IF Box**

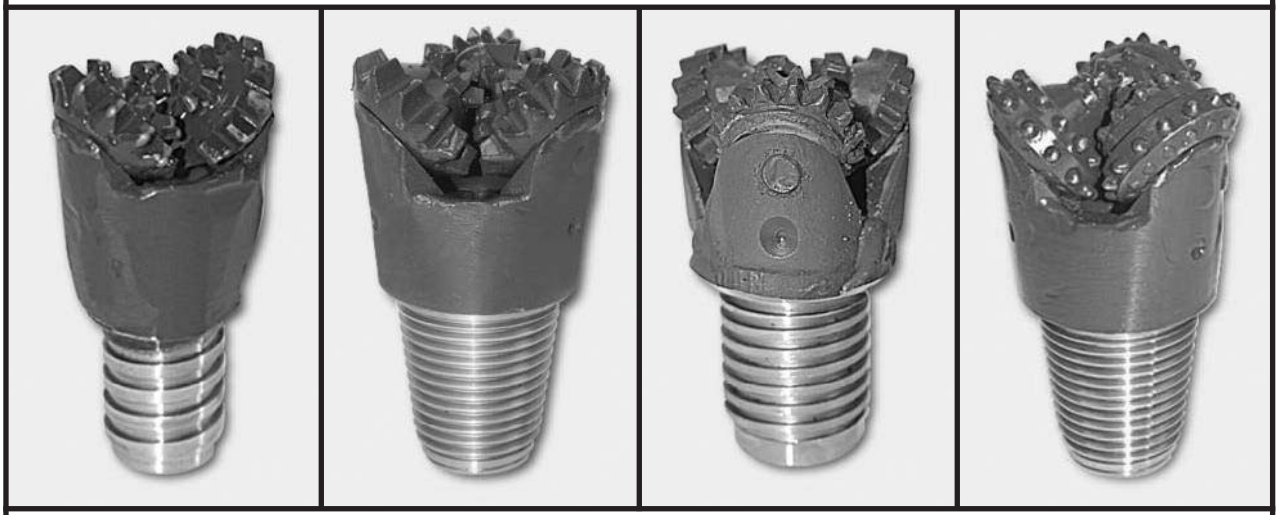
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ROLLER ROCK BITS - MILLTOOTH

Part No.	Size	Type	Connection
32016	2.125″	2 Cone	A Box
32018	2.125″	2 Cone	AW Box
32027	2.375″	2 Cone	AW Pin
32060	2.9375″	3 Cone	N4 Pin
32069	3.125″	3 Cone	N4 Pin
32095	3.625″	3 Cone	2.375″ API
32103	3.875″	3 Cone	2.375″ API
32111	4.125″	3 Cone	2.375″ API
32119	4.5″	3 Cone	2.375″ API
32124	4.875″	3 Cone	2.875″ API
32135	5.625″	3 Cone	3.500″ API
32139	5.875″	3 Cone	3.500″ API

NOTE: Also available, Bits w/Tungsten Carbide Inserts (TCI), shown picture, below right.
Retips and Reruns available upon request.



NOTE: See page 5.17 for Bit Subs

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REFLEX EXHIBIT 1017 - 132/280

CARBIDE INSERT DRAG BITS - CHEVRON

Part No.	Size	Type	Connection
32167	2.000″	3 Wing	AW Pin
32175	2.250″	3 Wing	AW Pin
32179	2.500″	3 Wing	AW Pin
32191	2.9375″	3 Wing	N4 Pin
32195	3.125″	3 Wing	N4 Pin
32207	3.500″	3 Wing	N4 Pin
32225	3.875″	3 Wing	2.375″ API
32231	4.125″	3 Wing	2.375″ API
32240	4.750″	3 Wing	2.375″ API
32258	6.000″	3 Wing	3.500″ API

NOTE: Also available in Step Type, shown picture, below right.







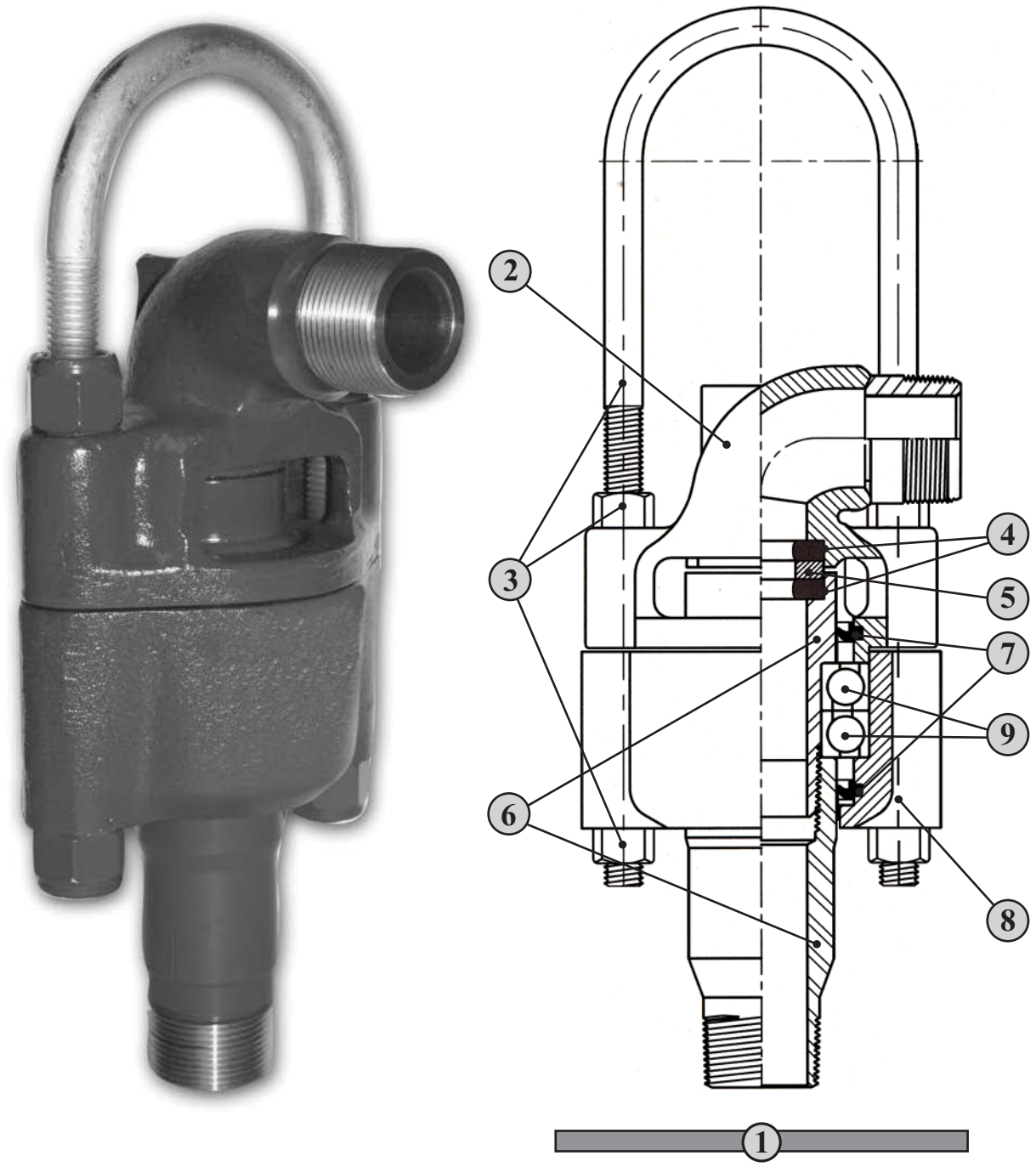
NOTE: See page 5.17 for Bit Subs

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REFLEX EXHIBIT 1017 - 133/280

Water Swivel

1 J



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REFLEX EXHIBIT 1017 - 134/280

Water Swivel

1 J

Ref. No.	Part No.	Description
1	30860	Swivel, Iron, 1.25″ male NPT hose connection with 1.25″ NPT LH pin lower connection
1	31133	Swivel, Iron, 1.25″ male NPT hose connection with CMK LH pin lower connection
2	30861	Gooseneck, 1.25″ male NPT
3	30862	Bail with nuts
4	30863	Packing (2 req'd.)
4	31086	Packing, 90 Duro (2 req'd.) Air
4	31137	Packing, Viton (2 req'd.)
5	30864	Wearbushing
6	31134	Bearing Spindle Shaft 1J with 1.25″ NPT LH pin lower connection (Mated set)
6	31135	Bearing Spindle Shaft 1J with CMK LH pin lower connection (Mated set)
7	30867	Housing Seals (2 req'd.)
8	30868	Bearing Housing
9	30869	Bearings (2 req'd.)

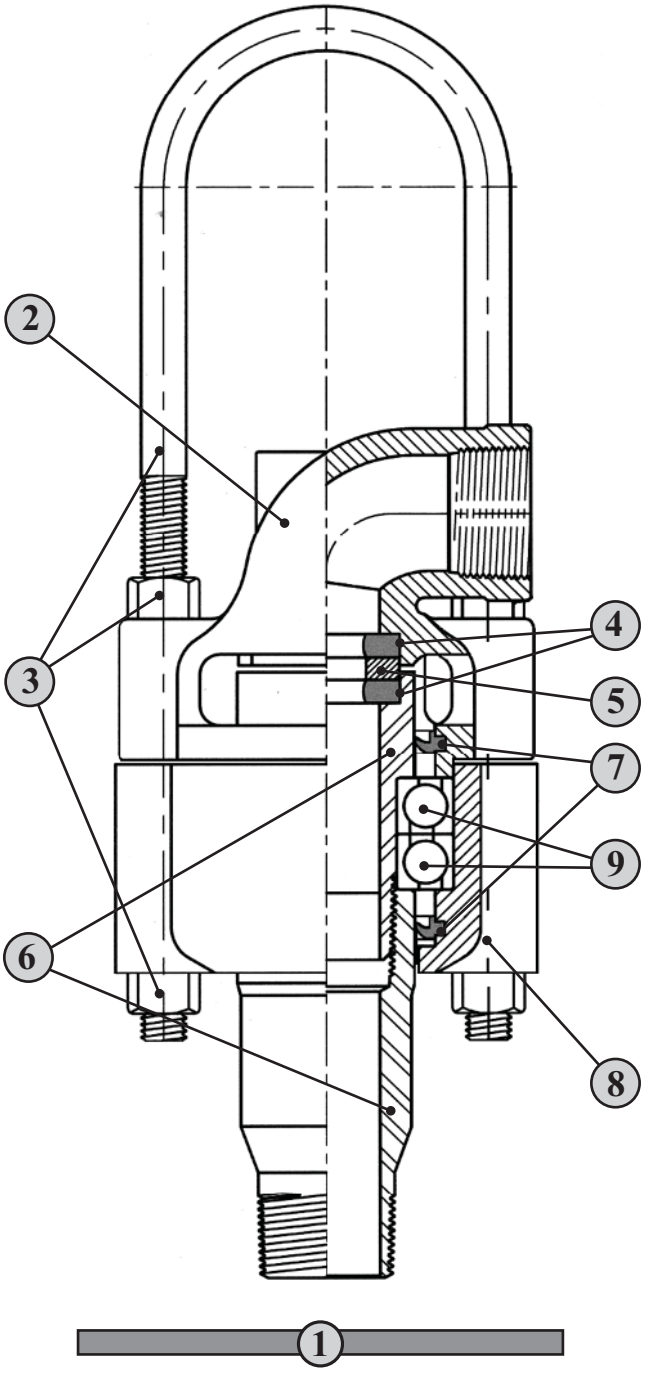
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Water Swivel

2 J





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REFLEX EXHIBIT 1017 - 136/280

Water Swivel

2 J

Ref. No.	Part No.	Description
1	30870	Swivel, Iron, 1.5″ female NPT hose connection with 1.5″ NPT LH pin lower connection
1	31125	Swivel, Iron, 1.5″ female NPT hose connection with CMK LH pin lower connection
2	30871	Gooseneck, 1.5″ female NPT
3	30872	Bail with nuts
4	30873	Packing (2 req'd.)
4	31075	Packing, 90 Duro (2 req'd.) Air
4	31138	Packing, Viton (2 req'd.)
5	30874	Wearbushing
6	31126	Bearing Spindle Shaft 2J with 1.5″ NPT LH pin lower connection (Mated set)
6	31127	Bearing Spindle Shaft 2J with CMK LH pin lower connection (Mated set)
7	30877	Housing Seals (2 req'd.)
8	30878	Bearing Housing
9	30879	Bearings (2 req'd.)

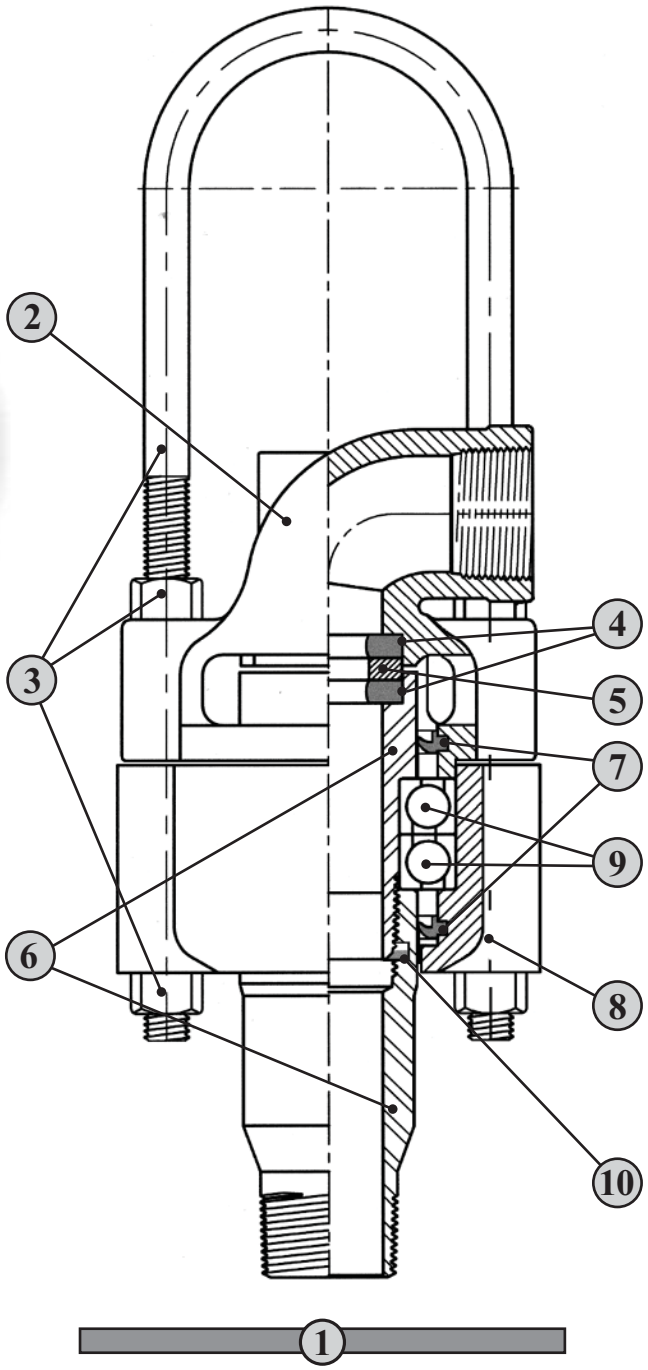
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Water Swivel

3 J





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REFLEX EXHIBIT 1017 - 138/280

Water Swivel

3 J

Ref. No.	Part No.	Description
1	31069	Swivel, Iron, 2″ female NPT hose connection with 2″ NPT LH pin lower connection
1	31064	Swivel, Iron, 2″ female NPT hose connection with CMK 6V LH pin lower connection
2	31037	Gooseneck, 2″ female NPT
3	31038	Bail with nuts
4	30904	Packing (2 req'd.)
4	31035	Packing, 90 Duro (2 req'd.) Air
4	31139	Packing, Viton (2 req'd.)
5	30905	Wearbushing
6	31129	Bearing Spindle Shaft 3J with 2″ NPT LH pin lower connection (Mated set)
6	31128	Bearing Spindle Shaft 3J with CMK 6V LH pin lower connection (Mated set)
7	30908	Housing Seals (2 req'd.)
8	30909	Bearing Housing
9	30910	Bearings (2 req'd.)
10	30912	Spindle Thread Seal

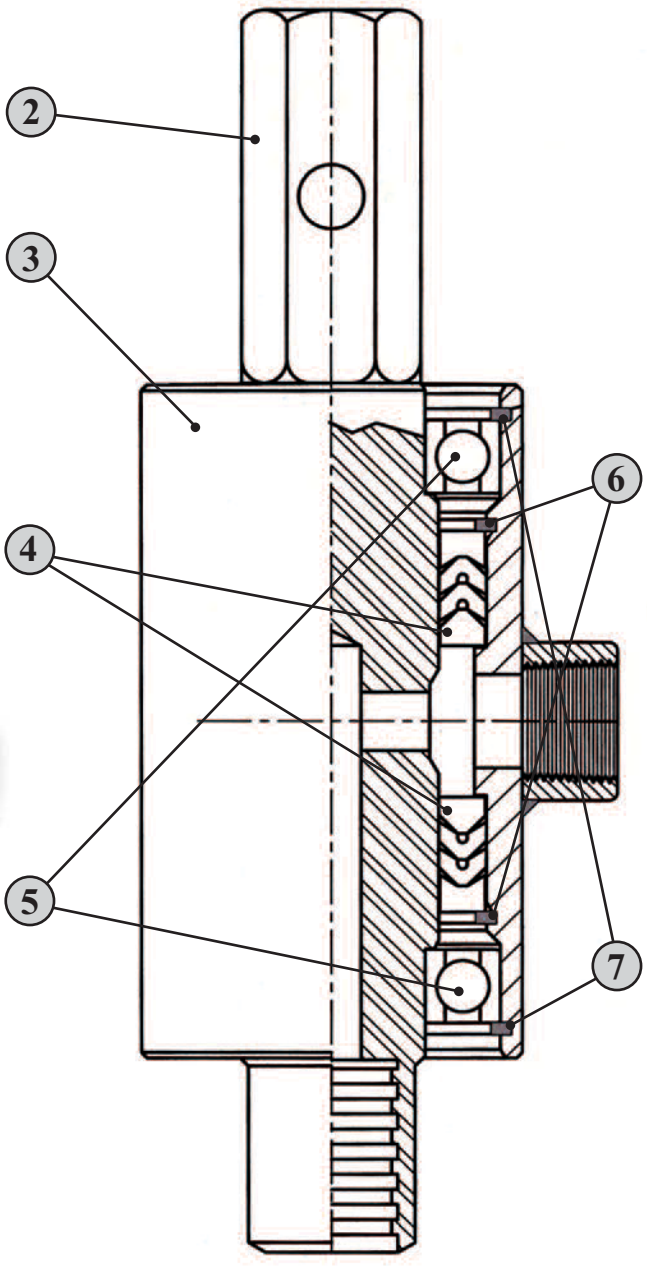
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REFLEX EXHIBIT 1017 - 139/280

Side Feed Swivel

AW





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REFLEX EXHIBIT 1017 - 140/280

Side Feed Swivel

AW

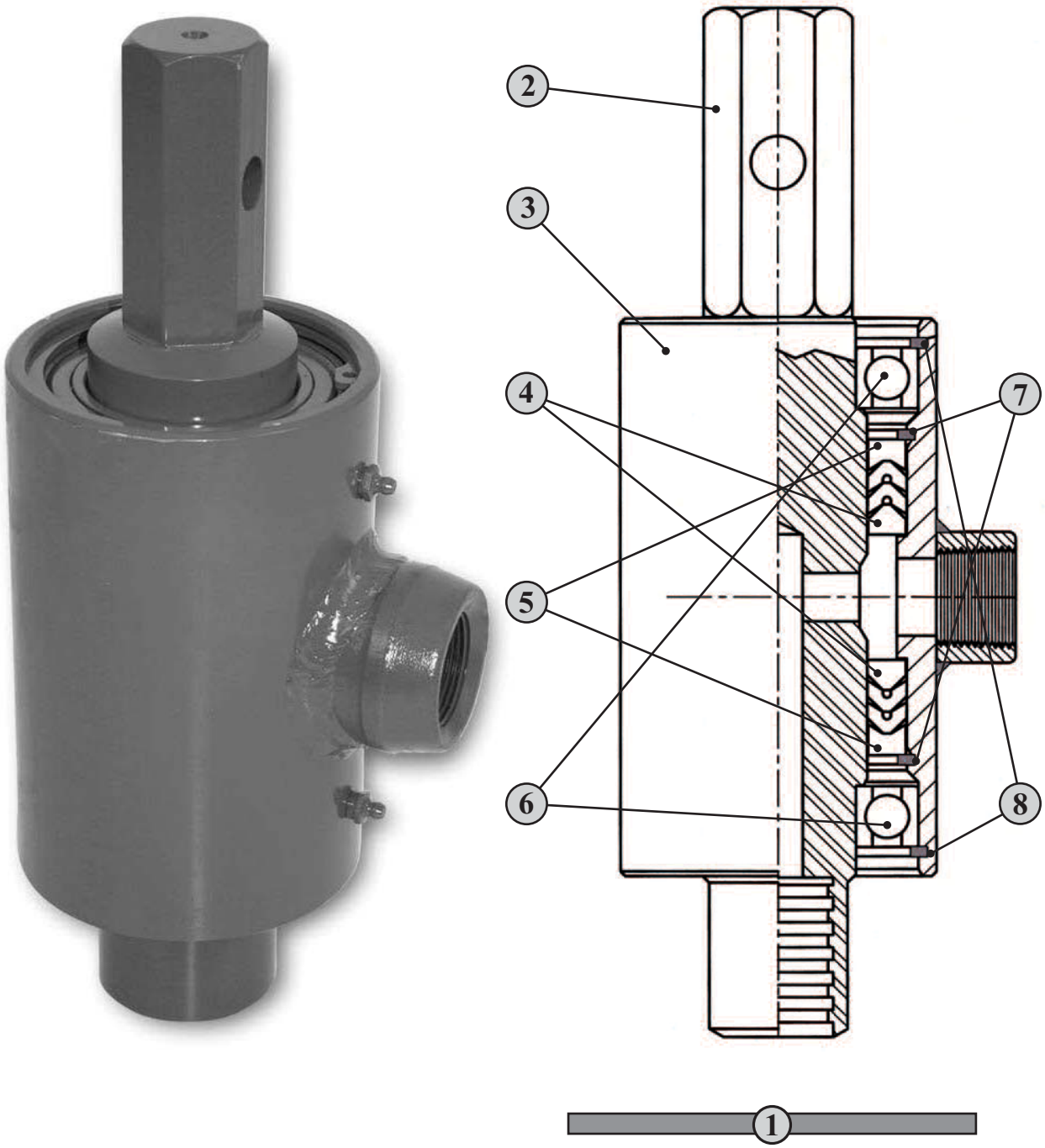
Ref. No.	Part No.	Description
1	31102	Side Feed Swivel, 1.125″ hex x AW box, 1″ NPT female hose connection
1	31103	Side Feed Swivel, 1.625″ hex x AW box, 1″ NPT female hose connection
2	31106	Stem, 1.125′ hex x AW box, RH
2	31107	Stem, 1.625′ hex x AW box, RH
3	31110	Packoff housing, 1″ NPT hose connection
4	31111	Packing set (2 req'd.)
5	31112	Bearings (2 req'd.)
6	31113	Packing retainer (2 req'd.)
7	31114	Bearing retainer (2 req'd.)

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REFLEX EXHIBIT 1017 - 141/280

Side Feed Swivel

NW



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Side Feed Swivel

NW

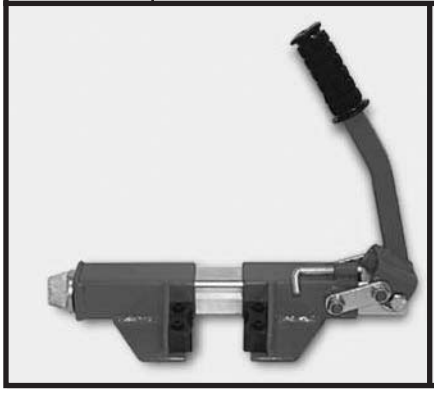
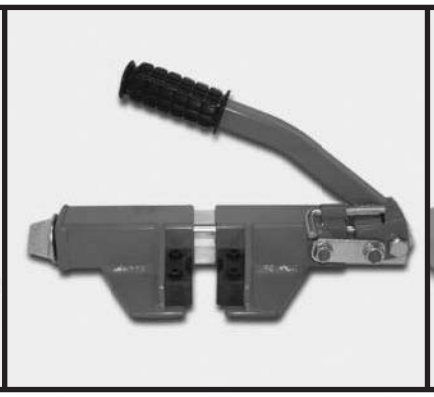
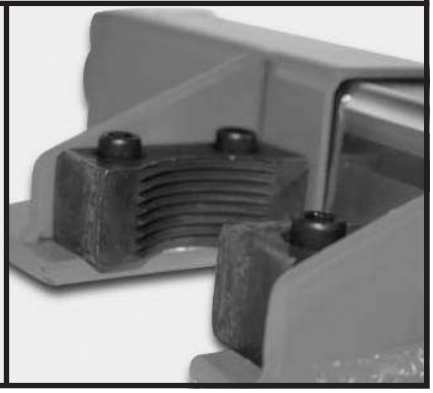
Ref. No.	Part No.	Description
1	31104	Side Feed Swivel, 1.625″ hex x NW box, 1.25″ NPT female hose connection
1	31105	Side Feed Swivel, 2″ hex x NW box, 1.25″ NPT female hose connection
2	31108	Stem, 1.625″ hex x NW box, RH
2	31109	Stem, 2″ hex x NW box, RH
3	31115	Packoff housing, 1.25″ NPT hose connection
4	31116	Packing set (2 req'd.)
5	31120	Packing seat ring (2 req'd.)
6	31117	Bearings (2 req'd.)
7	31118	Packing retainer (2 req'd.)
8	31119	Bearing retainer (2 req'd.)

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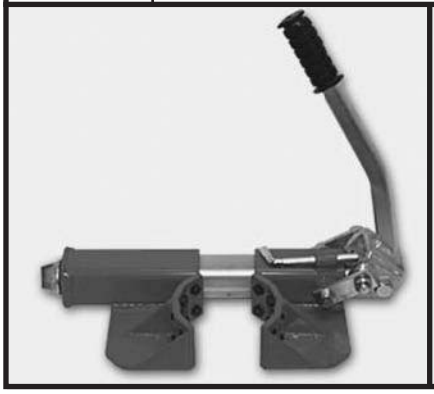
KWIK KLAMP

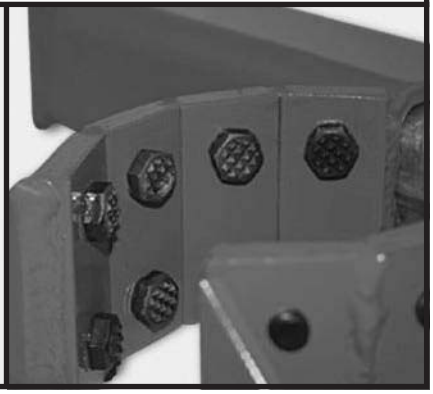
Part No.	Description
32459	Kwik Klamp (1.25″ to 2.625″ - 3,500 lbs. capacity)
32460	Jaw w/screws (2 Req'd)

KWIK KLAMP 2

Part No.	Description
32461	Kwik Klamp 2 (2.5″ to 4.5″ - 7,000 lbs. capacity)
32464	Gripper Carbide Tipped (16 Req'd)





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REFLEX EXHIBIT 1017 - 144/280

SLIP RINGS

OPEN			
A	**AW**	**N**	**NW**
32287	32288	32290	32291
CLOSED			
A	**AW**	**N**	**NW**
32292	32293	32295	32296



HOLDING IRONS

OPEN			
A	**AW**	**N**	**NW**
32297	32298	32300	32301
CLOSED			
A	**AW**	**N**	**NW**
32302	32303	32305	32306



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REFLEX EXHIBIT 1017 - 145/280

HOISTING SWIVEL - H.D. - BALL BEARING TYPE

	A	AW	AWJ	N4	N3	NW	NWJ
Part No.	32268	32269	32270	32272	32273	32274	32275





DRILL ROD RECOVERY TAPS *

INSIDE TAP			OUTSIDE TAP		
Part No.	Connection	Rod Size	Part No.	Connection	Rod Size
32307	AW	A / AW	32310	AW	A
			32311	AW	AW
32308	BW	BW	32312	BW	BW
32309	NW	N / NW	32313	NW	N / NW

NOTE: *Right-hand rod thread - Right-hand tap thread



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DRILL ROD WIPERS

Part No.	Size	O.D.
32366	A-Rod	9″
32367	AW-Rod	9″
32369	N-Rod	9″
32370	NW-Rod	9″
32371	HW-Rod	9″
32372	NW-Rod	12″
32373	N W/L-Rod	12″
32374	3.5″-Rod	12″
32375	4.5″-Rod	12″



DRILL ROD CLEAN-OUT TAPS

A	AW	BW
32279	32280	32282
N4	**N3**	**NW**
32283	32284	32285



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REFLEX EXHIBIT 1017 - 148/280

Diamond Bits



VIEWING OPTIONS:

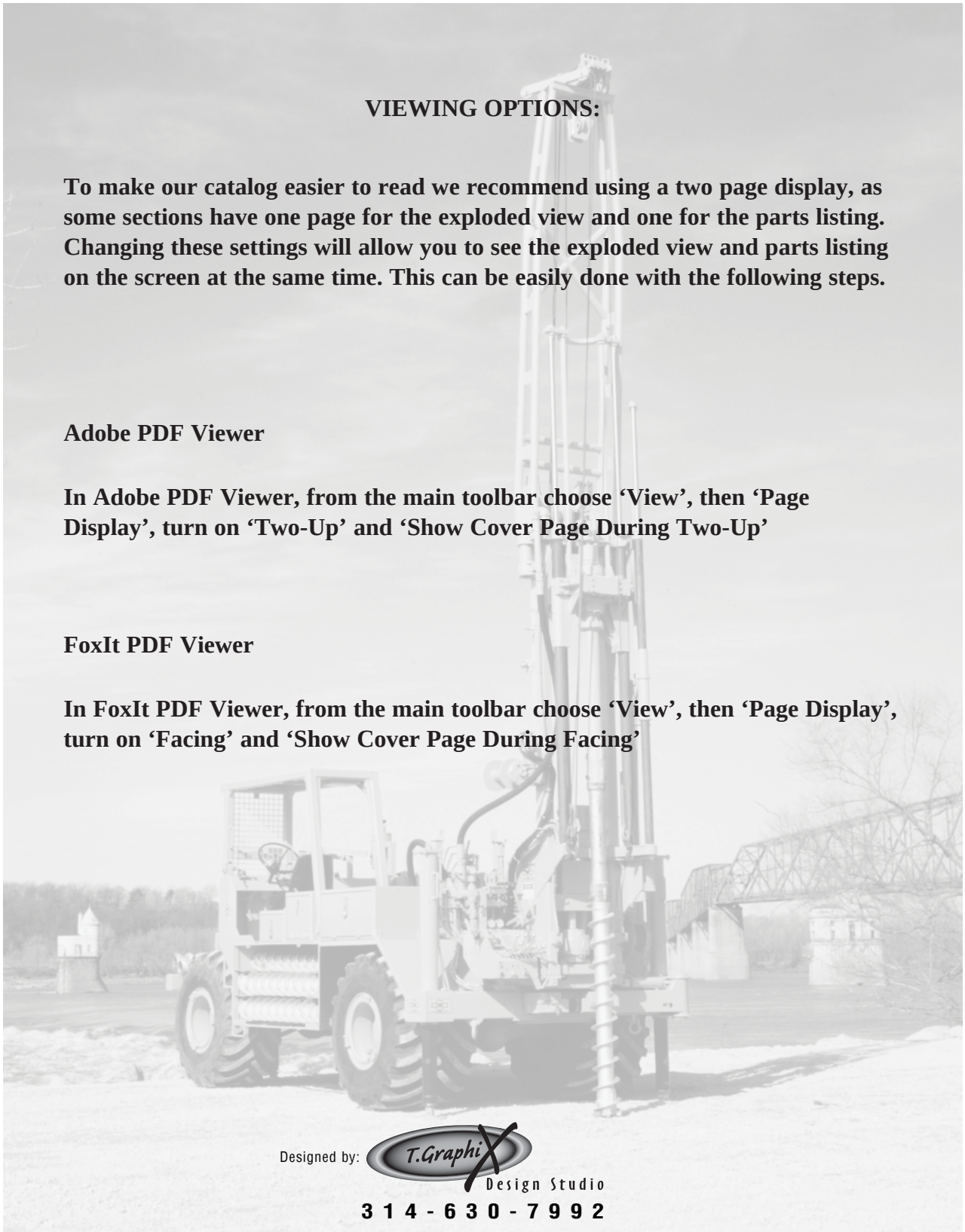
To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

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CME Diamond Bits

Core Bits **6.02**

Impregnated Diamond Bits **6.04**

Surface Set Diamond Bits **6.11**

Tungsten Carbide Bits **6.17**

Polycrystalline Diamond Compact Bits **6.19**

Casing & Rod Shoes **6.20**

Reamer Shells **6.22**

Bit & Shoe Set Dimensions **6.25**

Use & Care of Diamond Bits **6.26**

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MOH'S SCALE OF HARDNESS

This scale characterizes the scratch resistance of various minerals through the ability of a harder material to scratch a softer material.



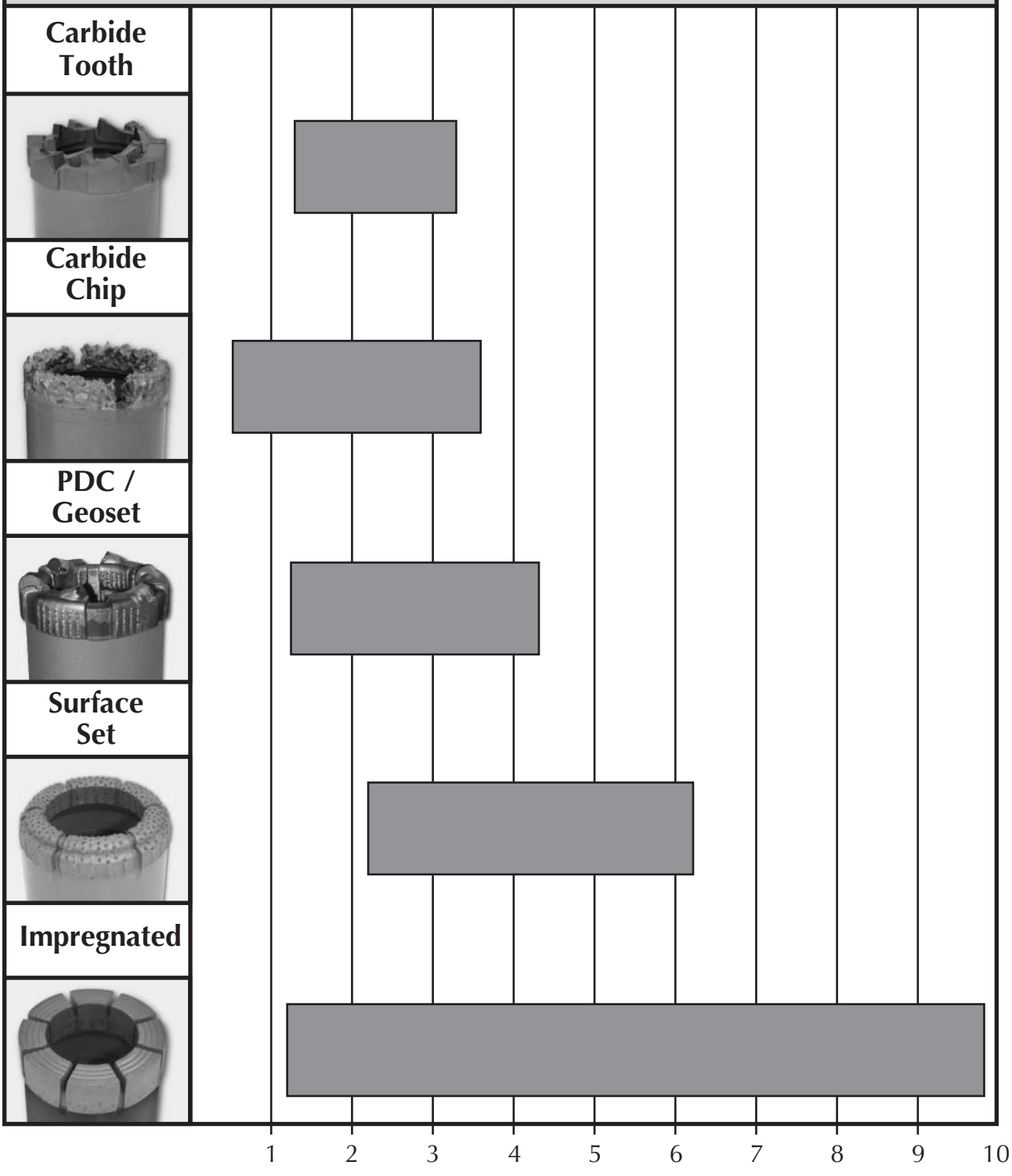
Mohs Hardness Scale

Note: On the Moh's scale, a pencil "lead" (graphite) has a hardness of 1; a fingernail, 2.5; copper penny, about 3.5; a knife blade, 5.5; window glass, 5.5; and a steel file, 6.5. Using these ordinary materials of known hardness can be a simple way to approximate the position of the mineral scale.

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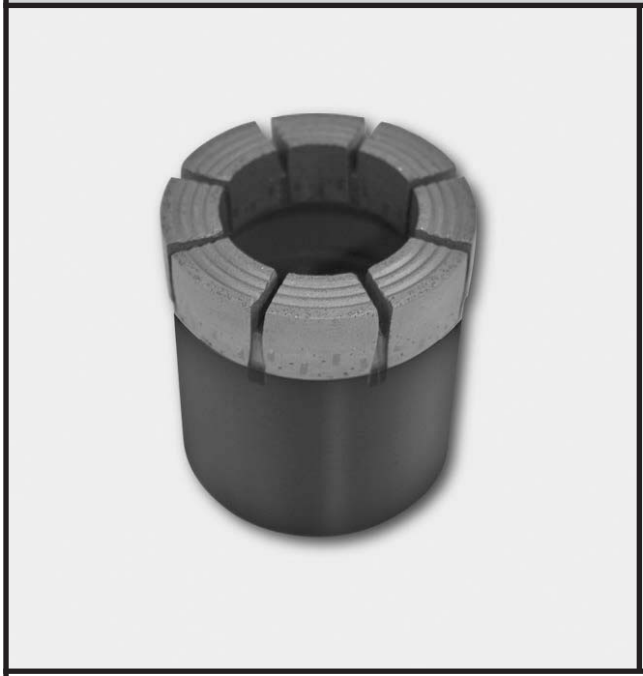
BIT SELECTION CHART vs. MOH'S HARDNESS SCALE



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BITS - IMPREGNATED





The impregnated diamond bit is for cutting medium to ultra-hard formations. They utilize various powdered metals mixed with synthetic diamond grits and are reinforced with carbide and diamond. This allows the bit to drill all types of formations. The impregnated diamond bit can be matched to the job ranging from broken and highly abrasive to fine-grained, consolidated and ultra-hard rock. The bit resharpens as it drills, renewing the cutting edges. New diamond layers are exposed as the matrix wears away. Several water-way designs are available for different types of formations and conditions. The impregnated bit is not designed to drill through overburden.

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BITS - IMPREGNATED

Selecting an impregnated diamond bit.
Where to get started.

What is the competency of the formation?

If it is fractured or broken a lower series # bit is recommended due to the abrasiveness of the rock. For a competent formation a higher series # bit is suggested where a softer matrix is utilized for proper diamond exposure and matrix erosion.

What is the torque output of the drill rig?

If a machine has low torque output then a higher series # bit ought to be used because of the higher RPM output. A lower series # bit may perform better with a high torque machine that optimizes the available RPM's.

What is the hardness of the rock?
(see Moh's scale of Hardness)

When drilling in soft rock a lower series # bit is more resistant to the abrasive conditions which extends bit life and increases penetration rates. A higher series # bit is more productive in hard rock conditions where the softer matrix wears exposing new diamonds to the rock formation.

Once these criteria have been evaluated and the bit has been selected and used, record the footage, wear pattern and penetration rates.

Continue to use bit if successful or re-evaluate your selection for a different bit.

Adjustments?

If penetration rate is slow try a higher series # bit.
If the bit life is short try a lower series # bit.

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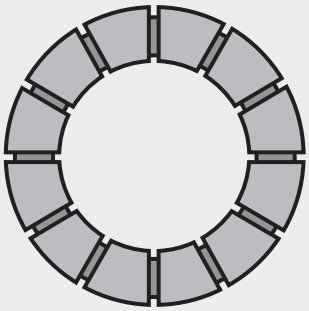
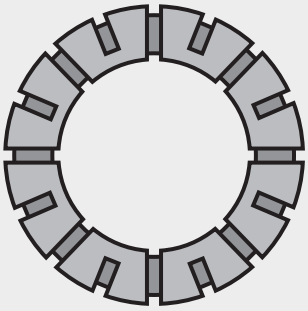
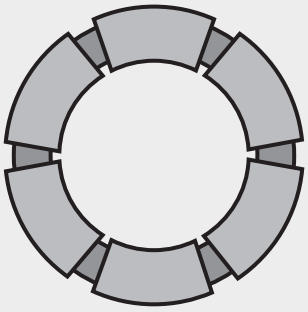
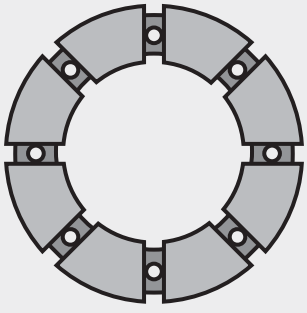
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BITS - IMPREGNATED SELECTION GUIDE

Series 2	Series 2-6	Series 6	Series 7	Series 8	Series 10
SILTSTONE	SHALE	SHALE	RHYOLITE	QUARTZ	CHERT
SCHIST	LIMESTONE	GNEISS		CHERT	QUARTZ
WEATHERED GRANITE	SANDSTONE	QUARTZ	FINE GRAINED SANDSTONE	JASPER	SCHIST
		CHERT			
Fractured or Broken	Coarse Abrasive	Competent Non-Abrasive	Fine Medium Hard	Ultra Hard Non-Abrasive	Fine Grain Ultra Hard

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BITS - IMPREGNATED	
Waterway Configurations	
	**Standard Waterways, longest life**
	**Hydra Waterways, faster penetration, reduced down pressure required**
	**Tapered Waterways, helps push cuttings to the OD and reduces pressure across bit face**
	**Face Discharge Waterways, has the benefit of reducing fluid pressure to the ID and redirects it to the face of the bit (reduces core wash)**

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BITS - IMPREGNATED

Operating Recommendations

We recommend flexible guidelines for running impregnated diamond bits that take into account the many operating variables such as; fluid flow, rpm and weight-on-bit. This approach, in combination with formation characteristics, maximizes bit life and penetration rate.

Drilling Fluid

Formation characteristics and penetration rate will dictate proper fluid make-up and flow. With an increase in penetration rate, fluid flow should be increased to properly clean the bit. The cuttings generated by an impregnated bit abrade the metal matrix around the diamonds, which plays an important role in keeping the bit sharp. Conversely, if the cuttings are washed away too quickly, the metal matrix will not wear away fast enough to properly expose new diamond surfaces, and the bit will polish, reducing performance.

Rotation Speed

In general, impregnated diamond bits should be run at higher rotational speeds (rpm) than are similar size surface set diamond bits. Maximum bit performance is achieved by running the impregnated bit as fast as conditions allow, without vibration caused by high rotation speed.

Weight-On-Bit

Optimum weight-on-bit, combined with proper rotation speed, fluid flow and penetration rate provides for a balanced system. The least possible weight-on-bit that maintains efficient penetration rates should be used. Applying insufficient weight results in polishing the diamonds, while too much weight, over a prolonged period, may damage the bit. When the bit fails to penetrate after adjusting weight-on-bit, rpm, or fluid flow, a different bit should be selected which is designed for drilling harder rock.

Operating Observations

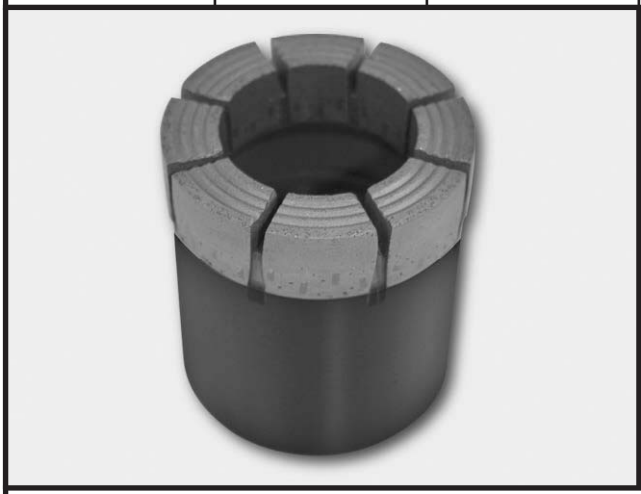
- Stable, smooth, vibration free rotation optimizes bit cutting efficiency. Reaming shells and stabilized core barrel outer tubes should provide improved bit performance.
- Experience indicates that optimum rotation speeds for impregnated bits in wireline applications should be 400 rpms or greater for N sized bits.
- While bit lubrication with a polymer or water soluble oil mixture is helpful, high fluid viscosity can create a cushion between the bit and formation, resulting in poor performance.

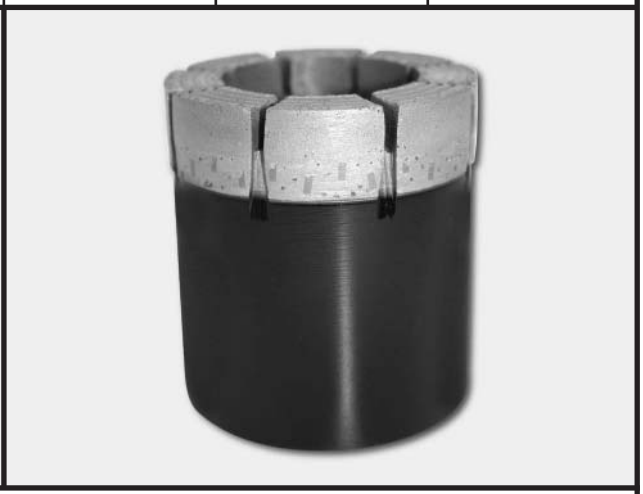
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BITS - IMPREGNATED

Size	Series 2	Series 6	Series 7	Series 8	Series 10
N W/L	C36500	C36501	C36668	C36502	C36730
N W/L2	C36508	C36509	C36667	C36510	C36670
N W/L3	C36624	C36625	-	C36626	C36671
NWD - 4	C36516	C36517	-	C36518	-
NXB - NWC3	C36524	C36525	-	C36526	-
H W/L	C36595	C36596	-	C36597	-
H W/L3	C36545	C36610	-	C36611	C36656
P W/L	C36700	C36701	-	C36702	-
P W/L3	C36717	C36718	-	C36719	-





NOTE: All bits set to Reamer Shell Gage (RSG) unless noted.

The bits listed above have proven to be successful in the majority of applications and are normally kept in stock for immediate shipment

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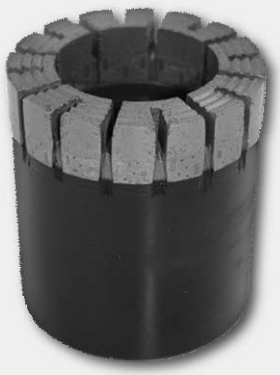
BITS - IMPREGNATED "ULTRA"

SPECIAL APPLICATION - CONSULT FACTORY

Size	Series 6	Series 8	Series 10
N W/L	C36587	C36588	C36639
N W/L2	C36589	C36590	C36640
NWD - 4	C36591	C36592	C36641
NXB - NWC3	C36593	C36594	C36642
H W/L	C36643	C36644	C36645

BITS - IMPREGNATED "HYDRA"

Size	Series 6	Series 8	Series 10
N W/L	C36571	C36572	-
N W/L2	C36555	C36556	-
NWD - 4	C36573	C36574	-
NXB - NWC3	C36575	C36576	-
H W/L	C36602	C36603	-
H W/L3	C36616	C36617	-
P W/L	C36708	C36709	-
P W/L3	C36724	C36725	-





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CME Surface Set Diamond Bits

The surface set diamond bit is for coring soft to medium hard formations where impregnated diamond bits are less effective. They are set with a single layer of natural diamonds in a tungsten carbide matrix with diamond and carbide reinforcements. They are recommended for relatively soft, unconsolidated formations and harder formations where the RPM's and bit loads required for impregnated bits are not available. The surface set bit is not ideal for ultra-hard formations and are not recommended.

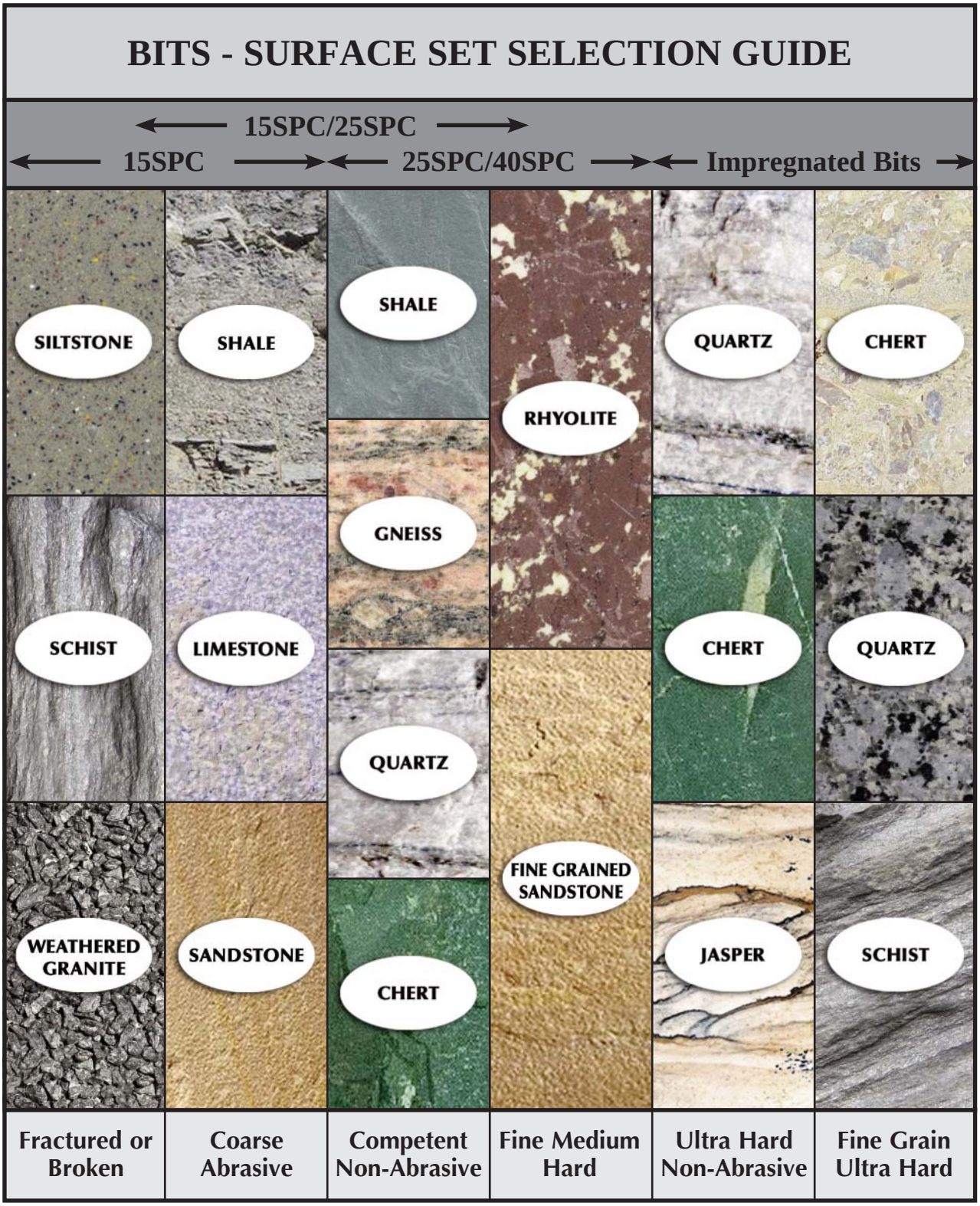
The choice of a Surface Set Bit will be dictated by the rock type. The diamond size, crown design and matrix hardness used will be determined by the hardness of the formation. The friability of the core will determine the type of fluid passages. The surface set bit provides a greater exposure of diamonds than the impregnated bit and therefore faster penetration in soft formations.

Surface Set Bits are available in 8spc, 15spc, 25spc, 40spc, & 40/60spc-step diamond sizes. (SPC=stones per carat). Other diamond sizes are available upon request.

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BITS - SURFACE SET SELECTION GUIDE



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BITS - SURFACE SET



CME SR 8

The 8 stone per carat bit applies the advantage of diamond cutting power to drilling in exceptionally soft, friable formations.

Using natural diamonds and extra hard matrix, extended bit life is achieved in formations that tend to abraid the matrix.



CME MR 15

Designed for coring in badly fractured, soft to moderately hard formations, this bit utilizes a hard matrix and a pilot crown design which stabilizes the cutting face and minimizes hole deviation and vibration. The 15 stone per carat bit with natural diamonds uses a controlled diamond exposure for increased drilling efficiency.



CME MR 25

This bit configuration is designed for coring fractured, medium to hard formations. A hard matrix and natural diamonds, extend bit life and resists abrasion. The modified pilot crown is designed for stability and permits diamonds to be set over a comparatively regular surface to increase load per stone. This coupled with controlled diamond exposure optimizes cutting efficiency.

Reinforced waterways contribute OD and ID strength, minimizing matrix and waterway erosion while providing flushing and cooling of a predetermined diamond pad area.

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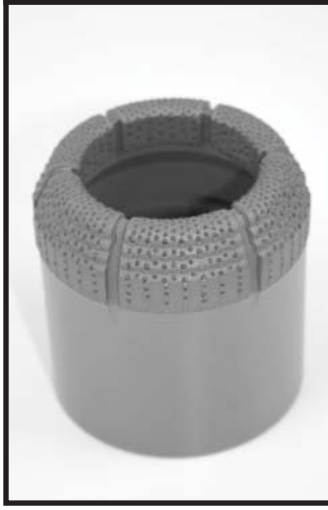
BITS - SURFACE SET



CME HR 40

This bit provides excellent performance in coring medium-hard to hard broken formations. The diamonds are set in a hard matrix, balancing the need for cutting power with abrasive resistance and ductility.

The semi-round crown provides a reduced area over which diamonds can be set. The resulting smaller crown area in contact with the formation improves cutting efficiency and increases penetration. Optimum unit loading of the diamonds keeps them cutting in hard rock.



CME HR 40-60 STEP

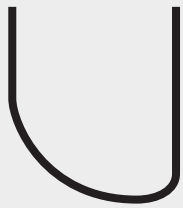
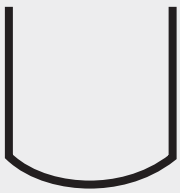
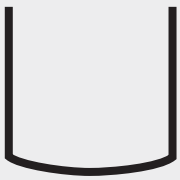
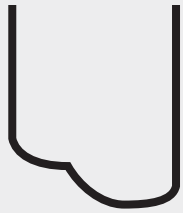
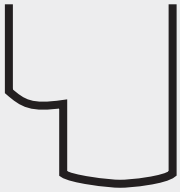
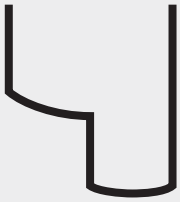
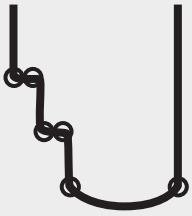
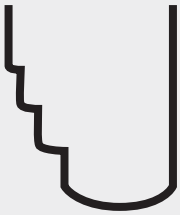
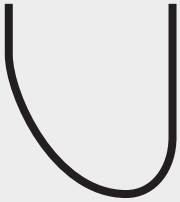
Hard solid formations are drilling territory for this design which is set with a size blend of natural diamonds. By using a medium concentration of diamonds, cutting efficiency and penetration are optimized allowing maximum loading of the diamonds to keep them cutting. The tapered step crown design of this bit provides good stability and fast penetration. Free cutting is enhanced by this design, facilitating constant mechanical fracturing and chipping of the formation.

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BITS - SURFACE SET

Bit Profiles

 #2 A CROWN	 #4 W CROWN	 #5 FLAT W CROWN
 #8 MODIFIED PILOT	 #9 WIDE PILOT	 #10 NARROW PILOT
 #11 WIDE STEP # OF STEPS OPTIONAL	 #12 NARROW STEP	 #13 TAPERED CROWN

NOTE: Other crown types for special applications are available upon request.

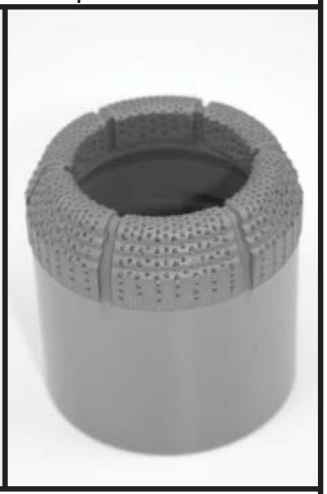
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BITS - SURFACE SET

Size	SR 8	MR 15	MR 25	HR 40	HR 60/40 STEP
N W/L	C36504	C36505	C36506	C36507	C36547
N W/L2	C36655	C36513	C36514	C36515	C36546
N W/L3	C36631	C36627	C36628	C36629	C36630
NWD4	C36520	C36521	C36522	C36523	C36548
NXB	C36528	C36529	C36530	C36531	C36549
H W/L	C36608	C36598	C36599	C36600	C36601
H W/L3	C36621	C36612	C36613	C36614	C36615
P W/L	C36713	C36703	C36704	C36705	C36707
P W/L3	C36729	C36720	C36721	C36722	C36723



NOTE: All bits set to Reamer Shell Gage (RSG) unless noted. Other set sizes available upon request.

The bits listed above have proven to be successful in the majority of applications and are normally kept in stock for immediate shipment

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BITS - TUNGSTEN CARBIDE

Carbide Tooth	Tuff-Kut Carbide Chip
	

The Carbide Tooth core bit is designed to cut soft formations with very small gravel, sticky shales or clay. The tooth bit is provided in 2 styles, Full Sawtooth or Staggered Tooth. Tungsten carbide inserts are selectively placed in the carbide matrix. Waterways are designed for optimum discharge of fluid and aid in controlling matrix abrasion to maximize cutting efficiency and penetration. The carbide bits will not drill hard formations and are constructed with single layer cutting elements. The bit is also available with face discharge ports to reduce washing of the core.

The Tuff-Kut core bit is for general drilling in soft formations such as clay, sand, gypsum or soft shale. The matrix is comprised of tungsten carbide chips suspended in the metal alloy. This bit is similar to an impregnated diamond bit in that the crown is composed of several layers of cutting media. As the bit wears new layers of randomly set carbide chips are exposed. The Tuff-Kut bit is also used to clean steel fragments from existing drill holes.

An oversized bit gage is highly recommended (but not mandatory) for these bits. Oversized bits will not permit passage thru the corresponding casing. (i.e. N size bit thru NW casing)

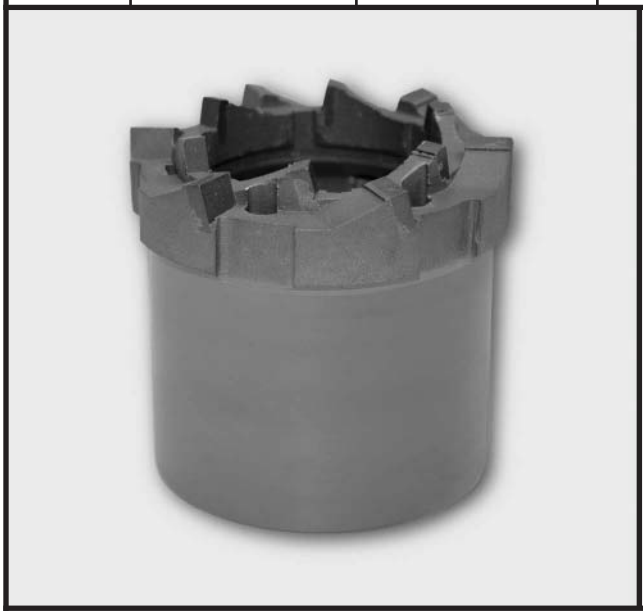
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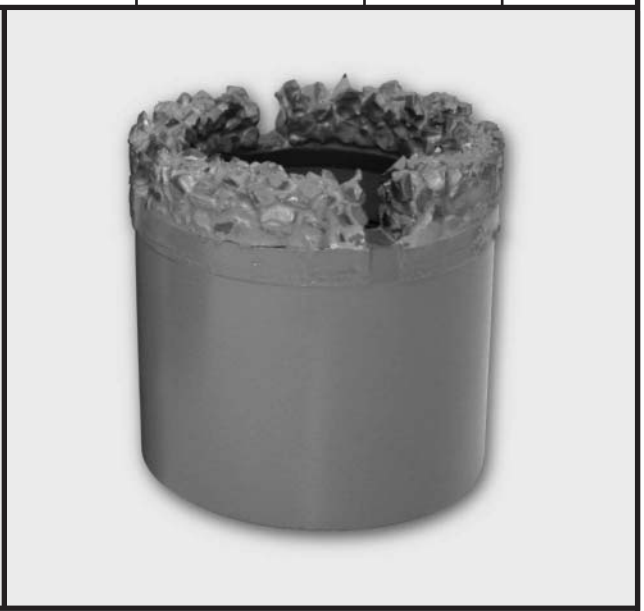
REFLEX EXHIBIT 1017 - 167/280

BITS - TUNGSTEN CARBIDE

Size	Face Discharge	Face Discharge 3.125”	Stgrd Tooth	Stgrd Tooth 3.125”	Tuff-Kut	Tuff-Kut 3.125”
N W/L	C36577	C36581	C36560	C36564	C36568	-
N W/L2	C36578	C36582	C36561	C36565	C36557	-
N W/L3	C36634	C36635	C36632	C36633	C36636	C36637
NWD - 4	C36579	C36583	C36562	C36566	C36569	-
NXB	C36580	C36584	C36563	C36567	C36570	-

Size	Face Discharge 3.90”	Face Discharge 5.25”	Stgrd Tooth 3.90”	Stgrd Tooth Discharge 5.25”	Tuff-Kut 3.90”	Tuff-Kut 5.25”
H W/L	C36605	-	C36604	-	C36606	-
H W/L3	C36619	-	C36618	-	C36620	-
P W/L	-	C36711	-	C36710	-	C36712
P W/L3	-	C36727	-	C36726	-	C36728





NOTE: All bits set to Reamer Shell Gage (RSG) unless noted. Other set sizes available upon request.

The bits listed above have proven to be successful in the majority of applications and are normally kept in stock for immediate shipment

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REFLEX EXHIBIT 1017 - 168/280

BITS - PDC (Polycrystalline Diamond Compact)

PDC	Geo Set
	

PDC bits are for coring formations too soft and/or sticky for large stone diamond bits such as clay, shale, or sandstone to abrasive, broken siltstone or limestone. Disc shaped cutters consist of a layer of polycrystalline diamonds on a tungsten carbide base. The bit is set with 9 mm or 13 mm diameter cutters. Gage is maintained by natural diamond and hard facing. Waterways are designed for efficient cuttings removal. Oversized gage is highly recommended for these bits. PDC bits are primarily run on drills with high torque and low RPM output.

Geo Set bits are triangular shaped polycrystalline diamond cutters. These bits are designed for high performance in soft abrasive to medium hard formation. The crown design with its intermediate waterways allows for high volume cuttings removal and fast penetration.

Footnote: Attributes of these bits are fast penetration and long life.

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REFLEX EXHIBIT 1017 - 169/280

CASING and ROD SHOES

Impregnated	Carbide Tooth	Tuff-Kut
		

Casing or wireline rod shoes are used to seat casing or wireline rod into the rock to maintain fluid control during core or rotary drilling applications.

Shoes are designed in several configurations which include: Diamond Impregnated (Standard or Heavy Duty), Surface Set, Carbide Tooth and Tuff-Kut.

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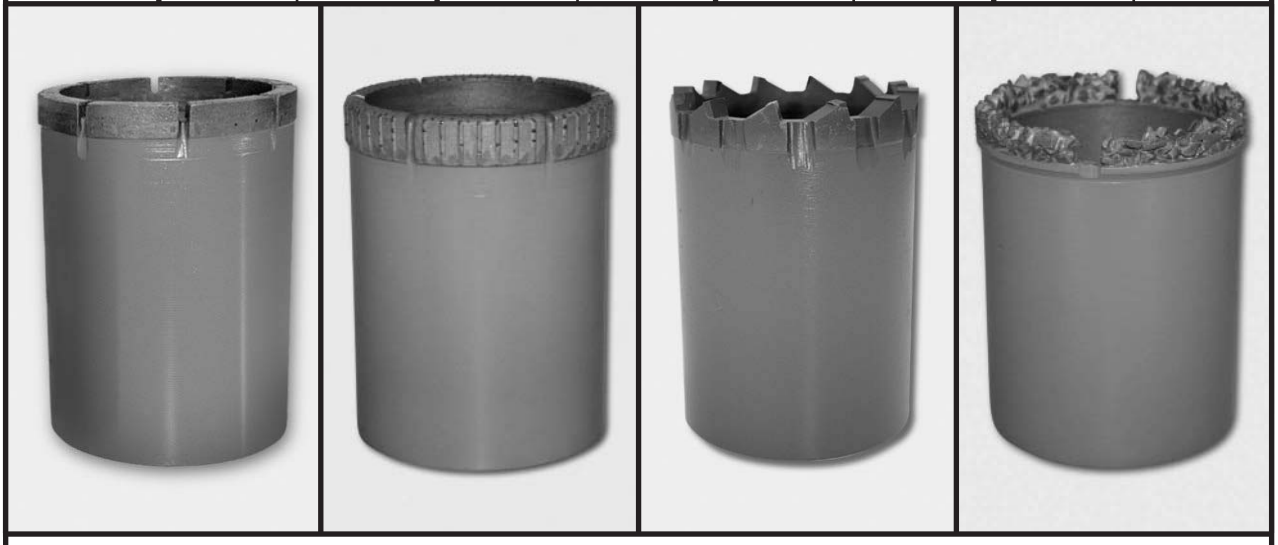
REFLEX EXHIBIT 1017 - 170/280

CASING SHOES

	IMPREGNATED		IMPREGNATED HD		ADVANCER IMPG HD		SAWTOOTH		TUFF-KUT	
Size	Part No.	O.D.	Part No.	O.D.	Part No.	O.D.	Part No.	O.D.	Part No.	O.D.
NW	C36542	3.615″	C36552	3.615″	C36646	3.75″	C36731	3.75″	220500	3.75″
	-	-	C36585	3.75″	-	-	-	-	-	-
HW	C36543	4.625″	C36553	4.625″	C36647	4.75″	-	-	-	-
HWT	C36551	4.625″	C36554	4.625″	C36648	4.75″			C36659	4.75″

WIRELINE ROD SHOES

	IMPREGNATED		IMPREGNATED HD		25/35 SPC SURFACE SET		TUFF-KUT	
Size	Part No.	O.D.	Part No.	O.D.	Part No.	O.D.	Part No.	O.D.
H W/L	C36651	3.615″	C36652	3.615″	C36653	3.615″	C36660	3.75″



NOTE: Other sizes available upon request.
The shoes listed above are normally kept in stock for immediate shipment.
Advancer Impregnated HD is required for the casing advancer system.

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REFLEX EXHIBIT 1017 - 171/280

REAMER SHELL

Standard	Heavy Duty
	

Reamer shells connect the core bit to a core barrel. The outside surface of the reamer shell can be inset with diamonds or hard facing to maintain the gage of the hole as the O.D. of the core bit wears. The proper hole gage is critical. If the hole gage is reduced, the cuttings may not be flushed from the face of the bit. This can result in core grinding. In extreme cases, the core barrel may become difficult or even impossible to remove from the hole. Reamer shells are available in a standard or a heavy duty design.

Note: Oversized, blank, and hardfaced reamer shells are also available.

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REAMER SHELLS

Size	DIAMOND	HARD FACED
N W/L	C36532	C36539
NXB	C36534	C36541
NWD-4	C36533	C36540
H W/L	C36544	C36607
P W/L	C36716	C36715





NOTE: Oversized shells are available upon request.
The Reamer Shells listed above are normally kept in stock for immediate shipment.

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CROSSOVER REAMER SHELLS

Size	DIAMOND	HARDFACED
N W/L - NXB	C36536	C36538
NXB - N W/L	C36535	C36537





NOTE: Cross Over Shells (X-O) permit the use of a bit on one design core barrel to be used on another (i.e. NXB bit on a N W/L barrel)

Oversized shells are available upon request.

The Reamer Shells listed above are normally kept in stock for immediate shipment.

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REFLEX EXHIBIT 1017 - 174/280

BIT SET DIMENSIONS

CORE BARREL	BIT DIMENSIONS		CORE BARREL	BIT DIMENSIONS	
Size	O.D. RSG	I.D.	Size	O.D. RSG	I.D.
EWG,EWM*	1.485	.845	HWD-4	3.650	2.400
AWG, AWM*	1.890	1.185	HXB, HWC-3	3.650	2.400
A W/L, AV	1.890	1.062	H W/L	3.782	2.500
BWG, BWM*	2.360	1.655	H W/L3	3.782	2.406
BWD-4	2.360	1.615	P W/L	4.827	3.345
BXB, BWC-3	2.360	1.432	P W/L3	4.827	3.270
B W/L, BV	2.360	1.432	2.75 X 3.875*	3.875	2.690
NWG, NWM*	2.980	2.155	3 X 4.625	-	3.000
NWD-3, NWD-4	2.980	2.060	4 X 5.125	5.125	3.922
NXB, NWC-3	2.980	1.875	4 X 5.5*	5.495	3.970
N W/L, NV	2.980	1.875	4 X 5.75	-	3.970
N W/L2	2.980	1.995	6 X 7.125	7.125	5.922
NXE	2.980	1.995	6 X 7.75*	7.750	5.970
N W/L3	2.980	1.775	6.5 X 7.875	7.875	6.547
HWG*	3.907	3.000			

SHOE SET DIMENSIONS

CASING	SHOE DIMENSIONS		CASING	SHOE DIMENSIONS	
Size	O.D.	I.D.	Size	O.D.	I.D.
RW*	1.485	1.185	HW/HWT*	4.625	3.975
EW*	1.875	1.495	PW*	5.650	4.852
AW*	2.345	1.900	SW*	6.790	5.937
BW*	2.965	2.370	UW*	7.800	6.905
NW*	3.615	2.992	ZW*	8.815	7.977

NOTE: * Conforms to DCDMA standards. All dimensions are in inches.

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REFLEX EXHIBIT 1017 - 175/280

USE & CARE OF DIAMOND BITS

WHAT TO DO	WHY IT IS DONE
1. Be sure wrenches never contact the diamonds in bits and shells.	1. Broken stones will result. Diamonds will not stand this kind of abuse.
2. Use full circle grip inner & outer tube wrenches.	2. Avoid damaging or egg-shaping the tubular connections of the core barrel assembly.
3. Start a hole with a used bit whenever possible in slow feed at moderate RPM's.	3. The sharp points on a new bit may be broken on a rough rock surface.
4. Start water circulating before putting a bit on bottom.	4. To remove the cuttings which have settled in the bottom of the hole.
5. Start a new bit in an existing core hole 4-6 inches from bottom and drill it down.	5. The used bit it replaced may have been slightly under gage.
6. Run a new bit in slow feed and at moderate RPM for the first few inches.	6. To give the diamonds time to seat themselves in the rock.
7. Tighten all drill rod joints and wick when necessary, before lowering into the hole.	7. Wash water may escape through joints and the bit will burn in the sludge at bottom.
8. Grease core barrels and rods.	8. To prevent vibration and its hammering effect, which results in broken diamonds.
9. Avoid grinding core.	9. Grinding core rapidly destroys both bit and shell.
10. Remove lost core.	10. Running over loose core is very destructive to the bit.
11. Avoid dry blocking.	11. The heat generated in dry blocking can render a bit useless.
12. Never drop a bit on bottom.	12. Diamonds may shatter.
13. Never start bits turning under pressure.	13. This will damage the cutting points on the diamonds.
14. Make sure that fluid is circulating through the bit, before starting to drill.	14. Remember that time is required, particularly on deeper holes, for circulation to reach the bit.
15. When necessary to improve circulation in sticky ground, never raise the bit more than half an inch off bottom.	15. Short lengths of core may fall in the hole and damage the bit.
16. Maintain safe storage for bits and shells. They should be removed from the barrel, well oiled, and packed in a separate box.	16. Protects bits and shells from damage.

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REFLEX EXHIBIT 1017 - 176/280

Core Drilling



VIEWING OPTIONS:

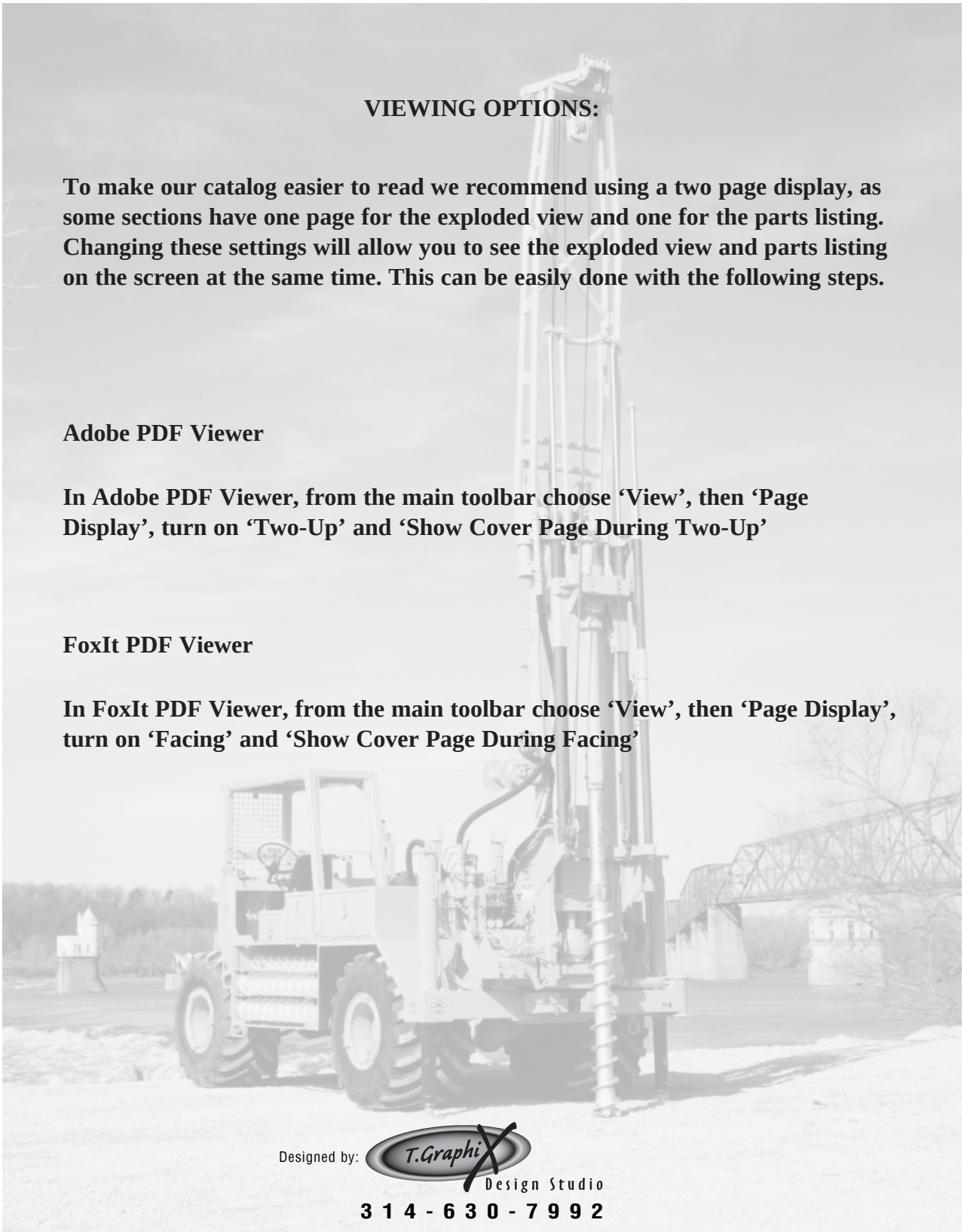
To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

Adobe PDF Viewer

In Adobe PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Two-Up' and 'Show Cover Page During Two-Up'

FoxIt PDF Viewer

In FoxIt PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Facing' and 'Show Cover Page During Facing'



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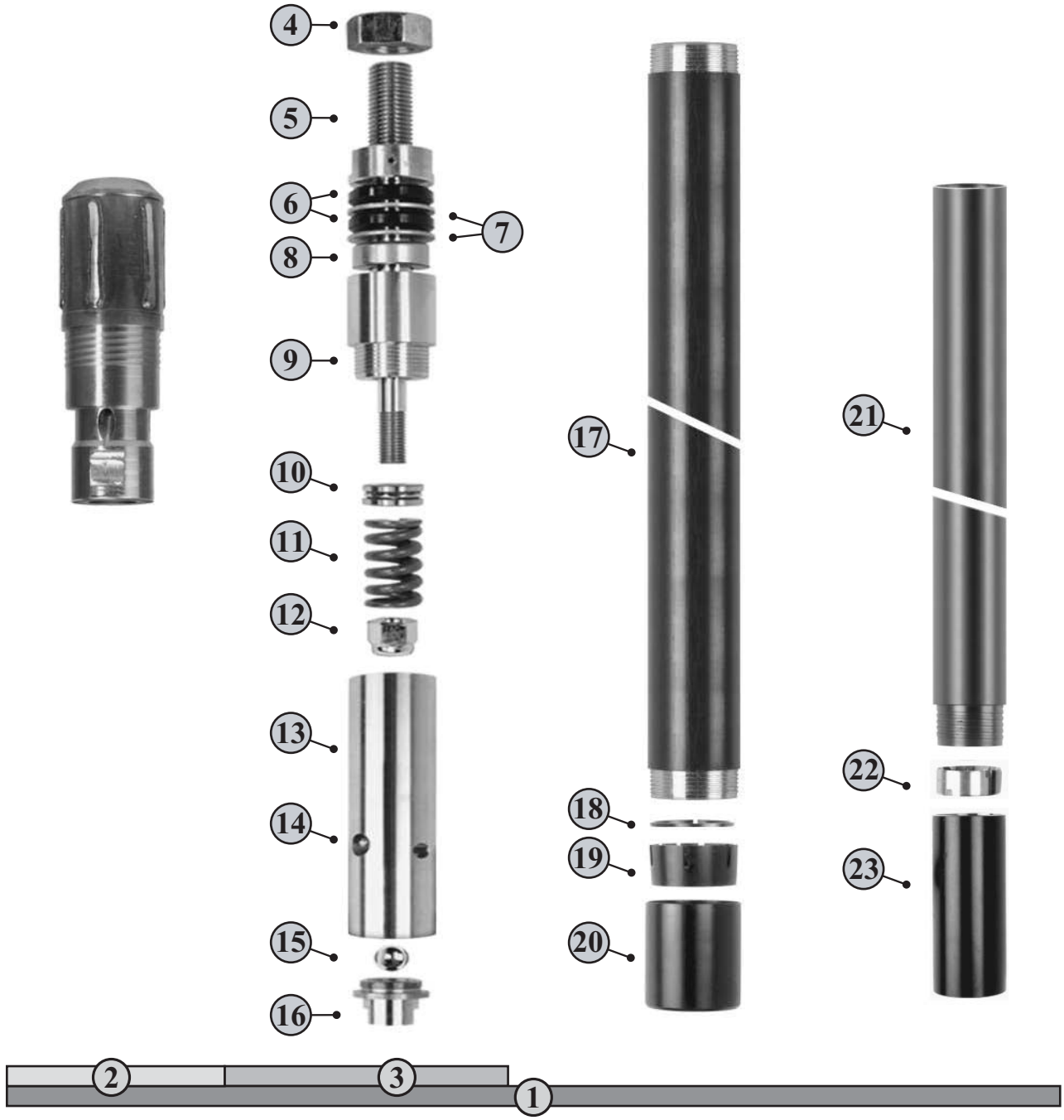
Core Drilling **7.01**
Casing - W Series Flush Joint **7.50**
Core Barrels
Conventional Core Barrels
NV, NV2, NV3 ..... **7.02**
HV, HV3 ..... **7.08**
PV, PV3 ..... **7.12**
Wireline Core Barrels
N W/L, N W/L2, N W/L3 ..... **7.16**
Overshot N W/L **7.26**
H W/L, H W/L3 ..... **7.28**
Overshot H W/L **7.34**
P W/L, P W/L3 ..... **7.36**
Overshot P W/L **7.40**
Core Boxes **7.65**
Drill Rod (Wireline) **7.42**
Foot Clamp **7.63**
Insta-Vis Plus **7.66**
Kwik Klamps **7.62**
Lubricants & Dope Brush **7.66**
Punch Shoes **7.45**
Subs & Adapters **7.46**
Water Swivels, Side Feed & Bail Type **7.52**
Wrenches - Full Circle Grip **7.64**

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REFLEX EXHIBIT 1017 - 179/280

CONVENTIONAL CORE BARRELS

NV Core Barrel



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REFLEX EXHIBIT 1017 - 180/280

CONVENTIONAL CORE BARRELS

NV Core Barrel

Ref. No.	Part No.				Description
	5′	10′	5′	10′	
	Chrome plated		Plain		
1	36095	36096	36100	36101	NV Core barrel assembly - NWJ
2	36084	36084	36084	36084	Head
3	37076	37076	37076	37076	Bearing assembly
4	36014	36014	36014	36014	Lock nut
5	36015	36015	36015	36015	Spindle assembly
6	36016	36016	36016	36016	Shut-off valve (2 req′d.)
7	36017	36017	36017	36017	Valve adjusting washer (2 req′d.)
8	36018	36018	36018	36018	Ball thrust bearing
9	36019	36019	36019	36019	Spindle bearing
10	36020	36020	36020	36020	Hanger bearing
11	36021	36021	36021	36021	Compression spring
12	36022	36022	36022	36022	Self lock nut
13	36023	36023	36023	36023	Inner tube cap assembly
14	36024	36024	36024	36024	Grease fitting
15	36025	36025	36025	36025	Steel ball
16	36026	36026	36026	36026	Check valve body
17	36034	36035	36110	36111	Inner tube
18	36036	36036	36036	36036	Stop ring
19	36037	36037	36037	36037	Core lifter (Standard)
19	36038	36038	36038	36038	Core lifter (Broached)
20	36039	36039	36039	36039	Core lifter case
21	36044	36045	36129	36130	Outer tube
22	36046	36046	36046	36046	IT stabilizer
23	36047	36047	36047	36047	Thread protector

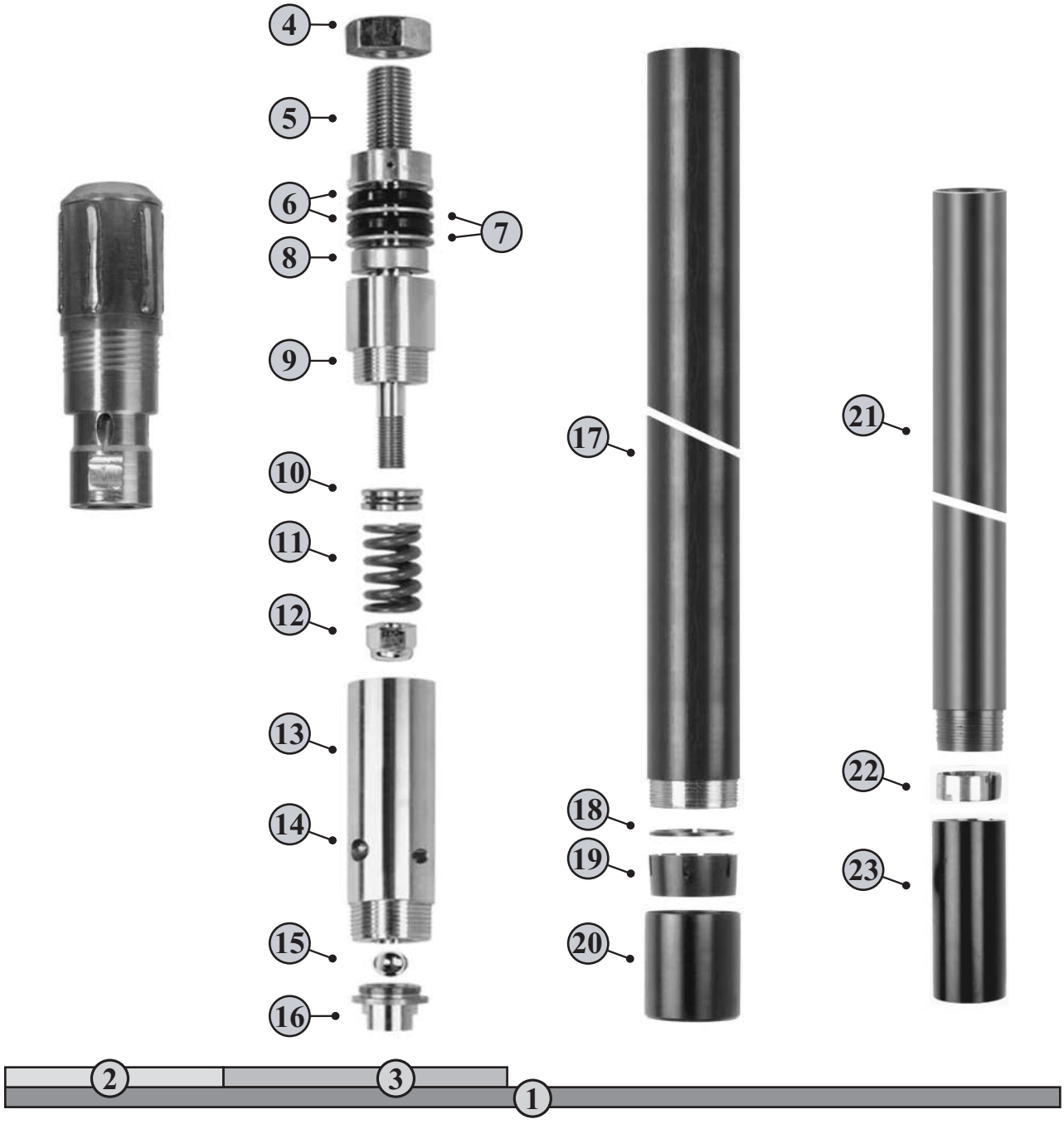
NOTE: **All barrels have NWJ box connection. Sub required for other rod sizes.**
If chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D.
NV Core barrel assembly does not include reamer shell or bit. (See Diamond Bit section)

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CONVENTIONAL CORE BARRELS

NV 2 Core Barrel



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REFLEX EXHIBIT 1017 - 182/280

CONVENTIONAL CORE BARRELS

NV 2 Core Barrel

Ref. No.	Part No.				Description
	5′	10′	5′	10′	
	Chrome plated		Plain		
1	36082	36083	36102	36103	NV 2 Core barrel assembly - NWJ
2	36084	36084	36084	36084	Head
3	37077	37077	37077	37077	Bearing assembly
4	36014	36014	36014	36014	Lock nut
5	36015	36015	36015	36015	Spindle assembly
6	36016	36016	36016	36016	Shut-off valve (2 req′d.)
7	36017	36017	36017	36017	Valve adjusting washer (2 req′d.)
8	36018	36018	36018	36018	Ball thrust bearing
9	36019	36019	36019	36019	Spindle bearing
10	36020	36020	36020	36020	Hanger bearing
11	36021	36021	36021	36021	Compression spring
12	36022	36022	36022	36022	Self lock nut
13	36074	36074	36074	36074	Inner tube cap assembly
14	36024	36024	36024	36024	Grease fitting
15	36025	36025	36025	36025	Steel ball
16	36026	36026	36026	36026	Check valve body
17	36075	36076	36112	36113	Inner tube
18	36077	36077	36077	36077	Stop ring
19	36078	36078	36078	36078	Core lifter (Standard)
19	36090	36090	36090	36090	Core lifter (Broached)
20	36079	36079	36079	36079	Core lifter case
21	36044	36045	36129	36130	Outer tube
22	36081	36081	36081	36081	IT stabilizer
23	36047	36047	36047	36047	Thread protector
	36124	36246	36124	36246	Inner tube extentions

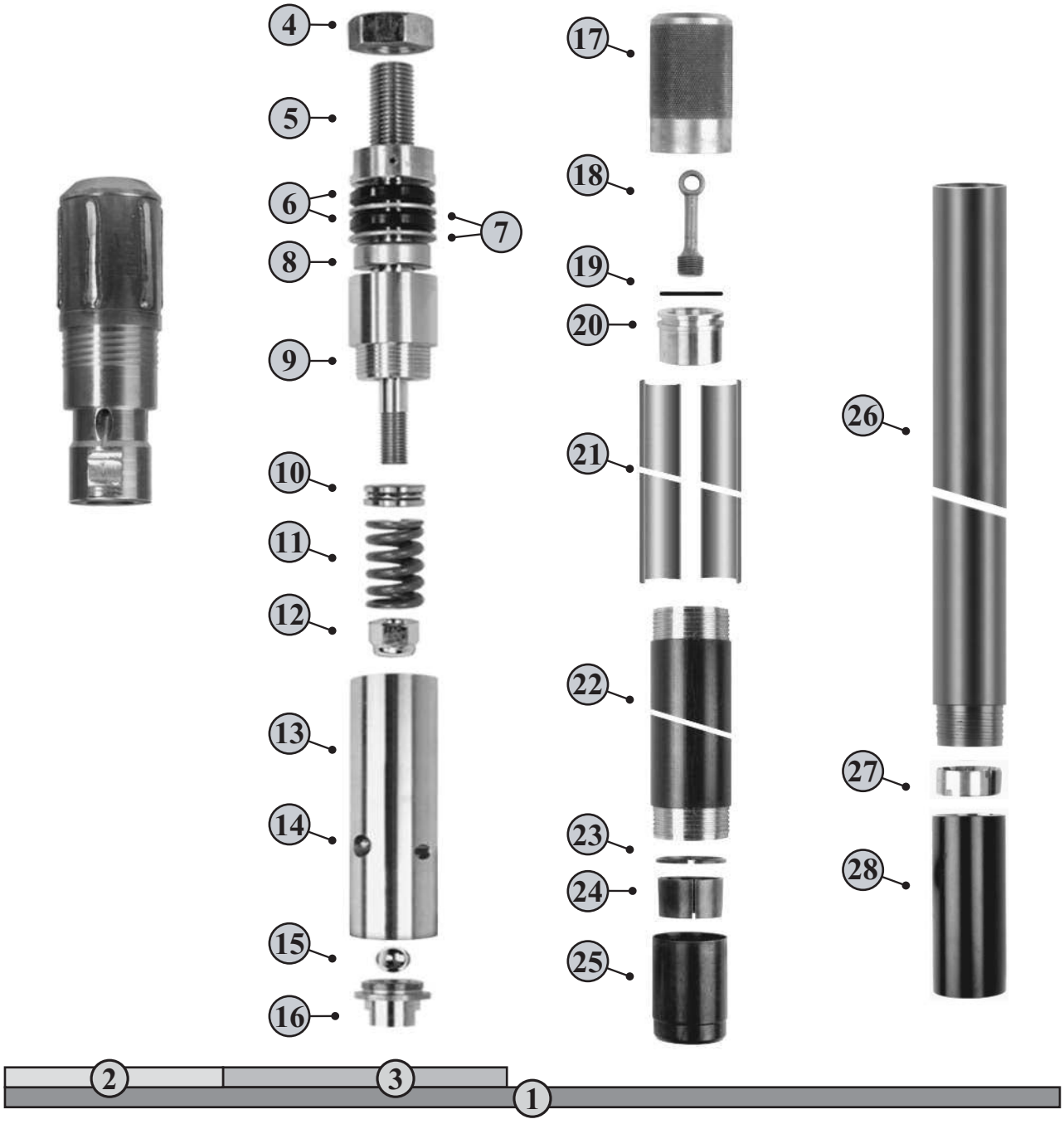
NOTE: All barrels have NWJ box connection. Sub required for other rod sizes. If chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D. NV2 Core barrel assembly does not include reamer shell or bit. (See Diamond Bit section)

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CONVENTIONAL CORE BARRELS

NV 3 Core Barrel



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CONVENTIONAL CORE BARRELS

NV 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36104	36105	NV 3 Core barrel assembly - NWJ	21	36114	36115	Split tube liner
2	36084	36084	Head	22	36110	36111	Inner tube
3	37076	37076	Bearing assembly	23	36116	36116	Stop ring
4	36014	36014	Lock nut	24	36117	36117	Core lifter (Standard)
5	36015	36015	Spindle assembly	24	36118	36118	Core lifter (Broached)
6	36016	36016	Shut-off valve (2 req′d.)	25	36119	36119	Core lifter case
7	36017	36017	Valve adjusting washer (2 req′d.)	26	36129	36130	Outer tube
7	36018	36018	Ball thrust bearing	27	36046	36046	IT stabilizer
9	36019	36019	Spindle bearing	28	36047	36047	Thread protector
10	36020	36020	Hanger bearing				
11	36021	36021	Compression spring				
12	36022	36022	Self lock nut				
13	36023	36023	Inner tube cap assembly				
14	36024	36024	Grease fitting				
15	36025	36025	Steel ball				
16	36026	36026	Check valve body				
17	36122	36122	Adapter				
18	36123	36123	Piston plug				
19	36121	36121	"O" ring				
20	36120	36120	Piston				

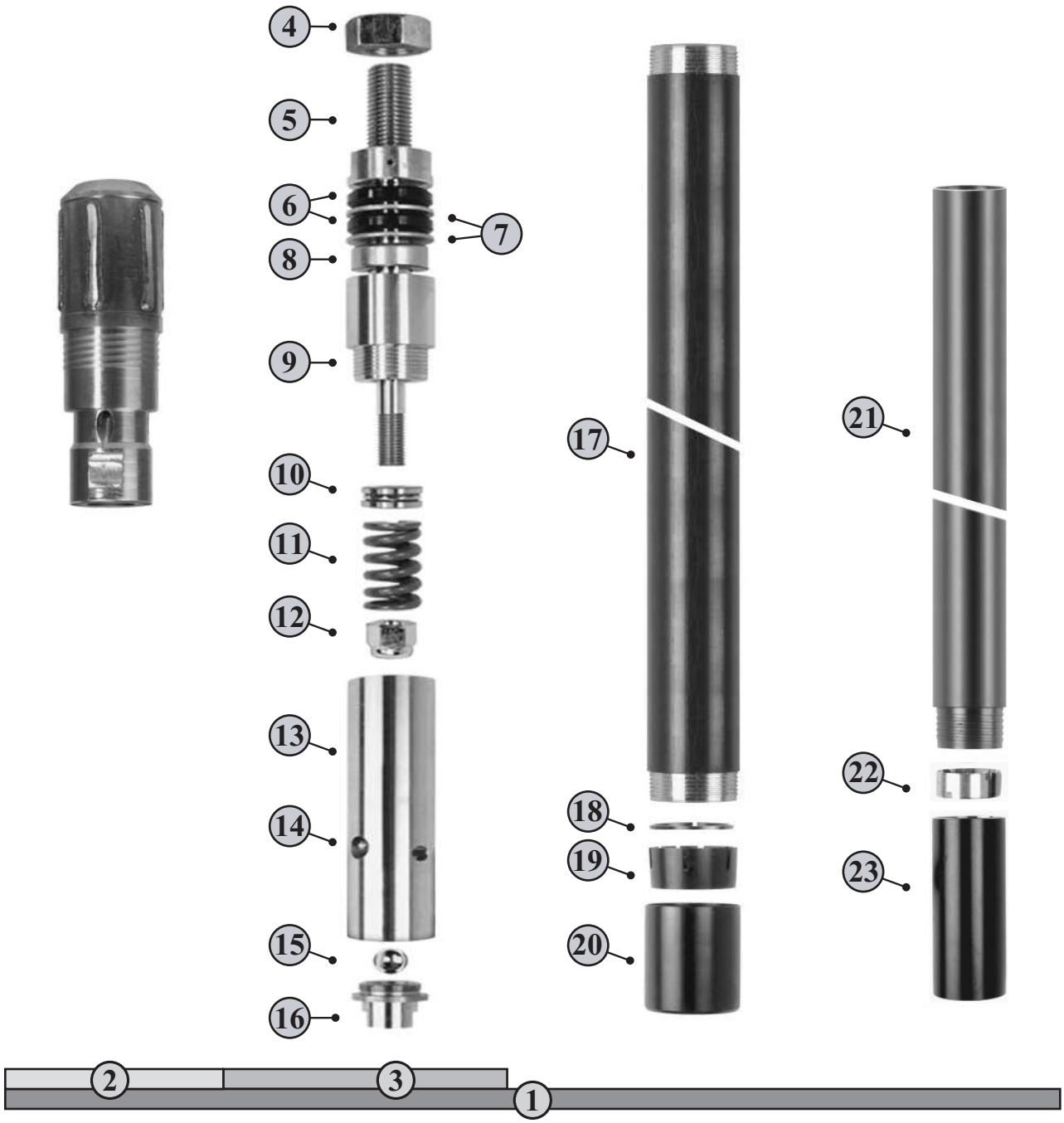
NOTE: All barrels have NWJ box connection. Sub required for other rod sizes.
NV 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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CONVENTIONAL CORE BARRELS

HV Core Barrel



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CONVENTIONAL CORE BARRELS

HV Core Barrel

Ref. No.	Part No.				Description
	5′	10′	5′	10′	
	Chrome plated		Plain		
1	37061	37062	37073	37074	HV Core barrel assembly - NWJ
2	37066	37066	37066	37066	Head
3	37078	37078	37078	37078	Bearing assembly
4	37017	37017	37017	37017	Lock nut
5	37018	37018	37018	37018	Spindle assembly
6	37019	37019	37019	37019	Shut-off valve (2 req′d.)
7	37020	37020	37020	37020	Valve adjusting washer (2 req′d.)
8	37021	37021	37021	37021	Ball thrust bearing
9	37022	37022	37022	37022	Spindle bearing
10	36018	36018	36018	36018	Hanger bearing
11	37024	37024	37024	37024	Compression spring
12	37025	37025	37025	37025	Self lock nut
13	37026	37026	37026	37026	Inner tube cap assembly
14	36024	36024	36024	36024	Grease fitting
15	36025	36025	36025	36025	Steel ball
16	36026	36026	36026	36026	Check valve body
17	37031	37032	37045	37046	Inner tube
18	37033	37033	37033	37033	Stop ring
19	37034	37034	37034	37034	Core lifter (Standard)
19	37035	37035	37035	37035	Core lifter (Broached)
20	37036	37036	37036	37036	Core lifter case
21	37041	37042	37067	37068	Outer tube
22	37043	37043	37043	37043	IT stabilizer
23	37044	37044	37044	37044	Thread protector

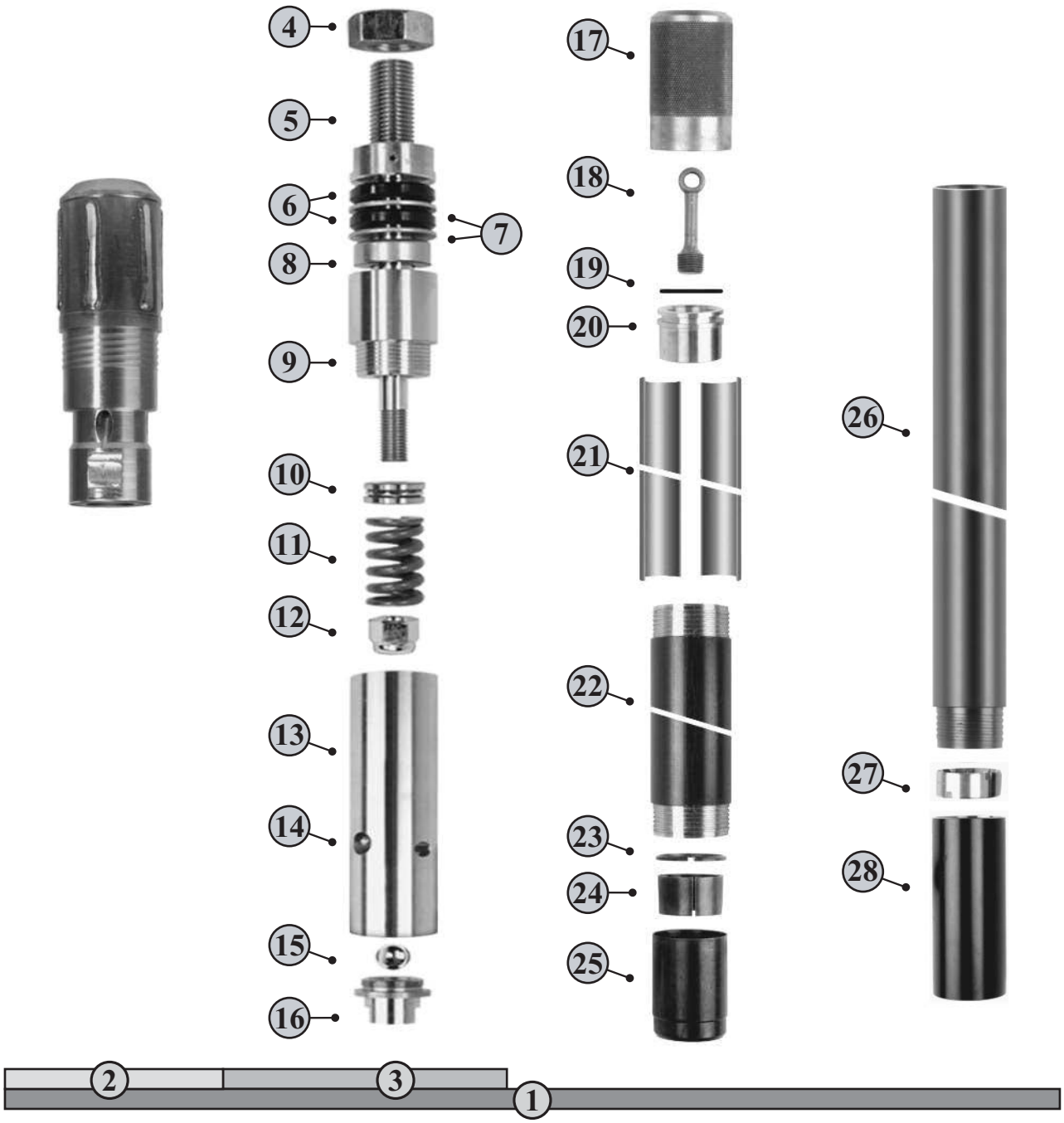
NOTE: **All barrels have NWJ box connection. Sub required for other rod sizes.**
If chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D.
HV Core barrel assembly does not include reamer shell or bit. (See Diamond Bit section)

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CONVENTIONAL CORE BARRELS

HV 3 Core Barrel



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CONVENTIONAL CORE BARRELS

HV 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	37063	37064	HV 3 Core barrel assembly - NWJ	21	37047	37048	Split tube liner
2	37066	37066	Head	22	37045	37046	Inner tube
3	37078	37078	Bearing assembly	23	37049	37049	Stop ring
4	37017	37017	Lock nut	24	37050	37050	Core lifter (Standard)
5	37018	37018	Spindle assembly	24	37051	37051	Core lifter (Broached)
6	37019	37019	Shut-off valve (2 req′d.)	25	37052	37052	Core lifter case
7	37020	37020	Valve adjusting washer (2 req′d.)	26	37067	37068	Outer tube
8	37021	37021	Ball thrust bearing	27	37043	37043	IT stabilizer
9	37022	37022	Spindle bearing	28	37044	37044	Thread protector
10	37023	37023	Hanger bearing				
11	37024	37024	Compression spring				
12	37025	37025	Self lock nut				
13	37026	37026	Inner tube cap assembly				
14	36024	36024	Grease fitting				
15	36025	36025	Steel ball				
16	36026	36026	Check valve body				
17	37055	37055	Adapter				
18	36123	36123	Piston plug				
19	37054	37054	“O” ring				
20	37053	37053	Piston				

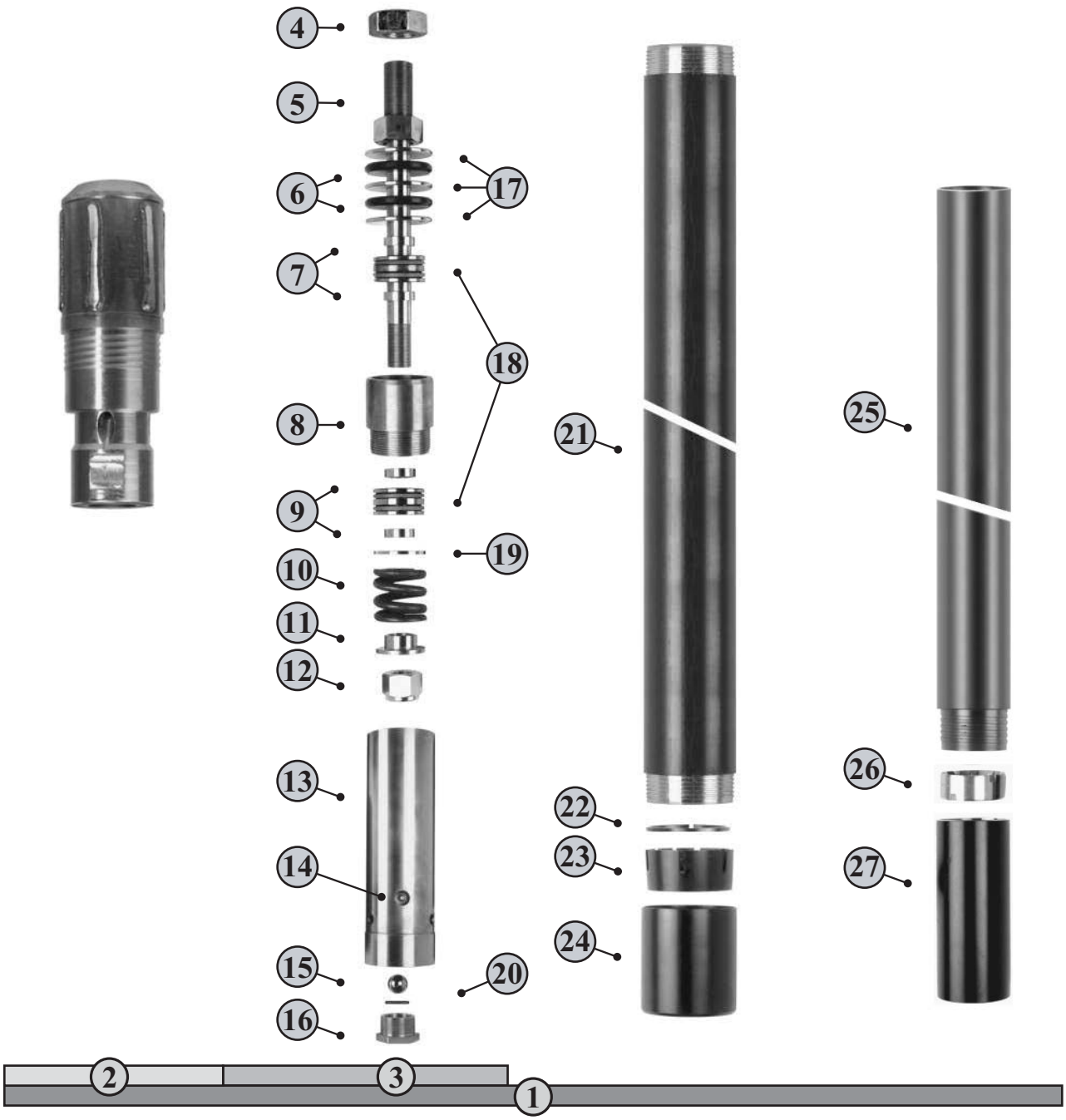
NOTE: All barrels have NWJ box connection. Sub required for other rod sizes.
HV 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

Central Mine Equipment Company
4215 Rider Trail North • Earth City, MO 63045 • Ph: 314.291.7700 • 800.325.8827 • Fax: 314.291.4880
E-mail: info@cmeco.com • Website: www.cmeco.com

REFLEX EXHIBIT 1017 - 189/280

CONVENTIONAL CORE BARRELS

PV Core Barrel



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REFLEX EXHIBIT 1017 - 190/280

CONVENTIONAL CORE BARRELS

PV Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36139	36140	PV Core barrel assembly	20	36174	36174	"O" ring
2	36144	36144	Head (NWJ Box)	21	36183	36184	Inner tube
3	37079	37079	Bearing assembly	22	36185	36185	Stop ring
4	36161	36161	Lock nut	23	36186	36186	Core lifter (Standard)
5	36162	36162	Spindle assembly	23	36187	36187	Core lifter (Broached)
6	36163	36163	Shut-off valve (2 req'd.)	24	36188	36188	Core lifter case
7	36165	36165	Thrust bearing spacer (2 req'd.)	25	36221	36223	Outer tube
8	36167	36167	Spindle bearing w/cage	26	36224	36224	IT stabilizer
9	36165	36165	Thrust bearing spacer (2 req'd.)	27	36225	36225	Thread protector
10	36168	36168	Compression spring				
11	36170	36170	Spring retaining washer				
12	36171	36171	Self lock nut				
13	36172	36172	Inner tube cap assembly				
14	36024	36024	Grease fitting				
15	36173	36173	Steel ball				
16	36175	36175	Check valve body				
17	36164	36164	Valve adjusting washer (3 req'd.)				
18	36166	36166	Ball thrust bearing (2 req'd.)				
19	36169	36169	Thrust bearing spacer				

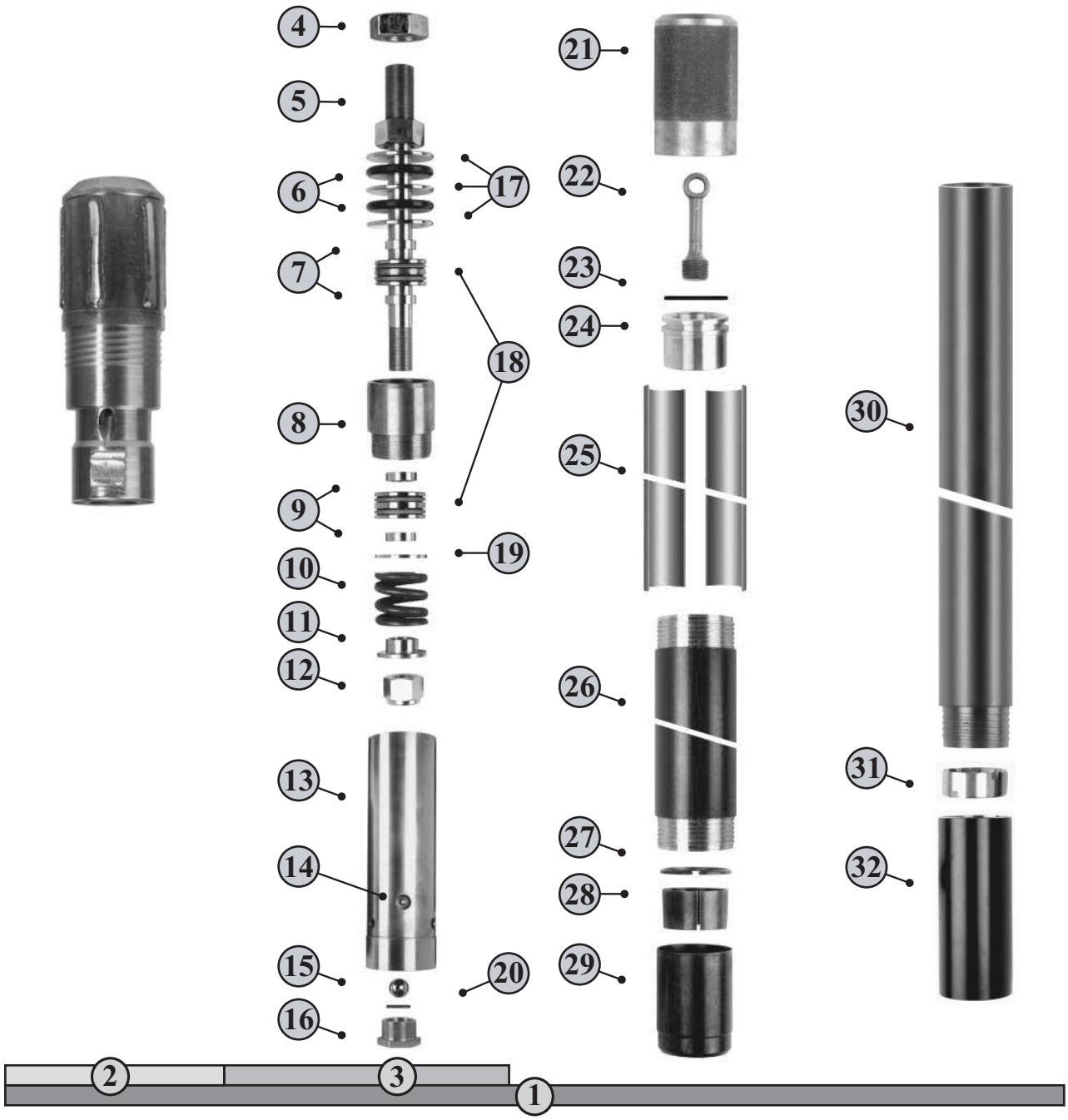
NOTE: All barrels have NWJ box connection. Sub required for other rod sizes.
PV Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 191/280

CONVENTIONAL CORE BARRELS

PV 3 Core Barrel



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REFLEX EXHIBIT 1017 - 192/280

CONVENTIONAL CORE BARRELS

PV 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36141	36142	PV 3 Core barrel assembly	20	36174	36174	"O" ring
2	36144	36144	Head (NWJ Box)	21	36197	36197	Adapter
3	37079	37079	Bearing assembly	22	36198	36198	Piston plug
4	36161	36161	Lock nut	23	36196	36196	"O" ring
5	36162	36162	Spindle assembly	24	36195	36195	Piston
6	36163	36163	Shut-off valve (2 req'd.)	25	36193	36194	Split tube liner
7	36165	36165	Thrust bearing spacer (2 req'd.)	26	36183	36184	Inner tube
8	36167	36167	Spindle bearing w/cage	27	36189	36189	Stop ring
9	36165	36165	Thrust bearing spacer (2 req'd.)	28	36190	36190	Core lifter (Standard)
10	36168	36168	Compression spring	28	36191	36191	Core lifter (Broached)
11	36170	36170	Spring retaining washer	29	36188	36188	Core lifter case
12	36171	36171	Self lock nut	30	36221	36223	Outer tube
13	36172	36172	Inner tube cap assembly	31	36224	36224	IT stabilizer
14	36024	36024	Grease fitting	32	36225	36225	Thread protector
15	36173	36173	Steel ball				
16	36175	36175	Check valve body				
17	36164	36164	Valve adjusting washer (3 req'd.)				
18	36166	36166	Ball thrust bearing (2 req'd.)				
19	36169	36169	Thrust bearing spacer				

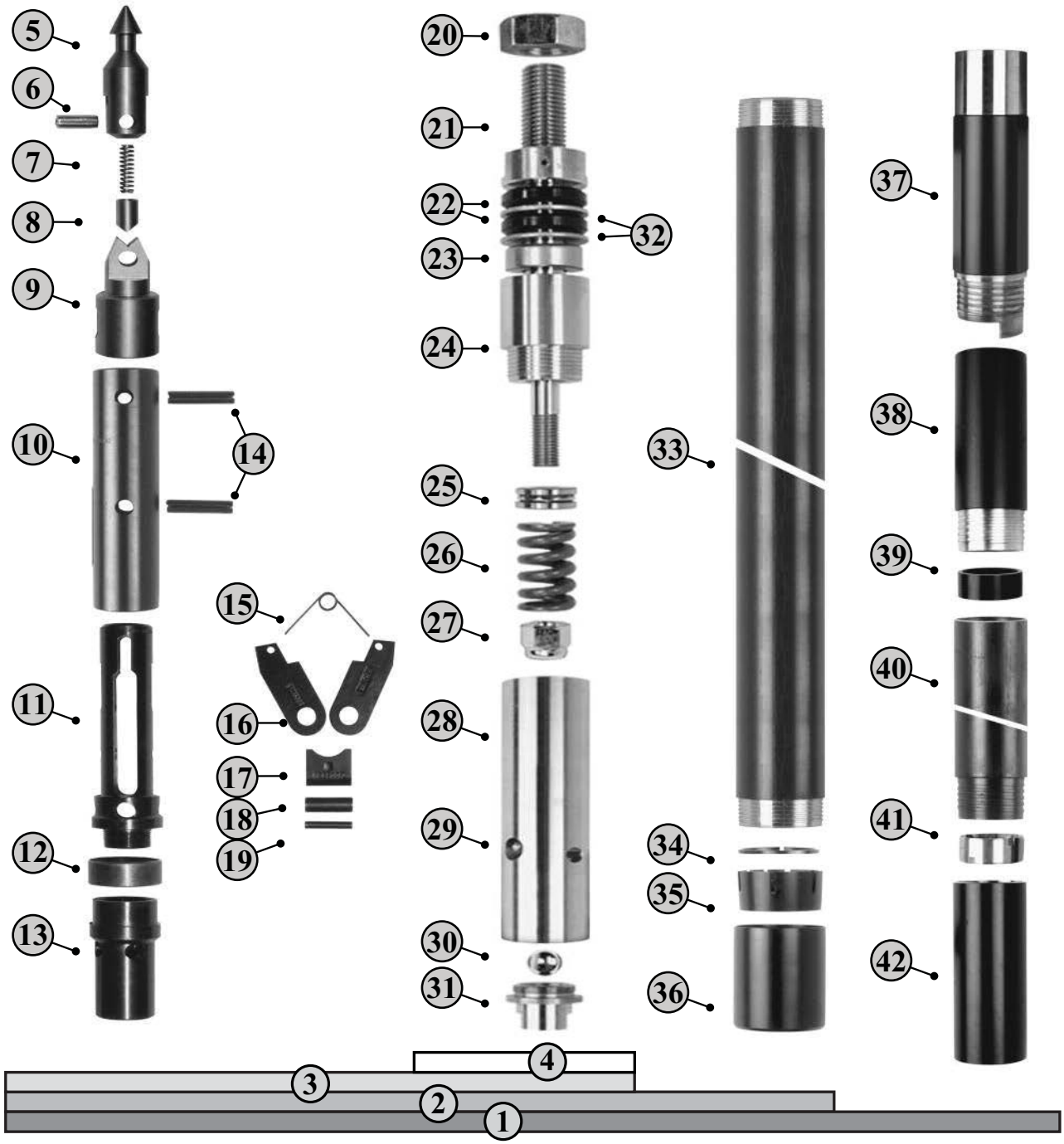
NOTE: All barrels have NWJ box connection. Sub required for other rod sizes.
PV 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 193/280

WIRELINE CORE BARRELS

N W/L Core Barrel (Chrome Plated)



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REFLEX EXHIBIT 1017 - 194/280

WIRELINE CORE BARRELS

N W/L Core Barrel (Chrome Plated)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36001	36002	N W/L Core barrel assembly	24	36019	36019	Spindle bearing
2	36003	36004	Inner tube assembly	25	36020	36020	Hanger bearing
3	36005	36005	Head assembly	26	36021	36021	Compression spring
4	37076	37076	Bearing assembly	27	36022	36022	Self lock nut
5	36027	36027	Spearhead point	28	36023	36023	Inner tube cap assembly
6	36028	36028	Spiral pin (.4375″ x 1″)	29	36024	36024	Grease fitting
7	36029	36029	Compression spring	30	36025	36025	Steel ball
8	36030	36030	Detent plunger	31	36026	36026	Check valve body
9	36031	36031	Spearhead base	32	36017	36017	Valve adjusting washer (2 req′d.)
10	36033	36033	Latch retracting case	33	36034	36035	Inner tube
11	36011	36011	Upper latch body	34	36036	36036	Stop ring
12	36012	36012	Landing shoulder	35	36037	36037	Core lifter (Standard)
13	36013	36013	Lower latch body	35	36038	36038	Core lifter (Broached)
14	36032	36032	Spring pin (2 req′d.)	36	36039	36039	Core lifter case
15	36006	36006	Latch spring	37	36040	36040	Locking coupling (Standard)
16	36007	36007	Latch (2 req′d.)	37	36041	36041	Locking coupling (Carbide)
17	36008	36008	Latch support	38	36042	36042	Adapter coupling
18	36009	36009	Spring pin (.5″ x 2″)	39	36043	36043	Landing ring
19	36010	36010	Spring pin (.375″ x 2″)	40	36044	36045	Outer tube
20	36014	36014	Lock nut	41	36046	36046	IT stabilizer
21	36015	36015	Spindle assembly	42	36047	36047	Thread protector
22	36016	36016	Shut-off valve (2 req′d.)		36260	36260	Inner tube coupling
23	36018	36018	Ball thrust bearing				

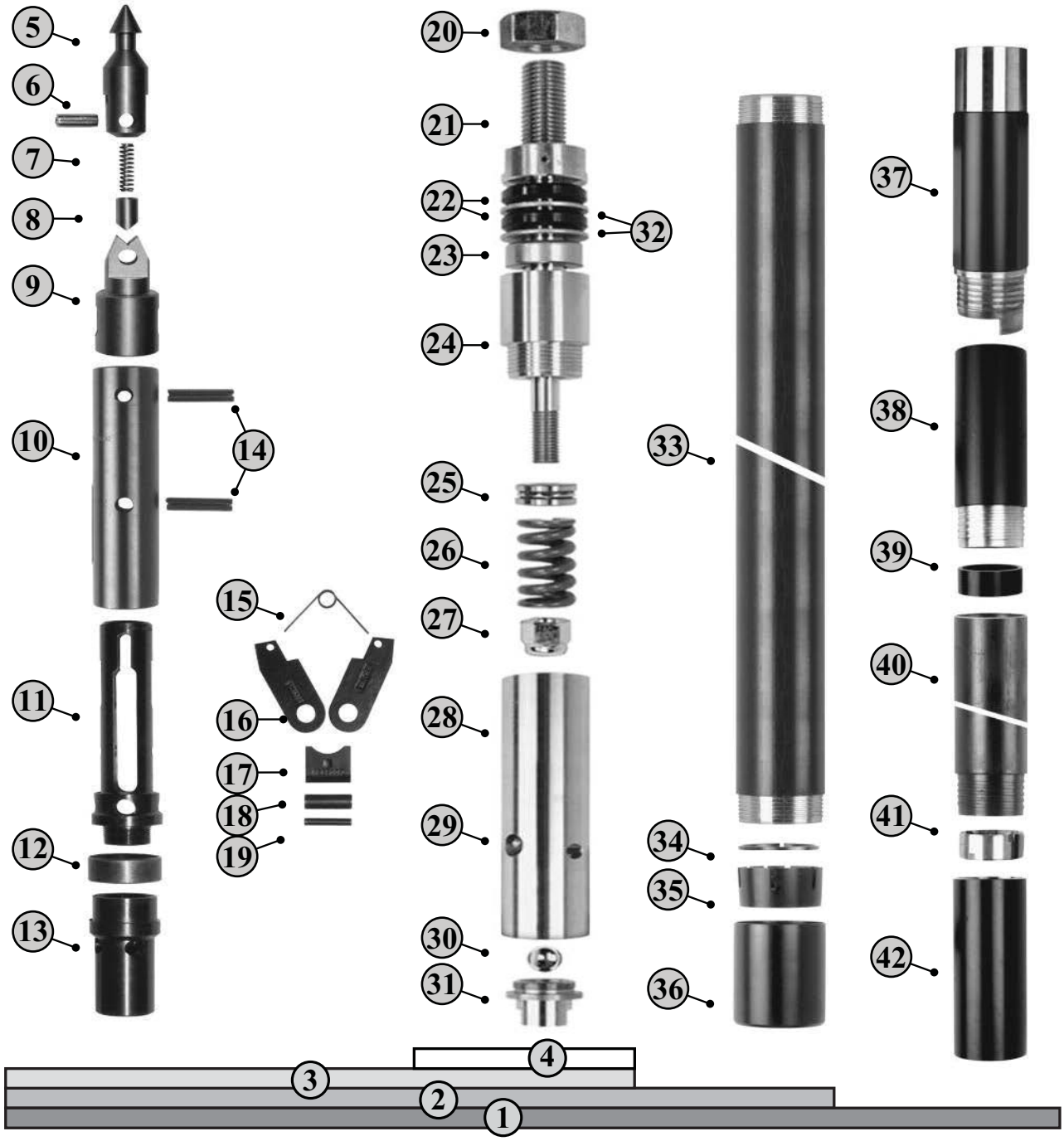
NOTE: All barrels have N W/L rod box connection.
Chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D.
N W/L Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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WIRELINE CORE BARRELS

N W/L Core Barrel (Plain)



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REFLEX EXHIBIT 1017 - 196/280

WIRELINE CORE BARRELS

N W/L Core Barrel (Plain)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36131	36132	N W/L Core barrel assembly	24	36019	36019	Spindle bearing
2	36133	36134	Inner tube assembly	25	36020	36020	Hanger bearing
3	36005	36005	Head assembly	26	36021	36021	Compression spring
4	37076	37076	Bearing assembly	27	36022	36022	Self lock nut
5	36027	36027	Spearhead point	28	36023	36023	Inner tube cap assembly
6	36028	36028	Spiral pin (.4375″ x 1″)	29	36024	36024	Grease fitting
7	36029	36029	Compression spring	30	36025	36025	Steel ball
8	36030	36030	Detent plunger	31	36026	36026	Check valve body
9	36031	36031	Spearhead base	32	36017	36017	Valve adjusting washer (2 req′d.)
10	36033	36033	Latch retracting case	33	36110	36111	Inner tube
11	36011	36011	Upper latch body	34	36036	36036	Stop ring
12	36012	36012	Landing shoulder	35	36037	36037	Core lifter (Standard)
13	36013	36013	Lower latch body	35	36038	36038	Core lifter (Broached)
14	36032	36032	Spring pin (2 req′d.)	36	36039	36039	Core lifter case
15	36006	36006	Latch spring	37	36040	36040	Locking coupling (Standard)
16	36007	36007	Latch (2 req′d.)	37	36041	36041	Locking coupling (Carbide)
17	36008	36008	Latch support	38	36042	36042	Adapter coupling
18	36009	36009	Spring pin (.5″ x 2″)	39	36043	36043	Landing ring
19	36010	36010	Spring pin (.375″ x 2″)	40	36129	36130	Outer tube
20	36014	36014	Lock nut	41	36046	36046	IT stabilizer
21	36015	36015	Spindle assembly	42	36047	36047	Thread protector
22	36016	36016	Shut-off valve (2 req′d.)		36260	36260	Inner tube coupling
23	36018	36018	Ball thrust bearing				

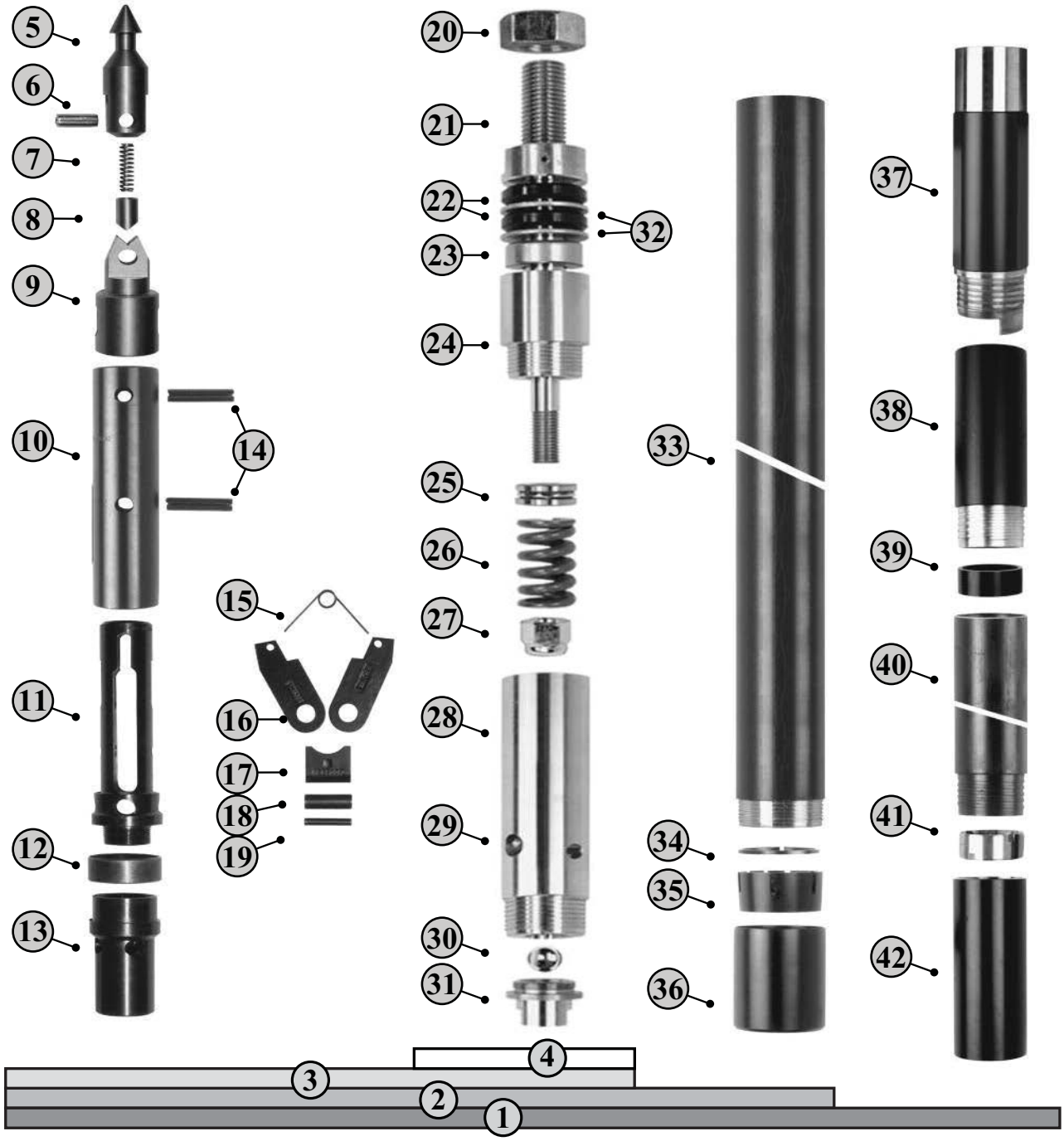
NOTE: All barrels have N W/L rod box connection.
N W/L Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 197/280

WIRELINE CORE BARRELS

N W/L 2 Core Barrel (Chrome Plated)



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WIRELINE CORE BARRELS

N W/L 2 Core Barrel (Chrome Plated)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36067	36068	N W/L 2 Core barrel assembly	24	36019	36019	Spindle bearing
2	36069	36070	Inner tube assembly	25	36020	36020	Hanger bearing
3	36071	36071	Head assembly	26	36021	36021	Compression spring
4	37077	37077	Bearing assembly	27	36022	36022	Self lock nut
5	36027	36027	Spearhead point	28	36074	36074	Inner tube cap assembly
6	36028	36028	Spiral pin (.4375″ x 1″)	29	36024	36024	Grease fitting
7	36029	36029	Compression spring	30	36025	36025	Steel ball
8	36030	36030	Detent plunger	31	36026	36026	Check valve body
9	36031	36031	Spearhead base	32	36017	36017	Valve adjusting washer (2 req′d.)
10	36033	36033	Latch retracting case	33	36075	36076	Inner tube
11	36011	36011	Upper latch body	34	36077	36077	Stop ring
12	36072	36072	Landing shoulder	35	36078	36078	Core lifter (Standard)
13	36013	36013	Lower latch body	35	36090	36090	Core lifter (Broached)
14	36032	36032	Spring pin (2 req′d.)	36	36079	36079	Core lifter case
15	36006	36006	Latch spring	37	36040	36040	Locking coupling (Standard)
16	36007	36007	Latch (2 req′d.)	37	36041	36041	Locking coupling (Carbide)
17	36008	36008	Latch support	38	36042	36042	Adapter coupling
18	36009	36009	Spring pin (.5″ x 2″)	39	36080	36080	Landing ring
19	36010	36010	Spring pin (.375″ x 2″)	40	36044	36045	Outer tube
20	36014	36014	Lock nut	41	36081	36081	IT stabilizer
21	36015	36015	Spindle assembly	42	36047	36047	Thread protector
22	36016	36016	Shut-off valve (2 req′d.)		36124	36246	Inner tube extenders
23	36018	36018	Ball thrust bearing		36261	36261	Pump-out adaptor

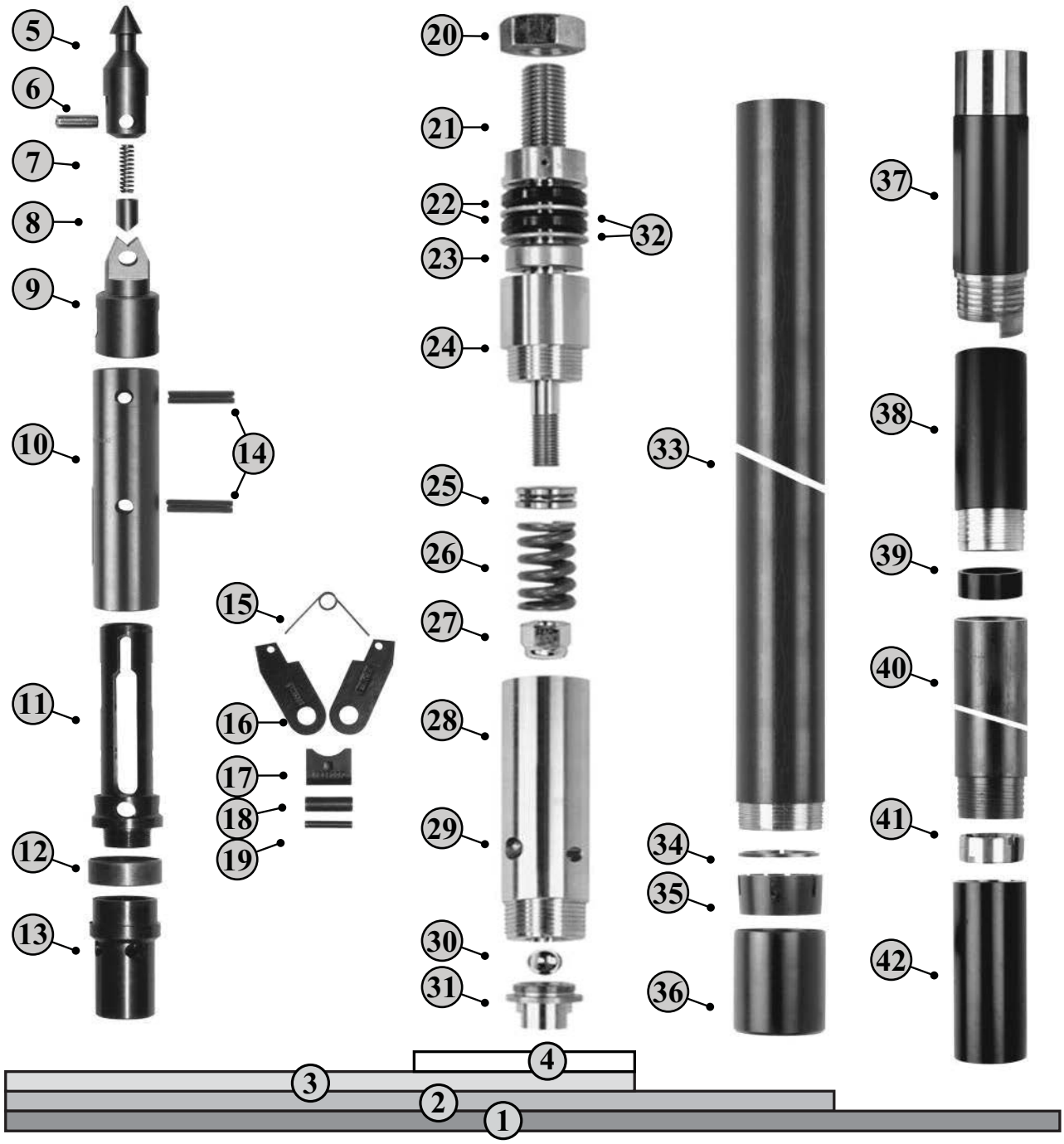
NOTE: All barrels have N W/L rod box connection.
Chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D.
N W/L 2 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 199/280

WIRELINE CORE BARRELS

N W/L 2 Core Barrel (Plain)



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REFLEX EXHIBIT 1017 - 200/280

WIRELINE CORE BARRELS

N W/L 2 Core Barrel (Plain)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36135	36136	N W/L 2 Core barrel assembly	24	36019	36019	Spindle bearing
2	36137	36138	Inner tube assembly	25	36020	36020	Hanger bearing
3	36071	36071	Head assembly	26	36021	36021	Compression spring
4	37077	37077	Bearing assembly	27	36022	36022	Self lock nut
5	36027	36027	Spearhead point	28	36074	36074	Inner tube cap assembly
6	36028	36028	Spiral pin (.4375″ x 1″)	29	36024	36024	Grease fitting
7	36029	36029	Compression spring	30	36025	36025	Steel ball
8	36030	36030	Detent plunger	31	36026	36026	Check valve body
9	36031	36031	Spearhead base	32	36017	36017	Valve adjusting washer (2 req′d.)
10	36033	36033	Latch retracting case	33	36112	36113	Inner tube
11	36011	36011	Upper latch body	34	36077	36077	Stop ring
12	36072	36072	Landing shoulder	35	36078	36078	Core lifter (Standard)
13	36013	36013	Lower latch body	35	36090	36090	Core lifter (Broached)
14	36032	36032	Spring pin (2 req′d.)	36	36079	36079	Core lifter case
15	36006	36006	Latch spring	37	36040	36040	Locking coupling (Standard)
16	36007	36007	Latch (2 req′d.)	37	36041	36041	Locking coupling (Carbide)
17	36008	36008	Latch support	38	36042	36042	Adapter coupling
18	36009	36009	Spring pin (.5″ x 2″)	39	36080	36080	Landing ring
19	36010	36010	Spring pin (.375″ x 2″)	40	36129	36130	Outer tube
20	36014	36014	Lock nut	41	36081	36081	IT stabilizer
21	36015	36015	Spindle assembly	42	36047	36047	Thread protector
22	36016	36016	Shut-off valve (2 req′d.)		36261	36261	Pump-out adaptor
23	36018	36018	Ball thrust bearing				

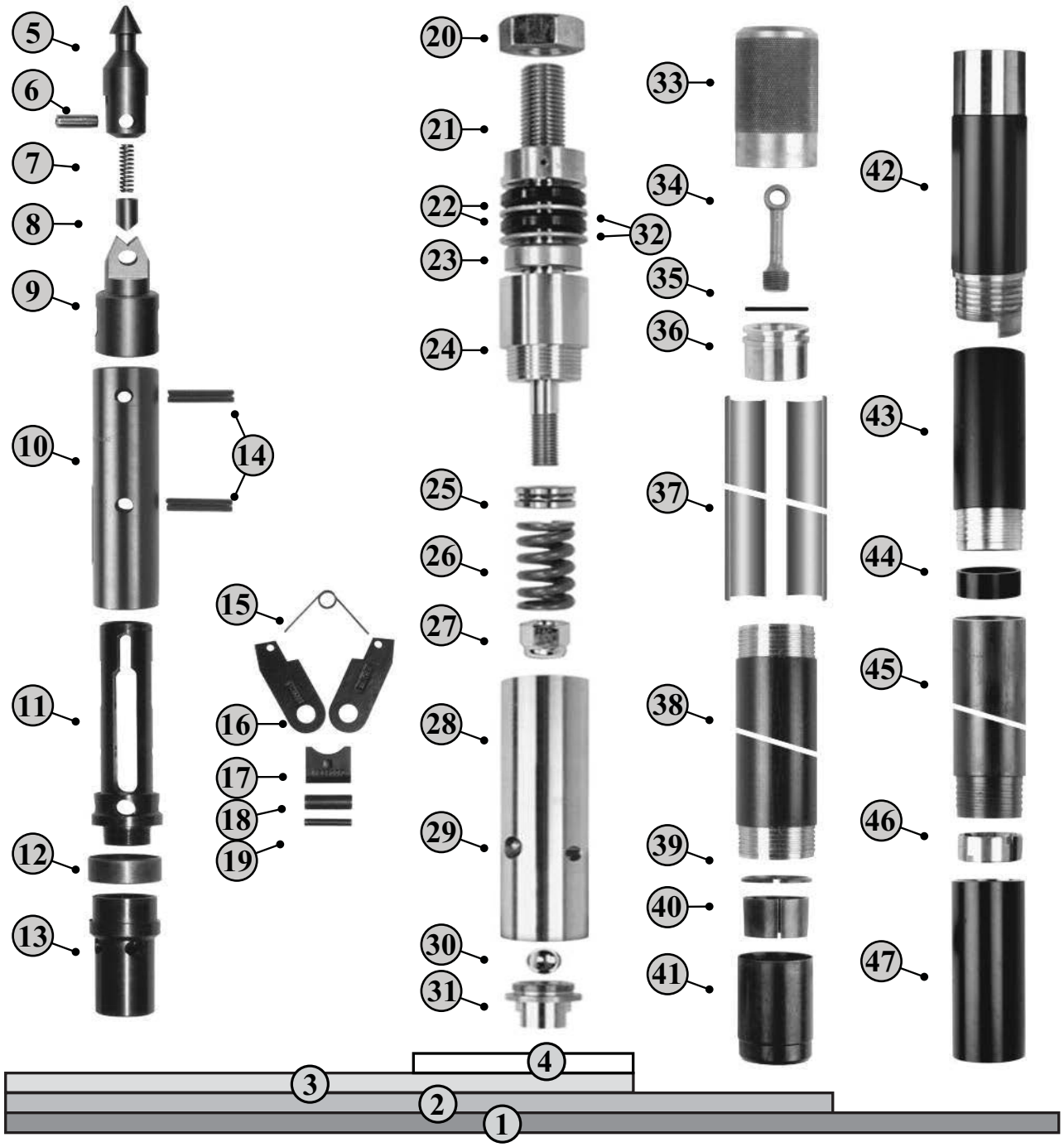
NOTE: All barrels have N W/L rod box connection.
N W/L 2 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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E-mail: info@cmeco.com • Website: www.cmeco.com

REFLEX EXHIBIT 1017 - 201/280

WIRELINE CORE BARRELS

N W/L 3 Core Barrel



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REFLEX EXHIBIT 1017 - 202/280

WIRELINE CORE BARRELS

N W/L 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36106	36107	NW/L 3 Core barrel assembly	26	36021	36021	Compression spring
2	36108	36109	Inner tube assembly	27	36022	36022	Self lock nut
3	36005	36005	Head assembly	28	36023	36023	Inner tube cap assembly
4	37076	37076	Bearing assembly	29	36024	36024	Grease fitting
5	36027	36027	Spearhead point	30	36025	36025	Steel ball
6	36028	36028	Spiral pin (.4375″ x 1″)	31	36026	36026	Check valve body
7	36029	36029	Compression spring	32	36017	36017	Valve adjusting washer (2 req′d.)
8	36030	36030	Detent plunger	33	36122	36122	Adapter
9	36031	36031	Spearhead base	34	36123	36123	Piston plug
10	36033	36033	Latch retracting case	35	36121	36121	“O” ring
11	36011	36011	Upper latch body	36	36120	36120	Piston
12	36012	36012	Landing shoulder	37	36114	36115	Split tube liner
13	36013	36013	Lower latch body	38	36110	36111	Inner tube
14	36032	36032	Spring pin (2 req′d.)	39	36116	36116	Stop ring
15	36006	36006	Latch spring	40	36117	36117	Core lifter (Standard)
16	36007	36007	Latch (2 req′d.)	40	36118	36118	Core lifter (Broached)
17	36008	36008	Latch support	41	36119	36119	Core lifter case
18	36009	36009	Spring pin (.5″ x 2″)	42	36040	36040	Locking coupling (Standard)
19	36010	36010	Spring pin (.375″ x 2″)	42	36041	36041	Locking coupling (Carbide)
20	36014	36014	Lock nut	43	36042	36042	Adapter coupling
21	36015	36015	Spindle assembly	44	36043	36043	Landing ring
22	36016	36016	Shut-off valve (2 req′d.)	45	36129	36130	Outer tube
23	36018	36018	Ball thrust bearing	46	36046	36046	IT stabilizer
24	36019	36019	Spindle bearing	47	36047	36047	Thread protector
25	36020	36020	Hanger bearing				

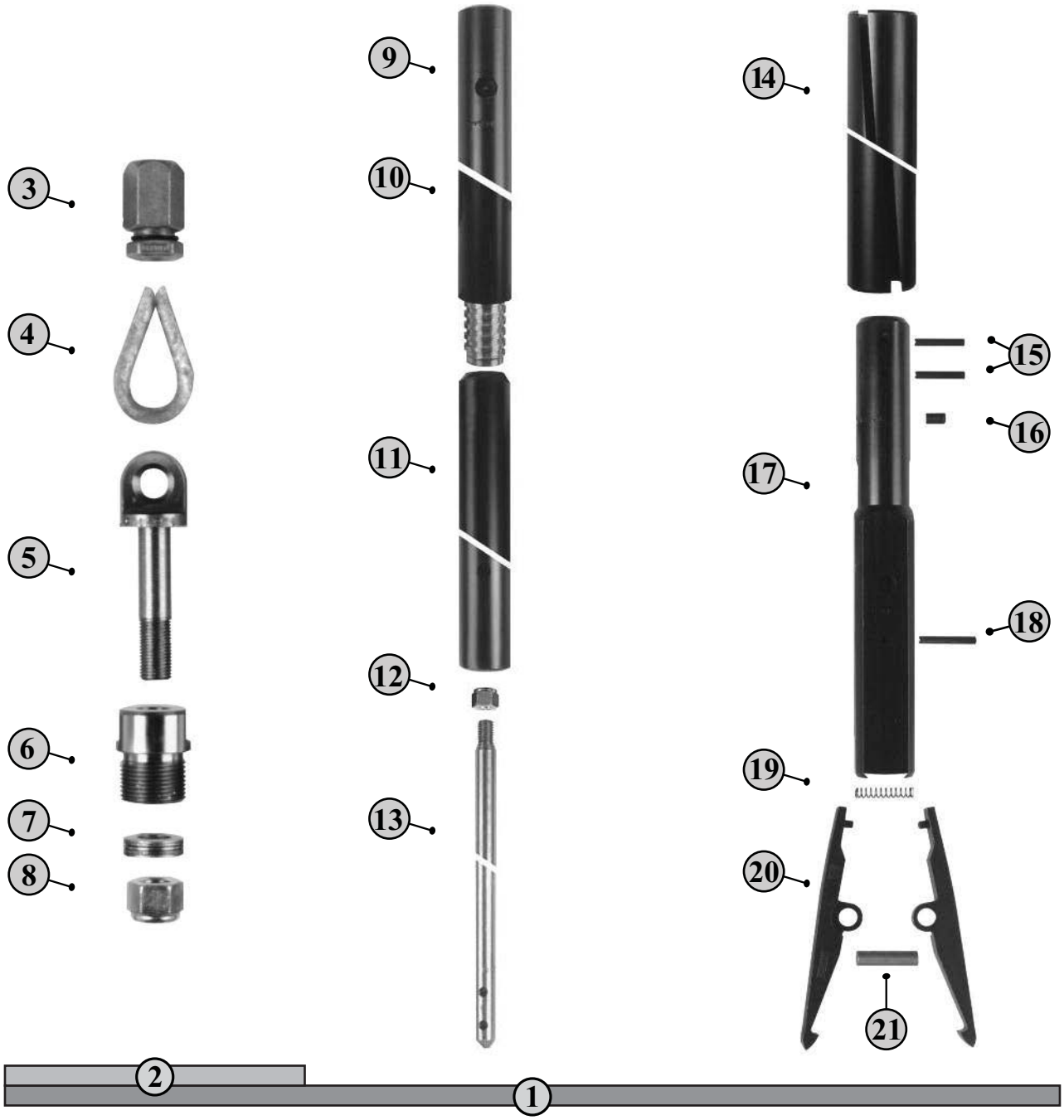
NOTE: All barrels have N W/L rod box connection.
N W/L 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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E-mail: info@cmeco.com • Website: www.cmeco.com

REFLEX EXHIBIT 1017 - 203/280

WIRELINE CORE BARRELS

N W/L Overshot Assembly



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WIRELINE CORE BARRELS

N W/L Overshot Assembly

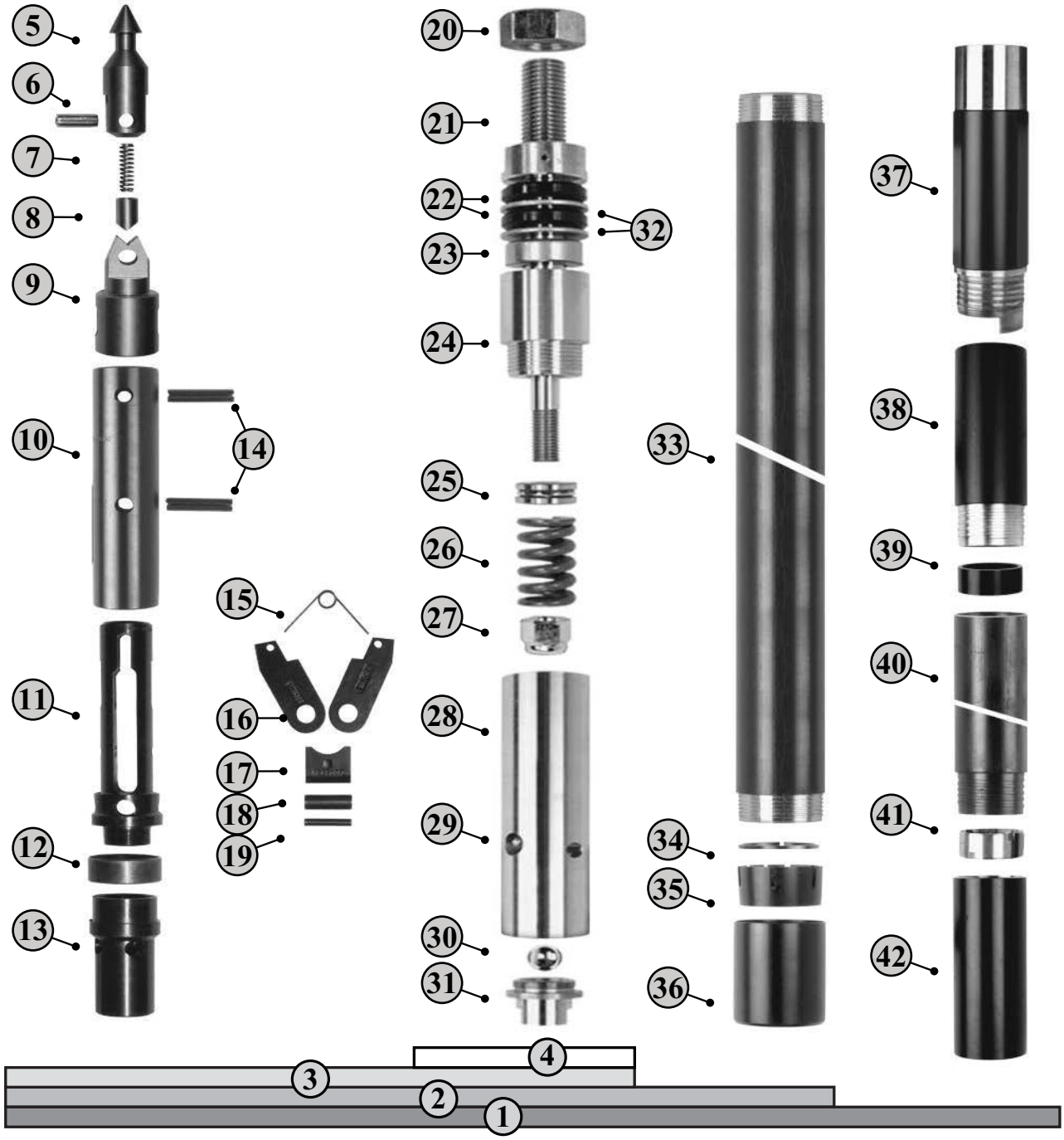
Ref. No.	Part No.	Description
1	36048	N W/L Overshot Assembly Complete
2	36049	Cable Swivel Assembly
3	37075	Cable clamp - Overshot
4	36050	Wire rope thimble
5	36051	Eye bolt
6	36052	Cable swivel collar
7	36053	Needle thrust bearing
8	36054	Nut
9	36024	Grease fitting
10	36056	Cable swivel body ***Note: 4″ Shoulder length available (36249)***
11	36057	Jar tube weldment
12	36058	Self lock nut
13	36059	Jar staff
14	36060	Locking sleeve
15	36091	Spiral Pin (2 req'd.) (.25″ x 1.5″)
16	36061	Set screw
17	36066	Overshot head
18	36065	Spring Pin (.25″ x 1.75″)
19	36062	Lifting dog spring
20	36063	Lifting dog (2 req'd.)
21	36064	Lifting dog pin (.5″ x 1.9375″)

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REFLEX EXHIBIT 1017 - 205/280

WIRELINE CORE BARRELS

H W/L Core Barrel (Chrome Plated)



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REFLEX EXHIBIT 1017 - 206/280

WIRELINE CORE BARRELS

H W/L Core Barrel (Chrome Plated)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	37000	37001	HW/L Core barrel assembly	23	37021	37021	Ball thrust bearing
2	37002	37003	Inner tube assembly	24	37022	37022	Spindle bearing
3	37008	37008	Head assembly	25	36018	36018	Hanger bearing
4	37078	37078	Bearing assembly	26	37024	37024	Compression spring
5	36027	36027	Spearhead point	27	37025	37025	Self lock nut
6	36028	36028	Spiral pin (.4375″ x 1″)	28	37026	37026	Inner tube cap assembly
7	36029	36029	Compression spring	29	36024	36024	Grease fitting
8	36030	36030	Detent plunger	30	36025	36025	Steel ball
9	37028	37028	Spearhead base	31	36026	36026	Check valve body
10	37030	37030	Latch retracting case	32	37020	37020	Valve adjusting washer (2 req′d.)
11	37014	37014	Upper latch body	33	37031	37032	Inner tube
12	37015	37015	Landing shoulder	34	37033	37033	Stop ring
13	37016	37016	Lower latch body	35	37034	37034	Core lifter (Standard)
14	37029	37029	Spring pin (2 req′d.)	35	37035	37035	Core lifter (Broached)
15	37009	37009	Latch spring	36	37036	37036	Core lifter case
16	37010	37010	Latch (2 req′d.)	37	37037	37037	Locking coupling (Standard)
17	37011	37011	Latch support	37	37038	37038	Locking coupling (Carbide)
18	37012	37012	Spring pin (.5″ x 2″)	38	37039	37039	Adapter coupling
19	37013	37013	Spring pin (.375″ x 2″)	39	37040	37040	Landing ring
20	37017	37017	Lock nut	40	37041	37042	Outer tube
21	37018	37018	Spindle assembly	41	37043	37043	IT stabilizer
22	37019	37019	Shut-off valve (2 req′d.)	42	37044	37044	Thread protector

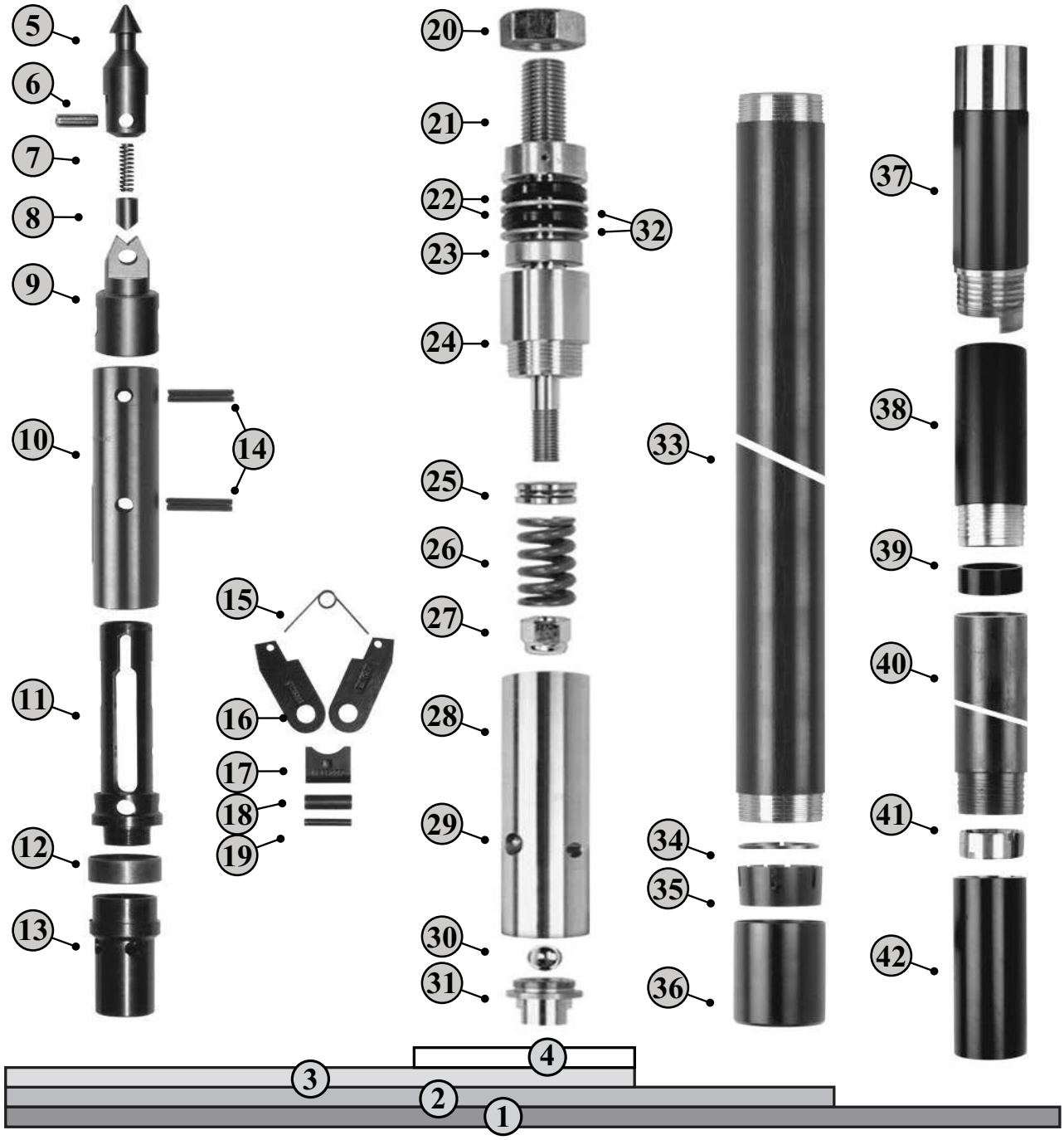
NOTE: All barrels have H W/L rod box connection.
Chrome plated, approximately 12″ on either end of the outer tube & full length of the inner tube I.D.
H W/L Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 207/280

WIRELINE CORE BARRELS

H W/L Core Barrel (Plain)



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REFLEX EXHIBIT 1017 - 208/280

WIRELINE CORE BARRELS

H W/L Core Barrel (Plain)

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	37069	37070	HW/L Core barrel assembly	23	37021	37021	Ball thrust bearing
2	37071	37072	Inner tube assembly	24	37022	37022	Spindle bearing
3	37008	37008	Head assembly	25	36018	36018	Hanger bearing
4	37078	37078	Bearing assembly	26	37024	37024	Compression spring
5	36027	36027	Spearhead point	27	37025	37025	Self lock nut
6	36028	36028	Spiral pin (.4375″ x 1″)	28	37026	37026	Inner tube cap assembly
7	36029	36029	Compression spring	29	36024	36024	Grease fitting
8	36030	36030	Detent plunger	30	36025	36025	Steel ball
9	37028	37028	Spearhead base	31	36026	36026	Check valve body
10	37030	37030	Latch retracting case	32	37020	37020	Valve adjusting washer (2 req′d.)
11	37014	37014	Upper latch body	33	37045	37046	Inner tube
12	37015	37015	Landing shoulder	34	37033	37033	Stop ring
13	37016	37016	Lower latch body	35	37034	37034	Core lifter (Standard)
14	37029	37029	Spring pin (2 req′d.)	35	37035	37035	Core lifter (Broached)
15	37009	37009	Latch spring	36	37036	37036	Core lifter case
16	37010	37010	Latch (2 req′d.)	37	37037	37037	Locking coupling (Standard)
17	37011	37011	Latch support	37	37038	37038	Locking coupling (Carbide)
18	37012	37012	Spring pin (.5″ x 2″)	38	37039	37039	Adapter coupling
19	37013	37013	Spring pin (.375″ x 2″)	39	37040	37040	Landing ring
20	37017	37017	Lock nut	40	37067	37068	Outer tube
21	37018	37018	Spindle assembly	41	37043	37043	IT stabilizer
22	37019	37019	Shut-off valve (2 req′d.)	42	37044	37044	Thread protector

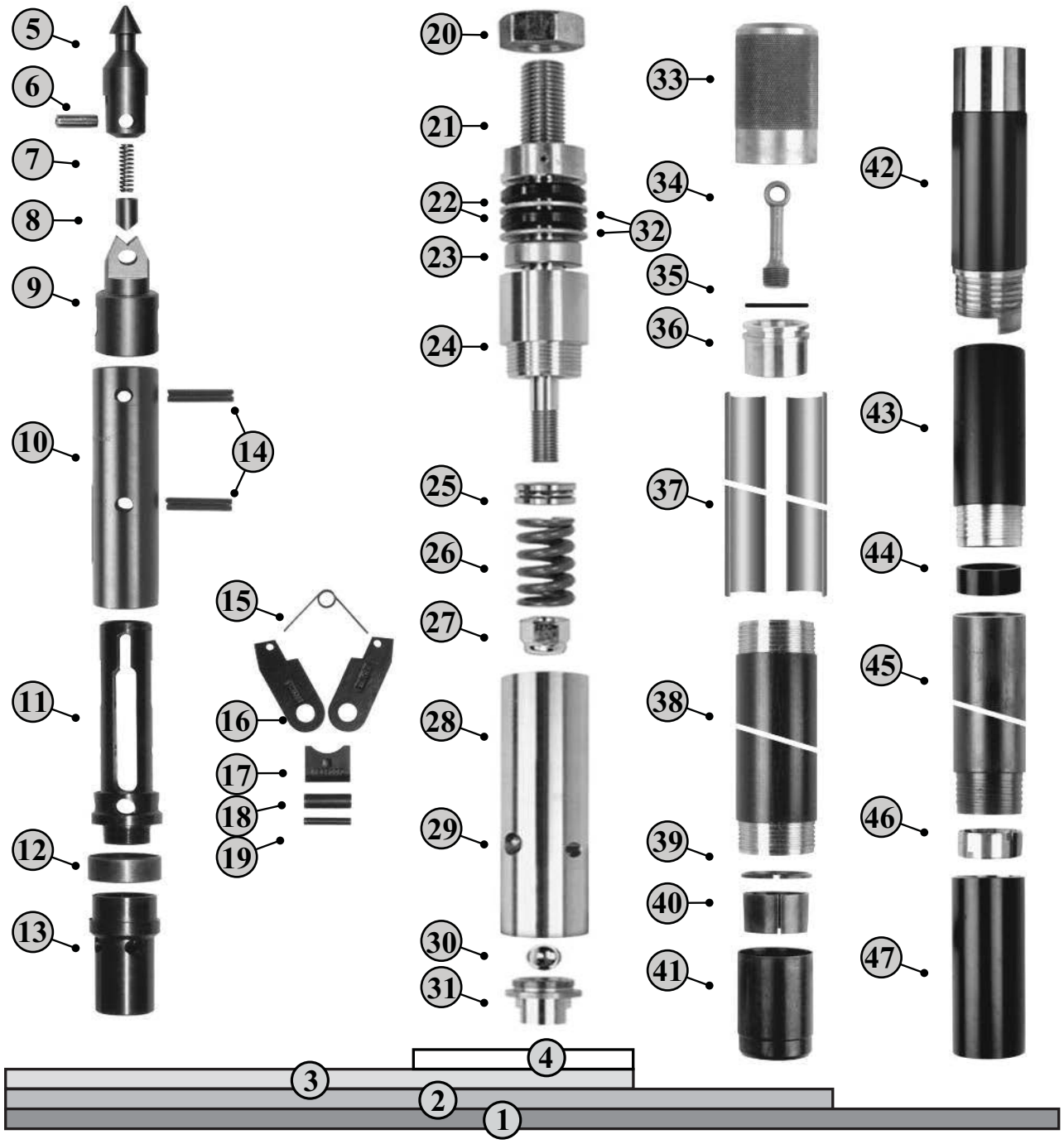
NOTE: All barrels have H W/L rod box connection.
H W/L Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 209/280

WIRELINE CORE BARRELS

H W/L 3 Core Barrel



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REFLEX EXHIBIT 1017 - 210/280

WIRELINE CORE BARRELS

H W/L 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	37004	37005	HW/L 3 Core barrel assembly	26	37024	37024	Compression spring
2	37006	37007	Inner tube assembly	27	37025	37025	Self lock nut
3	37008	37008	Head assembly	28	37026	37026	Inner tube cap assembly
4	37078	37078	Bearing assembly	29	36024	36024	Grease fitting
5	36027	36027	Spearhead point	30	36025	36025	Steel ball
6	36028	36028	Spiral pin (.4375″ x 1″)	31	36026	36026	Check valve body
7	36029	36029	Compression spring	32	37020	37020	Valve adjusting washer (2 req′d.)
8	36030	36030	Detent plunger	33	37055	37055	Adapter
9	37028	37028	Spearhead base	34	36123	36123	Piston plug
10	37030	37030	Latch retracting case	35	37054	37054	“O” ring
11	37014	37014	Upper latch body	36	37053	37053	Piston
12	37015	37015	Landing shoulder	37	37047	37048	Split tube liner
13	37016	37016	Lower latch body	38	37045	37046	Inner tube
14	37029	37029	Spring pin (2 req′d.)	39	37049	37049	Stop ring
15	37009	37009	Latch spring	40	37050	37050	Core lifter (Standard)
16	37010	37010	Latch (2 req′d.)	40	37051	37051	Core lifter (Broached)
17	37011	37011	Latch support	41	37052	37052	Core lifter case
18	37012	37012	Spring pin (.5″ x 2″)	42	37037	37037	Locking coupling (Standard)
19	37013	37013	Spring pin (.375″ x 2″)	42	37038	37038	Locking coupling (Carbide)
20	37017	37017	Lock nut	43	37039	37039	Adapter coupling
21	37018	37018	Spindle assembly	44	37040	37040	Landing ring
22	37019	37019	Shut-off valve (2 req′d.)	45	37067	37068	Outer tube
23	37021	37021	Ball thrust bearing	46	37043	37043	IT stabilizer
24	37022	37022	Spindle bearing	47	37044	37044	Thread protector
25	36018	36018	Hanger bearing				

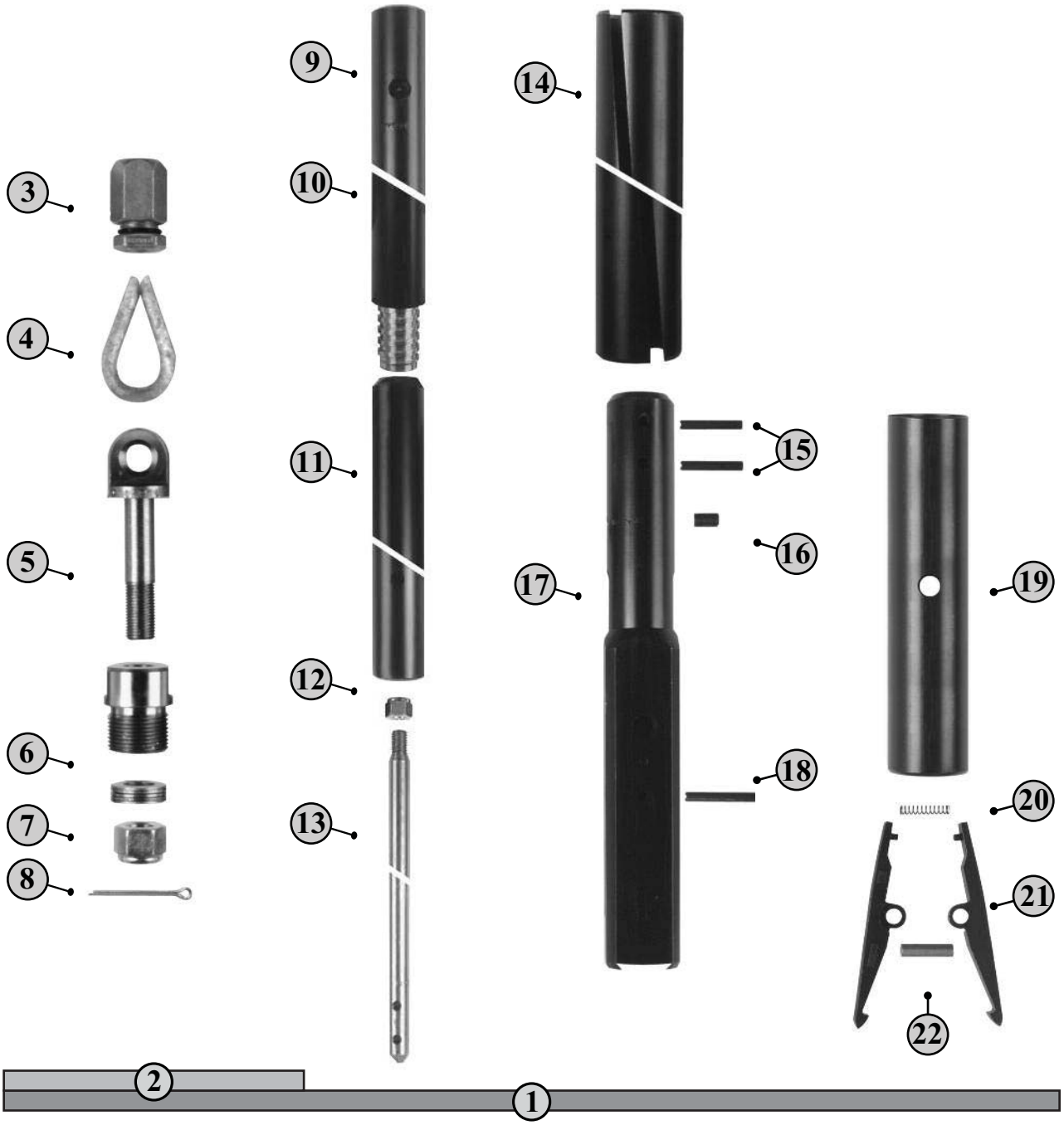
NOTE: All barrels have H W/L rod box connection.
H W/L 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 211/280

WIRELINE CORE BARRELS

H W/L Overshot Assembly



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WIRELINE CORE BARRELS

H W/L Overshot Assembly

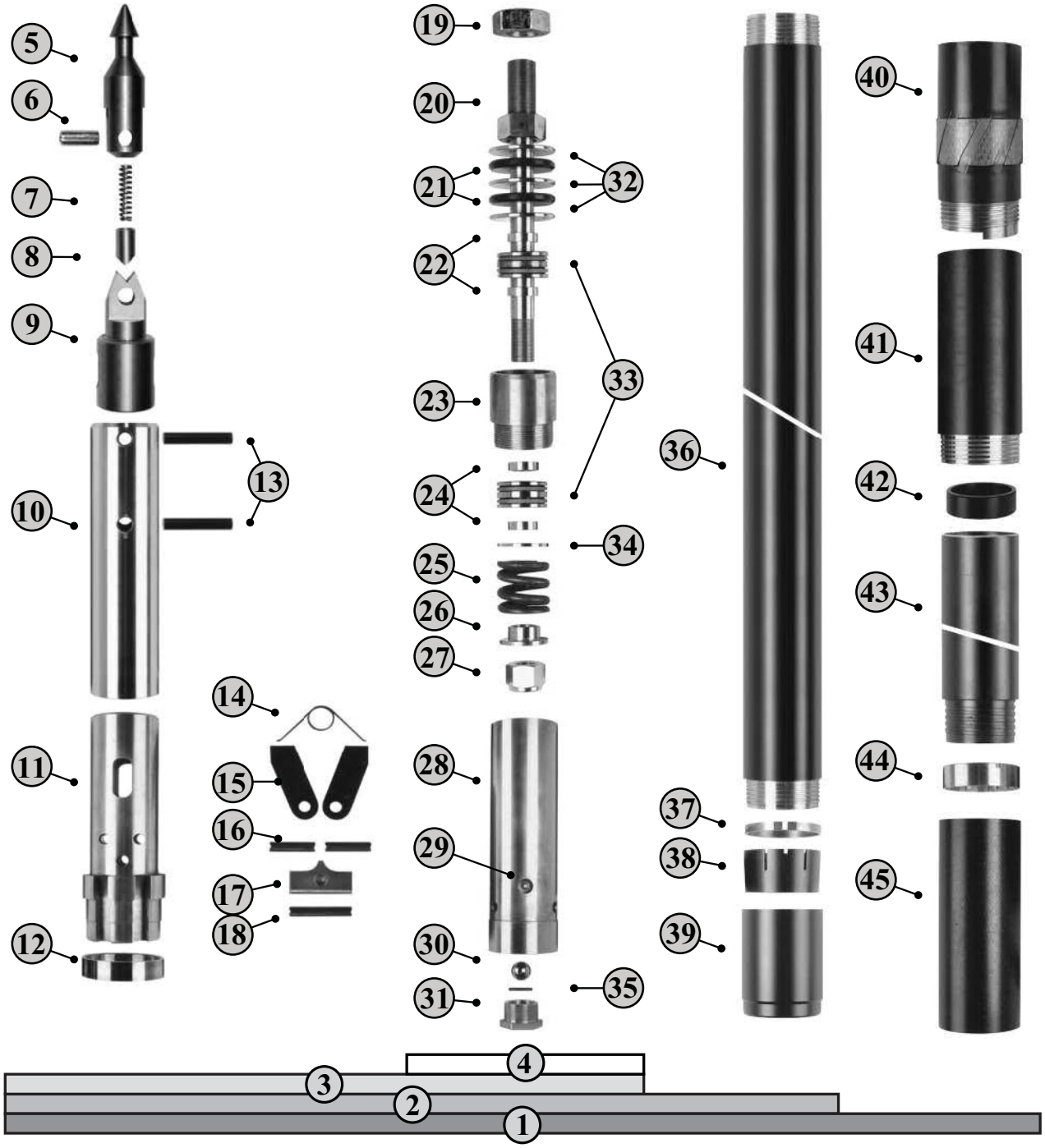
Ref. No.	Part No.	Description
1	37057	H W/L Overshot Assembly Complete
2	36049	Cable Swivel Assembly
3	37075	Cable clamp - Overshot
4	36050	Wire rope thimble (.1875″)
5	36051	Eye bolt
6	36052	Cable swivel collar
7	36053	Needle thrust bearing
8	36054	Nut
9	36024	Grease fitting
10	36056	Cable swivel body ***Note: 4″ Shoulder length available (36249)***
11	36057	Jar tube weldment
12	36058	Self lock nut
13	36059	Jar staff
14	36060	Locking sleeve
15	36091	Spiral Pin (2 req'd.) (.25″ x 1.5″)
16	36061	Set screw
17	37059	Overshot head
18	37029	Spring Pin (.5″ x 2.5625″)
19	37060	Adapter sleeve
20	36062	Lifting dog spring
21	36063	Lifting dog (2 req'd.)
22	37058	Lifting dog pin (.5″ x 1.9375″)

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WIRELINE CORE BARRELS

P W/L Core Barrel



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WIRELINE CORE BARRELS

P W/L Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36145	36146	PW/L Core barrel assembly	25	36168	36168	Compression spring
2	36147	36148	Inner tube assembly	26	36170	36170	Spring retaining washer
3	36153	36153	Head assembly	27	36171	36171	Self lock nut
4	37079	37079	Bearing assembly	28	36172	36172	Inner tube cap assembly
5	36182	36182	Spearhead point	29	36024	36024	Grease fitting
6	36181	36181	Pivot pin (.75″ x 2.25″)	30	36173	36173	Steel ball
7	36180	36180	Compression spring	31	36175	36175	Check valve body
8	36179	36179	Detent plunger	32	36164	36164	Valve adjusting washer (3 req′d.)
9	36178	36178	Spearhead base	33	36166	36166	Ball thrust bearing (2 req′d.)
10	36176	36176	Latch retracting case	34	36169	36169	Thrust bearing spacer (1 req′d.)
11	36159	36159	Latch body w/landing shoulder	35	36174	36174	“O” ring
12	36160	36160	Landing shoulder	36	36183	36184	Inner tube
13	36177	36177	Spiral pin (2 req′d.) (.75″ x 3.75″)	37	36185	36185	Stop ring
14	36154	36154	Latch spring	38	36186	36186	Core lifter (Standard)
15	36155	36155	Latch (2 req′d.)	38	36187	36187	Core lifter (Broached)
16	37012	37012	Spring pin (2 req′d.) (.5″ x 2″)	39	36188	36188	Core lifter case
17	36156	36156	Latch support	40	36199	36199	Locking coupling (HWT)
18	36158	36158	Spring pin (.5″ x 2.75″)	41	36219	36219	Adapter coupling
19	36161	36161	Lock nut	42	36220	36220	Landing ring
20	36162	36162	Spindle assembly	43	36221	36223	Outer tube
21	36163	36163	Shut-off valve (2 req.′d)	44	36224	36224	IT stabilizer
22	36165	36165	Thrust bearing spacer (2 req′d.)	45	36225	36225	Thread protector
23	36167	36167	Spindle bearing w/cage		36299	36299	Drive Sub 8″ (HWT)
24	36165	36165	Thrust bearing spacer (2 req′d.)				

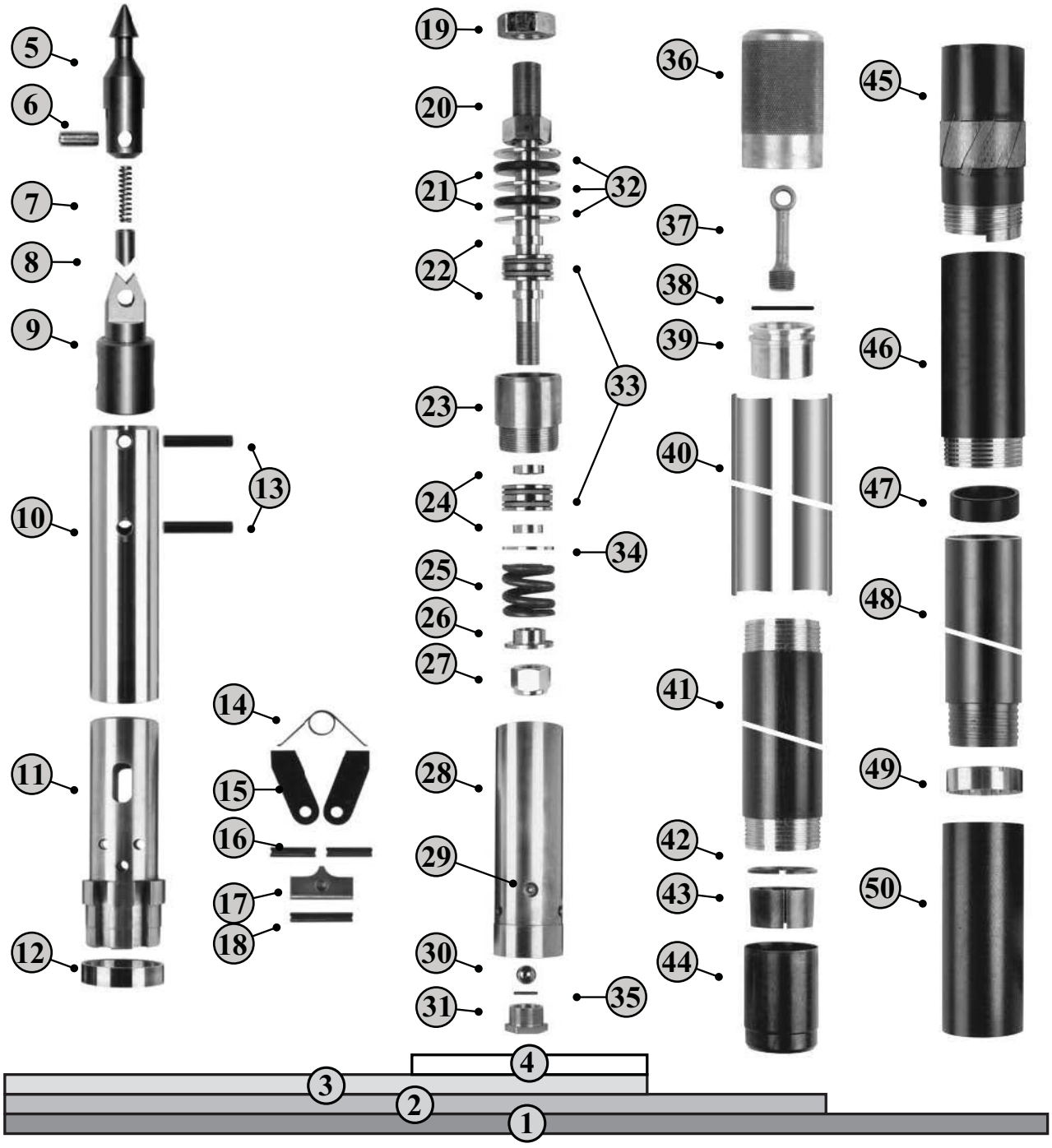
NOTE: All barrels have HWT rod box connection.
P W/L Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 215/280

WIRELINE CORE BARRELS

P W/L 3 Core Barrel



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WIRELINE CORE BARRELS

P W/L 3 Core Barrel

Ref. No.	Part No.		Description	Ref. No.	Part No.		Description
	5′	10′			5′	10′	
1	36149	36150	PW/L 3 Core barrel assembly	27	36171	36171	Self lock nut
2	36151	36152	Inner tube assembly	28	36172	36172	Inner tube cap assembly
3	36153	36153	Head assembly	29	36024	36024	Grease fitting
4	37079	37079	Bearing assembly	30	36173	36173	Steel ball
5	36182	36182	Spearhead point	31	36175	36175	Check valve body
6	36181	36181	Pivot pin (.75″ x 2.25″)	32	36164	36164	Valve adjusting washer (3 req′d.)
7	36180	36180	Compression spring	33	36166	36166	Ball thrust bearing (2 req′d.)
8	36179	36179	Detent plunger	34	36169	36169	Thrust bearing spacer (1 req′d.)
9	36178	36178	Spearhead base	35	36174	36174	“O” ring
10	36176	36176	Latch retracting case	36	36197	36197	Adapter
11	36159	36159	Latch body w/landing shoulder	37	36198	36198	Piston plug
12	36160	36160	Landing shoulder	38	36196	36196	“O” ring
13	36177	36177	Spiral pin (2 req′d.) (.75″ x 3.75″)	39	36195	36195	Piston
14	36154	36154	Latch spring	40	36193	36194	Split tube liner
15	36155	36155	Latch (2 req′d.)	41	36183	36184	Inner tube
16	37012	37012	Spring pin (2 req′d.) (.5″ x 2″)	42	36189	36189	Stop ring
17	36156	36156	Latch support	43	36191	36191	Core lifter (Broached)
18	37012	37012	Spring pin (.5″ x 2.75″)	44	36188	36188	Core lifter case
19	36161	36161	Lock nut	45	36199	36199	Locking coupling (HWT)
20	36162	36162	Spindle assembly	46	36219	36219	Adapter coupling
21	36163	36163	Shut-off valve (2 req′d.)	47	36220	36220	Landing ring
22	36165	36165	Thrust bearing spacer (2 req′d.)	48	36221	36223	Outer tube
23	36167	36167	Spindle bearing w/cage	49	36224	36224	IT stabilizer
24	36165	36165	Thrust bearing spacer (2 req′d.)	50	36225	36225	Thread protector
25	36168	36168	Compression spring		36299	36299	Drive sub 8″ (HWT)
26	36170	36170	Spring retaining washer				

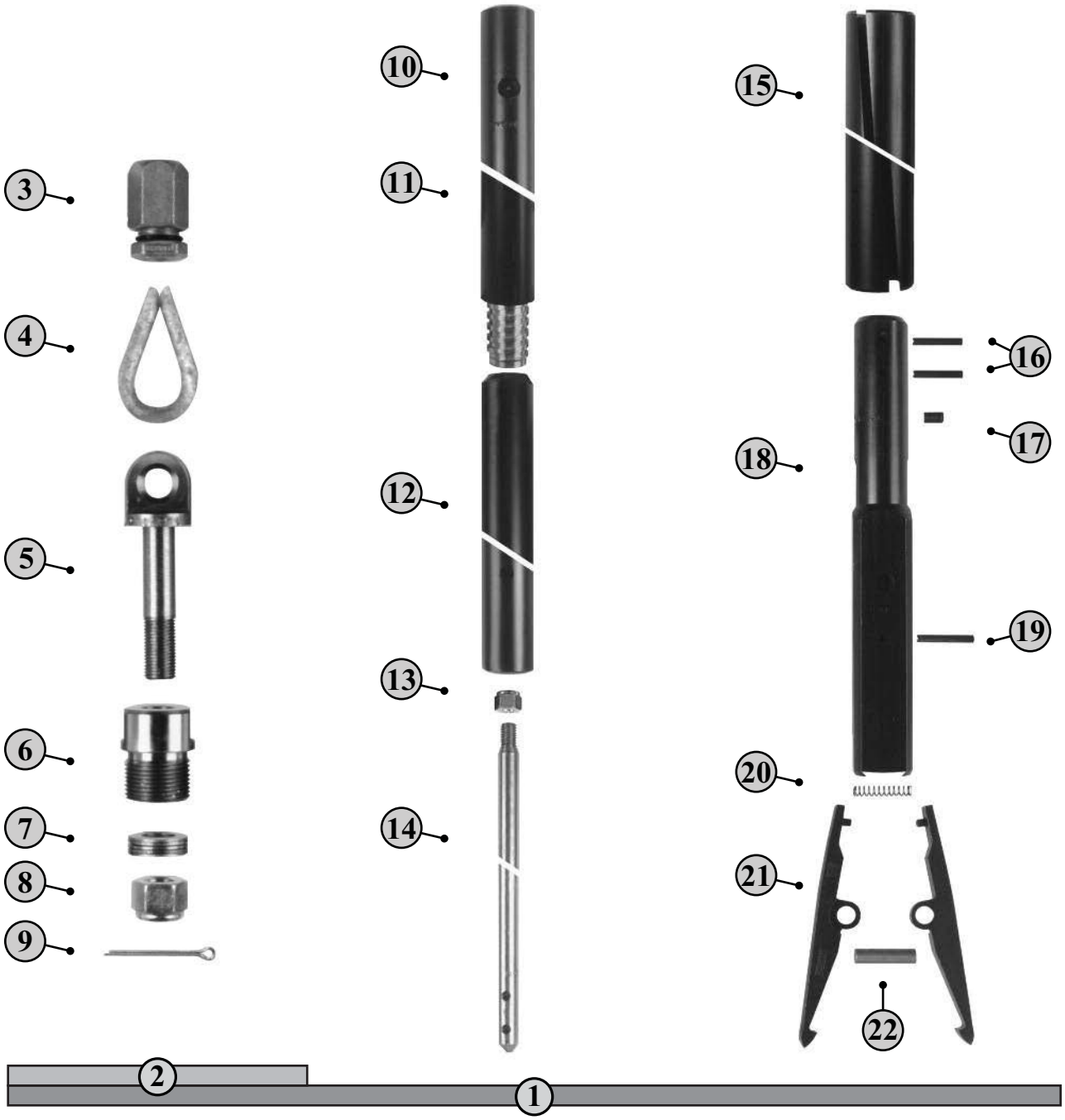
NOTE: All barrels have HWT rod box connection.
P W/L 3 Core barrel assembly does not include reamer shell or bit. ***(See Diamond Bit section)***

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REFLEX EXHIBIT 1017 - 217/280

WIRELINE CORE BARRELS

P W/L Overshot Assembly



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WIRELINE CORE BARRELS

P W/L Overshot Assembly

Ref. No.	Part No.	Description
1	36226	P W/L Overshot Assembly Complete
2	36227	Cable Swivel Assembly
3	36245	Cable clamp- Overshot
4	36228	Wire rope thimble (.3125″)
5	36229	Eye bolt
6	36230	Cable swivel collar
7	36231	Needle thrust bearing
8	36232	Nut
9	36233	Cotter pin (.09375 x 1″)
10	36024	Grease fitting
11	36234	Cable swivel body ***Note: 4″ Shoulder length available (36222)***
12	36235	Jar tube weldment
13	36236	Self lock nut
14	36237	Jar staff
15	36238	Locking sleeve
16	36239	Spiral Pin (2 req'd.) (.3125″ x 2″)
17	36061	Set screw
18	36242	Overshot head
19	36241	Spring Pin (.25″ x 3″)
20	36244	Lifting dog spring
21	36243	Lifting dog (2 req'd.)
22	36240	Lifting dog pin (.5″ x 1.9375″)

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WIRELINE DRILL ROD

N W/L		
	Part No.	**Weight**
1 Ft.	30064	5.0 lb / 2.3 KG
2 Ft.	30065	9.7 lb / 4.4 KG
5 Ft.	30066	25.7 lb / 11.7 KG
10 Ft.	30067	51.4 lb / 23.3 KG

N W/L ROD SPECIFICATIONS

N W/L			
OD Tube	**Tube Wall Thickness**	**ID Pin**	**Treads Per Inch**
2.75“ / 69.9 mm	.188″ / 9.6 mm	2.375″ / 60.3 mm	3

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WIRELINE DRILL ROD

H W/L

	Part No.	Weight
1 Ft.	30068	8.0 lb / 3.6 KG
2 Ft.	30069	15.6 lb / 7.0 KG
5 Ft.	30070	38.4 lb / 17.4 KG
10 Ft.	30071	76.7 lb / 34.8 KG

H W/L ROD SPECIFICATIONS

H W/L

OD Tube	Tube Wall Thickness	ID Pin	Treads Per Inch
3.5″ / 88.9 mm	.219″ / 11.1 mm	3.0625″ / 77.8 mm	3

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REFLEX EXHIBIT 1017 - 221/280



WIRELINE DRILL ROD

HWT*		
	Part No.	**Weight**
1 Ft.	30084	12.0 lb / 5.4 KG
2 Ft.	30085	22.6 lb / 10.2 KG
5 Ft.	30086	56.5 lb / 25.4 KG
10 Ft.	30087	113 lb / 51.3 KG

*** NOTE: HWT rod/casing is used as the Drill Rod for the P W/L Core Barrel.**

HWT ROD SPECIFICATIONS

HWT			
OD Tube	**Tube Wall Thickness**	**ID Pin**	**Treads Per Inch**
4.5" / 114.3 mm	.250" / 12.7 mm	4" / 101.6 mm	2.5

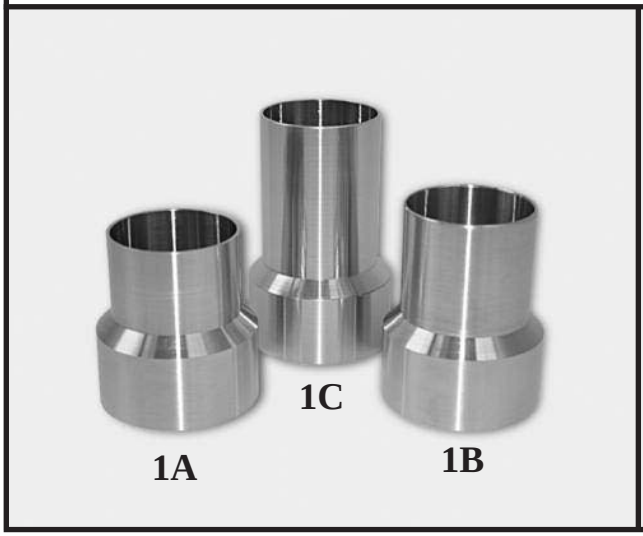
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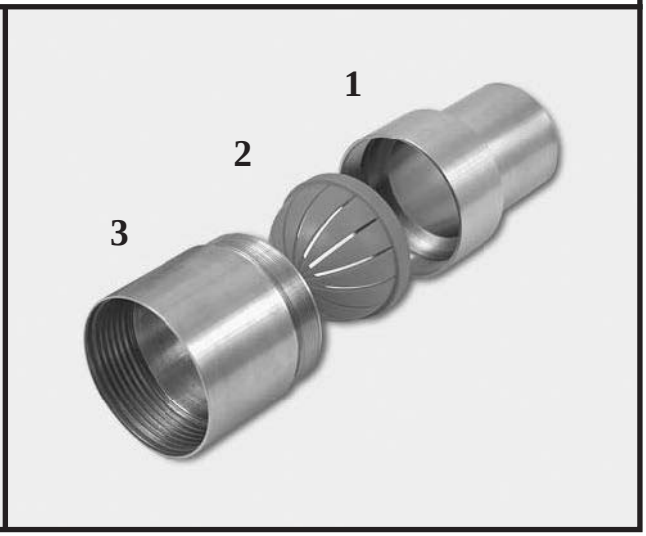
REFLEX EXHIBIT 1017 - 222/280

PUNCH SHOES

Ref. No.	N W/L - NV	N W/L2 - NV2	H W/L - HV	P W/L - PV	Description
1A	36201	36251	36208	36214*	Punch Shoe Pilot 1.5″
1B	36202	36252	36209	36215*	Punch Shoe Pilot 2.0″
1C	36203	36253	36210	36216*	Punch Shoe Pilot 2.5″
2	36204	36254	36211	36217	Basket Retainer - Plastic
3	36200	36250	36206	36213	Punch Shoe Upper Blank

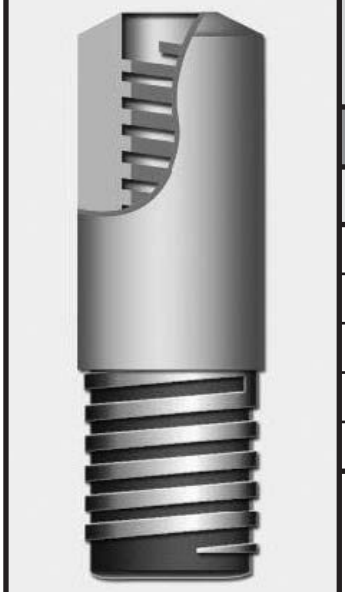
*** Note: P W/L Punch Shoe Pilots differ in length from other series. 1A = 1″ • 1B = 1.75″ • 1C = 3.5″**
Punch Shoes available for other style Core Barrels. (i.e. NXB • NWD - 4 • 94mm)





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REFLEX EXHIBIT 1017 - 223/280



WIRELINE DRILL ROD SUBS
N W/L

BOX to PIN

	Part No.	Weight
AW - N W/L	30280	5.8 lb / 2.6 KG
AWJ - N W/L	30305	5.8 lb / 2.6 KG
NW - N W/L*	30385	5.2 lb / 2.3 KG
NW - N W/L	30794	3.8 lb / 1.7 KG
NWJ - N W/L	30415	3.8 lb / 1.7 KG

Note: Pin end bored for latch mechanism.
Other combinations & sizes of subs available.
*** 6″ Body length.**



WIRELINE DRILL ROD SUBS
N W/L

BOX to BOX

	Part No.	Weight
N4 - N W/L	30201	5.4 lb / 2.4 KG
N W/L - 2.375 API Reg. Box	34415	9.6 lb / 4.3 KG
N W/L - 2.875 API Reg. Box	34416	16.4 lb / 7.4 KG

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REFLEX EXHIBIT 1017 - 224/280



WIRELINE DRILL ROD SUBS
N W/L

PIN to PIN

	Part No.	Weight
AW - N W/L	30459	6.0 lb / 2.7 KG
NW - N W/L	30513	4.8 lb / 2.1 KG

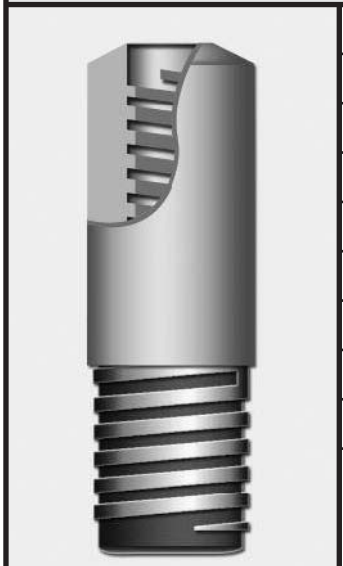
Note: Pin end bored for latch mechanism.
Other combinations & sizes of subs available.

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REFLEX EXHIBIT 1017 - 225/280

WIRELINE DRILL ROD SUBS
H W/L

BOX to PIN



	Part No.	Weight
AW - H W/L	30741	10.6 lb / 5.3 KG
AWJ - H W/L	37200	10.6 lb / 5.3 KG
NW - H W/L	34414	9.4 lb / 4.2 KG
NW - H W/L*	37201	10.6 lb / 5.3 KG
NWJ - H W/L	30775	10.6 lb / 5.3 KG
2.375 API IF - H W/L	30592	8.2 lb / 3.7 KG
NW Casing - H W/L	37240	4.0 lb / 1.8 KG
H W/L - NW Casing	37239	5.0 lb / 2.2 KG
H W/L - HW Casing	30771	12.6 lb / 5.7 KG

Note: Pin end bored for latch mechanism.
Other combinations & sizes of subs available.
*** 6″ Body length.**



WIRELINE DRILL ROD SUBS
H W/L

BOX to BOX

	Part No.	Weight
H W/L - 2.375 API Reg. Box	37243	12.4 lb / 6.2 KG
H W/L - 2.875 API Reg. Box	37244	14.6 lb / 6.6 KG
H W/L - 3.500 API Reg. Box	37245	21.8 lb / 9.9 KG
H W/L - 4.500 API Reg. Box	37246	34.2 lb / 15.5 KG

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REFLEX EXHIBIT 1017 - 226/280



WIRELINE DRILL ROD SUBS
H W/L

PIN to PIN

	Part No.	Weight
AW - H W/L	37242	9.6 lb / 4.3 KG
NW - H W/L	37202	9.2 lb / 4.1 KG

Note: Pin end bored for latch mechanism.
Other combinations & sizes of subs available.

SUBS - FLUSH JOINT CASING

BOX to PIN



Part No.	Description
30274	**AW Rod - NW Casing**
30299	**AWJ Rod - NW Casing**
30377	**NW Rod - NW Casing**
30407	**NWJ Rod - NW Casing**
30378	**NW Rod - HW Casing**
30408	**NWJ Rod - HW Casing**
30379	**NW Rod - HWT Casing**
30380	**NWJ Rod - HWT Casing**
30306	**NWJ Rod - PW Casing**
30409	**NWJ Rod - SW Casing**

Note: HWT Casing is not interchangeable with HW series casing.
HWT rod/casing is used as the Drill Rod for the P W/L Core Barrel.

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REFLEX EXHIBIT 1017 - 227/280



CASING
W SERIES - FLUSH JOINT

BW			NW		
	Part No.	Weight		Part No.	Weight
1 Ft.	30072	7.0 lb / 3.1 KG	1 Ft.	30076	9.0 lb / 4.1 KG
2 Ft.	30073	14.0 lb / 6.3 KG	2 Ft.	30077	17.0 lb / 7.7 KG
5 Ft.	30074	35.0 lb / 15.9 KG	5 Ft.	30078	43.0 lb / 19.5 KG
10 Ft.	30075	70.0 lb / 31.8 KG	10 Ft.	30079	86.0 lb / 39.1 KG

HW			PW		
	Part No.	Weight		Part No.	Weight
1 Ft.	30080	12.0 lb / 5.4 KG	1 Ft.	30000	15.0 lb / 6.8 KG
2 Ft.	30081	23.0 lb / 10.4 KG	2 Ft.	30001	29.0 lb / 13.1 KG
5 Ft.	30082	58.0 lb / 26.3 KG	5 Ft.	30002	70.0 lb / 31.8 KG
10 Ft.	30083	117.0 lb / 53.1 KG	10 Ft.	30003	144.0 lb / 65.4 KG

SW			UW		
	Part No.	Weight		Part No.	Weight
1 Ft.	30088	20.0 lb / 9.1 KG	1 Ft.	30092	23.0 lb / 10.4 KG
2 Ft.	30089	40.0 lb / 18.1 KG	2 Ft.	30093	46.0 lb / 20.9 KG
5 Ft.	30090	100.0 lb / 45.4 KG	5 Ft.	30094	117.0 lb / 53.1 KG
10 Ft.	30091	200.0 lb / 90.9 KG	10 Ft.	30095	234.0 lb / 106.3 KG

ZW		
	Part No.	Weight
1 Ft.	30096	24.0 lb / 10.9 KG
2 Ft.	30097	48.0 lb / 21.8 KG
5 Ft.	30098	119.0 lb / 54.0 KG
10 Ft.	30099	238.0 lb / 108.1 KG

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REFLEX EXHIBIT 1017 - 228/280



CASING
W SERIES - SPECIFICATIONS

BW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
2.875" / 73.0 mm	.250" / 12.7 mm	2.375" / 60.3 mm	4

NW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
3.5" / 88.9 mm	.250" / 12.7 mm	3.0" / 76.2 mm	4

HW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
4.5" / 114.3 mm	.250" / 12.7 mm	4.0" / 101.6 mm	4

PW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
5.5" / 139.7 mm	.250" / 12.7 mm	5.0" / 127.0 mm	3

SW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
6.625" / 168.3 mm	.312" / 15.9 mm	6.0" / 152.4 mm	3

UW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
7.625" / 193.7 mm	.312" / 15.9 mm	7.0" / 177.8 mm	2

ZW

OD Of Casing	Tube Wall Thickness	ID Of Casing	Treads Per Inch
8.625" / 219.1 mm	.312" / 15.9 mm	8.0" / 203.2 mm	2

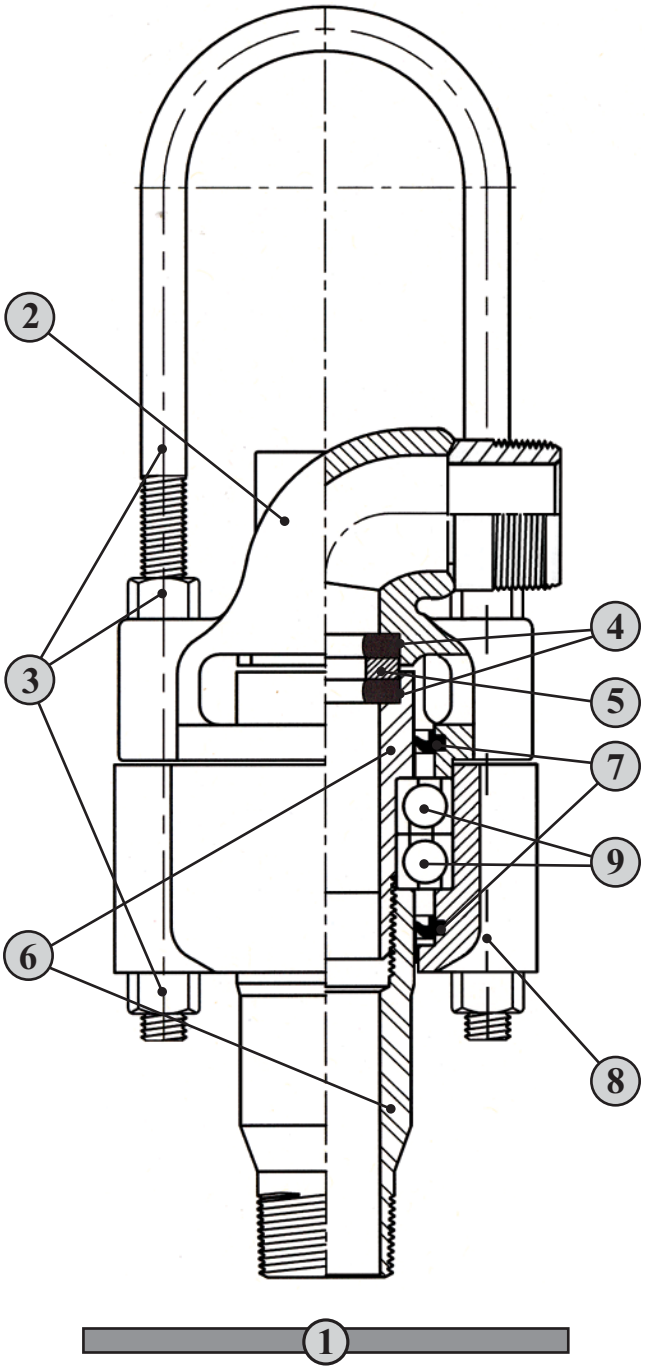
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REFLEX EXHIBIT 1017 - 229/280

Water Swivel

1 J





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REFLEX EXHIBIT 1017 - 230/280

Water Swivel

1 J

Ref. No.	Part No.	Description
1	30860	Swivel, Iron, 1.25″ male NPT hose connection with 1.25″ NPT LH pin lower connection
1	31133	Swivel, Iron, 1.25″ male NPT hose connection with CMK LH pin lower connection
2	30861	Gooseneck, 1.25″ male NPT
3	30862	Bail with nuts
4	30863	Packing (2 req'd.)
4	31086	Packing, 90 Duro (2 req'd.) Air
4	31137	Packing, Viton (2 req'd.)
5	30864	Wearbushing
6	31134	Bearing Spindle Shaft 1J with 1.25″ NPT LH pin lower connection (Mated set)
6	31135	Bearing Spindle Shaft 1J with CMK LH pin lower connection (Mated set)
7	30867	Housing Seals (2 req'd.)
8	30868	Bearing Housing
9	30869	Bearings (2 req'd.)

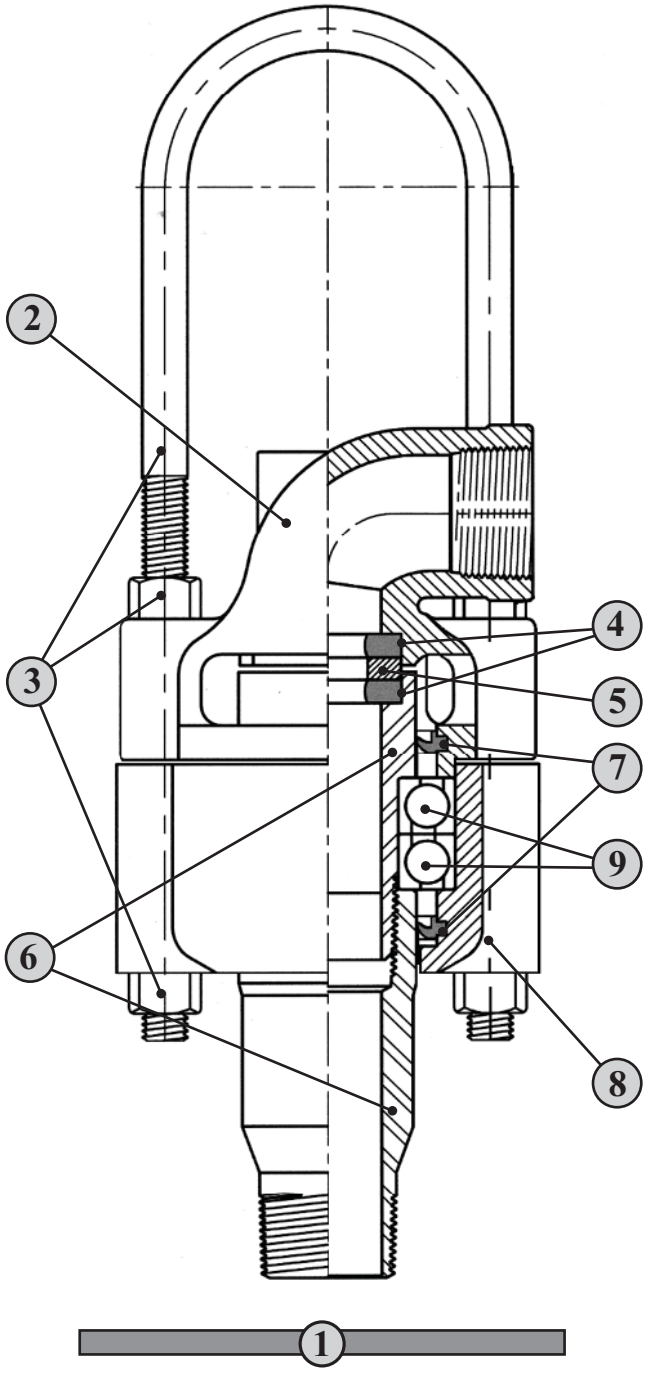
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REFLEX EXHIBIT 1017 - 231/280

Water Swivel

2 J





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REFLEX EXHIBIT 1017 - 232/280

Water Swivel

2 J

Ref. No.	Part No.	Description
1	30870	Swivel, Iron, 1.5″ female NPT hose connection with 1.5″ NPT LH pin lower connection
1	31125	Swivel, Iron, 1.5″ female NPT hose connection with CMK LH pin lower connection
2	30871	Gooseneck, 1.5″ female NPT
3	30872	Bail with nuts
4	30873	Packing (2 req'd.)
4	31075	Packing, 90 Duro (2 req'd.) Air
4	31138	Packing, Viton (2 req'd.)
5	30874	Wearbushing
6	31126	Bearing Spindle Shaft 2J with 1.5″ NPT LH pin lower connection (Mated set)
6	31127	Bearing Spindle Shaft 2J with CMK LH pin lower connection (Mated set)
7	30877	Housing Seals (2 req'd.)
8	30878	Bearing Housing
9	30879	Bearings (2 req'd.)

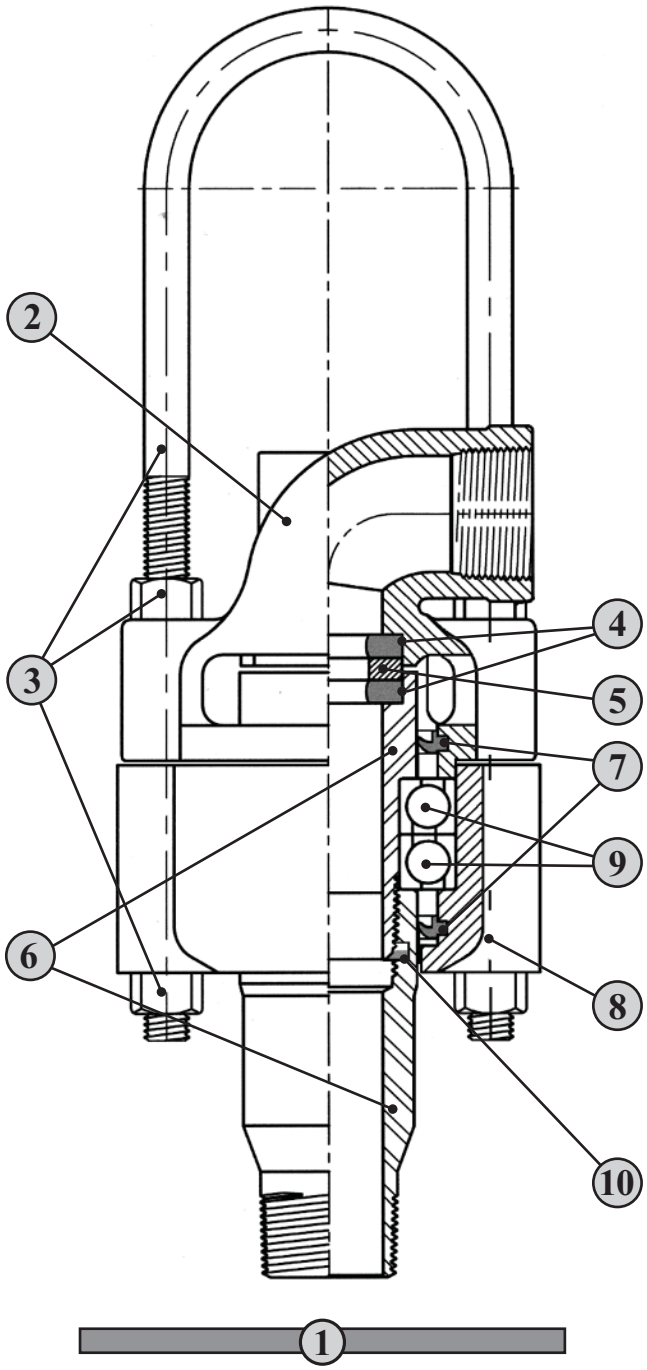
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Water Swivel

3 J





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REFLEX EXHIBIT 1017 - 234/280

Water Swivel

3 J

Ref. No.	Part No.	Description
1	31069	Swivel, Iron, 2″ female NPT hose connection with 2″ NPT LH pin lower connection
1	31064	Swivel, Iron, 2″ female NPT hose connection with CMK 6V LH pin lower connection
2	31037	Gooseneck, 2″ female NPT
3	31038	Bail with nuts
4	30904	Packing (2 req'd.)
4	31035	Packing, 90 Duro (2 req'd.) Air
4	31139	Packing, Viton (2 req'd.)
5	30905	Wearbushing
6	31129	Bearing Spindle Shaft 3J with 2″ NPT LH pin lower connection (Mated set)
6	31128	Bearing Spindle Shaft 3J with CMK 6V LH pin lower connection (Mated set)
7	30908	Housing Seals (2 req'd.)
8	30909	Bearing Housing
9	30910	Bearings (2 req'd.)
10	30912	Spindle Thread Seal

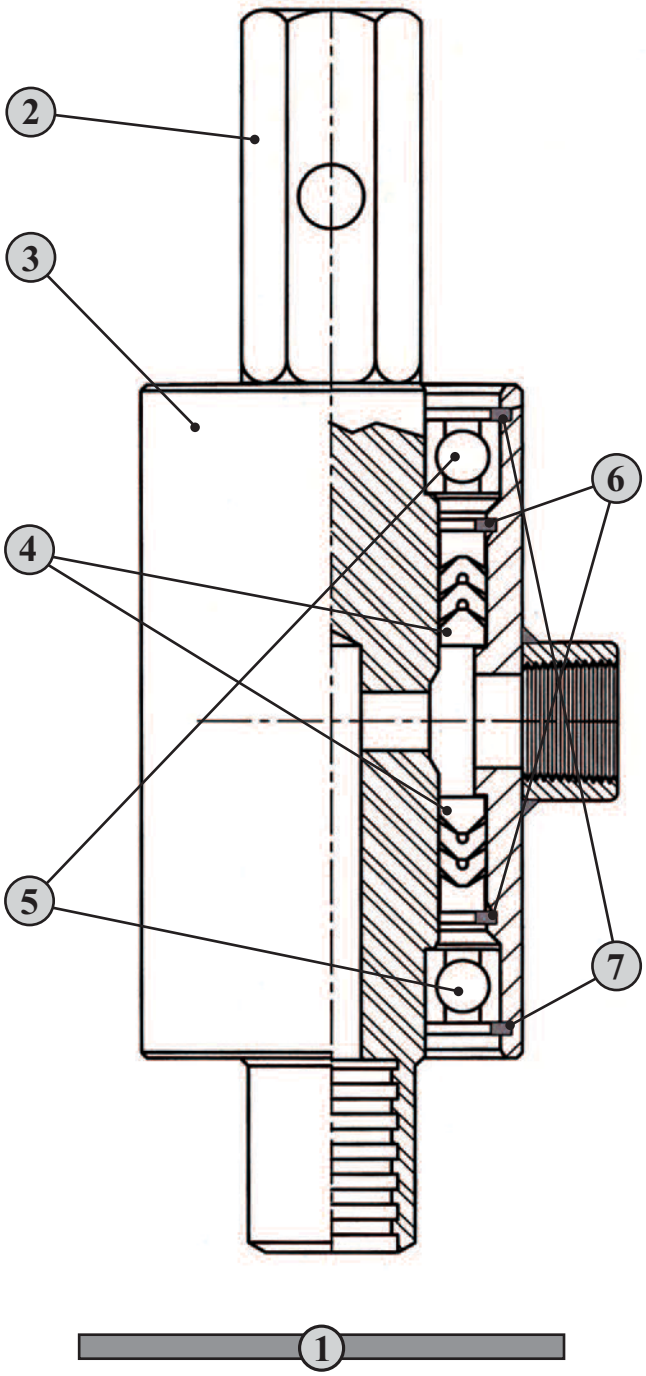
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REFLEX EXHIBIT 1017 - 235/280

Side Feed Swivel

AW





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REFLEX EXHIBIT 1017 - 236/280

Side Feed Swivel

AW

Ref. No.	Part No.	Description
1	31102	Side Feed Swivel, 1.125″ hex x AW box, 1″ NPT female hose connection
1	31103	Side Feed Swivel, 1.625″ hex x AW box, 1″ NPT female hose connection
2	31106	Stem, 1.125′ hex x AW box, RH
2	31107	Stem, 1.625′ hex x AW box, RH
3	31110	Packoff housing, 1″ NPT hose connection
4	31111	Packing set (2 req'd.)
5	31112	Bearings (2 req'd.)
6	31113	Packing retainer (2 req'd.)
7	31114	Bearing retainer (2 req'd.)

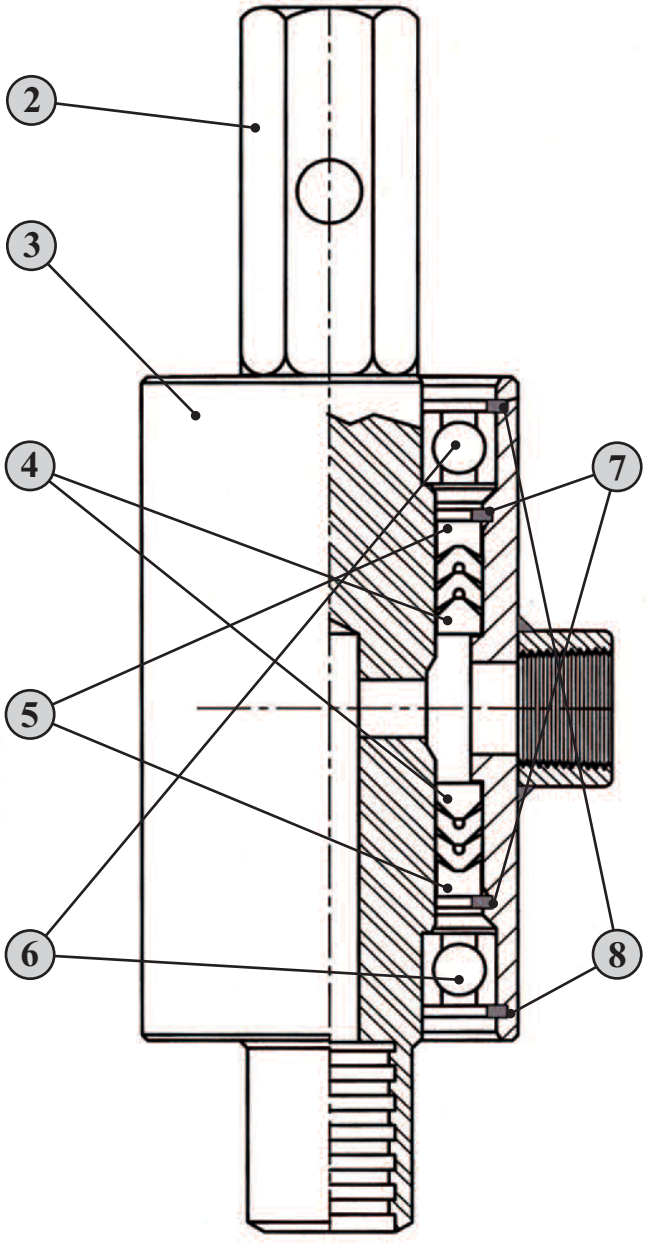
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REFLEX EXHIBIT 1017 - 237/280

Side Feed Swivel

NW





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REFLEX EXHIBIT 1017 - 238/280

Side Feed Swivel

NW

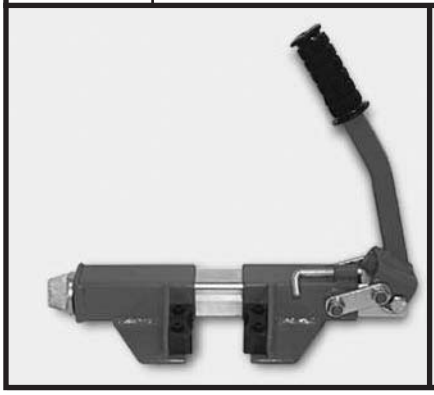
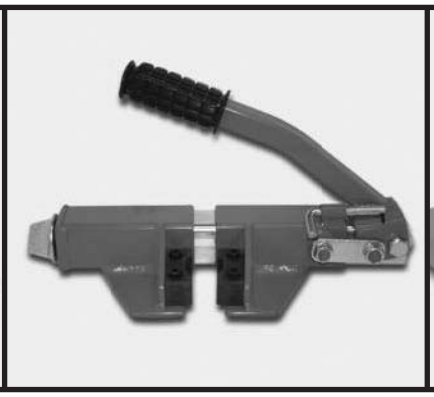
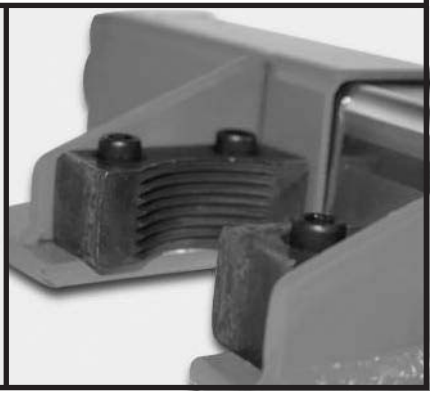
Ref. No.	Part No.	Description
1	31104	Side Feed Swivel, 1.625″ hex x NW box, 1.25″ NPT female hose connection
1	31105	Side Feed Swivel, 2″ hex x NW box, 1.25″ NPT female hose connection
2	31108	Stem, 1.625″ hex x NW box, RH
2	31109	Stem, 2″ hex x NW box, RH
3	31115	Packoff housing, 1.25″ NPT hose connection
4	31116	Packing set (2 req'd.)
5	31120	Packing seat ring (2 req'd.)
6	31117	Bearings (2 req'd.)
7	31118	Packing retainer (2 req'd.)
8	31119	Bearing retainer (2 req'd.)

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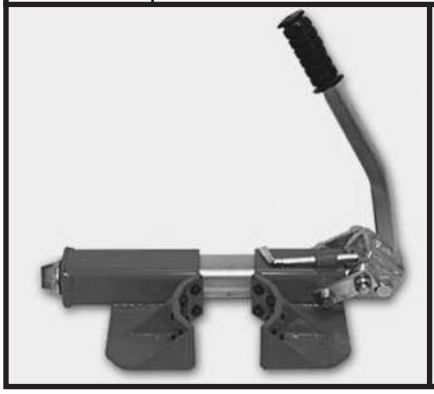
KWIK KLAMP

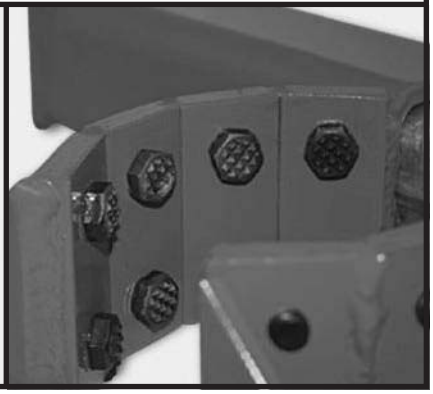
Part No.	Description
32459	Kwik Klamp (1.25″ to 2.625″ - 3,500 lbs. capacity)
32460	Jaw w/screws (2 Req'd)

KWIK KLAMP 2

Part No.	Description
32461	Kwik Klamp 2 (2.5″ to 4.5″ - 7,000 lbs. capacity)
32464	Gripper Carbide Tipped (16 Req'd)





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REFLEX EXHIBIT 1017 - 240/280

FOOT CLAMP

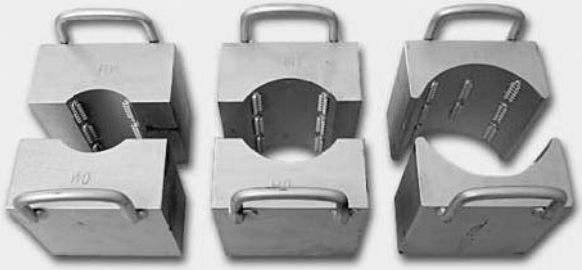
Ref. No.	Part No.	Description
1	32474	Foot Clamp, 5″ x 5″ (Jaw set not included)
2	32475	Jaw set, 2.75″ OD tube (N W/L Rod)
3	32476	Jaw set, 3.5″ OD tube (H W/L Rod, NW Casing)
4	32477	Jaw set, 4.5″ OD tube (HW Casing, HWT Casing)

Note: Other Jaw Set sizes available upon request.

1



2 3 4





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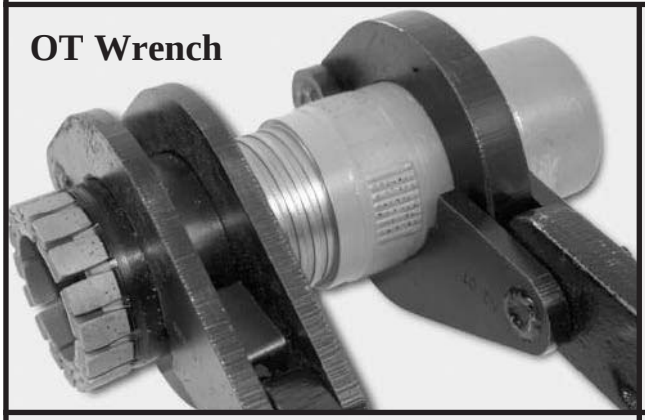
REFLEX EXHIBIT 1017 - 241/280

WRENCHES - FULL CIRCLE GRIP

Part No.	Description
36085	Wrench, OT, N W/L, NXB, NWD4, NWD4 Bit
36086	Wrench, IT, N W/L & Case
36087	Wrench, IT, N W/L 2 & Case
36088	Wrench, IT, NWD4
36089	Wrench, IT, Shoe, NWD4
36097	Wrench, OT, H W/L
36098	Wrench Bit / Shell H W/L
36085	Wrench, IT, H W/L & Case
36127	Wrench, OT / Bit, P W/L
36098	Wrench, IT, P W/L & Case

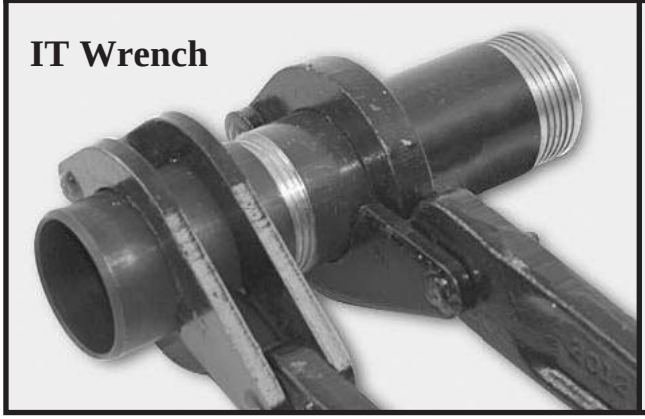
Note: Other Wrench sizes available upon request.

OT Wrench





IT Wrench





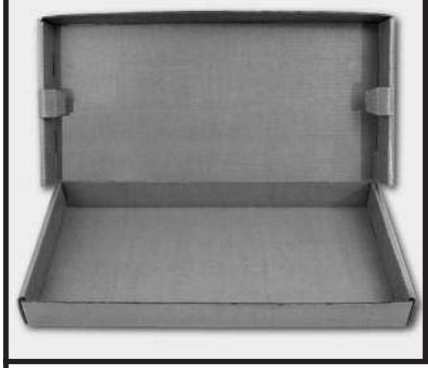
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REFLEX EXHIBIT 1017 - 242/280

CORE BOXES - WAXED CARDBOARD

N

Part No.	Description
36312	Core Box - One Piece (Divider not included)
36313	Divider for One Piece Core Box







Core capacity - 10′

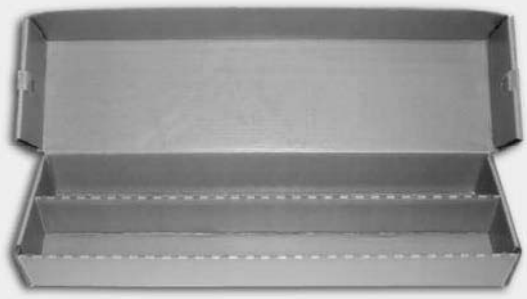
Packaged 25 per Bundle

H

Part No.	Description
36314	Core Box - One Piece (Divider not included)
36315	Divider for One Piece Core Box

P

Part No.	Description
36316	Core Box - One Piece (Divider included)





Core capacity - 5′

Packaged 20 per Bundle

Note: Wooden Core Boxes available in a variety of sizes.

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REFLEX EXHIBIT 1017 - 243/280

LUBRICANTS

Part No.	Description	Size
212291	KOPR-KOTE (Heavy Duty Drill Pipe Compound)	1 gal. pail
212292	KOPR-KOTE (Heavy Duty Drill Pipe Compound)	2 gal. pail
212299	KOPR-KOTE (Heavy Duty Drill Pipe Compound)	14oz. cartridge
212297	Dope Brush	1.125″ x 16″







INSTA-VIS PLUS

Part No.	Description	Size
214025	Liquid drilling fluid polymer	5 gal. pail

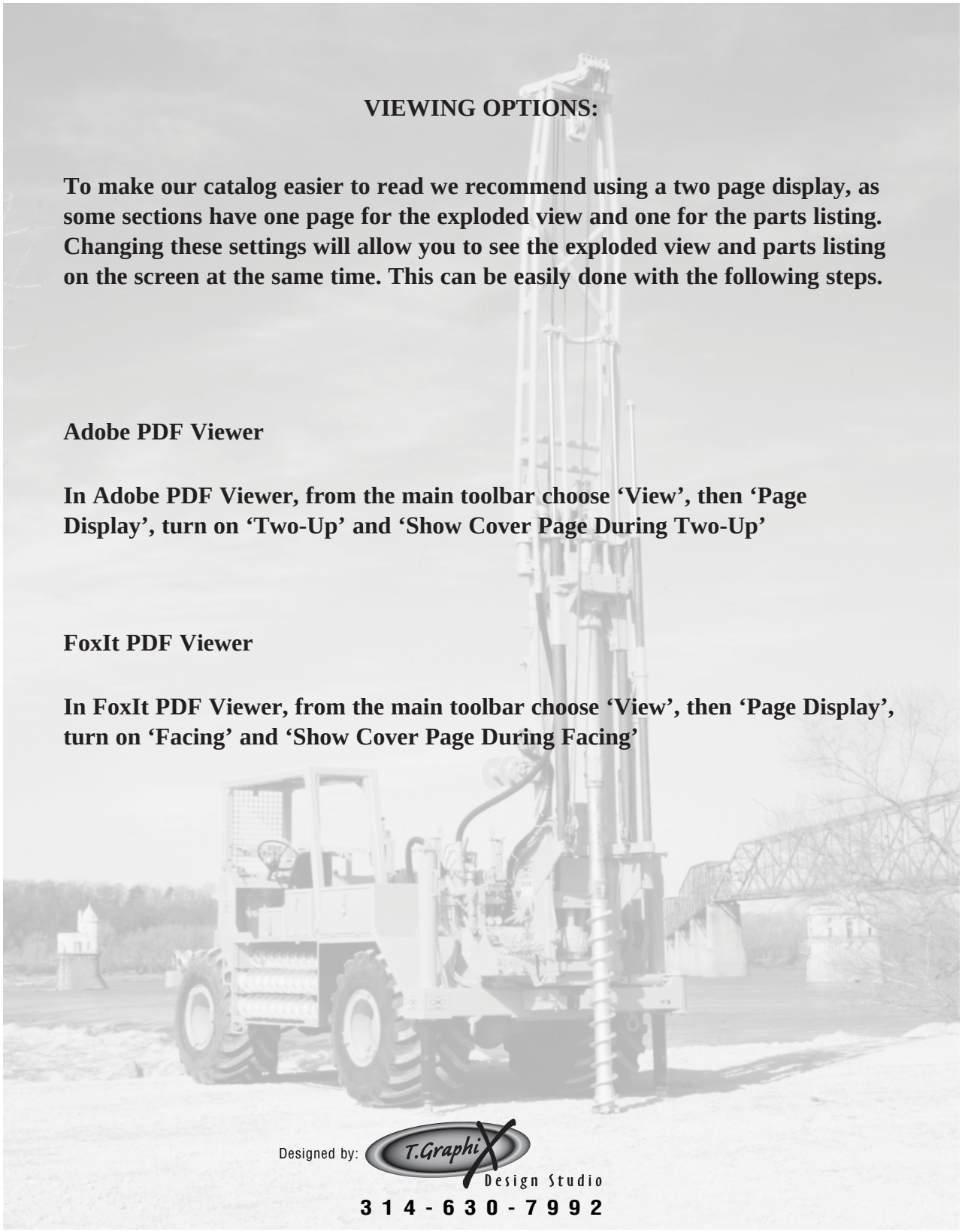
Note: Also available by the pallet. (32 pails per pallet)

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REFLEX EXHIBIT 1017 - 244/280

Ground Water Monitoring





VIEWING OPTIONS:

To make our catalog easier to read we recommend using a two page display, as some sections have one page for the exploded view and one for the parts listing. Changing these settings will allow you to see the exploded view and parts listing on the screen at the same time. This can be easily done with the following steps.

Adobe PDF Viewer

In Adobe PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Two-Up' and 'Show Cover Page During Two-Up'

FoxIt PDF Viewer

In FoxIt PDF Viewer, from the main toolbar choose 'View', then 'Page Display', turn on 'Facing' and 'Show Cover Page During Facing'

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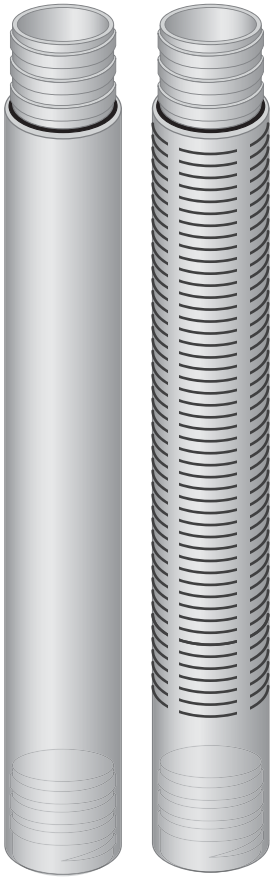
CME Ground Water Monitoring

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REFLEX EXHIBIT 1017 - 247/280

FLUSH THREAD PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS



Casing **Screen**

- CNC computer lathed flush threads follow ASTM F-480 recommendations for reliable, consistent results on the job site.
- Our Close tolerances provide a strong connection while retaining ease of assembly.
- Manufactured from quality PVC pipe, flush thread screens and casing are available in diameters of 1/2″ through 12″ with 2, 4, or 8 threads per inch in schedules 40 & 80.
- Laying length is standard for 2″ and 4″ schedules 40 & 80 PVC. Other pipe sizes are overall length. Custom lengths are available in all diameters.
- All standard PVC threads are compatible with other materials threaded to ASTM F-480 recommendations, with the same TPI.
- All standard screens provide maximum net open area. A wide variety of slot sizes and spacings are available to adapt to various site conditions and applications.
- 2″ and 4″ schedules 40 and 80 screens and casings are supplied with Buna-N O-rings at no additional charge. Buna-N O-rings are available for all other sizes for a nominal charge.
- All flush thread screens and casings are Envirowrapped and hermetically sealed at both ends as a standard practice.
- The following pages list flush thread PVC screens and casings along with the appropriate flush thread caps, plugs, and points. Custom lengths, threads and adapters are available.

 **Female Cap (solid)**	 **Female Point (solid)**	 **Male Plug (molded)**	 **Male Point (solid)**	 **Adaptor Female To MIP**
 **Female Cap (molded)**	 **Female Point (molded)**	 **Male Plug (solid)**	 **Slip Cap (molded)**	 **Adaptor Male To MIP**

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REFLEX EXHIBIT 1017 - 248/280

PVC PIPE SPECIFICATIONS

SCHEDULE 40

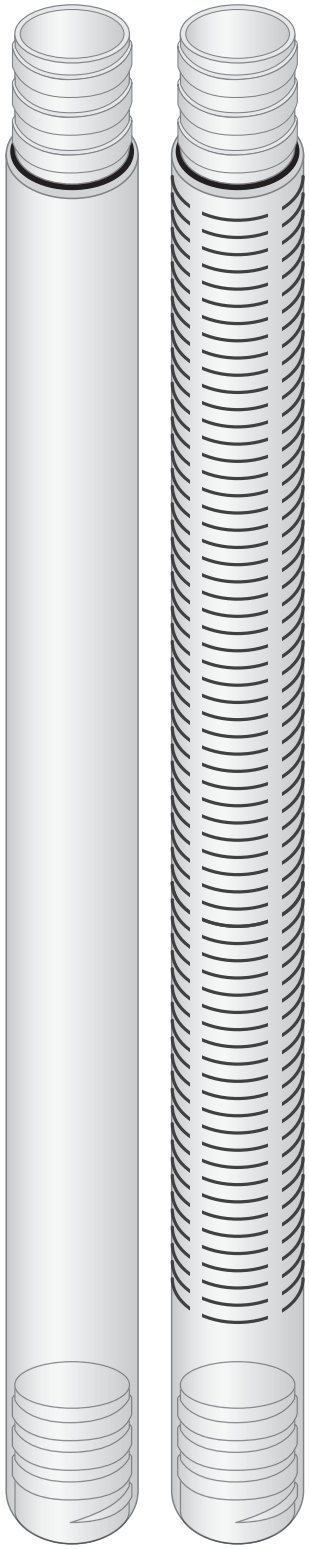
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI
1/8	.405	.261	.068	.045	810
1/4	.540	.354	.088	.081	780
3/8	.675	.483	.091	.109	620
1/2	.840	.608	.109	.161	600
3/4	1.050	.810	.113	.214	480
1	1.315	1.033	.133	.315	450
1 1/4	1.660	1.364	.140	.426	370
1 1/2	1.900	1.592	.145	.509	330
2	2.375	2.049	.154	.682	280
2 1/2	2.875	2.445	.203	1.076	300
3	3.500	3.042	.216	1.409	260
3 1/2	4.000	3.520	.226	1.697	240
4	4.500	3.998	.237	2.006	220
5	5.563	5.017	.258	2.726	190
6	6.625	6.031	.280	3.535	180
8	8.625	7.943	.322	5.305	160
10	10.750	9.976	.365	7.532	140
12	12.750	11.890	.406	9.949	130

SCHEDULE 80

Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI
1/8	.405	.203	.095	.058	1230
1/4	.540	.288	.119	.100	1130
3/8	.675	.407	.126	.138	920
1/2	.840	.528	.147	.202	850
3/4	1.050	.724	.154	.273	690
1	1.315	.935	.179	.402	630
1 1/4	1.660	1.256	.191	.554	520
1 1/2	1.900	1.476	.200	.673	470
2	2.375	1.913	.218	.932	400
2 1/2	2.875	2.289	.276	1.419	420
3	3.500	2.864	.300	1.903	370
3 1/2	4.000	3.326	.318	2.322	350
4	4.500	3.786	.337	2.782	320
5	5.563	4.767	.375	3.867	290
6	6.625	5.709	.432	5.313	280
8	8.625	7.565	.500	8.058	250
10	10.750	9.492	.593	11.956	230
12	12.750	11.294	.687	16.437	230

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1/2" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210000	1/2" x 10'	210083	1/2" x 10'	.010	210559	Plug Male
210001	1/2" x 5'	210088	1/2" x 5'	.010	210560	Cap Female
210002	1/2" x 2.5'	210093	1/2" x 2.5'	.010	210561	Point Male
		210084	1/2" x 10'	.020	210562	Point Female
		210089	1/2" x 5'	.020	210563	Cap Slip
		210094	1/2" x 2.5'	.020	210660	Adaptor, Male x MIP*
					210661	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 8 TPI
Screen slot spacing 0.125"
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 25 pieces per box

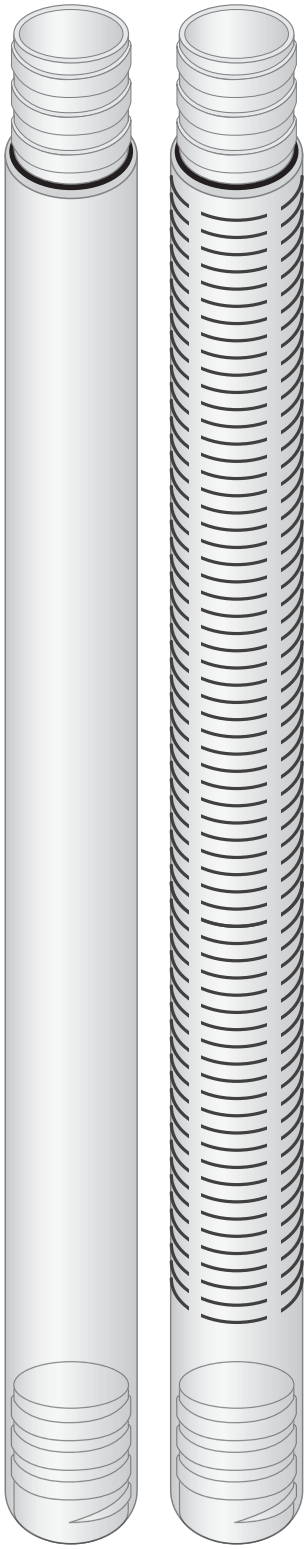
3/4" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210003	3/4" x 10'	210098	3/4 " x 10'	.010	210564	Plug Male
210004	3/4" x 5'	210103	3/4" x 5'	.010	210565	Cap Female
210005	3/4" x 2.5'	210108	3/4" x 2.5'	.010	210566	Point Male
		210099	3/4 " x 10'	.020	210567	Point Female
		210104	3/4" x 5'	.020	210568	Cap Slip
		210109	3/4" x 2.5'	.020	210664	Adaptor, Male x MIP*
					210665	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 8 TPI
Screen slot spacing 0.125"
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 25 pieces per box

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REFLEX EXHIBIT 1017 - 250/280



1” SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210006	1″ x 10′	210113	1″ x 10′	.010	210569	Plug Male
210007	1″ x 5′	210118	1″ x 5′	.010	210570	Cap Female
210009	1″ x 2.5′	210128	1″ x 2.5′	.010	210571	Point Male
		210114	1″ x 10′	.020	210572	Point Female
		210119	1″ x 5′	.020	210573	Cap Slip
		210129	1″ x 2.5′	.020	210668	Adaptor, Male x MIP*
					210669	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 8 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 20 pieces per box

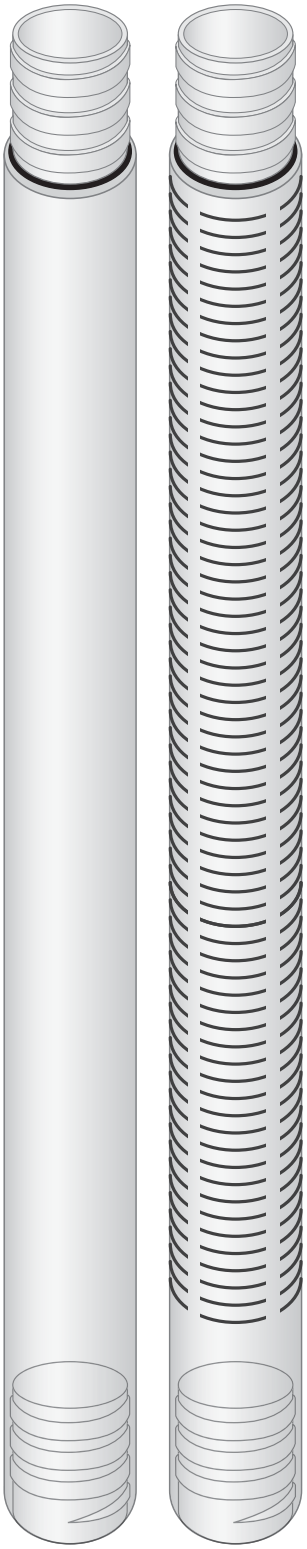
1 1/4” SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210010	1 1/4″ x 10′	210133	1 1/4″ x 10′	.010	210574	Plug Male
210011	1 1/4″ x 5′	210138	1 1/4″ x 5′	.010	210575	Cap Female
210012	1 1/4″ x 2.5′	210143	1 1/4″ x 2.5′	.010	210576	Point Male
		210134	1 1/4″ x 10′	.020	210577	Point Female
		210139	1 1/4″ x 5′	.020	210578	Cap Slip
		210144	1 1/4″ x 2.5′	.020	210672	Adaptor, Male x MIP*
					210673	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 8 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 12 pieces per box

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1 1/2" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210013	1 1/2″ x 10′	210148	1 1/2″ x 10′	.010	210579	Plug Male
210014	1 1/2″ x 5′	210153	1 1/2″ x 5′	.010	210580	Cap Female
210015	1 1/2″ x 2.5′	210158	1 1/2″ x 2.5′	.010	210581	Point Male
		210149	1 1/2″ x 10′	.020	210582	Point Female
		210154	1 1/2″ x 5′	.020	210583	Cap Slip
					210676	Adaptor, Male x MIP*
					210677	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 8 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 10 pieces per box

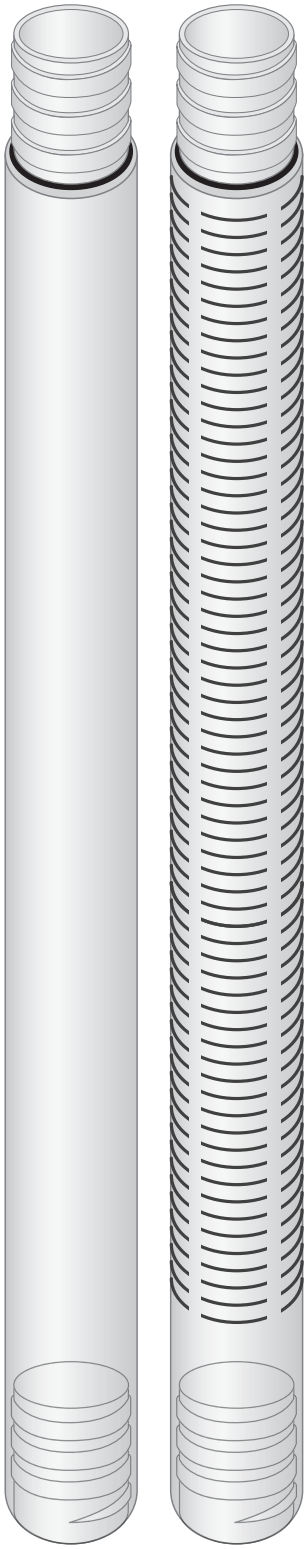
2" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210016	2″ x 10′	210160	2″ x 10′	.010	210584	Plug Male
210017	2″ x 5′	210165	2″ x 5′	.010	210585	Cap Female
210018	2″ x 2.5′	210170	2″ x 2.5′	.010	210586	Point Male
		210161	2″ x 10′	.020	210587	Point Female
		210166	2″ x 5′	.020	210588	Cap Slip
		210171	2″ x 2.5′	.020	210680	Adaptor, Male x MIP*
					210681	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 6 pieces per box

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3" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210019	3″ x 10′	210175	3″ x 10′	.010	210589	Plug Male
210020	3″ x 5′	210180	3″ x 5′	.010	210590	Cap Female
210021	3″ x 2.5′	210185	3″ x 2.5′	.010	210591	Point Male
		210176	3″ x 10′	.020	210592	Point Female
		210181	3″ x 5′	.020	210593	Cap Slip
		210186	3″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
Screen and Casing - 4 pieces per box

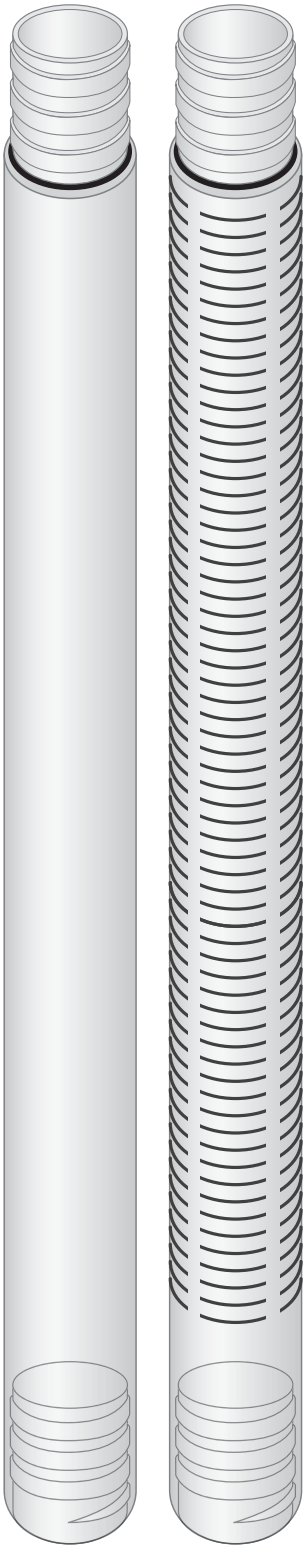
4" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210022	4″ x 10′	210190	4″ x 10′	.010	210594	Plug Male
210023	4″ x 5′	210195	4″ x 5′	.010	210595	Cap Female
210024	4″ x 2.5′	210200	4″ x 2.5′	.010	210596	Point Male
		210191	4″ x 10′	.020	210597	Point Female
		210196	4″ x 5′	.020	210598	Cap Slip
		210201	4″ x 2.5′	.020	210684	Adaptor, Male x MIP*
					210685	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 2 pieces per box

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REFLEX EXHIBIT 1017 - 253/280



5” SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210025	5″ x 10′	210205	5″ x 10′	.010	210599	Plug Male
210026	5″ x 5′	210210	5″ x 5′	.010	210600	Cap Female
210027	5″ x 2.5′	210215	5″ x 2.5′	.010	210601	Cap Slip
		210206	5″ x 10′	.020		
		210211	5″ x 5′	.020		
		210216	5″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
Screen and Casing - 1 piece per box

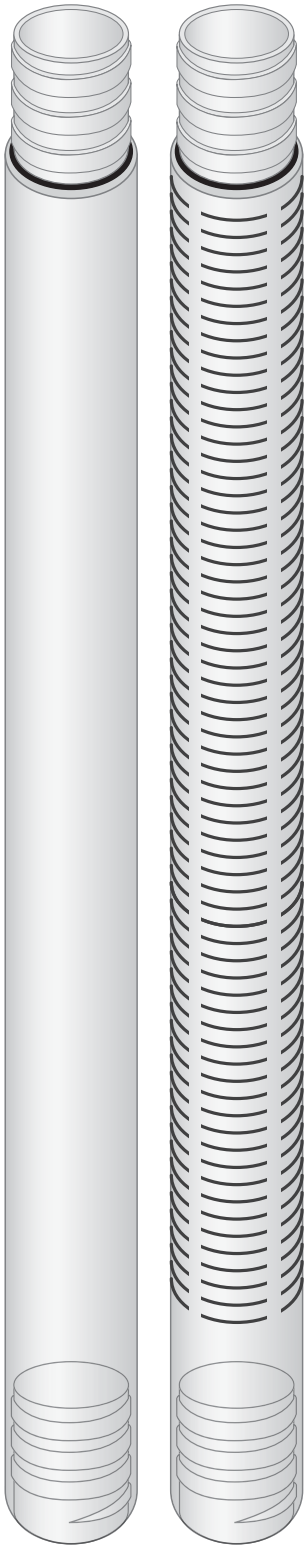
6” SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210028	6″ x 10′	210219	6″ x 10′	.010	210602	Plug Male
210029	6″ x 5′	210223	6″ x 5′	.010	210603	Cap Female
210030	6″ x 2.5′	210227	6″ x 2.5′	.010	210604	Cap Slip
		210220	6″ x 10′	.020		
		210224	6″ x 5′	.020		
		210228	6″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available
Screen and Casing - 1 piece per box

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REFLEX EXHIBIT 1017 - 254/280



8" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210031	8″ x 10′	210231	8″ x 10′	.010	210605	Plug Male
210032	8″ x 5′	210235	8″ x 5′	.010	210606	Cap Female
210033	8″ x 2.5′	210239	8″ x 2.5′	.010	210607	Cap Slip
		210232	8″ x 10′	.020		
		210236	8″ x 5′	.020		
		210240	8″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available
Screen and Casing - 1 piece per box

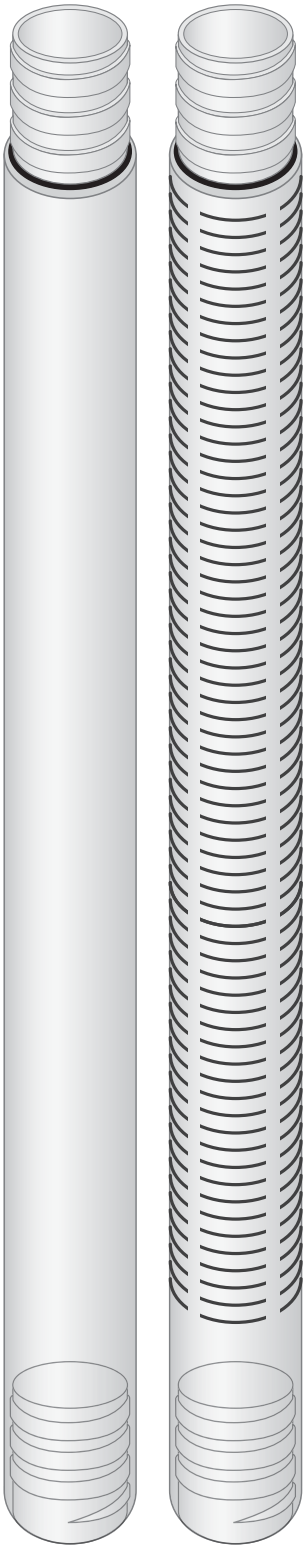
10" SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210034	10″ x 10′	210243	10″ x 10′	.010	210608	Plug Male
210035	10″ x 5′	210247	10″ x 5′	.010	210609	Cap Female
210036	10″ x 2.5′	210251	10″ x 2.5′	.010	210610	Cap Slip
		210244	10″ x 10′	.020		
		210248	10″ x 5′	.020		
		210252	10″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available

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REFLEX EXHIBIT 1017 - 255/280



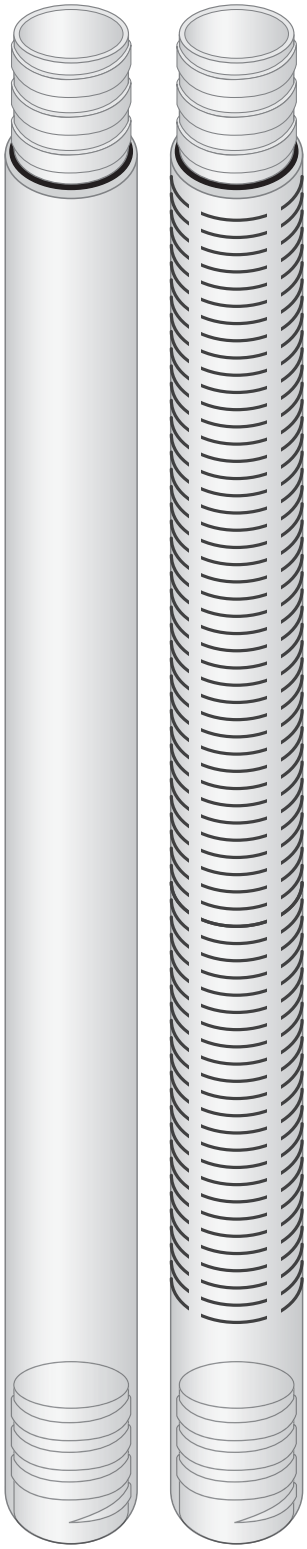
12” SCHEDULE - 40 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210037	12″ x 10′	210255	12″ x 10′	.010	210611	Plug Male
210038	12″ x 5′	210259	12″ x 5′	.010	210612	Cap Female
210039	12″ x 2.5′	210263	12″ x 2.5′	.010	210613	Cap Slip
		210256	12″ x 10′	.020		
		210260	12″ x 5′	.020		
		210264	12″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available

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1/2" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210040	1/2" x 10'	210268	1/2" x 10'	.010	210614	Plug Male
210041	1/2" x 5'	210272	1/2" x 5'	.010	210615	Cap Female
210042	1/2" x 2.5'	210276	1/2" x 2.5'	.010	210616	Point Male
		210269	1/2" x 10'	.020	210617	Point Female
		210273	1/2" x 5'	.020	210563	Cap Slip
		210277	1/2" x 2.5'	.020	210662	Adaptor, Male x MIP*
					210663	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 4 TPI
Screen slot spacing 0.125"
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 25 pieces per box

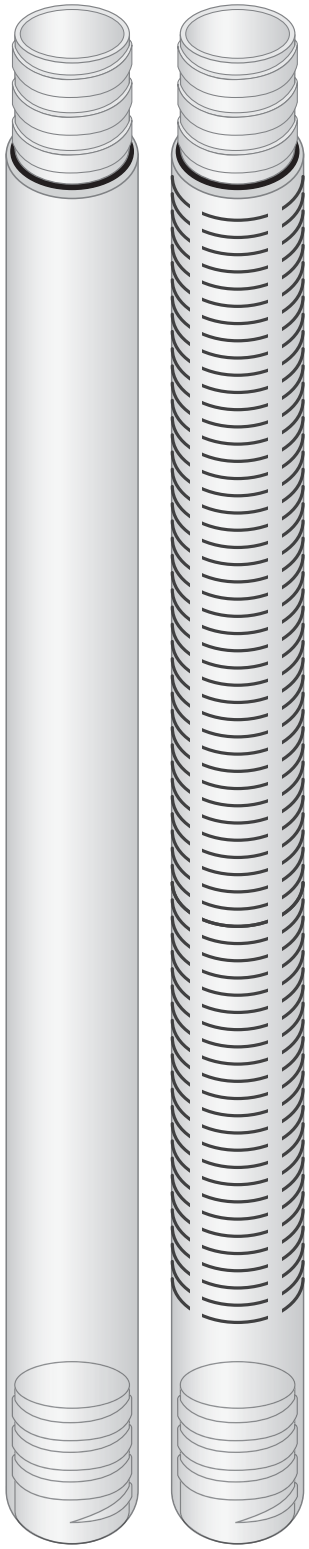
3/4" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210043	3/4" x 10'	210280	3/4" x 10'	.010	210618	Plug Male
210044	3/4" x 5'	210284	3/4" x 5'	.010	210619	Cap Female
210045	3/4" x 2.5'	210288	3/4" x 2.5'	.010	210620	Point Male
		210281	3/4" x 10'	.020	210621	Point Female
		210285	3/4" x 5'	.020	210568	Cap Slip
		210289	3/4" x 2.5'	.020	210666	Adaptor, Male x MIP*
					210667	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 4 TPI
Screen slot spacing 0.125"
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 25 pieces per box

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REFLEX EXHIBIT 1017 - 257/280



1" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210046	1″ x 10′	210292	1″ x 10′	.010	210622	Plug Male
210047	1″ x 5′	210297	1″ x 5′	.010	210623	Cap Female
210048	1″ x 2.5′	210302	1″ x 2.5′	.010	210624	Point Male
		210293	1″ x 10′	.020	210625	Point Female
		210298	1″ x 5′	.020	210573	Cap Slip
		210303	1″ x 2.5′	.020	210670	Adaptor, Male x MIP*
					210671	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 4 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 20 pieces per box

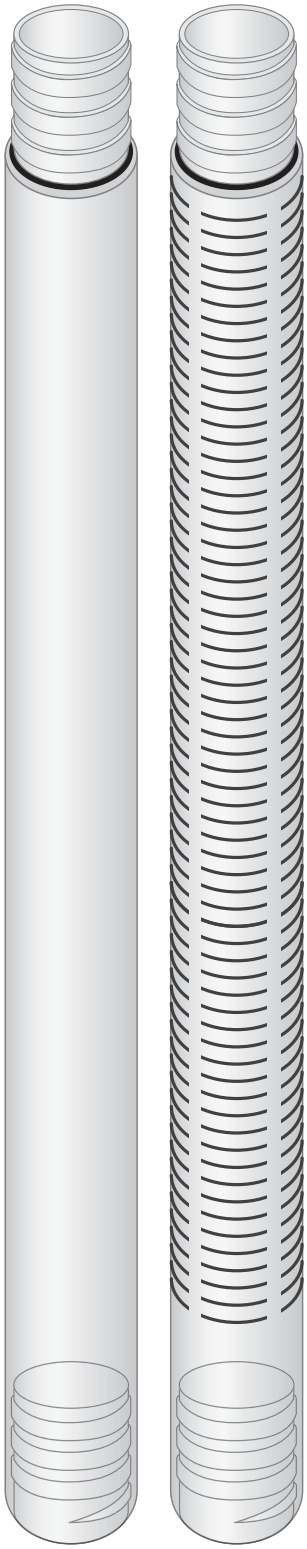
1 1/4" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210049	1 1/4″ x 10′	210307	1 1/4″ x 10′	.010	210626	Plug Male
210050	1 1/4″ x 5′	210312	1 1/4″ x 5′	.010	210627	Cap Female
210051	1 1/4″ x 2.5′	210317	1 1/4″ x 2.5′	.010	210628	Point Male
		210308	1 1/4″ x 10′	.020	210629	Point Female
		210313	1 1/4″ x 5′	.020	210578	Cap Slip
		210318	1 1/4″ x 2.5′	.020	210674	Adaptor, Male x MIP*
					210675	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 12 pieces per box

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REFLEX EXHIBIT 1017 - 258/280



1 1/2" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210052	1 1/2″ x 10′	210322	1 1/2″ x 10′	.010	210630	Plug Male
210053	1 1/2″ x 5′	210327	1 1/2″ x 5′	.010	210631	Cap Female
210054	1 1/2″ x 2.5′	210332	1 1/2″ x 2.5′	.010	210632	Point Male
		210323	1 1/2″ x 10′	.020	210633	Point Female
		210328	1 1/2″ x 5′	.020	210583	Cap Slip
		210333	1 1/2″ x 2.5′	.020	210678	Adaptor, Male x MIP*
					210679	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 10 pieces per box

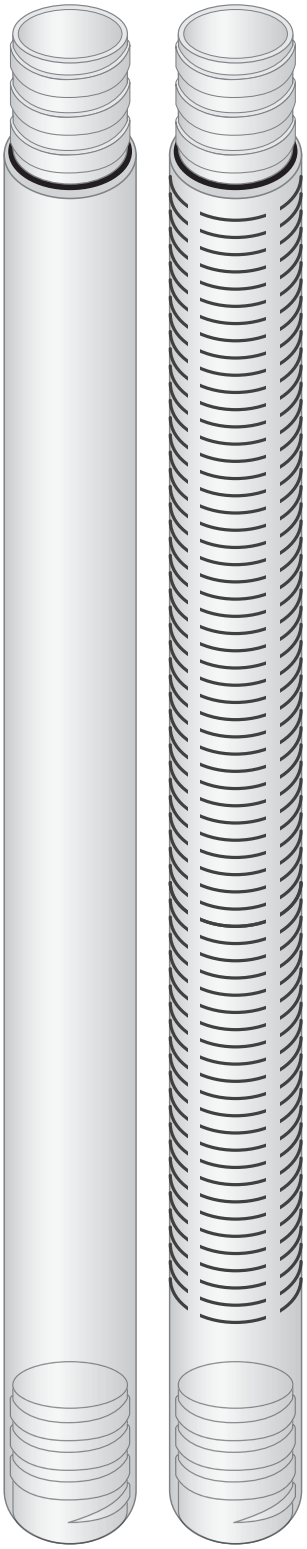
2" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210055	2″ x 10′	210337	2″ x 10′	.010	210634	Plug Male
210056	2″ x 5′	210342	2″ x 5′	.010	210635	Cap Female
210057	2″ x 2.5′	210347	2″ x 2.5′	.010	210636	Point Male
		210338	2″ x 10′	.020	210637	Point Female
		210343	2″ x 5′	.020	210588	Cap Slip
		210348	2″ x 2.5′	.020	210682	Adaptor, Male x MIP*
					210683	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 6 pieces per box

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2 1/2" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210058	2 1/2″ x 10′	210352	2 1/2″ x 10′	.010	210638	Plug Male
210059	2 1/2″ x 5′	210357	2 1/2″ x 5′	.010	210639	Cap Female
210060	2 1/2″ x 2.5′	210362	2 1/2″ x 2.5′	.010	210640	Point Male
		210353	2 1/2″ x 10′	.020	210641	Point Female
		210358	2 1/2″ x 5′	.020		
		210363	2 1/2″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
Screen and Casing - 5 pieces per box

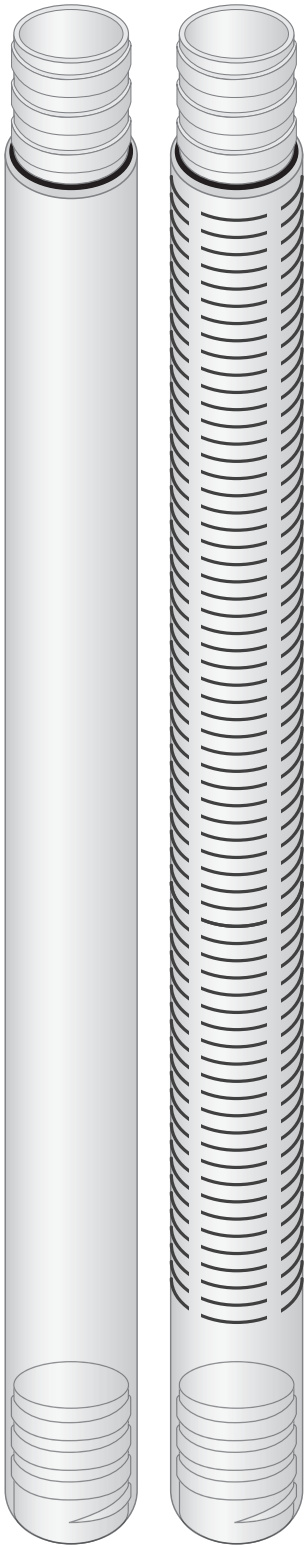
3" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210061	3″ x 10′	210367	3″ x 10′	.010	210642	Plug Male
210062	3″ x 5′	210372	3″ x 5′	.010	210643	Cap Female
210063	3″ x 2.5′	210377	3″ x 2.5′	.010	210644	Point Male
		210368	3″ x 10′	.020	210645	Point Female
		210373	3″ x 5′	.020	210593	Cap Slip
		210378	3″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
Screen and Casing - 4 pieces per box

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4" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS - ADAPTORS

Casing		Screen			Caps-Plugs-Adaptors	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210064	4″ x 10′	210382	4″ x 10′	.010	210646	Plug Male
210065	4″ x 5′	210387	4″ x 5′	.010	210647	Cap Female
210066	4″ x 2.5′	210392	4″ x 2.5′	.010	210648	Point Male
		210383	4″ x 10′	.020	210649	Point Female
		210388	4″ x 5′	.020	210598	Cap Slip
		210393	4″ x 2.5′	.020	210686	Adaptor, Male x MIP*
					210687	Adaptor, Female x MIP*

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
***MIP = Male Iron Pipe thread**
Screen and Casing - 2 pieces per box

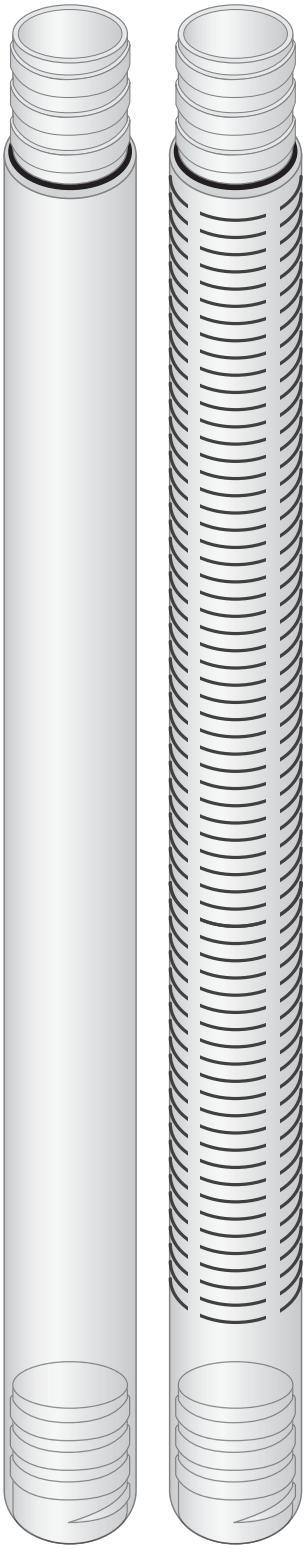
5" SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210067	5″ x 10′	210397	5″ x 10′	.010	210650	Plug Male
210068	5″ x 5′	210402	5″ x 5′	.010	210651	Cap Female
210069	5″ x 2.5′	210407	5″ x 2.5′	.010	210601	Cap Slip
		210398	5″ x 10′	.020		
		210403	5″ x 5′	.020		
		210408	5″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.125″
Other slot sizes available
Screen and Casing - 1 piece per box

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6” SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210070	6″ x 10′	210411	6″ x 10′	.010	210652	Plug Male
210071	6″ x 5′	210415	6″ x 5′	.010	210653	Cap Female
210072	6″ x 2.5′	210419	6″ x 2.5′	.010	210604	Cap Slip
		210412	6″ x 10′	.020		
		210416	6″ x 5′	.020		
		210420	6″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available
Screen and Casing - 1 piece per box

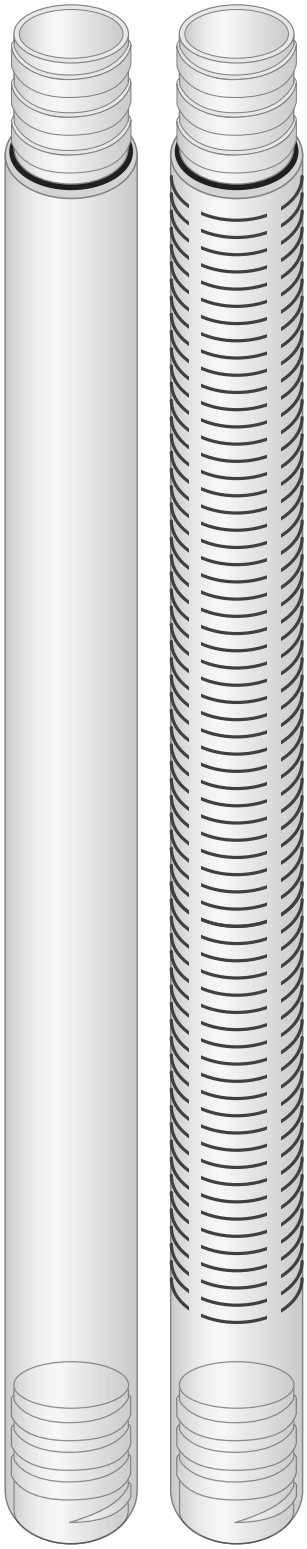
8” SCHEDULE - 80 PVC
CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210073	8″ x 10′	210423	8″ x 10′	.010	210654	Plug Male
210074	8″ x 5′	210427	8″ x 5′	.010	210655	Cap Female
210075	8″ x 2.5′	210431	8″ x 2.5′	.010	210607	Cap Slip
		210424	8″ x 10′	.020		
		210428	8″ x 5′	.020		
		210432	8″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available
Screen and Casing - 1 piece per box

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10” SCHEDULE - 80 PVC CASING - SCREEN - CAPS - PLUGS

Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210076	10″ x 10′	210435	10″ x 10′	.010	210656	Plug Male
210077	10″ x 5′	210439	10″ x 5′	.010	210657	Cap Female
210078	10″ x 2.5′	210443	10″ x 2.5′	.010	210610	Cap Slip
		210436	10″ x 10′	.020		
		210440	10″ x 5′	.020		
		210444	10″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available

12” SCHEDULE - 80 PVC CASING - SCREEN - CAPS - PLUGS

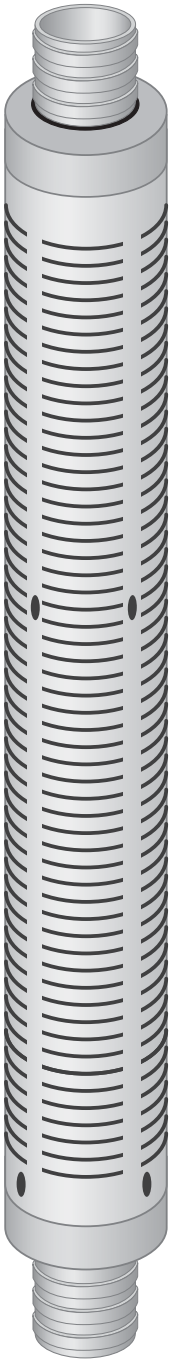
Casing		Screen			Caps - Plugs	
Part No.	Description	Part No.	Description	Slot Size	Part No.	Description
210079	12″ x 10′	210447	12″ x 10′	.010	210658	Plug Male
210080	12″ x 5′	210451	12″ x 5′	.010	210659	Cap Female
210081	12″ x 2.5′	210455	12″ x 2.5′	.010	210613	Cap Slip
		210448	12″ x 10′	.020		
		210452	12″ x 5′	.020		
		210456	12″ x 2.5′	.020		

NOTE: Screen and Casing is flush jointed - 2 TPI
Screen slot spacing 0.250″
Other slot sizes available

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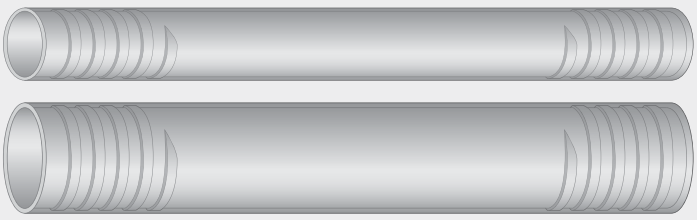
REFLEX EXHIBIT 1017 - 263/280

U-PACK®
WELL SCREENS - SCHEDULE 40



Screen

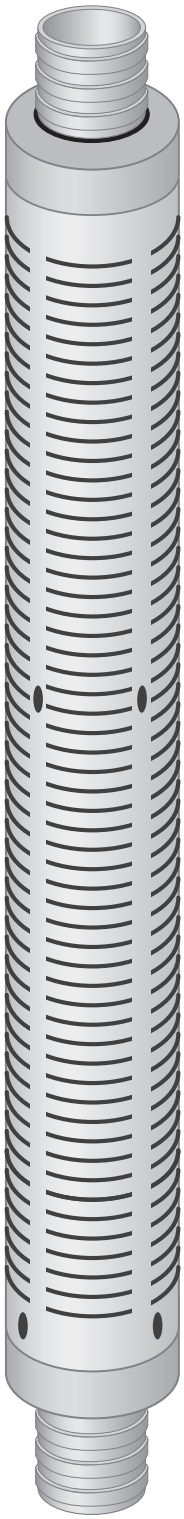
- U-Pack® Well Screens offer an economical solution for installing wells where a normal sand pack is not feasible. Typical applications include horizontal and angled wells, artesian wells, rock wells, jetted wells, open excavations, silty and fine grained soils, heaving sands, industrial filtration, and the relining of deteriorated wells.
- U-Pack® Well Screens consist of an outer PVC well screen and a centralized inner PVC well screen
- U-Pack® Well Screens are shipped fully assembled and ready to pack. Since they are shipped empty, freight costs are reduced and ease of handling is increased. These units are filled on site with a clean filter media before, during, or after the well is drilled. A different filter media may be used for each hole depending on the well requirements.
- All materials are clean, ink free, NSF approved, and no glues or solvents are used in the manufacture or assembly of these units.
- U-Pack® Well Screens are available from 1/2″ to 6″ diameters in a variety of lengths, slot sizes, and slot configurations. Standard threads conform to ASTM F-480. Standard slot spacings are 1/8″ and 1/4″. While .010 and .020 are the most common slot sizes, other slot sizes are available.
- Flush Thread U-Pack® Well Screens are compatible with our PVC flush thread casings. Units can be ordered with flush thread caps or female flush thread points for bottom.



Double Female Flush Thread Coupling

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U-PACK®
WELL SCREENS - SCHEDULE 40

Part No.	Nominal Size	Total Length	Slot Size	Outer Pipe		Inner Pipe	
				OD	ID	OD	ID
210475	3″ x 2″	10′	.010	3.500″	3.042″	2.375″	2.049″
210476	3″ x 2″	5′	.010	3.500″	3.042″	2.375″	2.049″
210477	5″ x 4″ *	10′	.010	5.563″	5.107″	4.500″	3.998″
210478	5″ x 4″ *	5′	.010	5.563″	5.107″	4.500″	3.998″

NOTE: * Will fit inside 6 1/4″ Hollow Stem Augers, 5″ Outer Screen utilizes SDR26

DOUBLE FEMALE
FLUSH THREAD COUPING

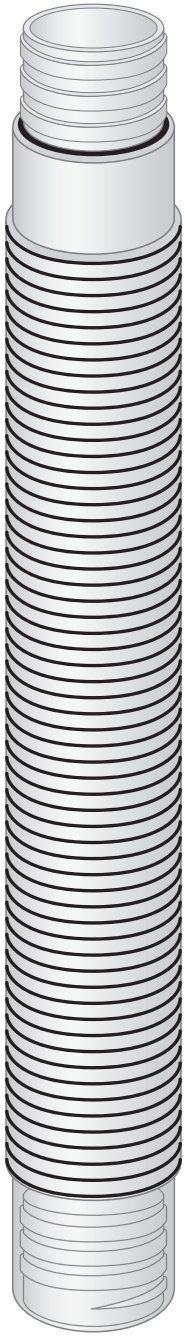
Part No.	Description
210479	2″
210480	4″

NOTE: If more than one unit is to be installed per well, order Double Female Flush Thread Couplings to attach one unit to the next.

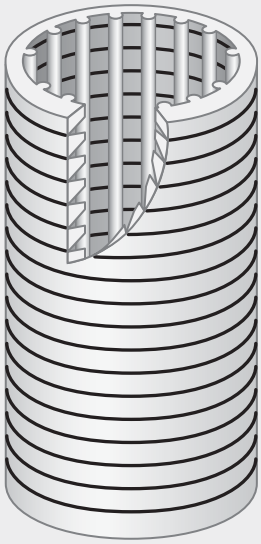
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REFLEX EXHIBIT 1017 - 265/280

PVC VEE-WIRE® SCREENS

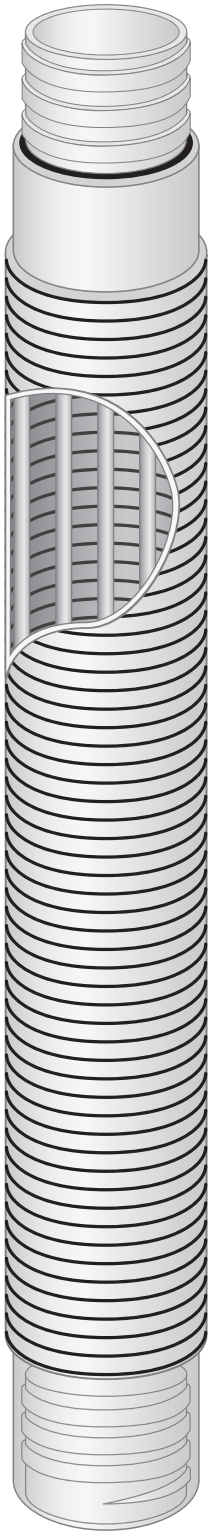


- Vee-Wire® PVC screens are the only continuous slot wire-wrapped non-metallic screen available without a restricting pipe base.
- Vee-Wire® PVC screens are sonic welded and present higher open area for a given slot size than any other non-metallic screen.
- Vee-Wire® PVC screens resist corrosion from salts and gases commonly found in salt or fresh water and may be treated repeatedly with hydrochloric acid.
- Vee-Wire® PVC screens range in size from 1.25 to 8 inches. Slot sizes range from .005 and up.
- Vee-Wire® PVC screens are cleaned and packaged in an individual protective wrapper.
- Vee-Wire® PVC screens are supplied with ASTM F-480 flush threads or plain ends for attaching to standard PVC fittings.



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REFLEX EXHIBIT 1017 - 266/280



2” & 4” PVC VEE-WIRE® SCREEN SCHEDULE - 40 FITTINGS

Part No.	Description	Slot Size	OD	ID
210459	2″ x 5′	.010	2.60″	2.00″
210461	2″ x 10′	.010	2.60″	2.00″
210460	2″ x 5′	.020	2.60″	2.00″
210462	2″ x 10′	.020	2.60″	2.00″
210463	4″ x 5′	.010	4.62″	4.00″
210465	4″ x 10′	.010	4.62″	4.00″
210464	4″ x 5′	.020	4.62″	4.00″
210466	4″ x 10′	.020	4.62″	4.00″

NOTE: Other lengths and slot sizes available. All threads ASTM 2 TPI.

6” & 8” PVC VEE-WIRE® SCREEN SCHEDULE - 40 FITTINGS

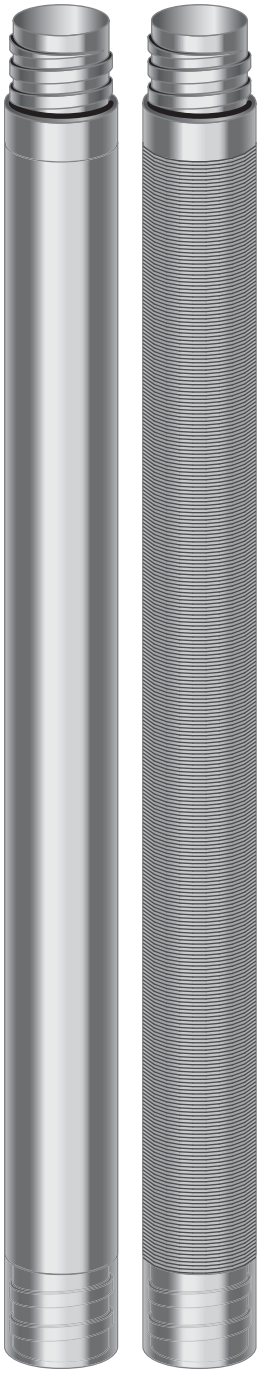
Part No.	Description	Slot Size	OD	ID
210467	6″ x 5′	.010	6.61″	5.75″
210469	6″ x 10′	.010	6.61″	5.75″
210468	6″ x 5′	.020	6.61″	5.75″
210470	6″ x 10′	.020	6.61″	5.75″
210471	8″ x 5′	.010	8.62″	7.50″
210473	8″ x 10′	.010	8.62″	7.50″
210472	8″ x 5′	.020	8.62″	7.50″
210474	8″ x 10′	.020	8.62″	7.50″

NOTE: Other lengths and slot sizes available. All threads ASTM 2 TPI.

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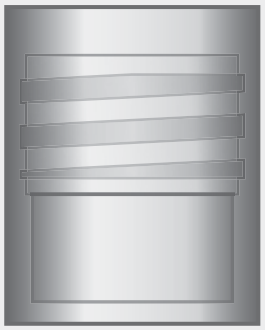
REFLEX EXHIBIT 1017 - 267/280

STAINLESS STEEL
SCREEN - CASING - CAPS - PLUGS

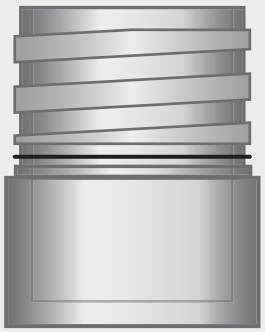


Casing Screen

- Continuous wrapped V-shaped wire produces a clog-free design with maximum open area.
- Screen and casing is manufactured from type 304 or type 316 stainless steel for maximum corrosion resistance.
- All threads comply with ASTM F-480 standards.
- All screen and casing is equipped with Viton "O" rings.
- All stainless steel screen and casing is cleaned and packaged in an individual protective wrapper.
- Flush thread stainless screen available from 1 to 12 inches.
- Slot sizes from .005 and up.
- Stainless steel casing is Schedule 5 mid-body with Schedule 40 ends. Mid-body also available in Schedule 10, 20 and 40.



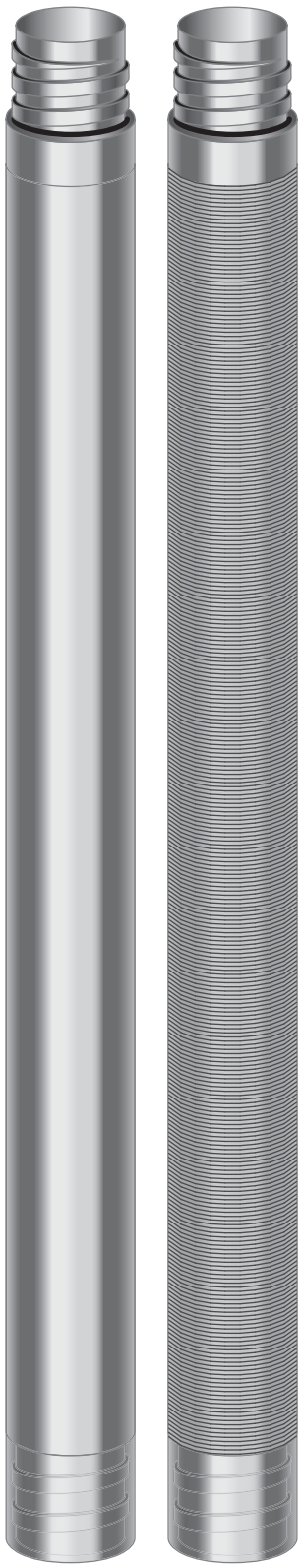
Female Cap



Male Plug

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2” STAINLESS STEEL - TYPE 304 SCREEN

Part No.	Description	Slot Size	OD	ID
212024	2″ x 10′ Male x Female ASTM	.010	2.4″	1.9″
212025	2″ x 10′ Female ASTM x Plate	.010	2.4″	1.9″
212131	2″ x 10′ Male ASTM x Plate	.010	2.4″	1.9″
212125	2″ x 5′ Male x Female ASTM	.010	2.4″	1.9″
212126	2″ x 5′ Female ASTM x Plate	.010	2.4″	1.9″
212026	2″ x 10′ Male x Female ASTM	.020	2.4″	1.9″
212127	2″ x 5′ Male x Female ASTM	.020	2.4″	1.9″

NOTE: Other lengths and slot sizes available.
All threads ASTM 2 TPI.
Also available in type 316SS.

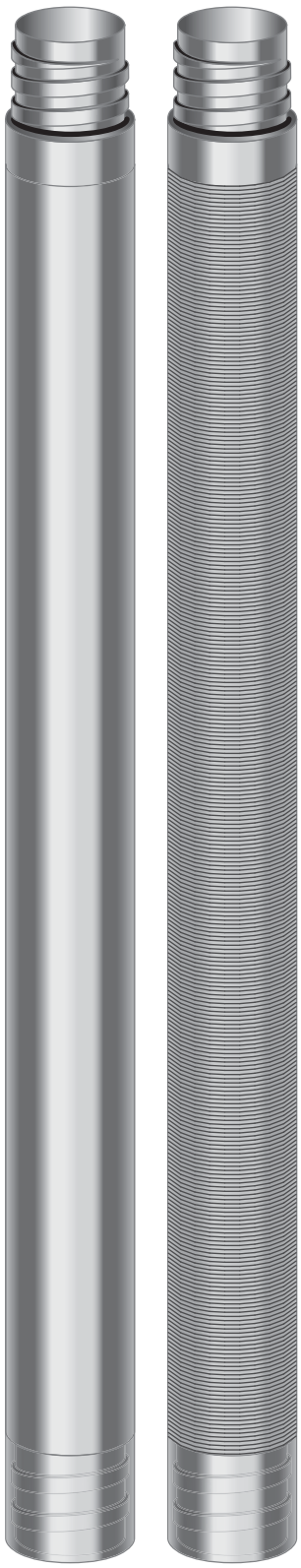
2” STAINLESS STEEL - TYPE 304 CASING - CAPS - PLUGS

Casing - Schedule 5		Caps-Plugs	
Part No.	Description	Part No.	Description
212307	2″ x 10′ Male x Female ASTM	212405	Plug Male
212308	2″ x 5′ Male x Female ASTM	212406	Cap Female
212309	2″ x 2.5′ Male x Female ASTM		

NOTE: Other lengths available.
All threads ASTM 2 TPI.
Also available in type 316SS.

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4” STAINLESS STEEL - TYPE 304 SCREEN

Part No.	Description	Slot Size	OD	ID
212044	4″ x 10′ Male x Female ASTM	.010	4.5″	3.9″
212045	4″ x 10′ Female ASTM x Plate	.010	4.5″	3.9″
212145	4″ x 5′ Male x Female ASTM	.010	4.5″	3.9″
212046	4″ x 10′ Male x Female ASTM	.020	4.5″	3.9″
212047	4″ x 10′ Female ASTM x Plate	.020	4.5″	3.9″
212147	4″ x 5′ Male x Female ASTM	.020	4.5″	3.9″

NOTE: Other lengths and slot sizes available.
All threads ASTM 2 TPI.
Also available in type 316SS.

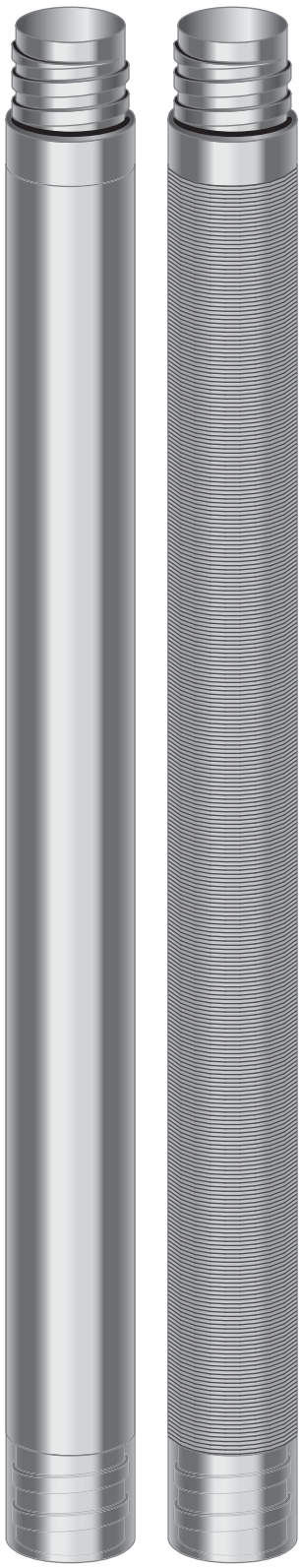
4” STAINLESS STEEL - TYPE 304 CASING - CAPS - PLUGS

Casing - Schedule 5		Caps-Plugs	
Part No.	Description	Part No.	Description
212313	4″ x 10′ Male x Female ASTM	212409	Plug Male
212314	4″ x 5′ Male x Female ASTM	212410	Cap Female
212315	4″ x 2.5′ Male x Female ASTM		

NOTE: Other lengths available.
All threads ASTM 2 TPI.
Also available in type 316SS.

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6” STAINLESS STEEL - TYPE 304 SCREEN

Part No.	Description	Slot Size	OD	ID
212064	6″ x 10′ Male x Female ASTM	.010	6.5″	6.0″
212065	6″ x 10′ Female ASTM x Plate	.010	6.5″	6.0″
212165	6″ x 5′ Male x Female ASTM	.010	6.5″	6.0″
212066	6″ x 10′ Male x Female ASTM	.020	6.5″	6.0″
212067	6″ x 10′ Female ASTM x Plate	.020	6.5″	6.0″
212167	6″ x 5′ Male x Female ASTM	.020	6.5″	6.0″

NOTE: Other lengths and slot sizes available.
All threads ASTM 2 TPI.
Also available in type 316SS.

6” STAINLESS STEEL - TYPE 304 CASING - CAPS - PLUGS

Casing - Schedule 5		Caps-Plugs	
Part No.	Description	Part No.	Description
212319	6″ x 10′ Male x Female ASTM	212413	Plug Male
212320	6″ x 5′ Male x Female ASTM	212414	Cap Female
212321	6″ X 2.5′ Male x Female ASTM		

NOTE: Other lengths available.
All threads ASTM 2 TPI.
Also available in type 316SS.

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FILTRATION SAND

Part No.	Description	Bags / Pallet
214000	Filtration Sand, #1, 50 pound bag	56
214001	Filtration Sand, #0, 50 pound bag	56
214002	Filtration Sand, #00N, 50 pound bag	56

BENTONITE GROUT AND SEALANTS

Part No.	Description	Units / Pallet
214012	Cetco Tablets, 3/8″, 50 pound pail	36
214033	Cetco Coated Tablets, 3/8″, 50 pound pail	36
214017	Cetco Crumbles #8, 50 pound bag	48
214018	Pure Gold Grout, 30% solids, 50 pound bag	48
214020	Pure Gold Medium Chips, 50 pound bag	48
214021	Pure Gold Gel, 50 pound bag	48



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WELL HEAD PROTECTION - ABOVE GROUND



Part No.	Description	Size
214200	Protective cover, steel	4″ sq. x 5′
214201	Protective cover, steel	4″ sq. x 8′
214202	Protective cover, steel	6″ sq. x 5′
214203	Protective cover, steel	6″ sq. x 8′
214204	Protective cover, steel	8″ sq. x 5′
214042	Protective cover, aluminum	4″ sq. x 7′
214043	Protective cover, aluminum	6″ sq. x 7′
214199	Bumper post	3.5″ round x 6′

NOTE: Square Steel Well Covers have Heavy Duty Stainless Steel Hinges.
Five foot Square Steel Well Covers are powder coated black.

MANHOLES



Part No.	Description	Size
214071	Manhole, with galvanized skirt	7″ x 10″
214208	Manhole, with galvanized skirt	8″ x 12″
214209	Manhole, with galvanized skirt	12″ x 12″
214073	Manhole, with galvanized skirt	18″ x 18″
214041	Vault, locking / watertight	24″ x 24″ x 24″
214070	Vault, watertight only	24″ x 24″ x 24″

NOTE: Other sizes and types available.

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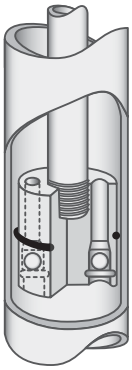
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ALUMINUM LOCKING CAP



Part No.	Description	Size
214221	Locking cap, Royer, aluminum	2″ PS
214222	Locking cap, Royer, aluminum	4″ PS
214224	Locking cap, Royer, aluminum	6″ PS
214225	Locking cap, Royer, aluminum	8″ PS
214226	Locking cap, Royer, aluminum	10″ PS
214227	Locking cap, Royer, aluminum	12″ PS

SURGE BLOCKS



Part No.	Description	FIP Connection	Fits Size
210901	Surge block, PVC	.75″	2″ S-40 PVC
210902	Surge block, PVC	.75″	2″ S-80 PVC
210903	Surge block, PVC	1″	4″ S-40 PVC
210904	Surge block, PVC	1.25	4″ S-80 PVC
210905	Surge block, PVC	1.25″	6″ S-40 PVC

NOTE: FIP = Female Iron Pipe thread.

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MASTER PADLOCKS

Part No.	Description
214228	Padlock, solid brass body, 130KA, key #1B019
214229	Padlock, solid brass body, 130KA, key #1B008
214232	Padlock, solid brass body, 140KA, key #1G014
214233	Padlock, solid brass body, 140KA, key #1G008
214236	Padlock, brass, laminated, 2KA, key #2464
214237	Padlock, brass, laminated, 2KA, key #2532
214240	Padlock, steel, laminated, 3KA, key #3072
214244	Padlock, steel, laminated, 3KA, key #3247
214245	Padlock, steel, laminated, 3KA, key #3374
212252	Padlock, brass, laminated, 4KA, key #3374
212258	Padlock, brass, laminated, 4KALH, key #3374, 2″ shackle
214238	Padlock, brass, laminated, 2KA, key #X2600

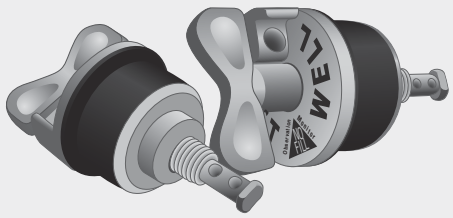


NOTE: All locks manufactured by Master Lock Company.
Other key numbers available upon special request.

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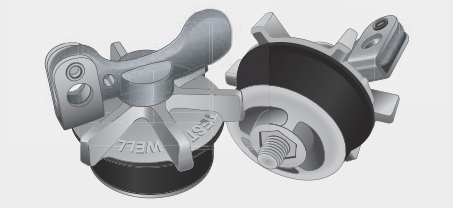
LOCKING PLUG



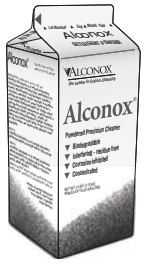
Part No.	Description	Fits Size
214127	Locking Plug	1″ Sch 40/80
214111	Locking Plug	2″ Sch 40
214114	Locking Plug	2″ Sch 80
214117	Locking Plug	4″ Sch 40
214125	Locking Plug	4″ Sch 80
214126	Locking Plug	6″ Sch 40/80

NOTE: Sizes up to 8″ available

MORRISON LOCKING PLUG



Part No.	Description	Fits Size
214048	Morrison Locking Plug	2″ Sch 40
214049	Morrison Locking Plug	4″ Sch 40
214216	Morrison Locking Plug	6″ Sch 40



POWDERED CLEANER WELL MATERIALS

Part No.	Description	Size
34420	Alconox Precision Cleaner	4 lb. carton

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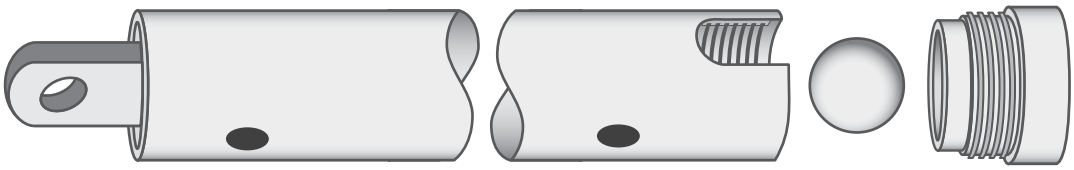
BAILERS - DISPOSABLE - HDPE

Part No.	Description	Size
210851	Bailer, HDPE, disposable	.75 x 36″
210852	Bailer, HDPE, disposable	1.5 x 36″



BAILERS - REGULAR - PVC

Part No.	Description	Size
210853	Bailer, PVC, white, regular	1.66″ x 36″
210854	Bailer, PVC, white, regular	1.66″ x 60″
210857	Bailer, PVC, white, regular	3.5″ x 36″

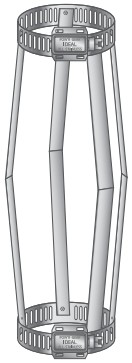


NOTE: Other types and sizes available.

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STAINLESS STEEL CENTRALIZERS



Part No.	Description	Size	Adjusts To
211001	Centralizer, stainless steel	1″	12″ hole
211004	Centralizer, stainless stell	2″	12″ hole
211006	Centralizer, stainless stell	4″	12″ hole
211008	Centralizer, stainless stell	6″	20″ hole

NOTE: Other sizes available.

INTERNAL PVC PIPE CUTTER

Part No.	Description
212276	I.D. Cutter, PVC, S-40, 2″
212277	Blade, replacement, 2″ I.D. cutter
212278	I.D. Cutter, PVC, S-40, 4″
212279	I.D. Cutter, PVC, S-80, 4″
212281	I.D. Cutter, PVC, S-40, 6″
212280	Blade, replacement, 4″ and 6″ I.D. cutter



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POLYESTER FILTER SOCK



Part No.	Description	Length
212363	1″ Filter sock	100′ Roll
212364	2″ Filter sock	100′ Roll
212365	4″ Filter sock	100′ Roll
212366	6″ Filter sock	100′ Roll
212367	8″ Filter sock	100′ Roll

PURGE PUMPS

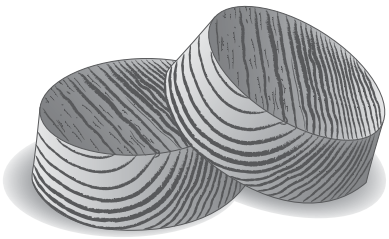
Part No.	Description
214066	Pump Purge, Mini, 12 volt, 50′ Lead
214067	Pump Purge, Super, 12 volt, 70′ Lead
214068	Polyethylene Tubing, .375″ x 100′
214108	Pump Purge, Mega, 12 volt, 90′ Lead



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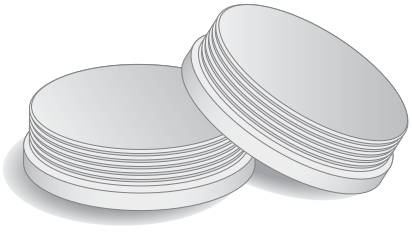
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HOLLOW-STEM AUGER KNOCK-OUT PLUGS - WOOD



Part No.	Description
212348	2.25″ Knock-out Plug
212368	2.75″ Knock-out Plug
212350	3.25″ Knock-out Plug
212351	3.75″ Knock-out Plug
212352	4.25″ Knock-out Plug
212353	6.25″ Knock-out Plug
212354	8.25″ Knock-out Plug
212355	10.25″ Knock-out Plug

HOLLOW-STEM AUGER KNOCK-OUT PLUGS - HDPE



Part No.	Description
212349	2.25″ Knock-out Plug
212369	2.75″ Knock-out Plug
212356	3.25″ Knock-out Plug
212357	3.75″ Knock-out Plug
212358	4.25″ Knock-out Plug
212359	6.25″ Knock-out Plug
212360	8.25″ Knock-out Plug
212361	10.25″ Knock-out Plug

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