

Raise Bore

MICON  **DRILLING**
Drilling Equipment Made in Germany

MICON-Drilling GmbH
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Company Profile

The MICON-Drilling GmbH is a worldwide operating service company, specialized in sales and rental of drilling equipment. Decades of experience, high quality standards and focused customer orientation are our unique selling points.

We are a member of the MICON Group, established in Nienhagen/Germany, in 1994. The privately owned company specializes in design, production, inspection and repair of drill string components, drill bits, sophisticated directional drilling systems and additional equipment. Our main focus lies on the technical service for drilling applications in the mining, oil & gas, tunneling and geothermal industries.

An innovative engineering department ensures continuous optimization of all MICON products. Additionally, we are in close contact with a network of several German universities to foster research and development activities.

The MICON Group manufactures drilling equipment in two independent facilities on state-of-the-art CNC milling, turning and welding machines. Latest technology and implementation of German engineering guarantee the highest degree of efficiency and quality.



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MICON Buildings "Im Nordfeld", Nienhagen/Germany



MICON Buildings "Breite Horst", Nienhagen/Germany

Quality Policy

MICON stands for high quality products Made in Germany. This high quality standard builds the basis for our success and is an integral part of the company policy. This is reflected by long-term and trustful cooperation with our customers.

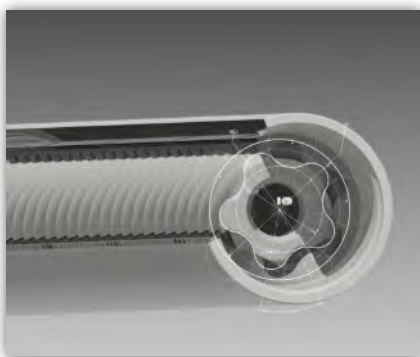
In order to achieve our high quality objectives the MICON Group manufacturing companies have implemented quality management systems certified according to international standards. The actual certification status of the Group companies is as follows:

MICON Downhole-Tools GmbH:
- ISO 9001:2015 - 0019058

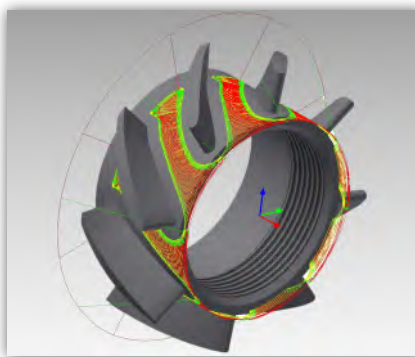
MICON GmbH & Co.KG:
- ISO 9001:2015 - 00007159
- ISO3834-2:2006 (D-ZE-16083-01-00-ISO3834-2019.0013.002)



Our global quality objectives lead to specific targets, which are defined by the top management in cooperation with the quality manager. The fulfilment of these specific quality targets is evaluated at least every 12 months in the management review. Our ambition is product reliability and quality that meets the customer requirements as well as your high quality standards. The MICON product cycle includes different process steps. Rigorous acceptance criteria at every process step ensure a consistent high quality level of each product.



CAD based product development



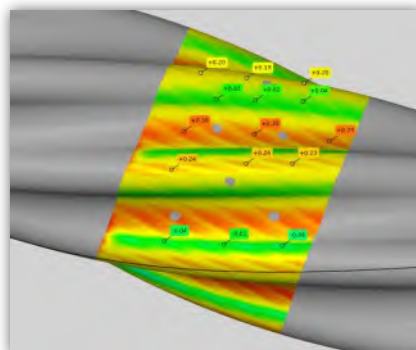
CAD – CAM manufacturing



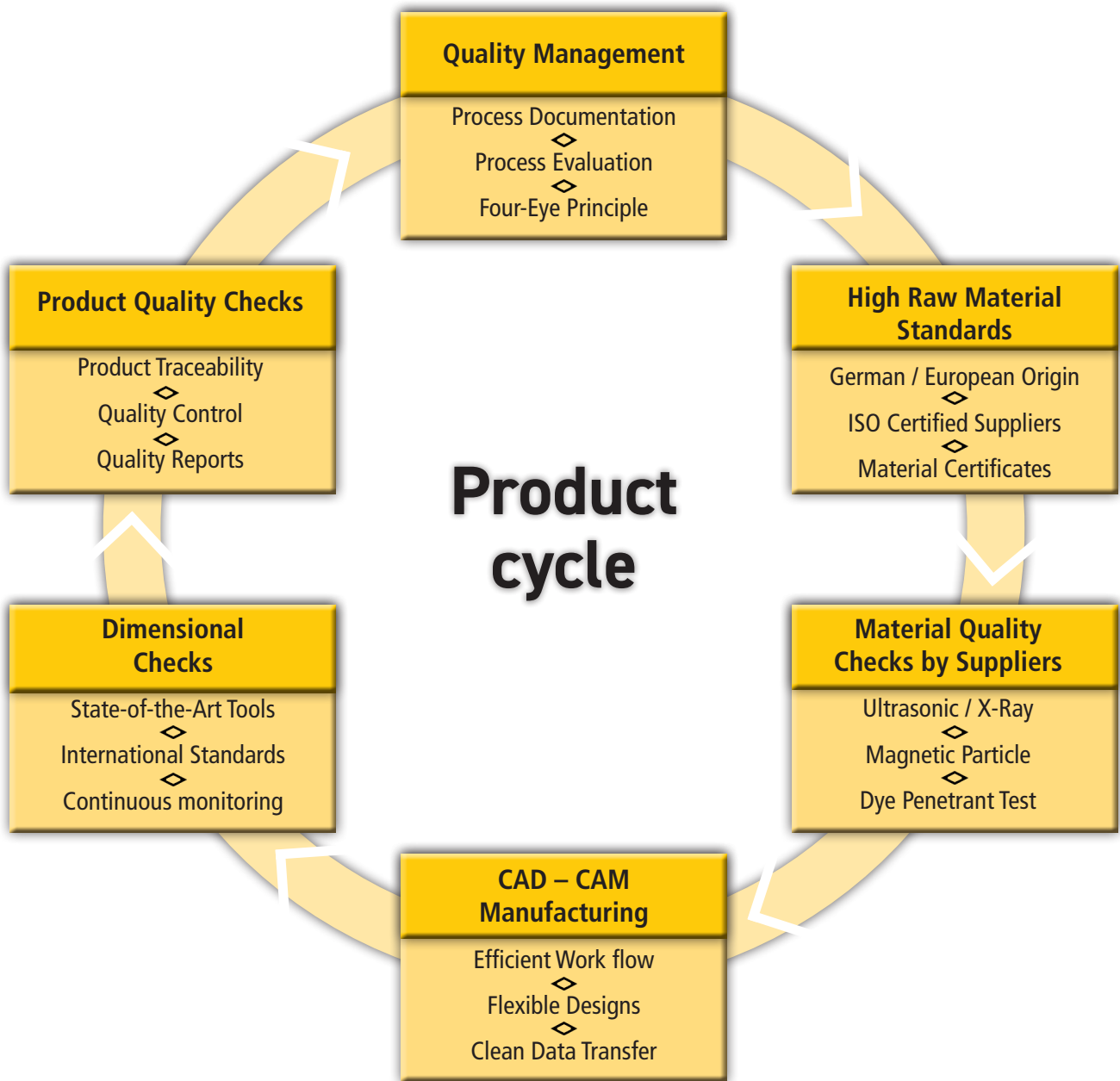
Permanent quality checks



High resolution 3-D scanning



3-D scan evaluation



MICON Raise Bore Equipment

MICON supplies a wide range of standard raise bore equipment. Highly specialized and customized solutions are available on request. We have a production capacity of more than 3000 raise bore rods and stabilizers per year. Our raise bore equipment is in operation worldwide. A track record of more than 300 successful projects and over 100 km of pilot hole drilling stands for itself.



Birth of a 12 7/8" Raise Bore Rod



Raise Bore Rod with DI-22 Thread



Raise Bore Underground Operation

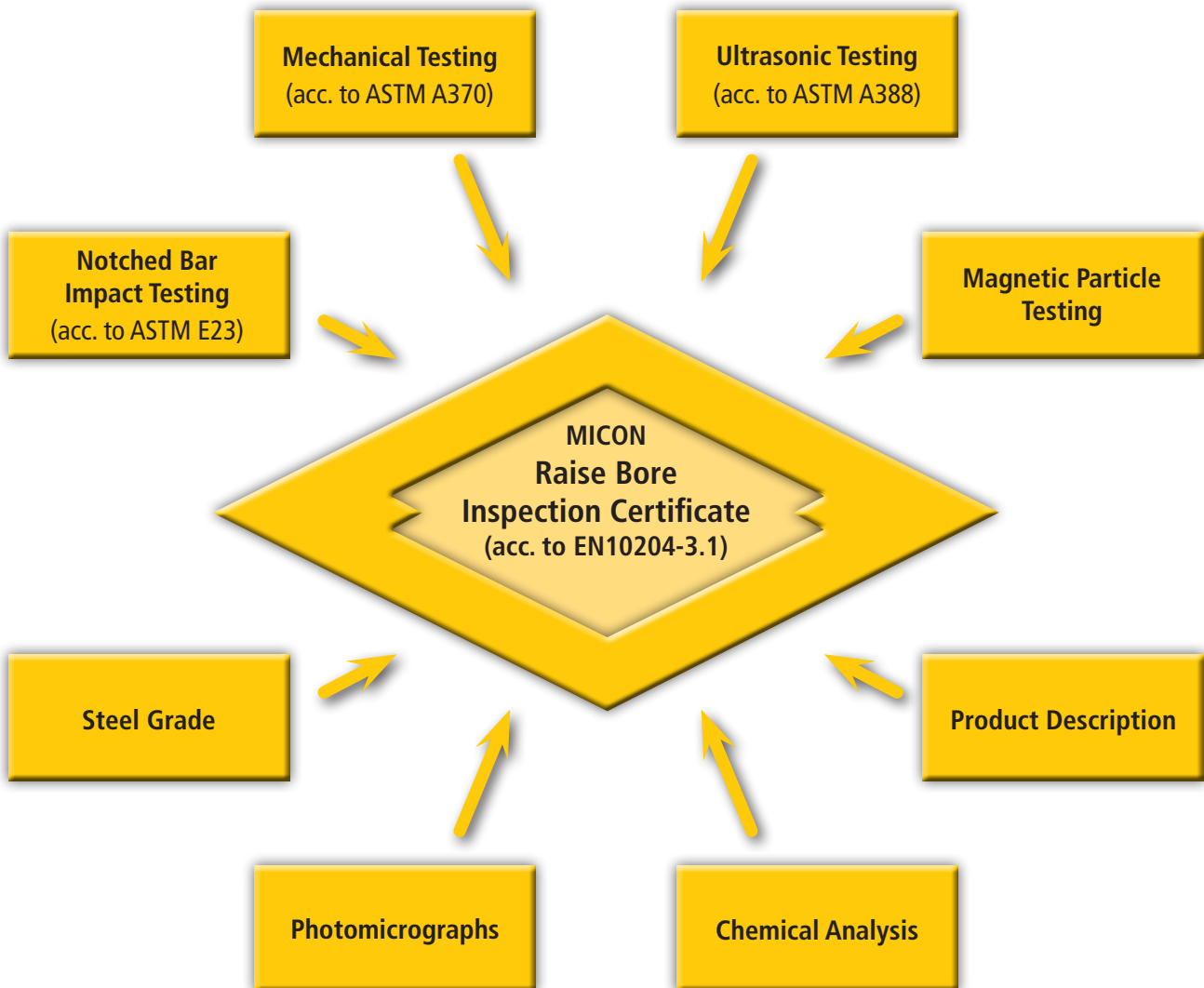


Raise Bore Surface Operation

With decades of experience MICON will find the most efficient solution for your individual project by defining the required capacity and scope of work. Our engineering department calculates the required capacity of the raise bore string and evaluates suitable thread configurations. According to this information the appropriate steel grade is selected. MICON offers several steel grades that are a result of comprehensive research together with independent German universities and German steel mills. Extensive testing in our facilities and in the field ensures highest quality and reliability.

Beside standard equipment MICON also provides customized or specifically designed equipment on request.

The MICON quality control and report procedures are in accordance to the latest API and ISO standards. Each product is traceable by serial number and has its own quality certificate that comprises all important material testing data.



Material Specifications

The utilized alloy steel is specifically adapted for the high demands of raise bore equipment. MICON provides raise bore equipment as Medium Strength, High Strength and Ultra-High Strength Series.

Medium Strength Series			
Material: Alloy Steel, ref. AISI 4330 — available for Raise Bore Rods: 8", 10", 11 ¼", 12 ⅞"			
Property	Symbol	Dimension	Raw Material Diameter 200 mm to 350 mm
Yield Strength	Rp _{0.2}	N/mm ²	≥ 930 (135 ksi)
Tensile Strength	Rm	N/mm ²	≥ 1030 (149 ksi)
Elongation after Fracture (Lo O 4x do)	A4	%	≥ 15
Reduction of Area	Z	%	≥ 45
Notch Impact Strength Charpy V-Notch	A	J	≥ 65
Hardness on Specific Diameter	–	HB	320 - 370
Hardness on Circumferential Surf	–	HB	≥ 340

High Strength Series			
Material: Alloy Steel, ref. AISI 4330 mod — available for Raise Bore Rods: 8", 10", 11 ¼", 12 ⅞"			
Property	Symbol	Dimension	Raw Material Diameter 200 mm to 350 mm
Yield Strength	Rp _{0.2}	N/mm ²	≥ 965 (140 ksi)
Tensile Strength	Rm	N/mm ²	≥ 1035 (150 ksi)
Elongation after Fracture (Lo O 4x do)	A4	%	≥ 15
Reduction of Area	Z	%	≥ 45
Notch Impact Strength Charpy V-Notch	A	J	≥ 65
Hardness on Specific Diameter	–	HB	320 - 380
Hardness on Circumferential Surf	–	HB	≥ 340

Ultra-High Strength Series			
Material: Alloy Steel, ref. AISI 4330 V mod — available for Raise Bore Rods: 10", 11 ¼", 12 ⅞", 15"			
Property	Symbol	Dimension	Raw Material Diameter 200 mm to 385 mm
Yield Strength	Rp _{0.2}	N/mm ²	≥ 1030 (149 ksi)
Tensile Strength	Rm	N/mm ²	≥ 1110 (161 ksi)
Elongation after Fracture (Lo O 4x do)	A4	%	≥ 14
Reduction of Area	Z	%	≥ 45
Notch Impact Strength Charpy V-Notch	A	J	≥ 65
Hardness on Specific Diameter	–	HB	330 - 390
Hardness on Circumferential Surf	–	HB	≥ 340

MICON Raise Bore Equipment Standards

The following standards apply for all MICON Raise Bore equipment:

- ◇ Threads zinc-phosphate coated / bonderized
- ◇ Pin and box thread protectors included
- ◇ Painting of one layer uni-color included
- ◇ Packing on pallets in truck or in container included
- ◇ Storing of equipment until collection included
- ◇ EUR1 certification included
- ◇ IPPC certificates of packing material
- ◇ MPI, dimensional check and material certificates included
- ◇ Made in Germany
- ◇ Manufacturing plant certified according to ISO 9001/2015

Rotary Vertical Drilling System (RVDS)

Improving existing and designing new equipment for the raise boring industries is a core business and motivation for MICON. The unique Rotary Vertical Drilling System (RVDS) targets drilling service for pilot hole drilling and opens new fields of activities for the raise boring industries.

The RVDS is a pre-programmable, self steering drilling device for drilling vertical holes. It consists of two modules which are integrated in the lower part of the BHA between the drill bit and the first string stabilizer.

Reliability and accuracy of the RVDS service are outstanding. Since 1993 an overall borepath deviation of less than 0.1 % was achieved on over 130,000 drilling meters world wide.






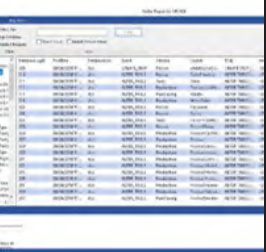

MIRIS – Automatic identification of drill rods

During drilling operations, in mining as well as in oilfield, technical or geological problems may occur which may lead to a loss of drilling equipment in hole. The amount of damage in such a case is essentially made up of the value of the well plus the equipment remaining in the well and can easily amount to several million Euros. To be able to claim such a damage from an insurance company and to plan suitable fishing operations for the equipment it is very important to know exactly which equipment was installed and how deep the borehole is.

An itemized list of equipment installed downhole (“tally list”) is usually kept by hand on the drill rig. Due to various reasons (illegible serial numbers, bad handwriting, forgotten drill pipes when changing shifts, multiple installation and removal of pipes, etc.) this list is often not 100% correct.

Therefore MICON has developed a system which automatically records drill rods and other equipment and lists the equipment in detail in a database. The system is called MIRIS (MICON Intelligent Rod Identification System). The system works with RFID (Radio-Frequency Identification) by exchanging data between a PC and a transponder in the drill rod via antennas on the drill rig.

General system overview

Maintenance	Pre-Job	Job	Post-Job	Database
				
<p>Saves Rod Status, Length, weight, inspection date and serial No. on the transponder via transmitter antennas.</p>	<p>Identifies all Rods on the Location by manual RFID scanner.</p>	<p>Identifies all Rods going into and out of the hole.</p>	<p>A summary of all used Rods during the drilling is being created.</p>	<p>All recorded Data will be stored in the data base and can be exported to *.csv file.</p>

MIRIS operation procedure on the drill site:

- 1 All supplied drill rods are scanned with the RFID manual scanner.
- 2 Run into hole or drilling: Set user interface to "Auto mode: insert rods".
- 3 MIRIS detects the installation of the rods by the antennas mounted on the drill rig.
- 4 The software updates the "Tally List" automatically. Parameters such as the number and total weight and length of rods are updated.
- 5 Run out of hole: Set user interface to "Auto mode: remove rods".
- 6 MIRIS recognizes the removal of the rods by the antennas.
- 7 The software updates the "Tally List" automatically. Parameters such as the number of rods are updated.
- 8 After the job, MIRIS creates a summary all on-site rods.

The RFID tag (transponder), which doesn't have its own energy supply, is installed into a milled recess into rod body, close to the wrenching area. Individual data sets can be stored in these tags. This might be the serial number, type, length, weight and date of the last inspection.



Drill Rod with RFID transponder

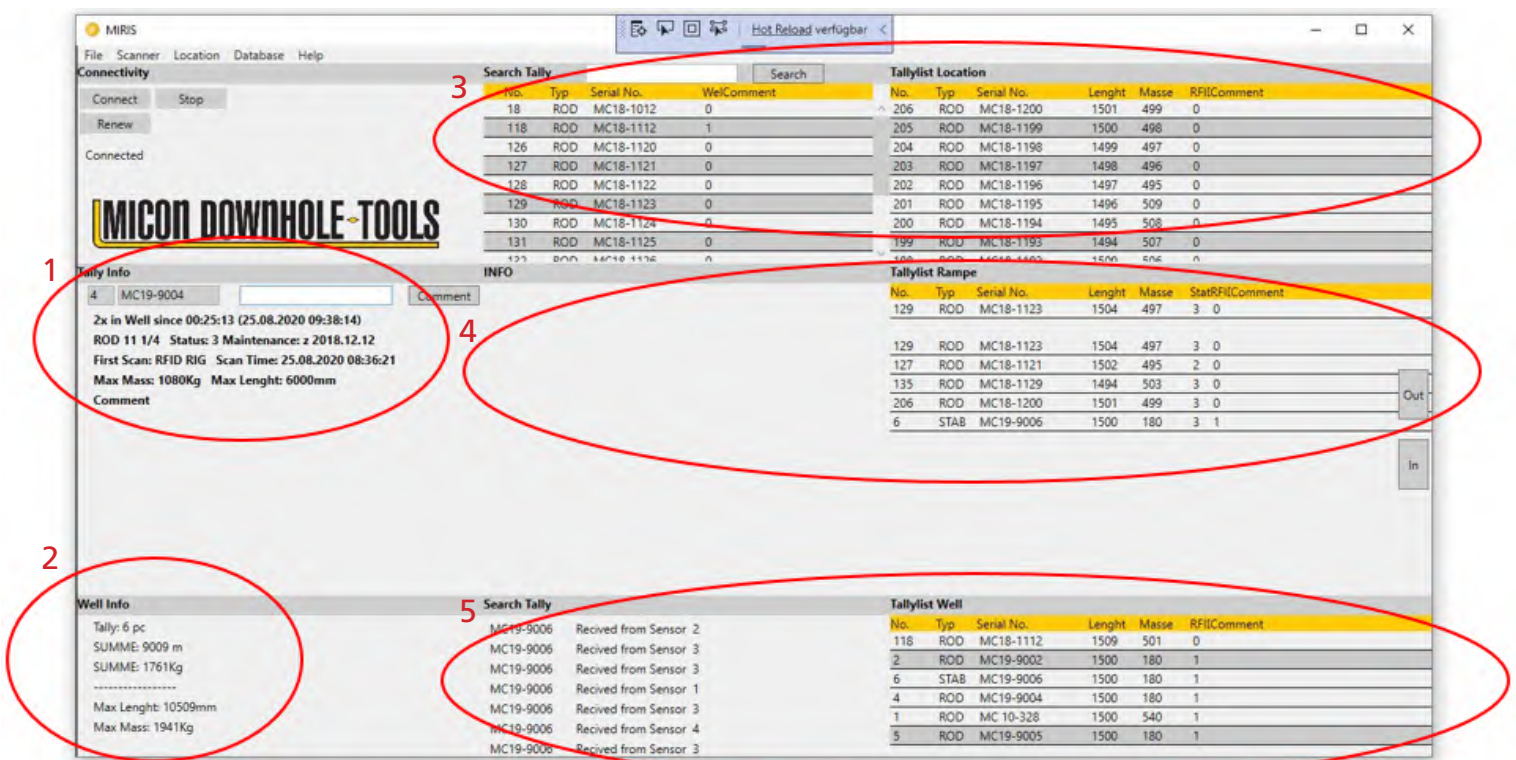
The data is processed using the MIRIS software developed by MICON.

Ready-to-use drilling rods on the drill rig are detected quickly and precisely using an RFID handheld scanner. The RFID scanner is linked via Bluetooth to a PC in order to transfer the collected data ("list of available drill rods") to a database.

When drill rods are installed or removed in the drill rig, the RFID tags are then detected via a permanently mounted antenna and visualized in real time in a table ("list of drill rods in the borehole"). Since the system cannot recognize at this point (beta software version 09/20) in time whether a rod is being installed or removed, the shift supervisor must confirm each rod detected. An automatic detection is possible after the drillers sets the user interface detection mode to "insert rods" or "remove rods".

At any time the recorded data, for example the number of drill rods and their total weight, can be retrieved. Also the drilling depth can now be determined more easily, because the individual lengths of the drill rods are automatically added up.

In addition, the application data for each individual drill rod is stored and can be transferred to a central database at the customer's site once drilling is complete. This makes it possible to create a CV for each drill rod and to better plan the necessary inspections.



MIRIS user interface

1. Details of the selected Rod
2. Summary Rods in hole
3. Rods on site
4. registered Rod
5. Rods in the hole

Torque-Tension Charts

Torque-Tension charts are essential to identify appropriate working parameters for your raise bore project. The following charts are valid for the given material parameters of MICON steel grades.

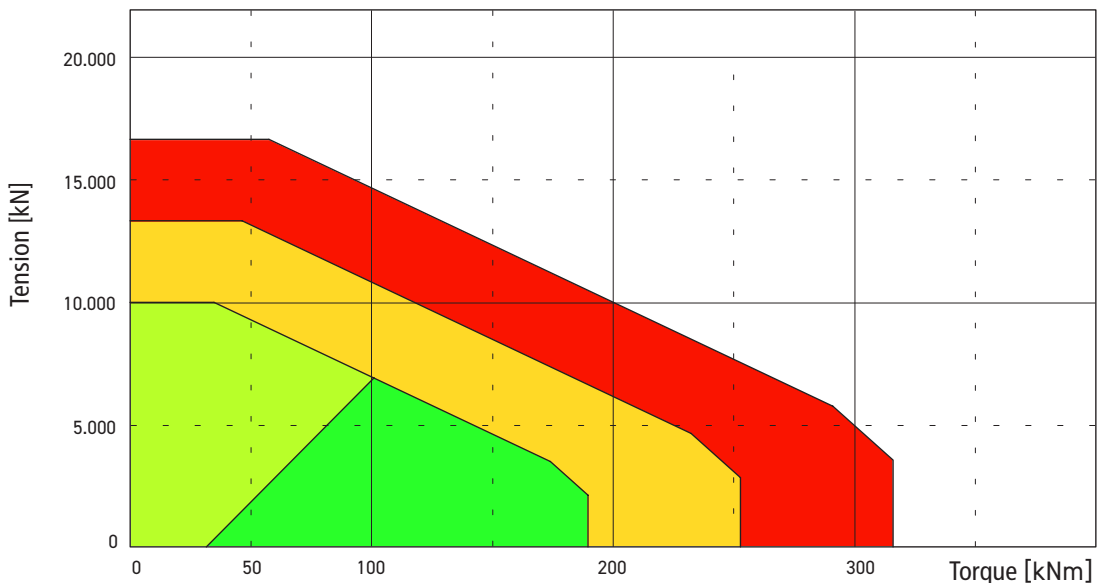
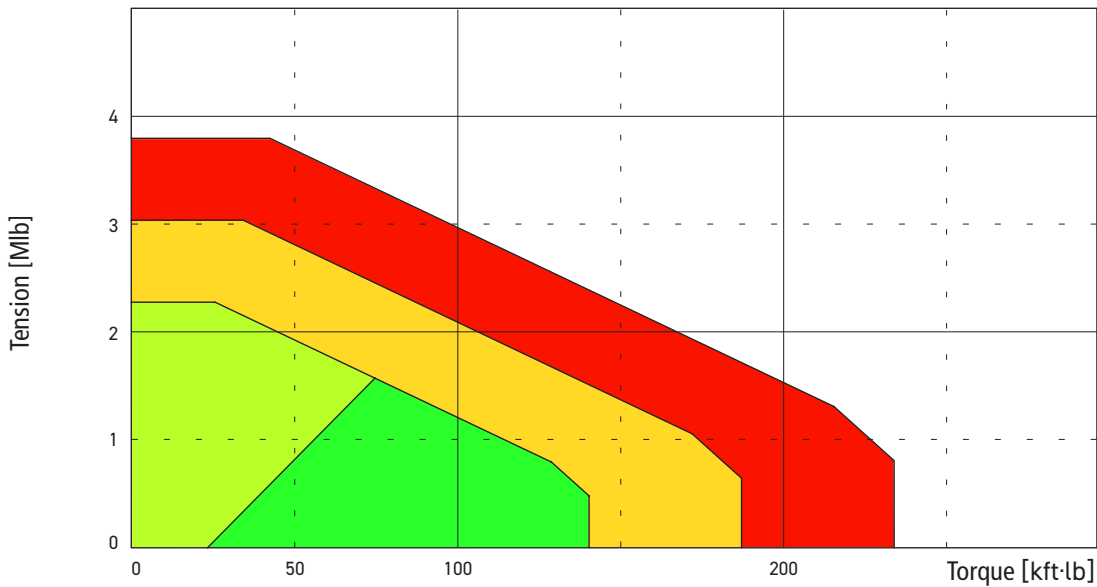
MICON provides specific and highly detailed calculations for each raise bore project.



8 1/4" DI-22 Connection

Medium Strength:

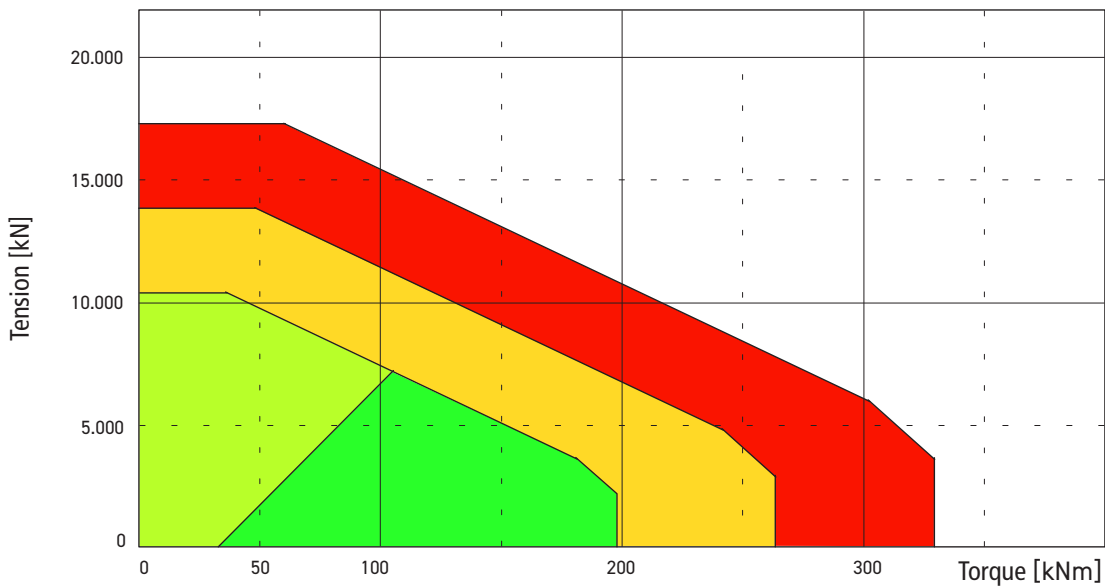
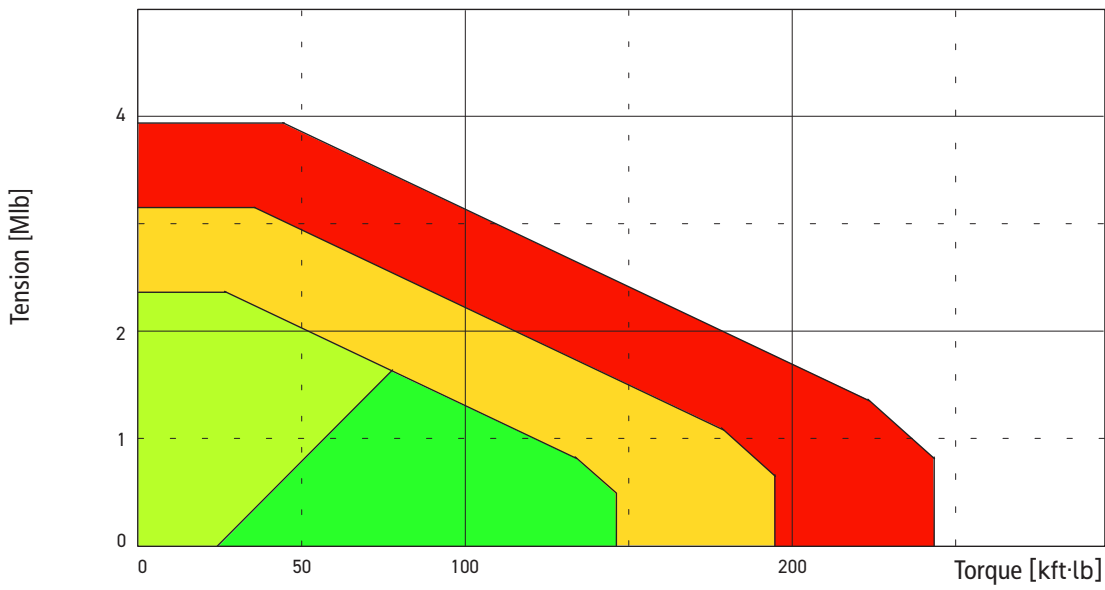
Material: AISI 4330 (135 ksi / 930 N/mm²), **ID:** 4 3/4", **Torque Factor:** 1.0 per API RP7A1



8 ¼" DI-22 Connection

High Strength

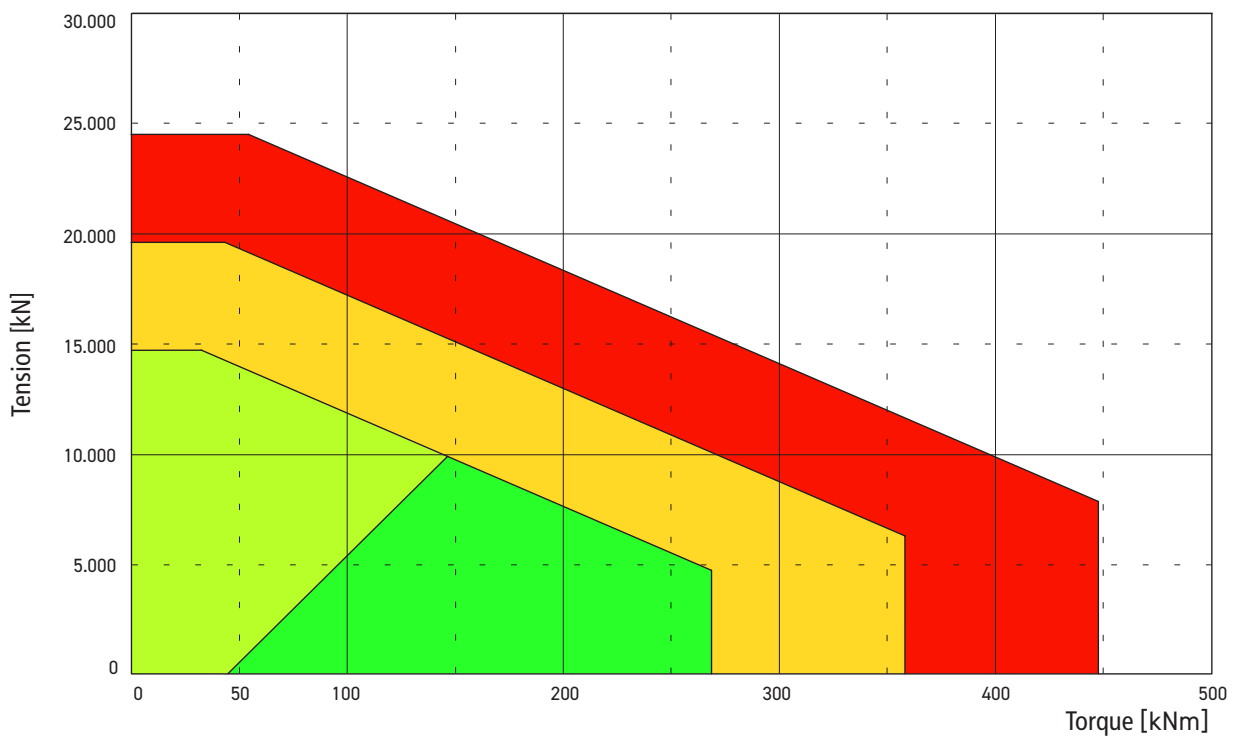
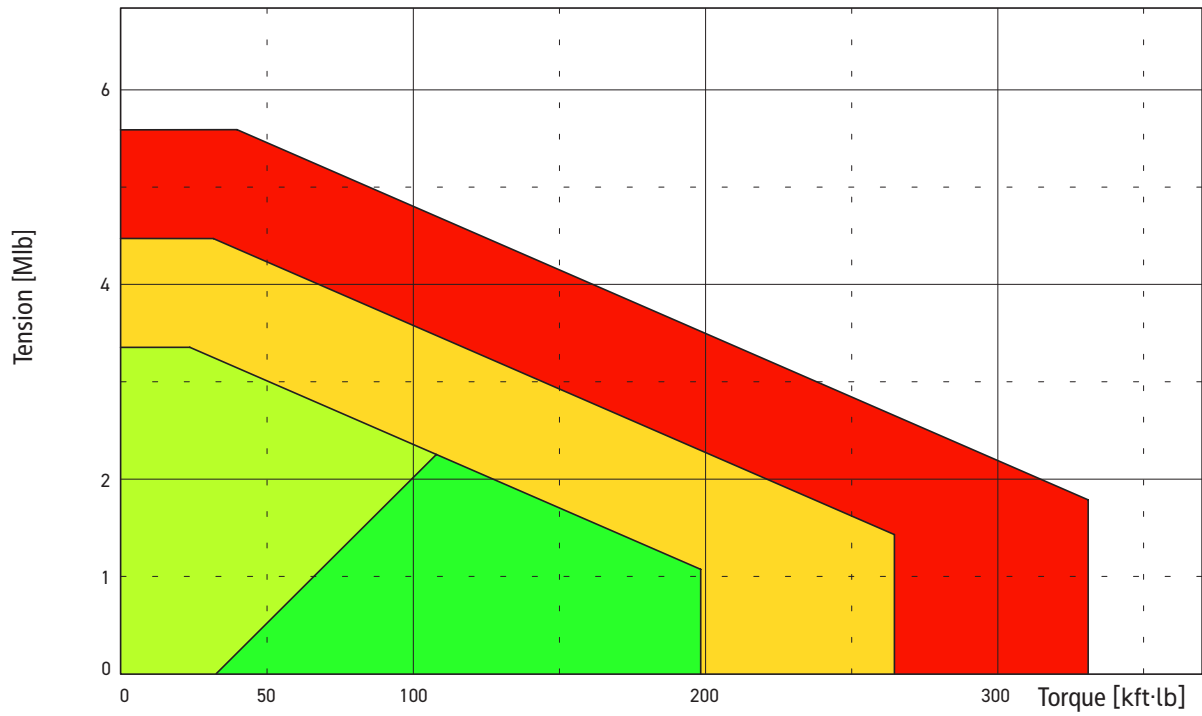
Material: AISI 4330 mod (140 ksi / 965 N/mm²), ID: 4 ¾", Torque Factor: 1.0 per API RP7A1



9 1/4" DI-22 Connection

Medium Strength:

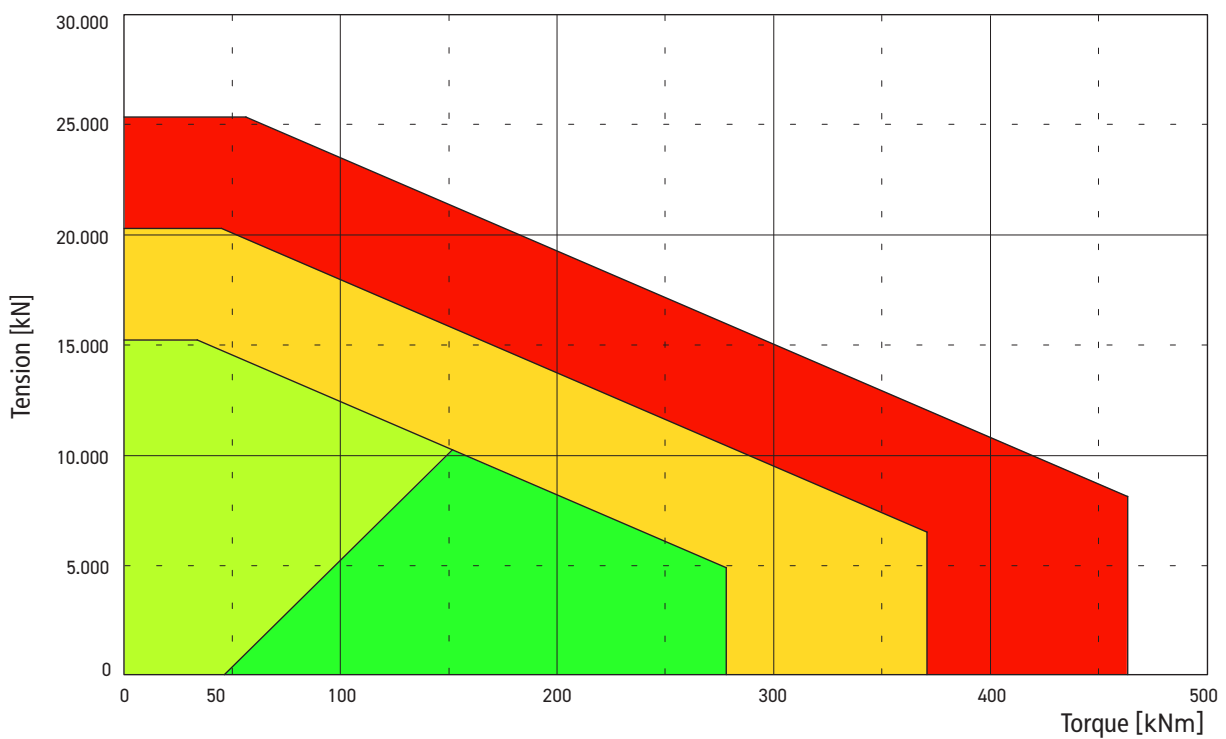
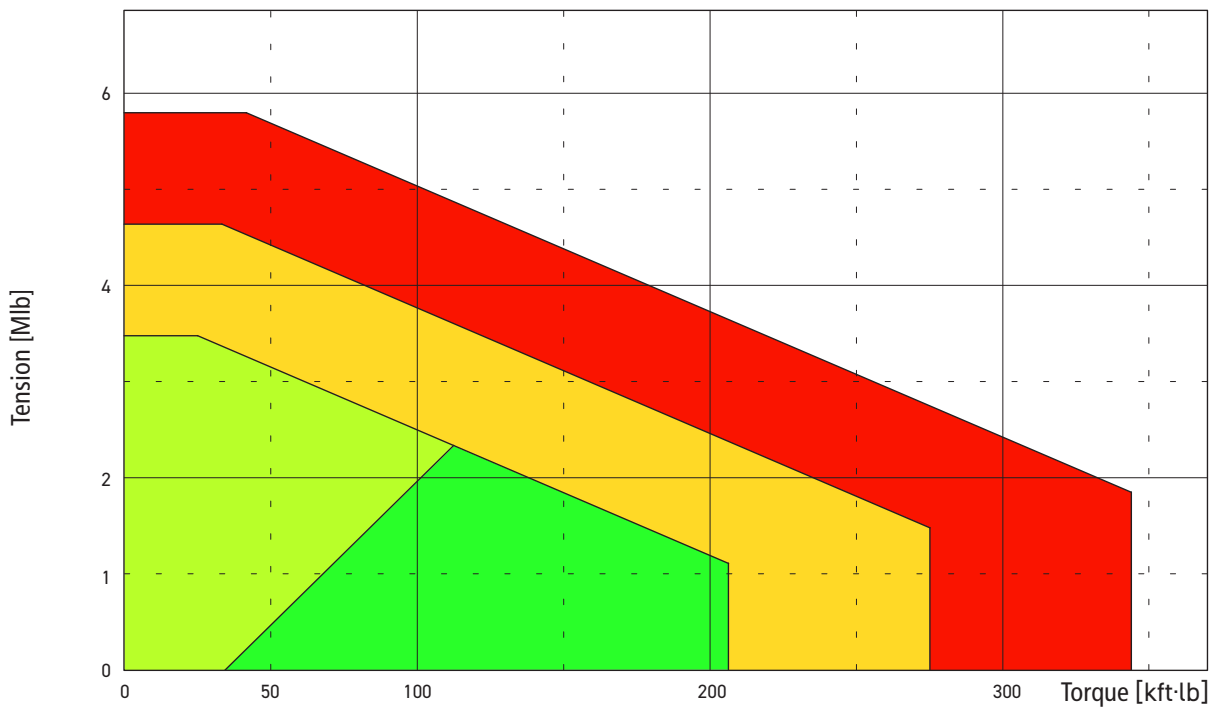
Material: AISI 4330 (135 ksi / 930 N/mm²), **ID:** 4 3/4", **Torque Factor:** 1.0 per API RP7A1



9 1/4" DI-22 Connection

High Strength:

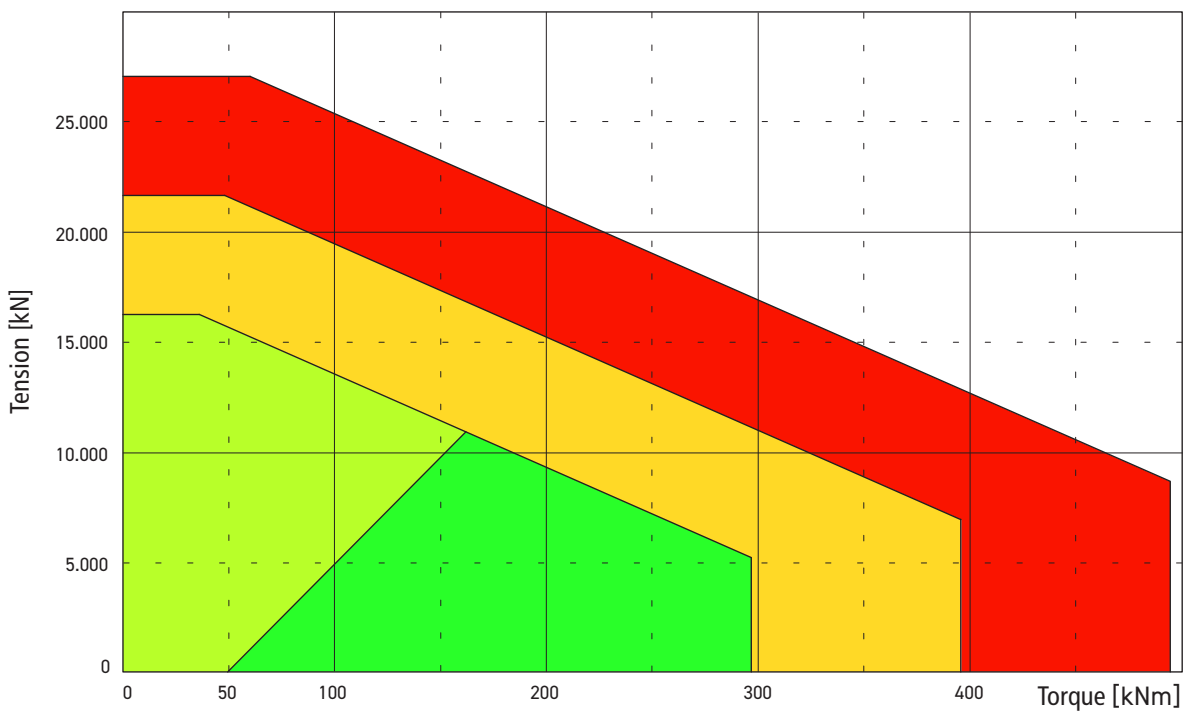
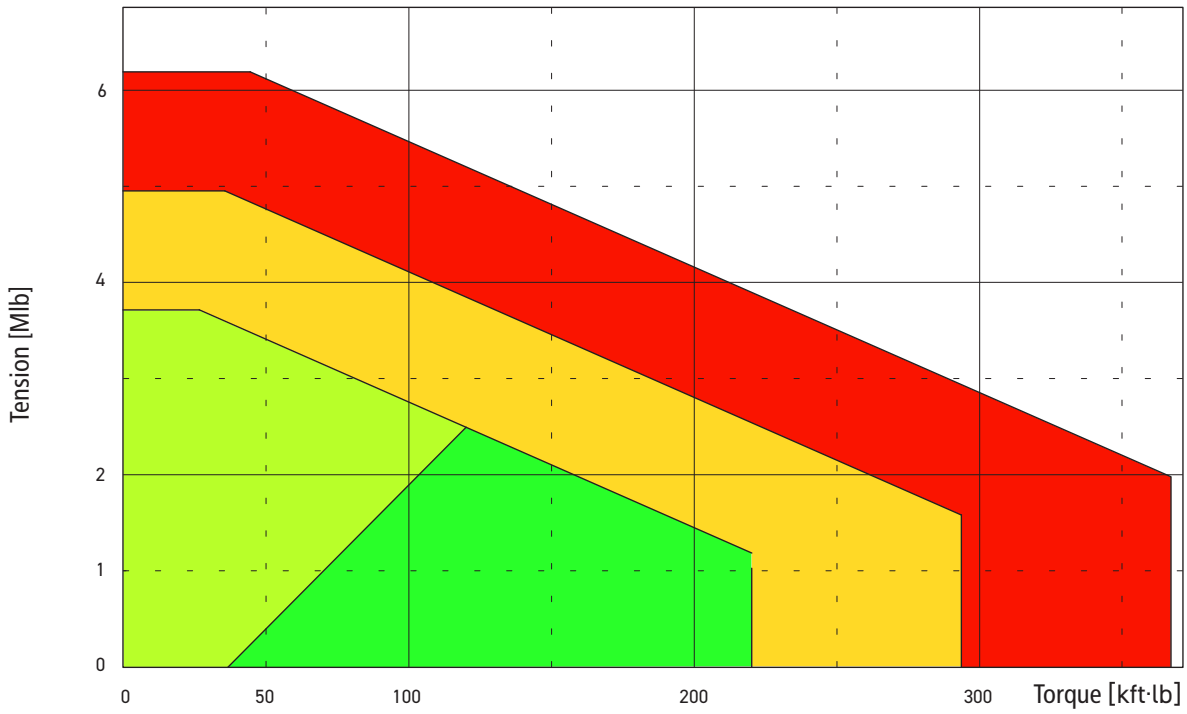
Material: AISI 4330 mod (140 ksi / 965 N/mm²), ID: 4 3/4", Torque Factor: 1.0 per API RP7A1



9 1/4" DI-22 Connection

Ultra-High Strength:

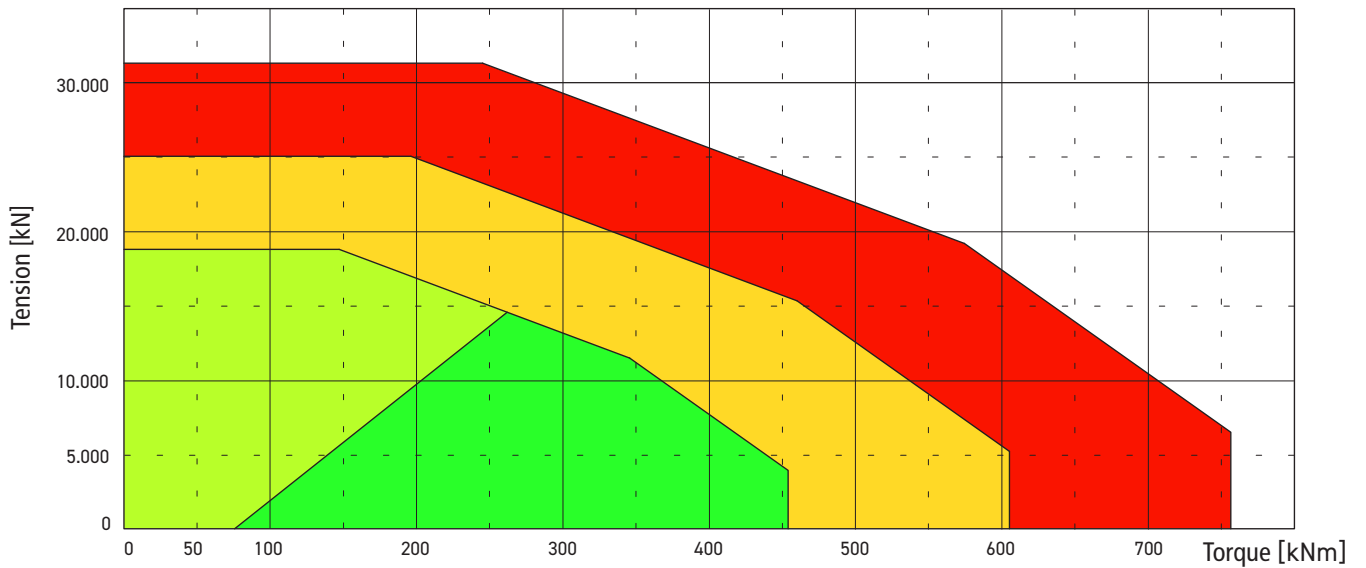
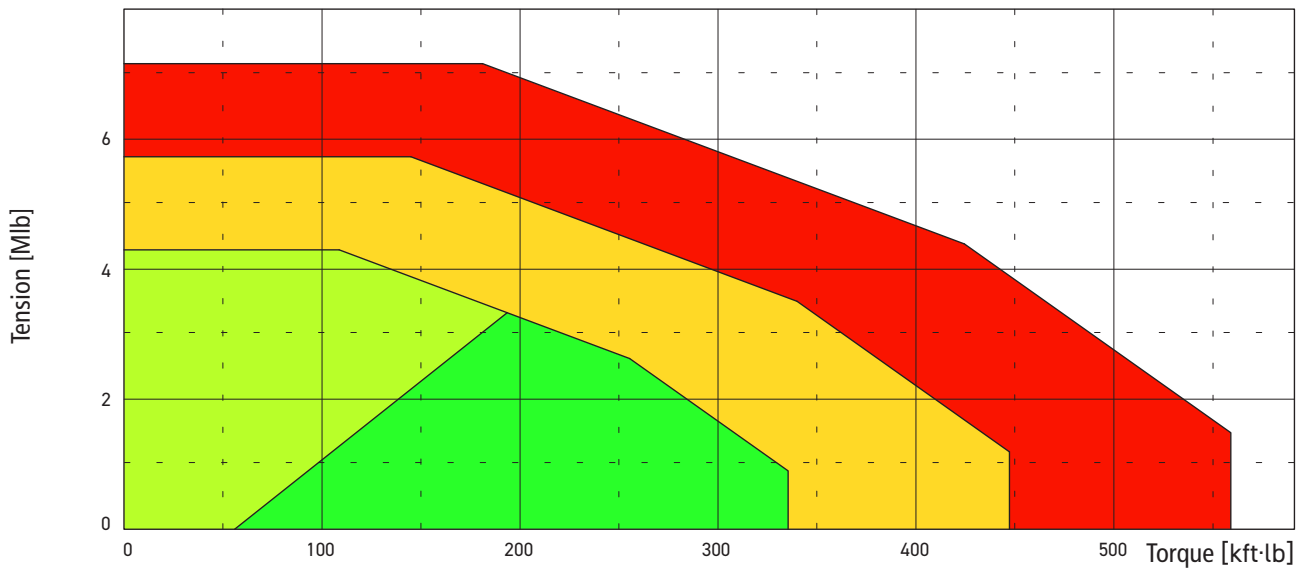
Material: AISI 4330 V mod (149 ksi / 1030 N/mm²), ID: 4 3/4", Torque Factor: 1.0 per API RP7A1



10 ½" DI-22 Connection

High Strength:

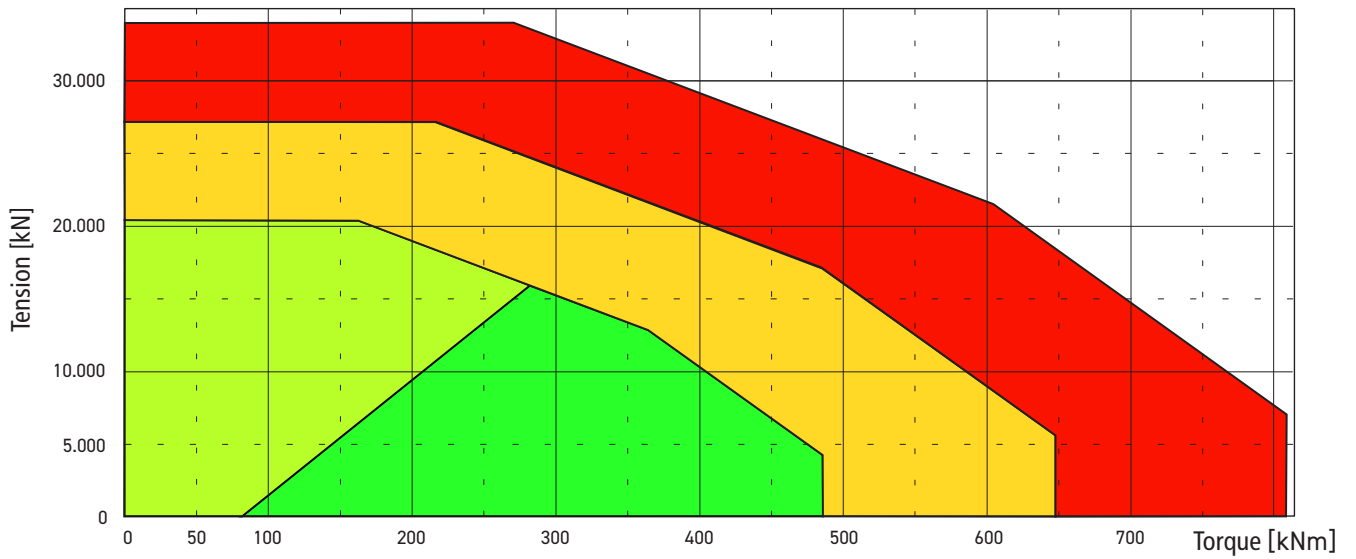
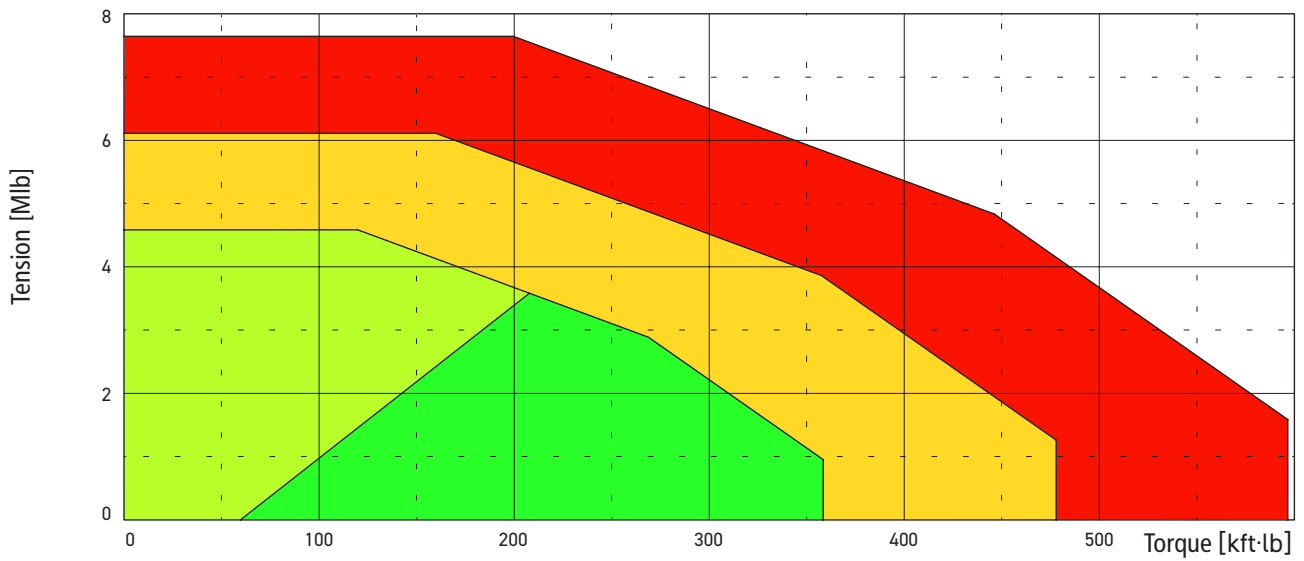
Material: AISI 4330 mod (140 ksi / 965 N/mm²), ID: 5 7/8", Torque Factor: 1.0 per API RP7A1



10 ½" DI-22 Connection

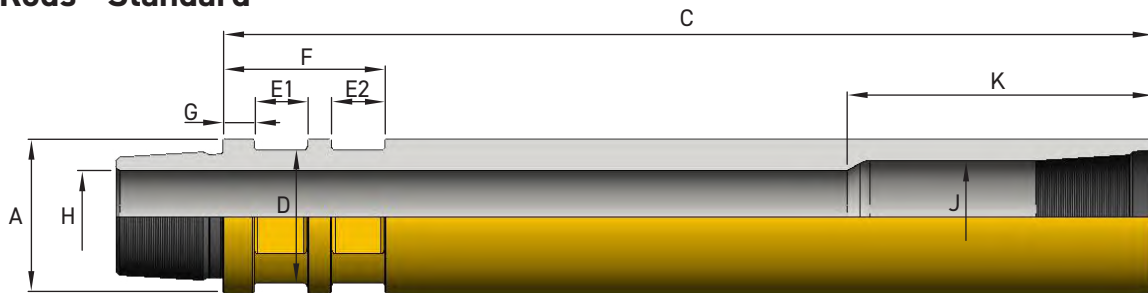
Ultra-High Strength:

Material: AISI 4330 V mod (149 ksi / 1030 N/mm²), ID: 5 7/8", Torque Factor: 1.0 per API RP7A1



Standard Raise Bore Products

Rods - Standard



Standard Dimensions - imperial:

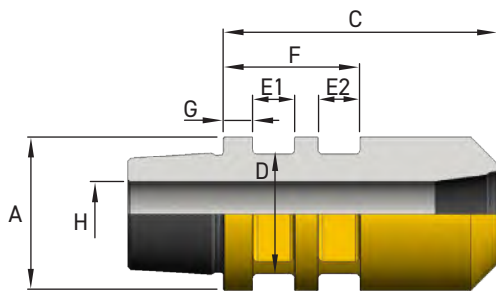
OD	Thread	Length	Wrenching			Length		ID		Length
			Body	Pin x Box	S/S	Square	Width	S/1 st Flat	S/2 nd Flat	
A	—	C	D	E1	E2	F	G	H	J	K
10"	8 1/4" DI-22	48"	8"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	4 3/4"	7 1/8"	19"
		60"	8 1/4"							36"
11 1/4"	9 1/4" DI-22	48"	9"	2.95"	2.95"	8.85"	1.58"	4 3/4"	7.69"	19"
		60"	9 1/4"	3 1/2"	3 1/2"	10"	2 1/2"			36"
12 7/8"	10 1/2" DI-22	60"	10"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	5 7/16"	9"	19"
			10 1/2"							36"

Standard Dimensions - metric:

OD	Thread	Length	Wrenching			Length		ID		Length
			Body	Pin x Box	S/S	Square	Width	S/1 st Flat	S/2 nd Flat	
A	—	C	D	E1	E2	F	G	H	J	K
254.0 mm	8 1/4" DI-22	1219.2 mm	203.2 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	120.5 mm	181.0 mm	482.6 mm
		1524.0 mm	209.5 mm							914.2 mm
285.7 mm	9 1/4" DI-22	1219.2 mm	228.6 mm	75.0 mm	75.0 mm	224.8 mm	40 mm	120.5 mm	195.26 mm	482.6 mm
		1524.0 mm	234.9 mm	88.9 mm	88.9 mm	254.0 mm	63.5 mm			914.2 mm
327.0 mm	10 1/2" DI-22	1524.0 mm	254.0 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	138.1 mm	228.6 mm	482.6 mm
			266.7 mm							914.2 mm

Further specific dimensions on request.

Starter Rods - Short



Standard Dimensions - imperial:

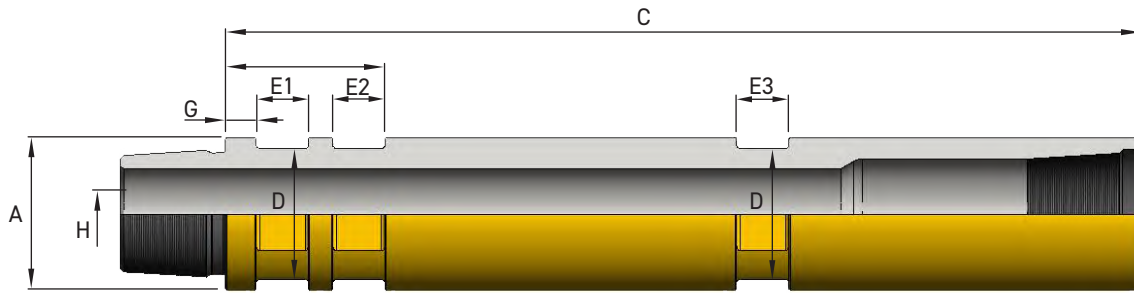
OD	Thread		Length	Wrenching			Length		ID
	Body	Pin		Box	S/S	Square	Width	S/1 st Flat	
A	—	—	C	D	E1	E2	F	G	H
10"	8 1/4" DI-22	6 5/8" API Reg.	23"	8" 8 1/4"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	4 3/4"
11 1/4"	9 1/4" DI-22	6 5/8" API Reg.	23"	9" 9 1/4"	2.95" 3 1/2"	2.95" 3 1/2"	8.85" 10"	1.58" 2 1/2"	4 3/4"
12 7/8"	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	23"	10" 10 1/2"	3 1/2" 4"	3 1/2" 4"	11 1/2" 12 1/2"	2 1/2"	5 7/16"

Standard Dimensions - metric:

OD	Thread		Length	Wrenching			Length		ID
	Body	Pin		Box	S/S	Square	Width	S/1 st Flat	
A	—	—	C	D	E1	E2	F	G	H
254.0 mm	8 1/4" DI-22	6 5/8" API Reg.	584.2 mm	203.2 mm 209.5 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	120.5 mm
285.7 mm	9 1/4" DI-22	6 5/8" API Reg.	584.2 mm	228.6 mm 234.9 mm	75.0 mm 88.9 mm	75.0 mm 88.9 mm	224.8 mm 254.0 mm	40 mm 63.5 mm	120.5 mm
327.0 mm	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	584.2 mm	254.0 mm 266.7 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	138.1 mm

Further specific dimensions on request.

Starter Rods - Long



Standard Dimensions - imperial:

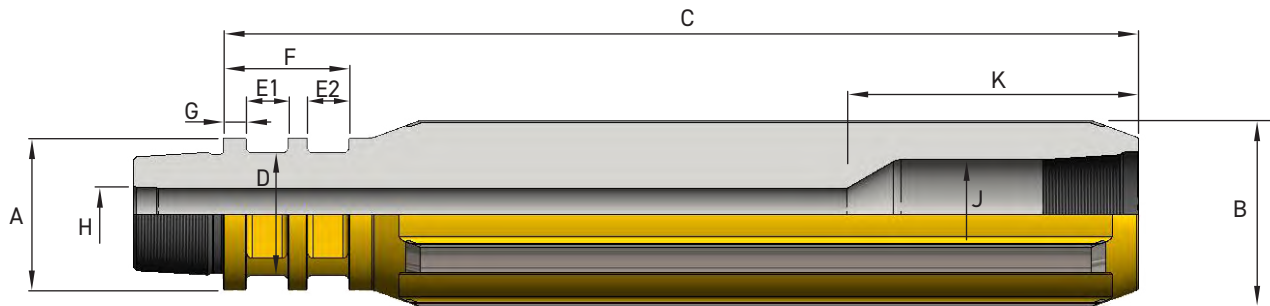
OD	Thread	Length	Wrenching			Length		ID	
Body	Pin x Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	
A	—	C	D	E1	E2	E3	F	G	H
10"	8 1/4" DI-22	60"	8" 8 1/4"	2 3/4"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	4 3/4"
11 1/4"	9 1/4" DI-22	60"	9" 9 1/4"	2.95" 3 1/2"	2.95" 3 1/2"	2.95" 3 1/2"	8.85" 10"	1.58" 2 1/2"	4 3/4"
12 7/8"	10 1/2" DI-22	60"	10" 10 1/2"	3 1/2"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	5 7/16"

Standard Dimensions - metric:

OD	Thread	Length	Wrenching			Length		ID	
Body	Pin x Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	
A	—	C	D	E1	E2	E3	F	G	H
254.0 mm	8 1/4" DI-22	1524.0 mm	203.2 mm 209.5 mm	69.8 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	120.5 mm
285.7 mm	9 1/4" DI-22	1524.0 mm	228.6 mm 234.9 mm	75.0 mm 88.9 mm	75.0 mm 88.9 mm	75.0 mm 88.9 mm	224.8 mm 254.0 mm	40 mm 63.5 mm	120.5 mm
327.0 mm	10 1/2" DI-22	1524.0 mm	254.0 mm 266.7 mm	88.9 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	138.1 mm

Further specific dimensions on request.

Stabilizers



Standard Dimensions - imperial:

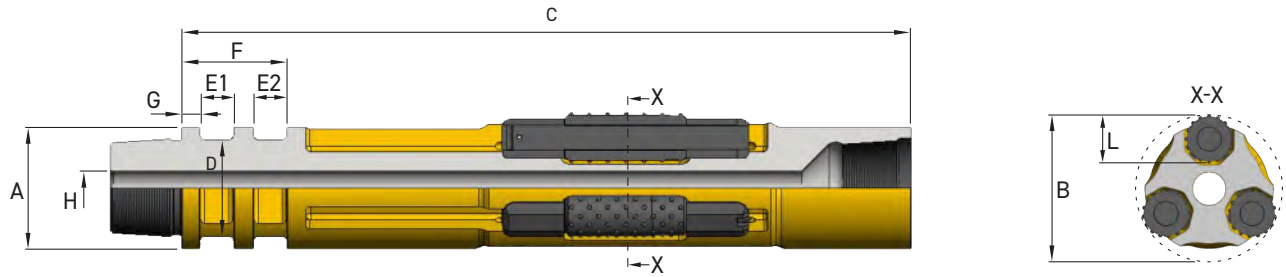
OD		Thread	Length	Wrenching		Length		ID		Length					
Body	Hole	Pin x Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	Boreback					
A	B	—	C	D	E1	E2	F	G	H	J	K				
10"	11"	8 1/4" DI-22	48"	8"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	3 3/8"	7 1/8"	19"				
	12 1/4"		60"	8 1/4"							36"				
	13 3/4"														
11 1/4"	12 1/4"	9 1/4" DI-22	48"	9"	2.95"	2.95"	8.85"	1.58"	4 3/4"	8"	19"				
	13 3/4"		60"	9 1/4"							3 1/2"	3 1/2"	10"	2 1/2"	36"
12 7/8"	13 3/4"	10 1/2" DI-22	48"	10"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	5 7/16"	9"	19"				
	15"		60"	10 1/2"							36"				
	16"														
	17 1/2"														

Standard Dimensions - metric:

OD		Thread	Length	Wrenching		Length		ID		Length					
Body	Hole	Pin x Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	Boreback					
A	B	—	C	D	E1	E2	F	G	H	J	K				
254.0 mm	279.4 mm	8 1/4" DI-22	1219.2 mm	203.2 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	85.7 mm	181.0 mm	482.6 mm				
	311.1 mm		1524.0 mm	209.5 mm							914.2 mm				
	349.2 mm														
285.7 mm	311.1 mm	9 1/4" DI-22	1219.2 mm	228.6 mm	75.0 mm	75.0 mm	224.8 mm	40 mm	120.5 mm	203.2 mm	482.6 mm				
	349.2 mm		1524.0 mm	234.9 mm							88.9 mm	88.9 mm	254.0 mm	63.5 mm	914.2 mm
327.0 mm	349.2 mm	10 1/2" DI-22	1219.2 mm	254.0 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	138.1 mm	228.6 mm	482.6 mm				
	381.0 mm		1524.0 mm	266.7 mm							914.4 mm				
	406.4 mm														
	444.5 mm														

Further specific dimensions on request.

Roller Reamer



Standard Dimensions - imperial:

OD		Thread		Length	Wrenching		Length		ID	Cutter	
Body	Hole	Pin	Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	Size
A	B	—	—	C	D	E1	E2	F	G	H	L
10"	11" 12 1/4"	8 1/4" DI-22	8 1/4" DI-22 6 5/8" API Reg.*	48" 60"	8" 8 1/4"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	2 1/2"	2 1/2" 4"
11 1/4"	12 1/4"	9 1/4" DI-22	8 1/4" DI-22 6 5/8" API Reg.*	60"	9" 9 1/4"	2.95" 3 1/2"	2.95" 3 1/2"	8.85" 10"	1 1/2"	2 1/2"	4"
12 7/8"	13 3/4" 15"	10 1/2" DI-22	10 1/2" DI-22 6 5/8" API Reg.* 7 5/8" API Reg.*	60"	10" 10 1/2"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	3 1/2"	4"

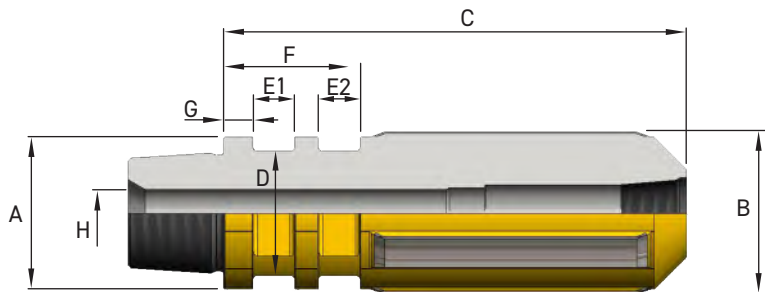
Standard Dimensions - metric:

OD		Thread		Length	Wrenching		Length		ID	Cutter	
Body	Hole	Pin	Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body	Size
A	B	—	—	C	D	E1	E2	F	G	H	L
254.0 mm	279.4 mm 311.1 mm	8 1/4" DI-22	8 1/4" DI-22 6 5/8" API Reg.*	1219.2 mm 1524.0 mm	203.2 mm 209.5 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	63.5 mm	63.5 mm 101.6 mm
285.7 mm	311.1 mm	9 1/4" DI-22	8 1/4" DI-22 6 5/8" API Reg.*	1524.0 mm	228.6 mm 234.9 mm	75.0 mm 88.9 mm	75.0 mm 88.9 mm	224.8 mm 254.0 mm	38.1 mm	63.5 mm	101.6 mm
327.0 mm	349.2 mm 381.0 mm	10 1/2" DI-22	10 1/2" DI-22 6 5/8" API Reg.* 7 5/8" API Reg.*	1524.0 mm	254.0 mm 266.7 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	88.9 mm	101.6 mm

* Roller Reamer with Float Valve

Further specific dimensions on request.

Bit Subs with Float Valve



Standard Dimensions - imperial:

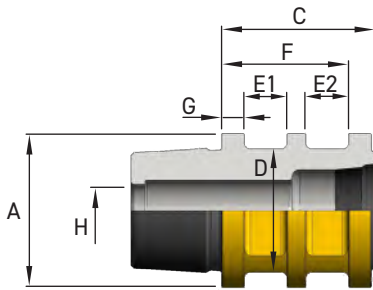
OD		Thread		Length	Wrenching		Length		ID	
Body	Hole	Pin	Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body
A	B	—	—	C	D	E1	E2	F	G	H
10"	11" 12 1/4" 13 3/4"	8 1/4" DI-22	6 5/8" API Reg.	31 1/2"	8" 8 1/4"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	4 3/4"
11 1/4"	12 1/4" 13 3/4"	9 1/4" DI-22	6 5/8" API Reg.	31 1/2"	9" 9 1/4"	2.95" 3 1/2"	2.95" 3 1/2"	8.85" 10"	1.58" 2 1/2"	4 3/4"
12 7/8"	13 3/4" 15" 16" 17 1/2"	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	31 1/2"	10" 10 1/2"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	5 7/16"

Standard Dimensions - metric:

OD		Thread		Length	Wrenching		Length		ID	
Body	Hole	Pin	Box	S/S	Square	Width		S/1 st Flat	S/2 nd Flat	Body
A	B	—	—	C	D	E1	E2	F	G	H
254.0 mm	279.4 mm 311.1 mm 349.2 mm	8 1/4" DI-22	6 5/8" API Reg.	800.1 mm	203.2 mm 209.5 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	120.5 mm
285.7 mm	311.1 mm 349.2 mm	9 1/4" DI-22	6 5/8" API Reg.	800.1 mm	228.6 mm 234.9 mm	75.0 mm 88.9 mm	75.0 mm 88.9 mm	224.8 mm 254.0 mm	40 mm 63.5 mm	120.5 mm
327.0 mm	349.2 mm 381.0 mm 406.4 mm 444.5 mm	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	800.1 mm	254.0 mm 266.7 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	138.1 mm

Further specific dimensions on request.

Pilot Sub with Float Valve - Double Spanner Flat



Standard Dimensions - imperial:

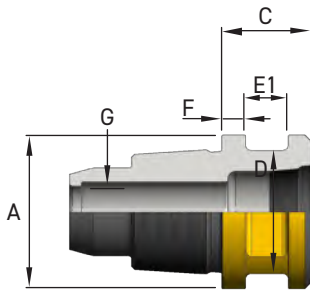
OD	Thread		Length	Wrenching			Length		ID
	Pin	Box		S/S	Square	Width		S/1 st Flat	
A	—	—	C	D	E1	E2	F	G	H
10"	8 1/4" DI-22	6 5/8" API Reg.	10"	8" 8 1/4"	2 3/4"	2 3/4"	8 1/4"	1 1/2"	3 3/8"
11 1/4"	9 1/4" DI-22	6 5/8" API Reg.	11 1/4"	9" 9 1/4"	3 1/2"	3 1/2"	10"	1 1/2"	3 3/8"
12 7/8"	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	13 1/2"	10" 10 1/2"	3 1/2"	3 1/2"	11 1/2"	2 1/2"	3 15/16"

Standard Dimensions - metric:

OD	Thread		Length	Wrenching			Length		ID
	Pin	Box		S/S	Square	Width		S/1 st Flat	
A	—	—	C	D	E1	E2	F	G	H
254.0 mm	8 1/4" DI-22	6 5/8" API Reg.	254.0 mm	203.2 mm 209.5 mm	69.8 mm	69.8 mm	209.5 mm	38.1 mm	85.7 mm
285.7 mm	9 1/4" DI-22	6 5/8" API Reg.	285.7 mm	228.6 mm 234.9 mm	88.9 mm	88.9 mm	254.0 mm	38.1 mm	85.7 mm
327.0 mm	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	342.9 mm	254.0 mm 266.7 mm	88.9 mm	88.9 mm	292.1 mm	63.5 mm	100.0 mm

Further specific dimensions on request.

Pilot Sub with Float Valve - Single Spanner Flat



Standard Dimensions - imperial:

OD	Thread		Length	Wrenching		Length	ID
	Pin	Box		S/S	Square		
A	—	—	C	D	E1	F	G
10"	8 1/4" DI-22	6 5/8" API Reg.	5 13/16"	8" 8 1/4"	2 3/4"	1 1/2"	3 3/8"
11 1/4"	9 1/4" DI-22	6 5/8" API Reg.	6 1/2"	9" 9 1/4"	3 1/2"	1 1/2"	3 3/8"
12 7/8"	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	8"	10" 10 1/2"	3 1/2"	2 1/2"	3 15/16"

Standard Dimensions - metric:

OD	Thread		Length	Wrenching		Length	ID
	Pin	Box		S/S	Square		
A	—	—	C	D	E1	F	G
254.0 mm	8 1/4" DI-22	6 5/8" API Reg.	147.6 mm	203.2 mm 209.5 mm	69.8 mm	38.1 mm	85.7 mm
285.7 mm	9 1/4" DI-22	6 5/8" API Reg.	165.1 mm	228.6 mm 234.9 mm	88.9 mm	38.1 mm	85.7 mm
327.0 mm	10 1/2" DI-22	6 5/8" API Reg. 7 5/8" API Reg.	203.2 mm	254.0 mm 266.7 mm	88.9 mm	63.5 mm	100.0 mm

Further specific dimensions on request.

Notes

Notes



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