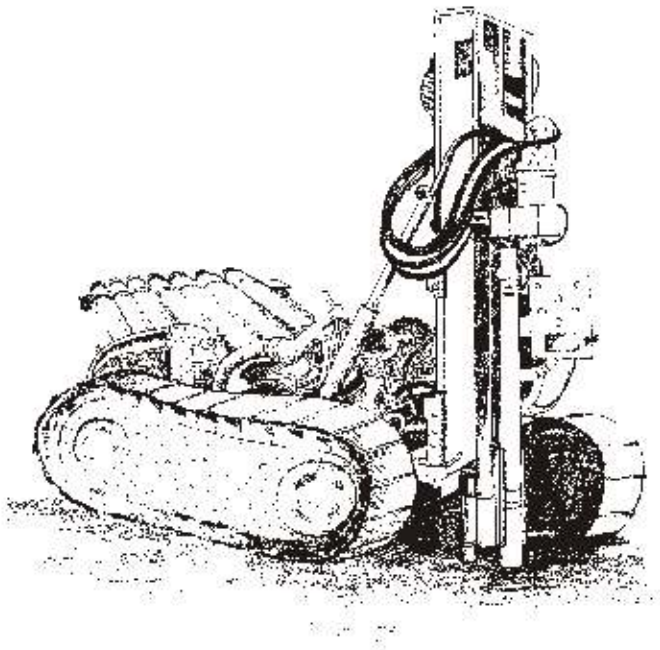


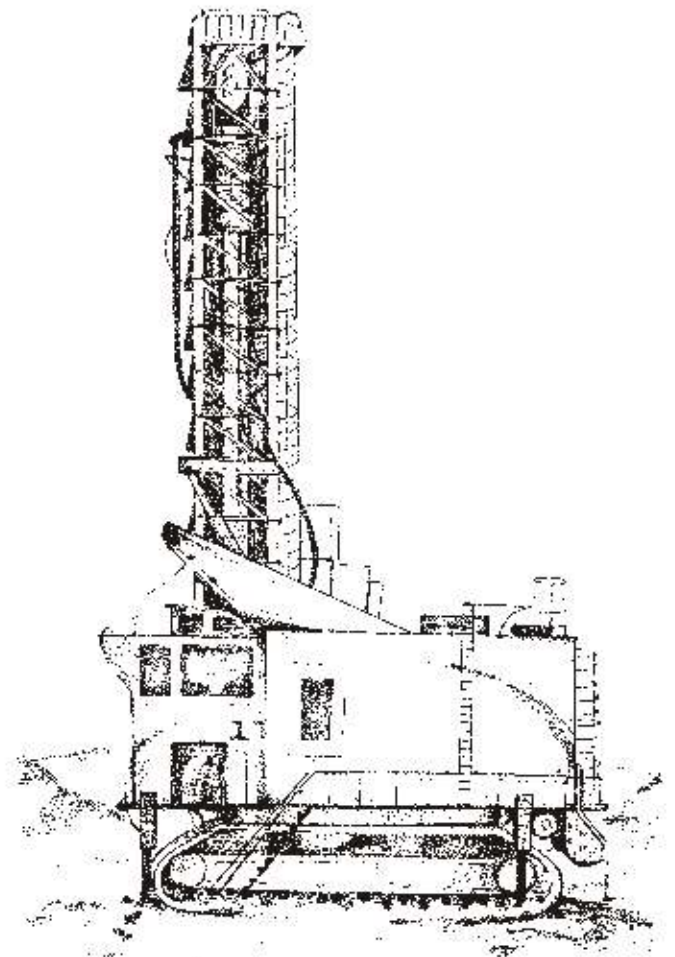
A stylized illustration in a monochromatic, line-art style. On the right side, a truck-mounted drilling rig is shown. The rig consists of a truck chassis with multiple wheels and a tall, lattice-structured derrick. A long, vertical pipe or drill string extends from the rig down into a series of horizontal layers representing geological strata. The background features a large, dark gear shape on the left and a light, semi-circular area at the top, suggesting a sky or a wellhead. The overall composition is clean and industrial.

Technology that works for you.

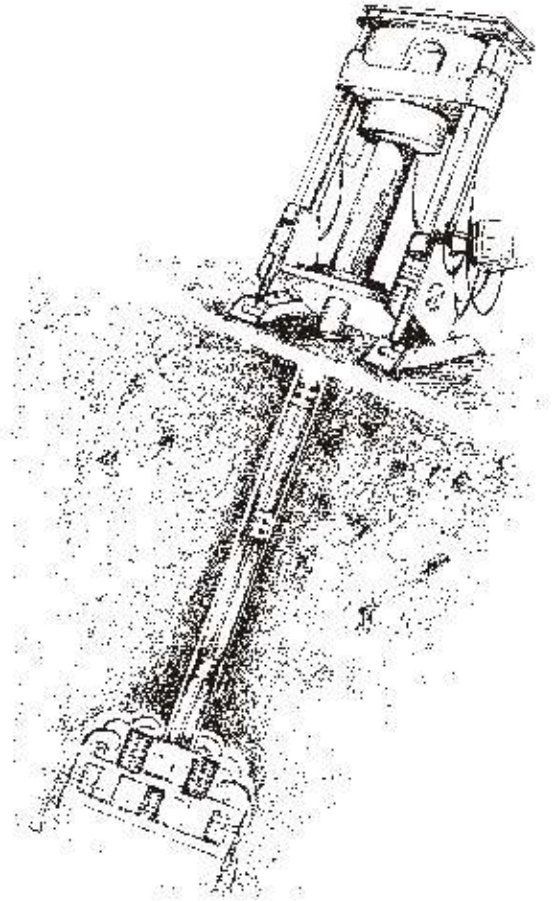
## WATER WELL & MINERAL EXPLORATION



Drilling accessories designed for use in Water Well and Mineral Exploration are illustrated in this brochure and are manufactured to the highest international standards. Vulcan Industrial Engineering Co. Ltd. is an ISO 9001 company manufacturing Drilling accessories for last three decades. Vulcan manufactures a complete range of Drilling Accessories for Open Pit Mines such as Drill Pipe, Drill Collars, Rotary Kellys, Stabilizers, Deck Bushings and Rotary Subs. The concept of open pit rotary blast-hole drilling has been adopted by numerous underground operations. Vulcan offers specially designed drill pipes in shorter length. The design takes into consideration important aspects such as torque requirement and weight factor.



## RAISE BORING



Rotary drilling method of boring ventilations shafts, manways and other mine operations is an important development in the safety and economy of underground operations. Vulcan is associated in this critical operation by supplying a host of drilling accessories to meet the requirement of the mine.



## CONTENTS

### Page No.

TOOL JOINTS	4
DRILL PIPES	5
EU/IU DRILL PIPES	6
RAISE BORING DRILL PIPE	7
DRILL COLLARS	8
ROTARY KELLYS	9
STABILIZERS	10
ROTARY DECK BUSHING	11
ROTARY SUBS	11

# VULCAN

## TOOL JOINTS

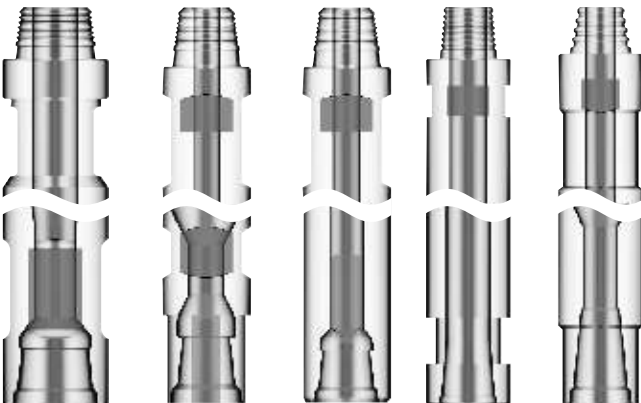
Tool joints are turned, bored prior to heat treatment by quench and temper process to produce a uniform microstructure, high ductility and other mechanical properties in accordance with API specifications. Threads are precision machined on CNC lathes. All threads are 100% inspected for all thread parameters. The threads are phosphatized with zinc for antigalling treatment.

Against specific request threads can be carbo-nitrided to provide exceptional surface hardness over entire tool joints for extended life.



**TOOL JOINTS**

Different Drill pipe requires special wrench slots to suit the wrenching arrangement of the drill. Vulcan can provide any design of wrench for the given drill pipe. Please specify the type of wrench slots required.



**WRENCH SLOT ARRANGEMENT**

Tungsten spray can be provided on the tool joint surface for superior wear protection at an extra cost.



**HARD FACING**

A complete set of Master and Working Gages are maintained and calibrated at regular intervals. Vulcan provides complete traceability for every product.



## THREAD PROTECTORS

Vulcan supplies Thread Protectors made from Styrene Butadiene Rubber to protect threads during transit and storage. On request Vulcan can provide Thread Protectors made from Cast Steel.

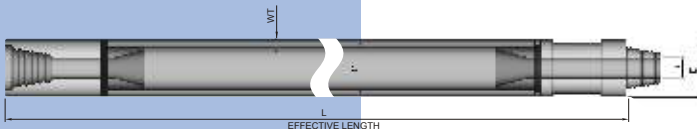


# VULCAN DRILL PIPES

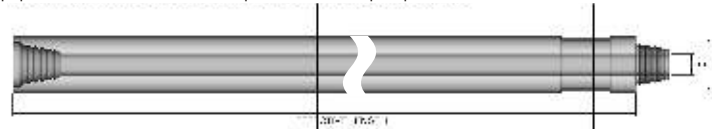
Vulcan manufactures Flush Jointed Drill Pipes made from ASTM-A 106 Gr.B Tubes. Vulcan takes care to ensure concentricity of the Tool Joints and the Pipe are maintained to close tolerance to ensure long life.

Vulcan offers a choice when it comes to improved properties for tubes. Client may specify the Grade of tubes i.e. API Gr. D, E-75, X-95, G-105 or S-135 Depending upon their need.

Vulcan manufactures Integral drill pipes. In very abrasive strata, the first rod used in the drilling gets worn out much more than the second or third drill rod. To overcome the excessive wear on the first rod we can offer integral drill pipe which is made from alloy steel SAE-4145H and of a greater wall thickness. The integral drill pipe is heat treated for improved wear properties.



**FLUSH JOINTED DRILL PIPE**



**INTEGRAL DRILL PIPE**

Fabricated Drill Pipe				Integral Drill Pipe		Recommended Thread Connection	Available in following lengths (Ft)
Tubing		Tool Joint		Tubing			
OD (Inch)	WT (Inch)	OD (Inch)	ID (Inch)	OD (Inch)	ID (Inch)		
D		D1	d	D	d		L
2.875	0.250	2.875	1.000			2.3/8" API Reg.	6', 8', 10', 12', 15'
2.875	0.346	2.875	1.000			2.3/8" API Reg.	6', 8', 10', 12', 15'
3.000	0.157	3.000	1.000			2.3/8" API Reg.	6', 8', 10', 12', 15', 20'
3.000	0.250	3.000	1.000			2.3/8" API Reg.	6', 8', 10', 12', 15', 20'
3.000	0.346	3.000	1.000			2.3/8" API Reg.	6', 8', 10', 12', 15', 20'
3.500	0.157	3.500	1.653			2.3/8" API IF	6', 8', 10', 12', 15', 20'
3.500	0.250	3.500	1.653			2.3/8" API IF	6', 8', 10', 12', 15', 20'
3.500	0.346	3.500	1.653			2.3/8" API IF	6', 8', 10', 12', 15', 20'
4.000	0.250	4.000	1.653			2.7/8" API IF	16', 20'
4.000	0.346	4.000	1.653	4.000	1.500	2.7/8" API IF	16', 20'
4.500	0.250	4.500	1.496			3.1/2" API Reg.	5', 7', 10', 12', 16', 20', 30'
4.500	0.346	4.500	1.496			3.1/2" API Reg.	5', 7', 10', 12', 16', 20', 30'
4.500	0.500	4.500	1.496	4.500	1.750	3.1/2" API Reg.	5', 7', 10', 12', 16', 20', 30'
4.500	0.250	4.500	1.377			3" BECO	5', 7', 10', 12', 16', 20', 30'
4.500	0.346	4.500	1.377			3" BECO	5', 7', 10', 12', 16', 20', 30'
4.500	0.500	4.500	1.377	4.500	1.750	3" BECO	5', 7', 10', 12', 16', 20', 30'
5.000	0.375	5.000	1.496			3.1/2" API Reg.	20', 25', 32.75', 33', 35', 36'
5.000	0.500	5.000	1.496			3.1/2" API Reg.	20', 25', 32.75', 33', 35', 36'
5.000	0.625	5.000	1.496			3.1/2" API Reg.	20', 25', 32.75', 33', 35', 36'
5.000	0.375	5.000	2.000			3.1/2" BECO	20', 25', 32.75', 33', 35', 36'
5.000	0.500	5.000	2.000			3.1/2" BECO	20', 25', 32.75', 33', 35', 36'
5.000	0.625	5.000	2.000	5.000	2.063	3.1/2" BECO	20', 25', 32.75', 33', 35', 36'
				5.500	2.313	4" BECO	20', 25', 32.75', 33', 35', 36'
6.000	0.750	6.000	2.000			4" BECO	20', 25'
6.000	1.000	6.000	2.000			4" BECO	20', 25'
				6.250	2.813	4.1/2" BECO	20', 25'
				6.500	2.813	4.1/2" BECO	20', 25'
7.000	0.750	7.000	3.000			5.1/4" BECO	25', 30'
7.000	1.000	7.000	3.000	7.000	2.813	5.1/4" BECO	25', 30'
7.625	0.750	7.625	3.000			5.1/4" BECO	25', 30'
7.625	1.000	7.625	3.000			5.1/4" BECO	25', 30'
7.625	0.750	7.625	3.000			6" BECO	25', 30'
7.625	1.000	7.625	3.000	7.625	2.813	6" BECO	25', 30'
8.000	0.500	8.000	3.000			5.1/4" BECO	25', 35'
8.000	0.750	8.000	3.000			5.1/4" BECO	25', 35'
8.000	1.000	8.000	3.000			5.1/4" BECO	25', 35'
8.625	0.875	8.625	3.000			6" BECO	25', 35'
8.625	1.000	8.625	3.000	8.625	3.250	6" BECO	25', 35'
9.000	0.750	9.000	3.000			7" BECO	25', 35'
9.000	1.000	9.000	3.000	9.000	3.250	7" BECO	25', 35'
10.000	0.750	10.000	3.000			7" BECO	25', 30', 50', 65'
10.000	1.000	10.000	3.000			7" BECO	25', 30', 50', 65'
10.750	0.750	10.750	3.000			8" BECO	25', 30', 50', 65'
10.750	1.000	10.750	3.000	10.750	4.750	8" BECO	25', 30', 50', 65'

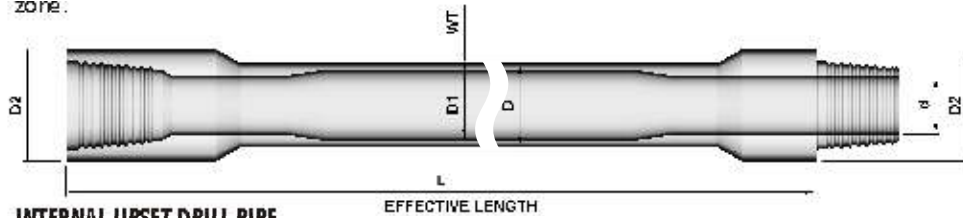
When ordering please specify : 1) Length of Drill Pipe. 2) OD off Drill Pipe. 3) Wall Thickness of Drill Pipe. 4) Thread Connections of End Joints. 5) Provide Wrench Slot Detail

# VULCAN

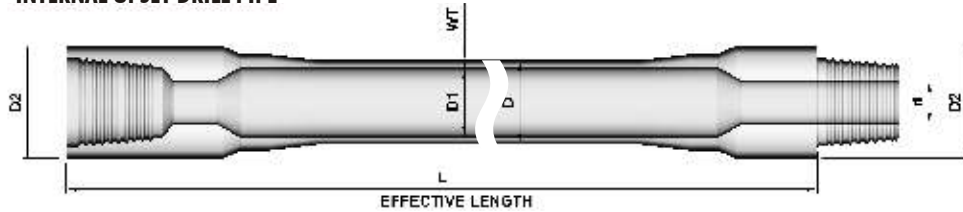
## EU/IU DRILL PIPES

The pipes of the drill tubes are upseted to provide for greater strength, upset maybe external or internal in accordance to API specification. The tool joints are welded to the pipe by friction welding to produce a high integrity solid state weld connection between tool joint & upset end drill pipe. OD or ID weld rams are removed and post weld heat treatment is done of the heat affected

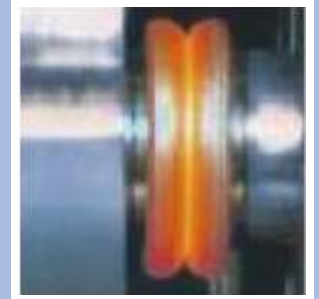
zone.



**INTERNAL UPSET DRILL PIPE**



**EXTERNAL UPSET DRILL PIPE**



Tool Joint Designation	Pipe Size and type of Upset (Inch)	Nominal Weight lb/ft	Steel Grade	Calculated Weight at Plain End lb/ft	Inside Diameter, (Inch)	Wall Thickness (Inch)	Outside Diameter of Pin & Box +1/32 -1/32 in. (Inch)	Inside Diameter of Pin +1/64 -1/32 in. (Inch)
	D				D1	WT	D2	d
<b>INTERNAL-UPSET DRILL PIPE</b>								
NC-40 (4 IF)	4.000	14.00	E75	12.95	3.340	0.330	5.250	2.812
			X95	12.95	3.340	0.330	5.250	2.687
			G105	12.95	3.340	0.330	5.500	2.437
			S135	12.95	3.340	0.330	5.500	2.000
NC-46 (4 IF)	4.500	13.75	E75	12.25	3.958	0.271	6.000	3.375
<b>EXTERNAL-UPSET DRILL PIPE</b>								
NC-26 (2.3/8 IF)	2.375	6.65	E75	6.27	1.815	0.280	3.375	1.750
			X95	6.27	1.815	0.280	3.375	1.750
			G105	6.27	1.815	0.280	3.375	1.750
NC-31 (2.7/8 IF)	2.875	10.40	E75	9.72	2.151	0.362	4.125	2.125
			X95	9.72	2.151	0.362	4.125	2.000
			G105	9.72	2.151	0.362	4.125	2.000
			S135	9.72	2.151	0.362	4.125	1.625
NC-38 (3.1/2 IF)	3.500	9.50	E75	8.81	2.992	0.254	4.750	2.687
NC-38 (3.1/2 IF)	3.500	13.30	E75	12.32	2.764	0.368	4.750	2.687
			X95	12.32	2.764	0.368	5.000	2.562
			G105	12.32	2.764	0.368	5.000	2.437
			S135	12.32	2.764	0.368	5.000	2.125
NC-38 (3.1/2 IF)	3.500	15.50	E75	14.64	2.602	0.449	5.000	2.562
			X95	14.64	2.602	0.449	5.000	2.437
			G105	14.64	2.602	0.449	5.000	2.125
NC-40 (4 FH)		15.50	S135	14.64	2.602	0.449	5.500	2.250
NC-40 (4 IF)	4.000	14.00	E75	12.95	3.340	0.330	6.000	3.250
			X95	12.95	3.340	0.330	6.000	3.250
			G105	12.95	3.340	0.330	6.000	3.250
			S135	12.95	3.340	0.330	6.000	3.000
NC-50 (4 1/2" IF)	4.500	13.75	E75	12.25	3.958	0.271	6.625	3.750
NC-50 (4 1/2" IF)	4.500	16.60	E75	15.00	3.826	0.337	6.625	3.750
			X95	15.00	3.826	0.337	6.625	3.750
			G105	15.00	3.826	0.337	6.625	3.750
			S135	15.00	3.826	0.337	6.625	3.500
NC-50 (4 1/2" IF)	4.500	20.00	E75	18.71	3.640	0.430	6.625	3.625
			X95	18.71	3.640	0.430	6.625	3.500
			G105	18.71	3.640	0.430	6.625	3.500
			S135	18.71	3.640	0.430	6.625	3.000

We supply Upset End Drill Pipe in effective lengths of 20 feet unless otherwise specified.

When ordering please specify : 1) Type of Upset. 2) Length of Drill Pipe. 3) OD off Drill Pipe. 4) Wall Thickness of Drill Pipe. 5) OD of Tool Joints.

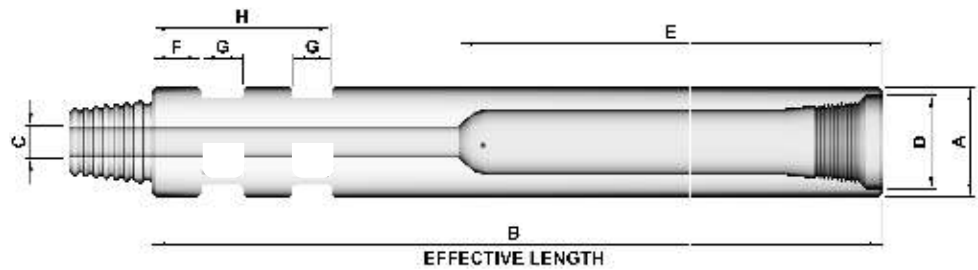


# VULCAN

## RAISE BORING DRILL PIPE

All raise bore drill pipes are designed to meet the specific drilling machine capabilities. The drill pipe is designed to suit the combined torsional compressive / tensile requirement as well as the unit length and wrenching configuration. All raise bore Drill Pipes are integral and optionally even Higher Strength Series integral drill pipes can be supplied. All rotary thread connections are machined on CNC Lathe.

Standard Strength Series of Raise Bore Drill Pipes are manufactured from SAE-4145H grade steel. Higher Strength Series of Raise Bore Drill Pipes are manufactured from SAE-4340 grade steel.



**RAISE BORE DRILL PIPE SELECTION CHART**

Nominal Size (Inch)	Shoulder to Shoulder Length (Inch)	Small Bore Diam. (Inch)	Diam. Of Boreback (Inch)	Length of Boreback (Inch)	Shoulder to First Spanner Flat (Inch)	Width of Spanner Flat (Inch)	Shoulder to End of Flat (Inch)	Dimension Across flat (Inch)	Weight (Kg)	Connections
A	B	C	D	E	F	G	H			
5.750	48.000	2.812	4.109	5.750	1.500	2.500	7.750	4.750	297.62	4. 3/4" DI 22
6.750	48.000	4.000	5.218	22.00	1.500	2.750	8.250	5.625	348.33	5. 3/4" DI 22
8.000	48.000	4.750	6.156	31.500	1.500	2.750	8.250	6.875	374.78	6.3/4 DI 22
10.000	60.000	4.750	7.437	43.312	1.500	2.750	8.250	8.000	760.59	8.1/4 DI 22
11.250	60.000	4.750	7.687	42.500	1.500	3.500	9.750	9.000	1058.21	9.1/4 DI 22
12.875	60.000	5.437	9.000	36.000	1.578	3.937	11.000	10.500	1410.95	10.1/2 DI 22

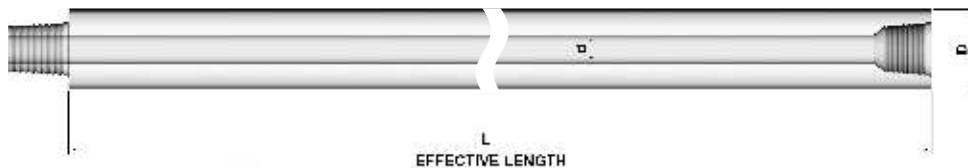
**When ordering please specify :**

1. Size and Connections.
2. Type of Machine to be used.
3. Any other dimensions or features which are required but are not given in selection chart.

# VULCAN

## DRILL COLLARS

Drill Collars are heavy weight integral drill pipe which are used as weight which forces the bit to penetrate the formation being drilled. All drill collars are full length heat treated to obtain the best physical properties. The drill collars are made from SAE 4145 H Grade steel. Drill collars are bored in a way to ensure close tolerance of bore alignment. Threads are cut on CNC Lathes to API Specification.



**STANDARD DRILL COLLARS SELECTION TABLE**

Thread Connection in Drill Collar	Outer Diameter inched Minimum (Inch)	Bore inches Tolerance + 1/16-0 (Inch)	Approximate weight of Drill Collars Lbs/Ft
	D	d	
NC 26-35 (2.3/8 IF)	3.500	1.500	26.7
NC 31-41 (2.7/8 IF)	4.125	2.000	34.7
NC 35-47	4.750	2.000	49.6
NC 38-50 (3.1/2 IF)	5.000	2.250	53.3
NC 44-60	6.000	2.250	82.6
NC 44-60	6.000	2.812	75.9
NC 44-62	6.250	2.250	90.5
NC 46-62 (4 IF)	6.250	2.812	83.8
NC 46-65 (4 IF)	6.500	2.250	99.5
NC 46-65 (4 IF)	6.500	2.812	92.8
NC 46-67 (4 IF)	6.750	2.250	108
NC 50-70 (4.1/2 IF)	7.000	2.250	117
NC 50-70 (4.1/2 IF)	7.000	2.812	111
NC 50-72 (4.1/2 IF)	7.250	2.812	120
NC 56-77	7.250	2.812	140
NC 56-80	8.000	2.812	151
6.5/8 Reg	8.000	2.812	162
NC 61-90	9.000	2.812	196
7.5/8 Reg	9.500	3.000	217
NC 70-97	9.750	3.000	230
NC 70-100	10.000	3.000	243
8.5/8 Reg	11.000	3.000	299

Standard length of 10,15,20,25 and 30 Feet are available or unless otherwise specified.

When ordering please specify :

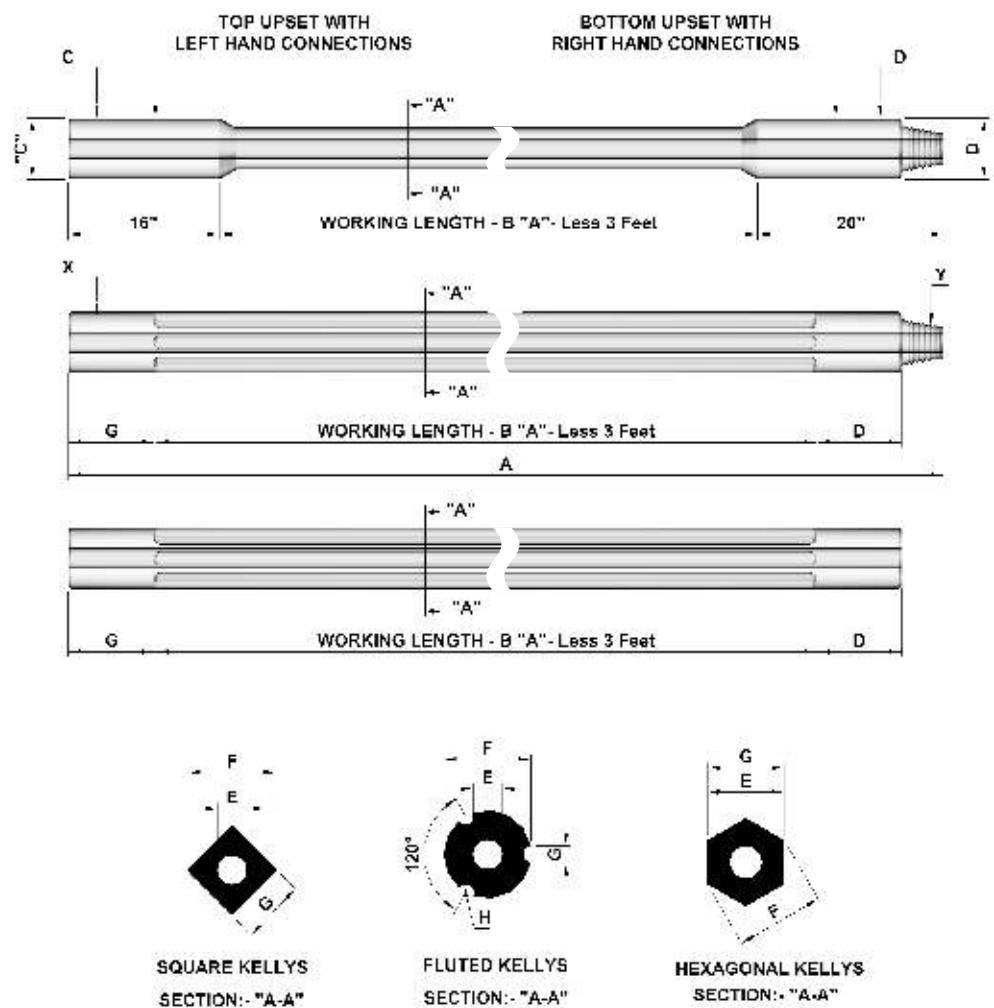
1. Drill Collar OD.
2. Drill Collar Bore.
3. Length of Drill Collar.
4. Type of Thread Connection.

Any other dimensions or features which are required but are not given in selection chart



Kellys are made from SAE 4145H steel. The steel bar is heat treated to obtain best physical properties. The solid heat treated bars are bored to the required specifications. The ends of the Kelly are upset and the mid portion can be maintained to provide square, fluted or hexagonal sections as shown in the figure below. The threads are at on CNC lathes to the required API specification.

The kellys are provided with a hardness range of 285 to 341 BHN and a minimum IZOD impact value of 40 ft/lb are guaranteed one inch below the surface at room temperature.



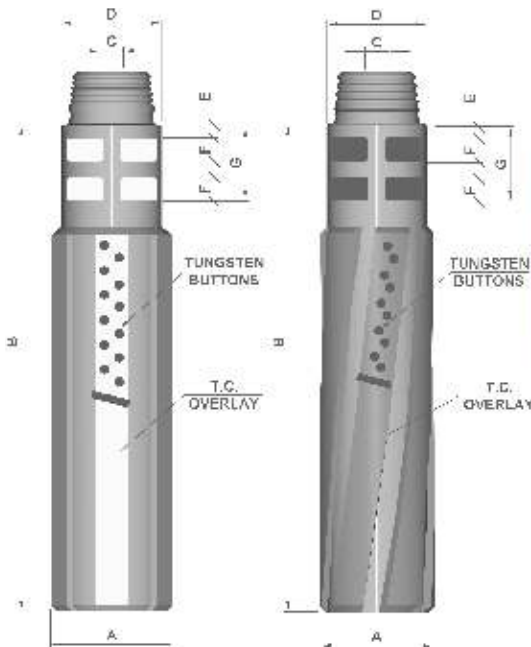
When ordering please specify :

1. Hexagonal, fluted or square.
2. Length A
3. Bore E
4. Size and type of top connection.
5. Size and type of bottom connection.
6. Top upset OD 'C'
7. Bottom upset OD 'D'
8. Dimensions F, G & H as shown in respective cases.

# VULCAN

## STABILIZERS

The integral rib stabilizers straight or spiral designs assures the best solutions for maximum stiffness. Stabilizers are machined from special alloy steels, selected for balance in hardness, strength, toughness and resistance to yield in bending. A choice of wear resistant rib surfaces is available in tungsten carbide buttons or crushed tungsten carbide overlay.

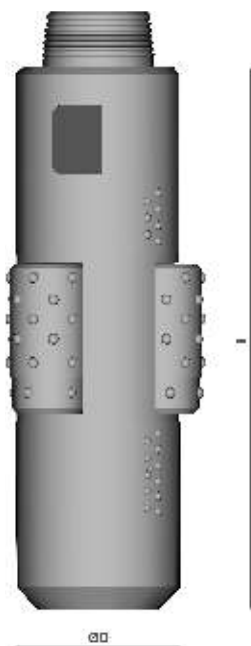


**STRAIGHT RIBBED**

**SPIRAL RIBBED**

SPECIFICATION								
Nominal Hole Size (Inch)	Shoulder to Shoulder Length (Inch)	Bore Dia. (Inch)	Body Dia. (Inch)	Shoulder to First Flat (Inch)	Width of Spanner Flat (Inch)	Shoulder to End of Flat (Inch)	Dimension Across Spanner Flat (Inch)	Approx. Weight (Kg)
A	B	C	D	E	F	G		
6.750	43.312	2.812	5.750	1.000	2.000	7.000	4.500	165
7.875	48.000	2.812	6.750	1.500	2.750	8.468	5.625	202
9.000	48.000	3.000	8.000	1.500	2.750	8.250	6.875	280
9.875	48.000	3.000	8.000	1.500	2.750	8.250	6.875	320
11.000	60.000	3.750	10.000	1.500	2.750	8.250	8.000	485
12.250	60.000	4.750	11.250	1.500	3.500	9.750	9.000	750
13.750	60.000	5.437	12.875	1.578	3.937	11.000	10.500	864
15.000	60.000	5.437	12.875	1.578	3.937	11.000	10.500	1050

Vulcan's Roller Stabilizers are specially designed for blast hole drilling, this provides an increased torsional strength and larger air circulation area. Its pressed-in tungsten carbide compacts, working against deeply carburized precision honed, air cooled bearings assure long life.



**ROLLER-STABILIZER**

BLAST HOLE STABILIZER			
HOLE SIZE (Inch)	S/S LENGTH (Inch)	BODY DIAMETER (Inch)	WT (LBS)
	L		
6.250	26.500	5.125	130
6.750	26.500	5.625	165
7.875	26.500	6.250-7.000	220
9.000	28.500	7.625	290
9.875	30.750	8.625	400
10.625	30.750	8.625-9.250	160
11.000	30.750	9.250-9.625	510
12.250	30.750	10.750	650
13.750	41.000	12.250	1000
15.000	41.000	13.375-14.375	1300

Shoulder to shoulder length varies with different wrenching configurations When ordering, please specify:

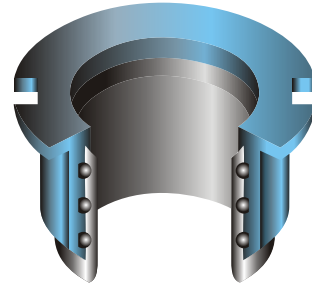
1. hole size
2. Drill make and model
3. Drill pipe O.D
4. Connections and any special requirements

Note:

Other sizes that are not mentioned here can be supplied on request.

## ROTARY DECK BUSHING

Rotary bushings assure you an enhanced drilling production and low maintenance and operational costs on your blast hole drills. Our specially designed two-piece bearing assembly replaces the frictional non rotating bushings which sits in the deck of a blast hole drill. This in turn gives drill operators extended drill steel life, increased penetration rates and lower rig vibration levels resulting in less downtime and overall reduction of drilling costs. Bushings are available in hardened and extended configurations to suit multilevel operations.



## ROTARY SUBS

Vulcan Subs are made from SAE-4145H Grade steel, heat treated to 285 to 320 BHN range to obtain the best physical properties. Threads are cut on CNC lathe machine, and they are phosphetised to prevent galling during initial make up.

**When ordering or requesting quotation, please furnish:**

### Reduced Section Subs:

- 1) Diameter of reduced section
- 2) Length of reduced section
- 3) Overall length
- 4) Size and type of upper & lower thread connection indicating Pin or Box.



**BOX x PIN**



**PIN x PIN**



**BOX x BOX**



**PIN x BOX**

### REDUCED SECTION SUBS

### Straight OD Subs:

- 1) Overall length
- 2) Diameter and bore
- 3) Size and type of upper & lower thread connection indicating Pin or Box



**BOX x BOX**



**BOX x PIN**



**PIN x PIN**

### STRAIGHT OD SUBS

### Kelly Saver Subs:

- 1) Kelly saver type, Stretch or Latch-on
- 2) Casing OD & weight for sizing rubber casing protector.



**BOX x PIN**



**BOX x PIN**

### KELLY SAVER SUBS



**VULCAN**  
**INDUSTRIAL**  
**ENGG. CO. LTD**  
AN ISO 9001 COMPANY

Email: [marketing@viecl.com](mailto:marketing@viecl.com)  
Website: [www.viecl.com](http://www.viecl.com)

**VULCAN**  
**GEARS**  
(A unit of VULCAN INDUSTRIAL ENGG. CO. LTD.)

A-2/440, G.I.D.C,  
Vithal Udyognagar,  
Anand, Gujarat-388 121, India.  
Ph.: +91-2692-236032.  
Fax: +91-2692-238723