

## TTGM-1 Thread

### Machining Range

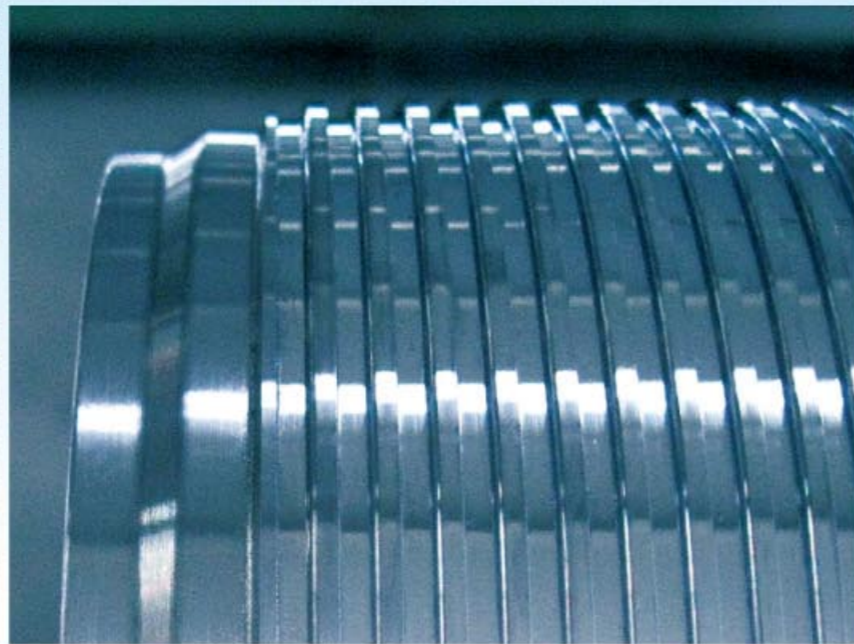
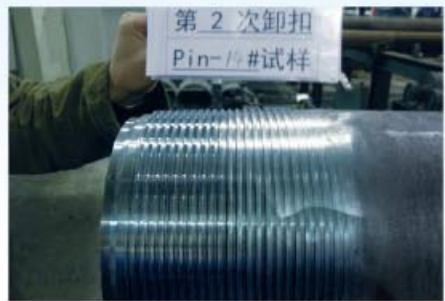
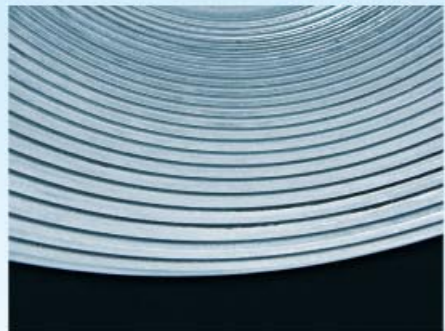
Name	Outer Diameter (mm)	Wall Thickness (mm)	Steel Grade	Thread Form	Product Specification and Grade
TTGM-1 Series	127.0~339.7	5.21~15.88	J/K/L/N/P	TTGM-1	PSL-1、PSL-2

### TTGM-1 Special Thread Series

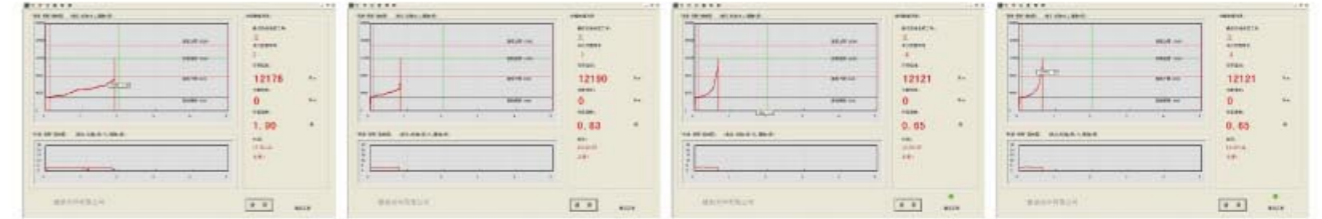
#### TTGM-1 Special Thread Profile



- Thread high strength joint technology and coupling design allow the joint strength to exceed the strength of the pipe body.
- Joint stress optimization technique greatly improves stress distribution through the optimization of the structure and enhances the joint capability of stress and cracking resistance.
- Joint multiple sealing technology enables the joint air resistance to achieve the yield pressure inside the pipe.
- Thread anti-gluing technology.



### Thread Feature of TTGM-1 Special Form



First time makeup and breakout

Second time makeup and breakout

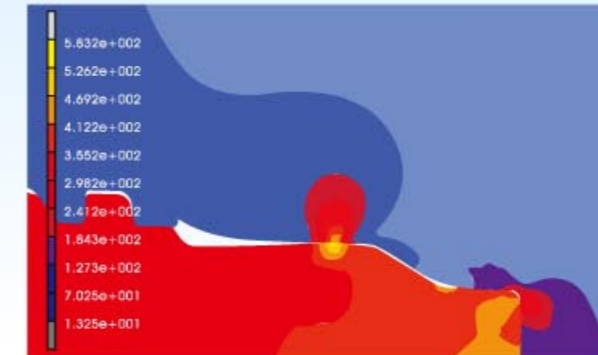
Third time makeup and breakout

Fourth time makeup and breakout

#### Makeup Less thread wear

- With shackle end and over torque resistance functions, 90° right-angle main torque shoulder is capable to improve the sealing feature under a composite loading.
- Radial interference size in thread can be reduced to +0.100mm (The actual radial interference size in the API Buttress Thread is 0.375-0.75mm.)

- With shackle end and over torque resistance functions, 90° right-angle main torque shoulder is capable to improve the sealing feature under a composite loading.
- More reasonably scientific stress distribution can effectively reduce the friction and wear of the thread.

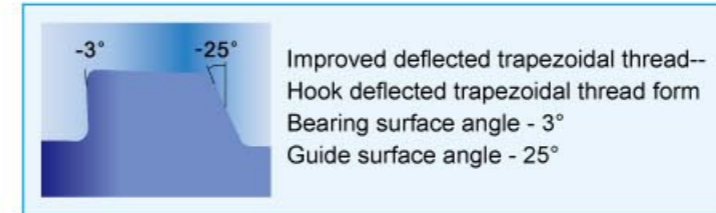


Stress distribution of shoulder and sealing surface after makeup (spherical surface is biggest and conic surface is smallest)

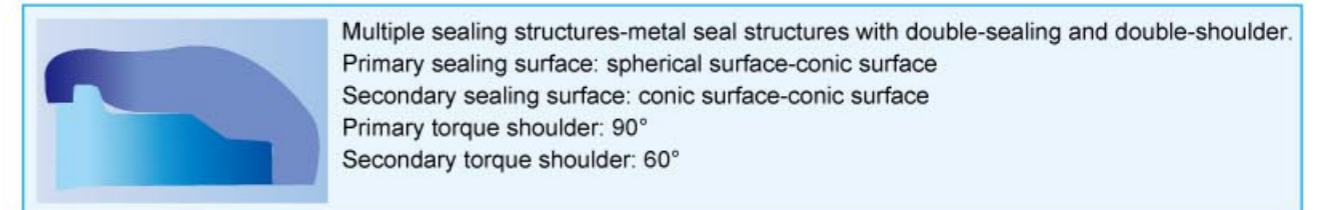


Stress distribution of shoulder and sealing surface after makeup (spherical surface is biggest and conic surface is smallest)

#### Thread joint Higher joint efficiency



#### Sealing structure integrated with structural advantages of double shoulders, bevel seal, and spherical sealing.



## TTGM-2 Expandable pipe

**Specification:** Outer diameter  $\varnothing$  114mm ~ 406mm

**Application Range:**

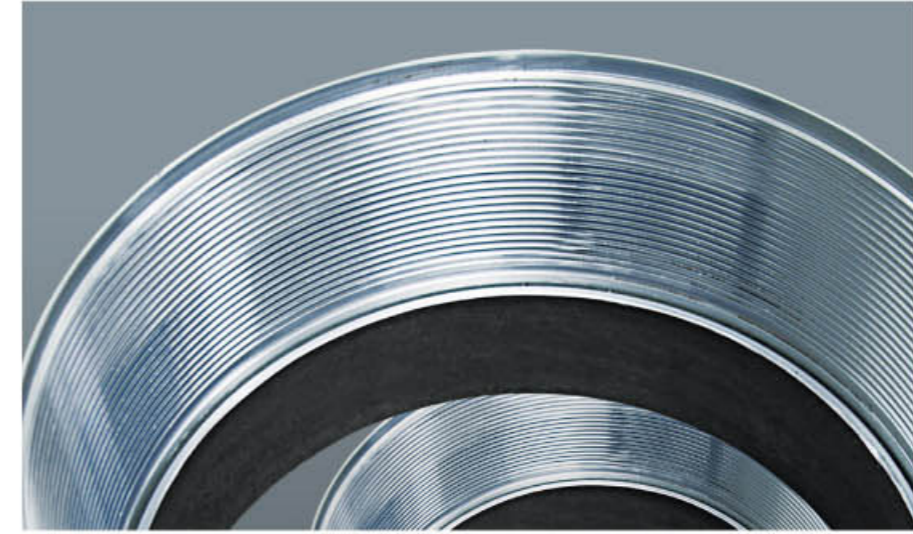
Repair for various fault, breakage, deformed and corrosive casing damaged well;  
Repair for high-temperature gas injection casing damaged well;  
Strengthen and shut off for already perforated perforation interval;  
Repair for worn and worn-through casing during drilling.

**Technical Features:**

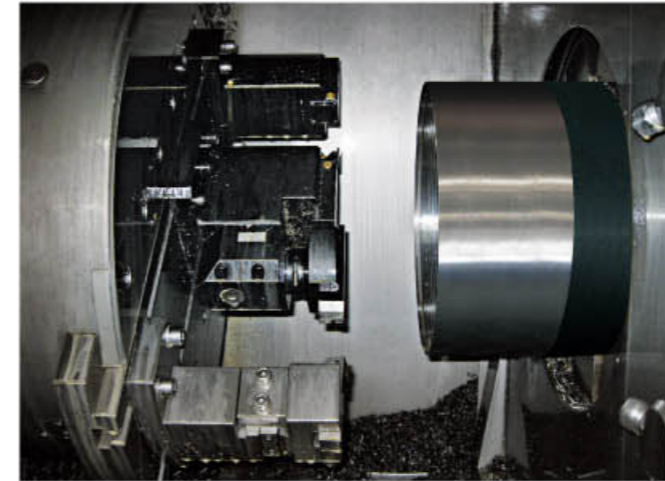
Suitable for different types of casing damaged wells repair;  
Available larger diameter after repair;  
Strong hoist capability. Reliable sealing. Obvious reinforcement effect.

**Performance Parameters:**

Expandable construction pressure is no greater than 4CMPa;  
The seal pressure of strengthened section is no less than 15CMPa, after the completion of strengthening;  
Internal pressure resistance of expandable pipe can reach 45MPa, and external squeeze resistance can reach 25MPa;  
After expansion, the mechanical properties of expandable pipe can achieve API standard J55 or the equivalent steel grade level as N80 casing.



Sample



During machining



After machining



Internal thread



External thread

## TTGM-3

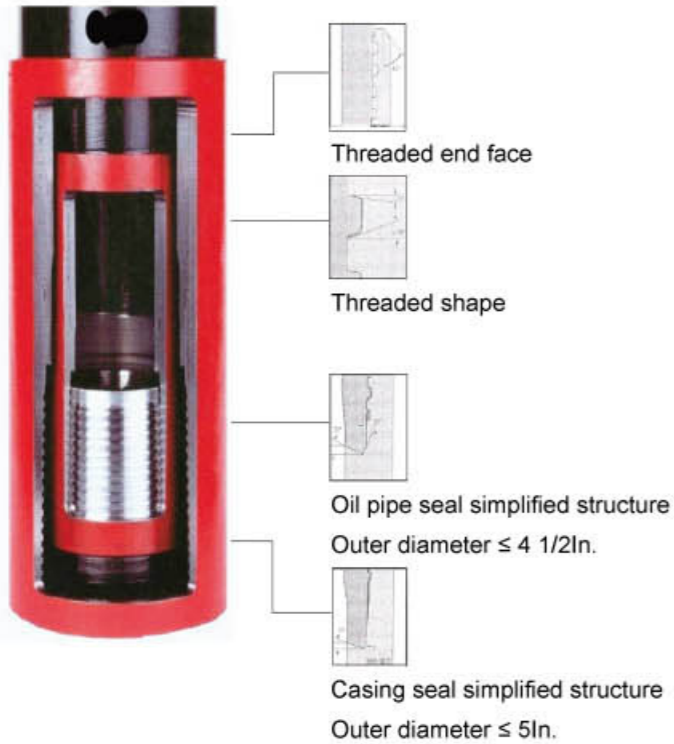
TTGM-3 is a multi-purpose oil pipe and casing joint, suitable for oil pipes and casings of middle and deep depth wells and gas wells, with the excellent air-tightness.

**Specification:** 2-3/8 In ~13~3/8In

**Sales Performance:**

7", 9-5/8", and 13-3/8" steel grade P110, among TTGM-3 products, have been accumulatively sold 2500 tons in total, and exported to Nigeria.

**TTGM-3 Special Thread Profile :**



- Metal – Metal sealing  
Tightness =1:10; 1:6; 1:3
- Negative angle torque ledge Flush inner holes
- Coupling design Low joint stress design
- Low joint stress design Guarantee that joint is safe and reliable under the corrosive environment.



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**Features:**

**Thread joint:**

Thread pitch: 5P/Inch, conical degree 1:16 improved Buttress Thread with strong joint strength. API thread gages can be used directly to detect and test various parameters of the thread part. Improved trapezoidal end can lower the possibility of thread gluing, and eliminate the adverse effect arising from plugged pipe dope after screwed.

**Hermetically-sealed structure:**

Conical surface – Conical surface metal seal. Ensure the seal surface to have sufficient contact width and reasonable contact pressure. Metal – Metal seal system guarantees the excellent air-tight capability under the composite load. The good tightness still can be met after multiple makeups and breakouts. Sealed surface geometric parameters can guarantee its excellent property of anti-gluing.

**Torque ledge:**

The negative angle torque ledge provides the precise screwed position. "Wedge effect" of the negative angle ledge and sealing surface structure reinforces the sealing capability for metal sealing surface. The selection of the best negative angle design can overcome the adverse composite load (compression + external pressure, bending + compression).

**Inner hole:**

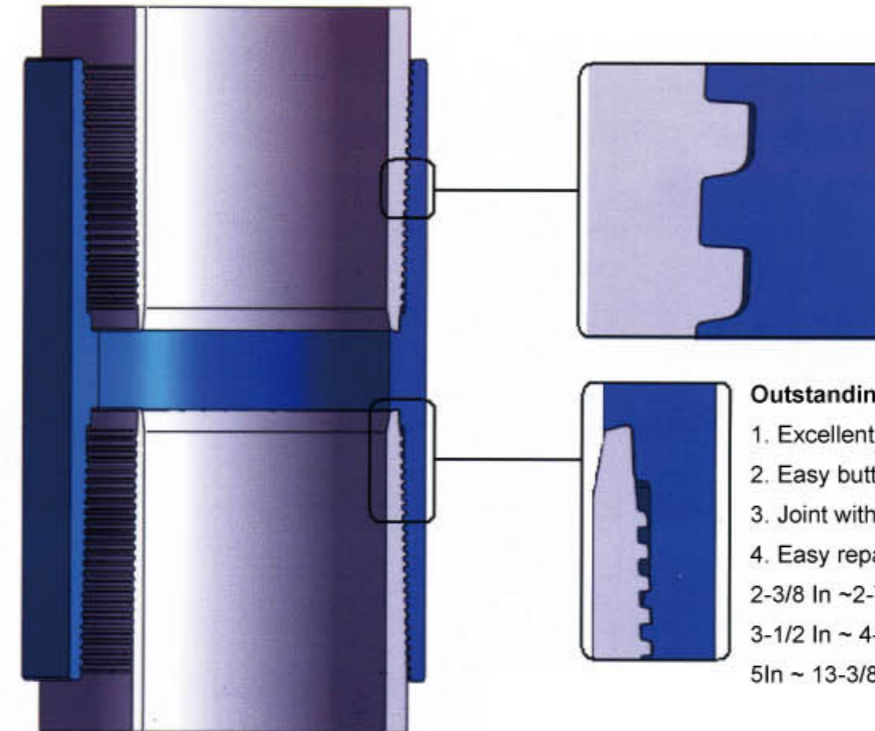
Streamlined inner hole can reduce the turbulence and energy loss during high-speed air flow.

**Coupling design:**

Joint efficiency is more than 100%, and coupling dangerous sectional area is larger than pipe dangerous sectional area. Coupling covers the thread disappeared from the pipe to further boost the joint strength.

**Joint low stress design:**

It can ensure the joint to be safe and reliable under the corrosive environment.



**Outstanding features:**

1. Excellent tightness performance under the composite load;
  2. Easy butt joint, and simple and convenient operation;
  3. Joint with good anti-gluing property;
  4. Easy repair.
- 2-3/8 In ~2-7/8 In Thread pitch = 8 P/Inch  
3-1/2 In ~ 4-1/2 In Thread pitch = 6P/Inch  
5In ~ 13-3/8 In Thread pitch =5P/Inch

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## TTGM-4

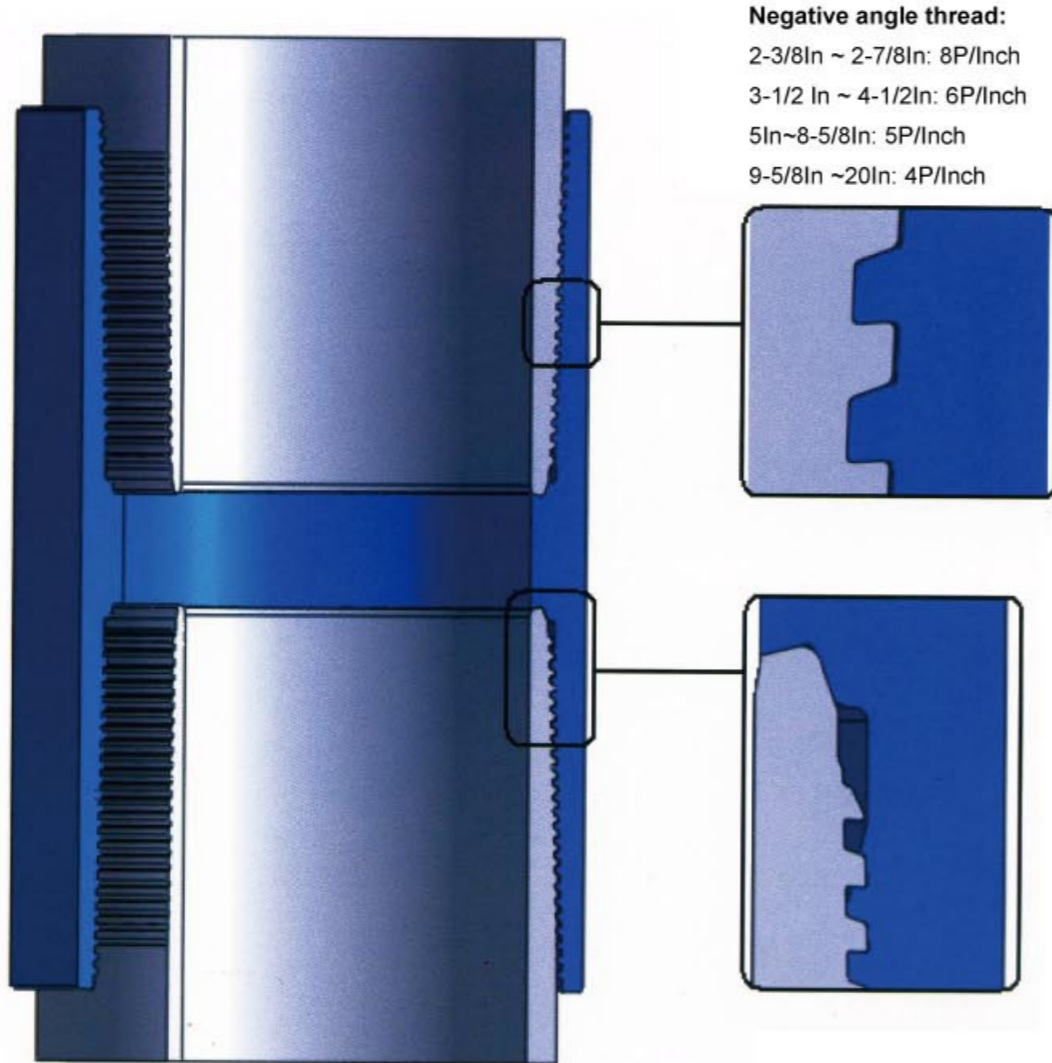
**Specification:** 2-3/8 In ~ 13-3/8In

**Product Technical Grade:** (PSL-1 and PSL-2)

**Sale Performance:**

5" L80 and 7" L80 P110, among TTGM-4 products, have been accumulatively sold 2000 tons in total, and exported to many middle east countries.

- Keep excellent structural integrity under stretching and bending;
- Own good anti-gluing property;
- Own excellent air-tight property under the composite load;
- Used for deep well, extended reach well, and horizontal well;
- Cover the whole size range for the oil pipe and casing.



**Features:**

**Thread joint:**

Side hook threaded joint is adopted. -3° bearing side angle can improve the joint capability for tensile and compression resistance. The excellent structural integrity can be kept under stretching and bending, especially for deep well, extended reach well, and horizontal well. The geometrical parameters of the thread can ensure its good anti-gluing property, and eliminate the adverse effect arising from plugged pipe dope after being screwed.

**Hermetically-sealed structure:**

15°Conical surface – Conical surface metal seal system ensures the excellent air-tight capability and good anti-gluing property under the composite load. The good tightness still can be met after multiple makeups and breakouts.

**Torque ledge:**

The negative angle torque ledge provides the precise screwed position. "Wedge effect" of the negative angle shoulder and sealing surface reinforces the sealing capability for metal sealing surface. The selection of the best negative angle design can overcome the adverse composite load (compression + external pressure, bending + compression).

**Inner hole:**

Streamlined inner hole can reduce the turbulence and energy loss during high-speed air flow.

**Coupling design:**

Joining efficiency is more than 100%, and coupling dangerous sectional area is larger than pipe dangerous sectional area. Coupling covers the thread disappeared from the pipe to further boost the joint strength.

**Joint low stress design:**

It can ensure the joint to be safe and reliable under the corrosive environment.



## TTGM-5 Large Diameter Thread

**Specification:** 20 In~30In

**Steel Grade:** J55 K55 N80

### 产品介绍

A series of large diameter petroleum casing is applicable for domestic large oil fields, such as, Tarim, Daqing, Liaohe, Xinjiang (Karamay), Bohai, Donghai, east of Nanhai, west of Nanhai, and Shengli oil fields, mainly used as surface casing for exploration and production of oil and gas wells.

With the movement of exploration and development of oil and natural gas to the west from the east in China, a strategy of "Stabilizing the east and developing the west" has been formulated. Most of the western oil wells are deep well with complex geologic conditions, which requires higher requirements on casing variety and specification. J55 steel grade is generally adopted to develop such oil casing with large diameter (609.60mm) used for the oil and gas wells under the complex geologic conditions. With the development of offshore oil, the demand for large diameter and high-strength oil casing will get larger and larger. The domestic manufacturers almost had no production capability to make large diameter (609.60mm) high-strength oil casing in the 20th century, with only small quantity of trial production and most of them relying on import. In order to fill the blanket in the field of large diameter oil casing for our country, it is imminent to research and develop high-performance and low-cost large-diameter (more than 609.60mm) casings.

### Descriptions of Product Comprehensive Performance:

- (1) Large-diameter and double-headed thread casing is our company's independently R&D non-API new product, initially produced in China.
- (2) Easy butt joint with fast makeup and high efficiency. Makeup and breakout time has been saved by approx. 50% -70%.
- (3) Many aspects, such as mechanic property, are equivalent to the casing base metal; therefore, the use performance will not be affected by fast makeup during operation.
- (4) Thread: 3P/In and large pitch deflected trapezoidal thread is adopted. With completely phosphate processing, this thread has features like easy butt joint, quick makeup, and high strength connection, to achieve 100% pipe body connection.
- (5) Welding: Special wire is used. Meanwhile, preheat and post-weld heat treatment are performed. Temperature on the welding seam can be equivalent to that on the pipe body. Zone affected by heat can reach 80% of pipe body strength to be completely able to meet the use requirements.



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## TTGM-6 Double-headed Thread

**Specification:** 9.5/8 In ~ 20 In

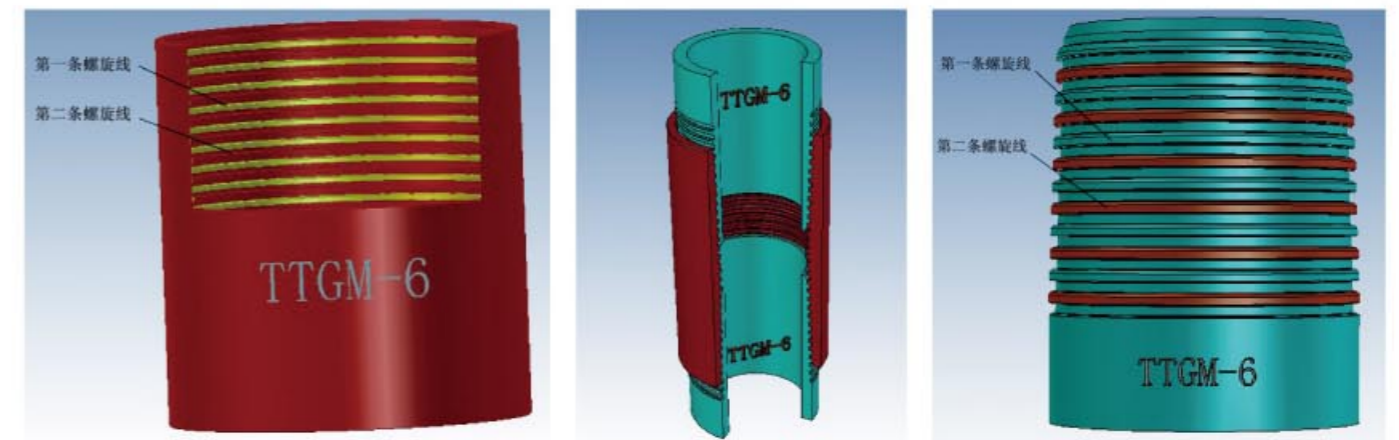
### Features:

With fairly large pitch, it is easy to fast makeup, and can save casing connection of well-logging time.

The joint features strong resistance to stress, crack and brushing corrosion

High-strength connection and good sealing performance.

Can be used together with acid corrosion-proof steel to greatly improve the corrosion resistance of the casing.



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## TT50 Special Steel Grade Casing Series

### Product Description:

For the response to the national call of energy saving, and to satisfy the need of cost control in the oil field, it is imminent to research and develop a low-cost and high-performance product. TTGM approved and initiated this project at the beginning of 2009. With great efforts in R&D TTGM successfully developed it at the end of 2010. It has obtained the test report after passing the evaluation test implemented by Xi'an Pip Institute.

TT50 steel grade casing is a new non-API standard product independently developed by us. Its mechanic property can reach close to reach J55 steel grade casing. TT50 casing is not only suitable for the actual requirement of oil field, but also able to significantly reduce the drilling cost of oil field. The following measures can be used to achieve product performance through material design:

- (1) Special high-quality carbon steel is used as raw material;
- (2) Pure steel smelting technology is adopted;
- (3) Modern precision steelmaking technology is adopted;
- (4) High-strength and high-toughness steel pipe heat-treatment technology is used;
- (5) Casing thread glue resistance processing technology is used.



### Application Range:

Special steel grade casing series (TT50) is suitable for large domestic oil fields, such as, Changqing, Daqing, Liaohe, Xinjiang (Karamay), and Shengli oil fields, mainly used as surface casing for the exploration and production of oil fields.

### Product Marker:

Steel Grade	Color Marker, Coupling Pipe Body	Coupling	Pipe Body
TT50		Completely coated in green	One green ring + one white ring

### Mechanical Properties:

Steel Grade	Yield Strength MPa	Tensile Strength MPa	Impact Energy J (Longitudinal normal temperature 10×10)
TT50	320-518	≥517	≥16

### Comparison of Grade Performance for TT50 and J55 Steel:

Steel Grade	Yield Strength MPa	Tensile Strength MPa	Impact Energy J (Longitudinal normal temperature 10×10)	Thread Sandblasting
TT50	320-518	≥517	≥16	YES
J55	379-552	≥517	No requirement	NO

### Machining Range:

Variety	Outer Diameter (mm)	Wall Thickness (mm)	Steel Grade	Thread Form	Manufacturing Method	Typical Usage
Special Steel Grade Casing Series	114.30~339.70	5.21~15.88	TT50	S/L/B/TT series	Seamless S Longitudinal ERW	Surface casing

检验报告

(2010) 质检字 915 号

产品名称	套管管体	规格型号	Q345B-8.88mm TT50
生产单位	天津石油装备制造有限公司	项目编号	19-0473
注册商標	/	检验类别	委托检验
委托单位	天津石油装备制造有限公司	委托地点	/
出厂编号	/	委托数量	/
生产日期	/	存库编号	19
检验日期	/	样品数量	1根
取样日期	2019.12.20	样品状态	清
检验日期	2019.12.20~2019.12.24	检验人	/
报告日期	2019.12.24	送样人	刘宝东

检验依据: 委托协议

检验依据标准: QB/T1089-08 (TTGM TT50 套管管体) \*

检验结论: (1) 该材料的产品性能符合 QB/T1089-08 标准要求; (2) 该材料的产品性能符合 QB/T1089-08 标准要求。

检验日期: 2019.12.20

检验人: 李光峰

编制: 李光峰

检验报告

(2010) 质检字 916 号

产品名称	套管管体	规格型号	Q345B-8.88mm TT50
生产单位	天津石油装备制造有限公司	项目编号	19-0483
注册商標	/	检验类别	委托检验
委托单位	天津石油装备制造有限公司	委托地点	/
出厂编号	/	委托数量	/
生产日期	/	存库编号	29
检验日期	/	样品数量	1根
取样日期	2019.12.20	样品状态	清
检验日期	2019.12.20~2019.12.24	检验人	/
报告日期	2019.12.24	送样人	刘宝东

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检验日期: 2019.12.20

检验人: 李光峰

编制: 李光峰

### 现场使用报告

四川英特工程公司 40293 钻井队承钻的 24-01 井表层钻井中, 其下入天津德华石油装备制造有限公司生产的规格为 124.48\*8.84, 钢级为 TT50 的表层套管 306.27 米, 在现场下管作业中, 上扣无问题, 表面无龟裂, 二次试压均达到地质所要求, 五厂产建项目组及工程设计要求。

特此证明

2019.12.28  
检验人: 李光峰  
日期: 2019.12.28

## TG Series Double-ledge High-torsion Big Water Hole Drill Rod

Double-ledge high-torsion big water hole drill rod is our new developed product; compared with API joint, it has similar makeup and breakout, and possesses the following advantages:

1. Double-ledge design is better to uniform the stress distribution, with two ends of thread to bear the load. Compared with API joint, it has stronger rigidity, and torsion resistance performance is increased by more than 30% under the same wall thickness;
2. The junction stress concentration is decreased; fatigue resistance is improved, so as to prolong the service life; compared with API thread, more outer diameter wear loss is allowed prior to the degrade;
3. Joint outer diameter is appropriately reduced, and annulus space is increased through optimization design, to accordingly lower the circulating pressure loss in annulus space and improve the joint salvageable ability;
4. Smooth inner surface design improves the joint hydraulic performance, result in more stable flow and smaller turbulence, to reduce the possibility of erosion and cement and solid particles deposition in the joint.
5. Inner diameter is increased through the optimization design, to reduce the circulating pressure loss within the drill tool, raise the efficiency and capacity of pumping in the drill string, and enhance the capacity of various cables and instruments in the drill string.

At present, our company's typical double-ledge high-torsion big water hole products include TG55 and TG50, etc.



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TG Series Drill Rod Parameters

TG Series Drill Rod Parameters	Pipe End Thickening Type	Drill Rod Steel Grade	Pound Class (lb/ft)	Nominal Wall Thickness (mm)	Male Thread Joint Tong Space Length (mm)	Female Thread Joint Tong Space Length (mm)	Single Drill Rod Length and Range m	Male Thread Joint Inner Diameter (mm)	Female Thread Joint Inner Diameter (mm)	Male&Female Thread Joint Outer Diameter (mm)	Pipe Body Outer Diameter (mm)	Drill Rod Joint Thread Form	Maximum Makeup Torque (N-M)
4 1/2"18°	IEU	G105	20.00	10.92	228.6	381	9.60 ± 0.15	82.6	≥82.6	158.8	114.3	TG46	38610
4 1/2"18°	IEU	S135	20.00	10.92	228.6	381	9.60 ± 0.15	82.6	≥82.6	158.8	114.3	TG46	38610
5"18°	IEU	G105	25.60	12.7	254	381	9.60 ± 0.15	95.3	≥95.3	168.3	127.0	TG50	43350
5"18°	IEU	S135	25.60	12.7	254	381	9.60 ± 0.15	95.3	≥95.3	168.3	127.0	TG50	43350
5 1/2"18°	IEU	G105	24.70	10.54	254	381	9.60 ± 0.15	101.6	≥101.6	177.8	139.7	TG55	62730
5 1/2"18°	IEU	S135	24.70	10.54	254	381	9.60 ± 0.15	101.6	≥101.6	177.8	139.7	TG55	62730



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## TTGM-7

- Straight connection without coupling to maximize annular clearance;
- Joint connection efficiency can achieve 50%-60% of pipe strength;
- Really flush inner and outer surfaces;
- Processed on the medium-and thick-walled casing.

### Features:

#### Threaded joint:

Non-API standard deflected trapezoidal thread is adopted with high-strength connection. Processed on the medium –or thick-walled casing, thread gages can be used directly to detect and test various parameters of the thread.

#### Hermetically-sealed structure:

Conical surface – Conical surface metal seal ensures the seal surface to have sufficient contact width and reasonable contact pressure. Metal – Metal seal system guarantees the excellent air-tight capability under the composite load. The good tightness still can be met after multiple makeups and breakouts. Sealed surface geometric parameters can guarantee its excellent property of anti-gluing.

#### Torque ledge:

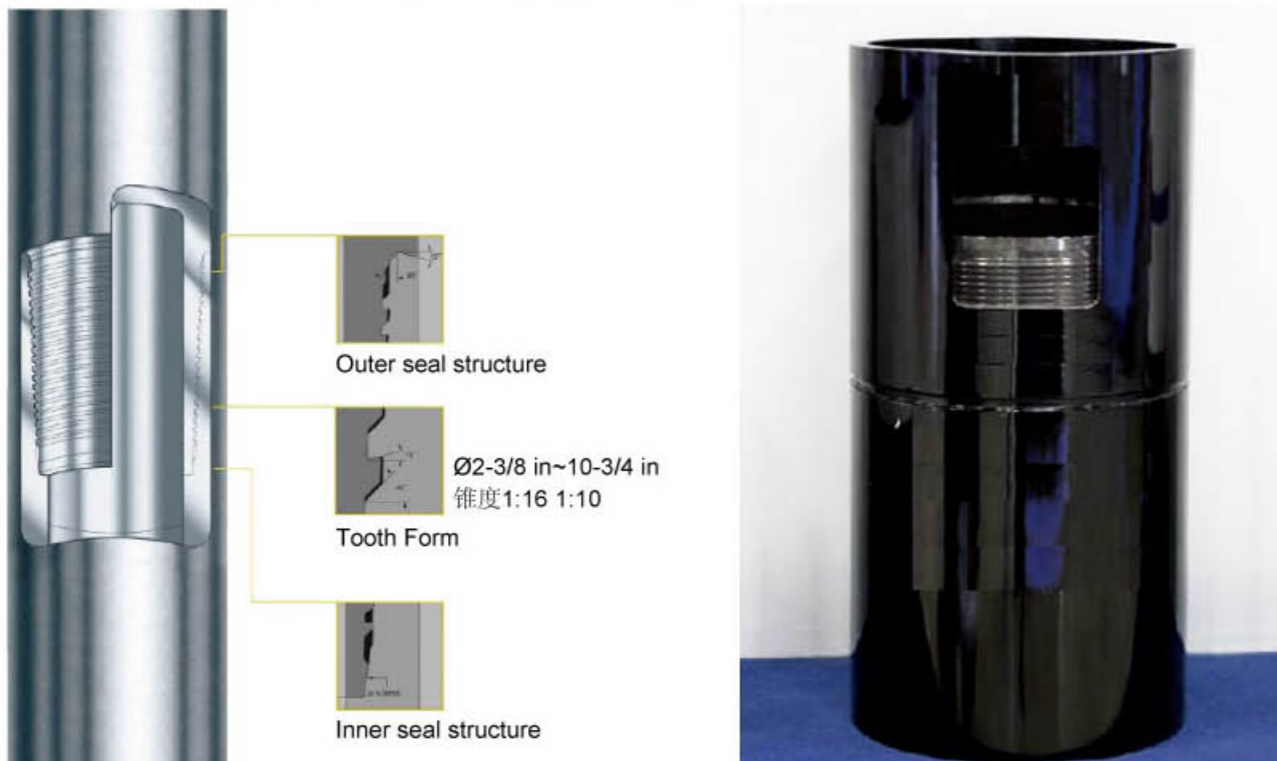
The torque ledge provides the precise screwed position, and reinforces metal --- sealing capability for metal seal surface.

#### Inner hole:

Inner and outer surfaces are really flush to provide the maximum clearance.

#### Joint low stress design:

It can ensure the joint to be safe and reliable under the corrosive environment.



TTGM-7 Common Specification and Performance Parameters Table

Size (OD)	Nominal weight	Pipe					Tensile Pipe Connection performance (1000 lb.)					External pressure (psi)				Minimum Internal Yield Pressure (psi)			
		Plain end weight	Wall thickness		ID nominal	Drift diameter	Parting Load					External pressure (psi)				Minimum Internal Yield Pressure (psi)			
			lb./ft.	in.			mm	l80	N80	R95	P110	Q125	80 ksi	95 ksi	110 ksi	125 ksi	80 ksi	95 ksi	110 ksi
inch	lb./ft.	lb./ft.	in.	mm	in.	in.	l80	N80	R95	P110	Q125	80 ksi	95 ksi	110 ksi	125 ksi	80 ksi	95 ksi	110 ksi	125 ksi
2 7/8 73.03	6.40	6.16	0.217	5.51	2.441	2.347	84	89	93	111	120	11170	12940	14550	16070	10570	12550	14530	16510
	7.80	7.66	0.276	7.01	2.323	2.229	111	117	123	146	158	13890	16490	19090	21700	13440	15960	18480	21000
	8.60	8.44	0.308	7.82	2.259	2.165	131	138	145	172	186	15300	18170	21040	23910	15000	17810	20620	23430
	9.80	9.72	0.362	9.19	2.151	2.057	149	157	165	197	212	17610	20910	24210	27510	17630	20930	24240	27540
3 1/2 88.90	7.70	7.58	0.216	5.49	3.068	2.943	101	106	111	132	143	7870	8850	9730	10500	8640	10260	11880	13500
	9.20	8.81	0.254	6.45	2.992	2.867	135	142	149	177	192	10540	12080	13530	14890	10160	12070	13970	15880
	10.20	9.91	0.289	7.34	2.922	2.797	152	160	168	200	216	12120	14390	16670	18940	11560	13730	15900	18060
	12.70	12.52	0.375	9.53	2.750	2.625	227	239	251	299	323	15310	18180	21050	23920	15000	17810	20630	23440
	13.70	13.62	0.413	10.49	2.674	2.549	258	271	285	339	366	16650	19770	22900	26020	16520	19620	22720	25810
5 1/2 139.70	14.70	14.63	0.449	11.40	2.602	2.477	278	293	308	366	396	17890	21250	24600	27960	17960	21330	24700	28060
	15.50	15.37	0.476	12.09	2.548	2.423	292	308	323	384	415	18800	22330	25850	29380	19040	22610	26180	29750
	15.50	15.35	0.275	6.99	4.950	4.825	236	249	261	311	336	4990	5380	5630	5890	7000	8310	9630	10940
	17.00	16.87	0.304	7.72	4.892	4.767	260	274	287	342	369	6290	6940	7480	7890	7740	9190	10640	12090
	20.00	19.81	0.361	9.17	4.778	4.653	325	342	359	427	461	8830	10020	11110	12090	9190	10910	12640	14360
	23.00	22.54	0.415	10.54	4.670	4.545	401	422	443	527	569	11160	12930	14540	16060	10560	12540	14530	16510
7 177.8	26.00	25.54	0.476	12.09	4.548	4.423	478	503	528	629	679	12650	15020	17390	19760	12120	14390	16660	18930
	28.40	28.13	0.530	13.46	4.440	4.315	478	503	528	629	679	13930	16540	19160	21770	13490	16020	18550	21080
	29.70	29.64	0.562	14.27	4.376	4.251	541	569	597	711	768	14680	17430	20180	22940	14310	16990	19670	22350
	32.00	31.95	0.612	15.54	4.276	4.251	583	613	644	767	828	15820	18790	21760	24720	15580	18500	21420	24340
	23.00	22.63	0.317	8.05	6.366	6.241	323	340	357	425	459	3830	4140	4430	4650	6340	7530	8720	9910
	26.00	25.66	0.362	9.19	6.276	6.151	408	430	451	537	580	5410	5890	6230	6450	7240	8600	9960	11310
9 5/8 244.48	29.00	28.72	0.408	10.36	6.184	6.059	494	520	546	650	702	7030	7840	8530	9110	8160	9690	11220	12750
	32.00	31.67	0.453	11.51	6.094	6.000A	576	606	637	758	819	8600	9740	10780	11710	9060	10760	12460	14160
	35.00	34.58	0.498	12.65	6.004	5.879	631	664	697	830	897	10180	11650	13030	14310	9960	11830	13700	15560
	38.00	37.26	0.540	13.72	5.920	5.795	679	715	751	894	965	11390	13430	15130	16740	10800	12830	14850	16880
	36.00	34.86	0.352	8.94	8.921	8.765	521	548	576	685	740	2370	2460	2470	2470	5120	6080	7040	8000
	40.00	38.94	0.395	10.03	8.835	8.679	635	668	701	835	902	3090	3330	3470	3530	5750	6820	7900	8980
59.40	43.50	42.69	0.435	11.05	8.755	8.599	739	778	817	973	1051	3810	4130	4420	4620	6330	7510	8700	9890
	47.00	46.14	0.472	11.99	8.681	8.525	836	880	924	1100	1188	4750	5090	5300	5630	6870	8150	9440	10730
	53.50	52.85	0.545	13.84	8.535	8.500A	962	1013	1063	1266	1367	6620	7340	7950	8440	7930	9410	10900	12390
	58.40	57.38	0.595	15.11	8.435	8.279	1092	1150	1207	1437	1552	7890	8890	9770	10540	8650	10280	11900	13520



## Anti-corrosion Series Casing

### Application Range:

According to statistics, approx. 1/3 world's oil and gas fields contain hydrogen sulfide gas. Many oil fields in our country, such as Sichuan, Changqing, North China, Xinjiang, and Jiangnan oil fields, have hydrogen sulfide gas in their reservoirs, in particular, Sichuan oil field as an example, which is one of the most serious corroded oil fields in the world.

### Mechanical Specifications:

Steel Grade	Yield Strength MPa	Tensile Strength MPa	Elongation %	Impact Value J	Grain Size	Hardness Value HRC
TT80S	552-655	≥655	API 5CT	≥40	≥6.0	≤23△≤3
TT80SS	552-655	≥655	API 5CT	≥40	≥6.0	≤23△≤3
TT95S	655-758	≥724	API 5CT	API 5CT	≥7.0	≤19-25.4△≤3
TT110S	758-862	≥800	API 5CT	≥120	≥7.0	≤30△≤3
TT110SS	758-862	≥800	API 5CT	≥120	≥7.0	≤30△≤3

### SSC Test

Steel Grade	SSC Threshold Value (Standard Sample)	Test Method
TT80S	80% S.M.Y.S	NACE TM0117-2005 A Method
TT80SS	90% S.M.Y.S	NACE TM0117-2005 A Method
TT95S	80% S.M.Y.S	NACE TM0117-2005 A Method
TT110S	80% S.M.Y.S	NACE TM0117-2005 A Method
TT110SS	90% S.M.Y.S	NACE TM0117-2005 A Method

### Machining Range

Variety	Outer Diameter (mm)	Wall Thickness (mm)	Steel Grade	Thread Form	Typical Usage
Anti-hydrogen Sulfide Casing Series	114.30~339.70	5.21~15.88	TT80S TT95S TT110S	S/L/B/ TT Series	Hydrogen sulfide corroded environment
High Anti-hydrogen sulfide Corrosion Casing Series	114.30~339.70	5.21~15.88	TT80SS TT110SS	S/L/B/ TT Series	Serious hydrogen sulfide corroded environment

### The following measures can be taken to achieve the product performance index:

(1) Steel grade design: Carbon chrome molybdenum steel is adopted to produce high-strength and hydrogen sulfide stress corrosion resistance casing which can meet API SPEC SCT and completely satisfy the actual performance requirement for hydrogen sulfide stress corrosion resistance in oil fields.

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(2) A unique pure steel production technology: Finished product substances in the high-strength anti-hydrogen sulfide corrosion petroleum special pipe are P≤0.010%, S≤0.005%, Hs≤2ppm. Other low melting point elements are within the 10ppm control value.

(3) Inclusions modification technology: With the modification of long MnS inclusions shape as control point, it is achieved to eliminate the cracking source, to effectively improve the hydrogen sulfide stress corrosion resistance performance of the material, and satisfy the requirements for high-grade steel anti-hydrogen sulfide corrosion petroleum special pipe with excellent corrosion resistance performance.

(4) A unique steel pipe heat treatment technology: With uniform tempered sorbite structure and fine grains, high-strength and high-toughness balance can be achieved, to guarantee the various mechanical properties and hydrogen sulfide stress corrosion resistance performance of steel pipe.

(5) A unique control technology of steel pipe residual stress: Selection of proper pipe heating system, and hot leveling temperature system and secondary sizing process can effectively control the residual stress of steel pipe, so as to solve the technical difficulties, e.g., high-strength casing used in the hydrogen sulfide stress corrosive sensitive areas, and allow the steel pipe to own excellent hydrogen sulfide stress corrosion resistance and anti-collapsing performances.



### Color Marker

Steel Grade	Color Marker, Coupling Pipe Body	Coupling	Pipe Body
TT80S		Completely coated in red + one yellow ring	One red ring + one yellow ring
TT80SS		Completely coated in red + one yellow ring	One red ring + two yellow rings
TT95S		Completely coated in silver + one yellow ring	One silver ring + one yellow ring
TT110S		Completely coated in white + one yellow ring	One white ring + one yellow ring
TT110SS		Completely coated in white + one yellow ring	One white ring + two yellow rings

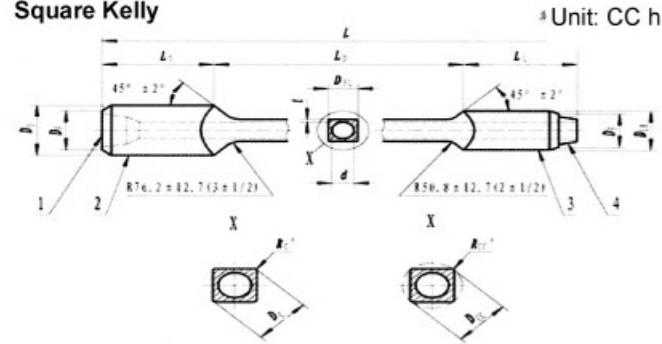
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## Kelly

With the implementation of API Spec 7-1 and SY/T6500 standard, the Kelly is made of AISI 41 45H alloy steel, to achieve excellent mechanical properties within the full length range, after the overall heat treatment with intermediate frequency and 20 meters horizontal electric resistance furnace; cold-rolled, copper plating, or phosphating treatments can be also applied to the thread.

### Square Kelly



Left-hand female thread  
Rear end added on the downside  
Rear end added on the upside  
Right-hand male thread

Kelly Spec. b	Female Thread Connection of Upper End					Female Thread Connection of Lower End				
	Marker c	Outer Diameter DU	Side Angle Right Angle DF	Thickness and Length of Upper End LU	Marker	Outer Diameter DLR	Inner Diameter d	Side Angle Right Angle DF	Thickness and Length of Lower End LL	
		±0.8	±0.4			±0.8		±0.4		
63.2	Standard	6 5/8REG	196.8	186.1	406.4	NC26	85.7	31.8	83.0	508.0
	Optional	4 1/2REG	146.0	134.5	406.4	NC26	85.7	31.8	83.0	508.0
76.2	Standard	6 5/8REG	196.8	186.1	406.4	NC31	104.8	44.4	100.4	508.0
	Optional	4 1/2REG	146.0	134.5	406.4	NC31	104.8	44.4	100.4	508.0
88.9	Standard	6 5/8REG	196.8	186.1	406.4	NC38	120.6	57.2	116.3	508.0
	Optional	4 1/2REG	146.0	134.5	406.4	NC38	120.6	57.2	116.3	508.0
108.0	Standard	6 5/8REG	196.8	186.1	406.4	NC46	158.8	71.4	145.2	508.0
	Optional	6 5/8REG	196.8	186.1	406.4	NC50	161.9	71.4	154.0	508.0
	Standard	4 1/2REG	146.0	134.5	406.4	NC46	158.8	71.4	145.2	508.0
	Optional	4 1/2REG	146.0	134.5	406.4	NC50	161.9	71.4	154.0	508.0
133.4	Standard	6 5/8REG	196.8	186.1	406.4	5 1/2 FH	177.8	82.6	170.6	508.0
	Optional	6 5/8REG	196.8	186.1	406.4	NC56	177.8	82.6	171.0	508.0

□ See 6.3 for rotating ledge thread connection.

□ Square Kelly specification --- column values are the same as square size DFL (distance between the edges) values of No. six column in Table 4.

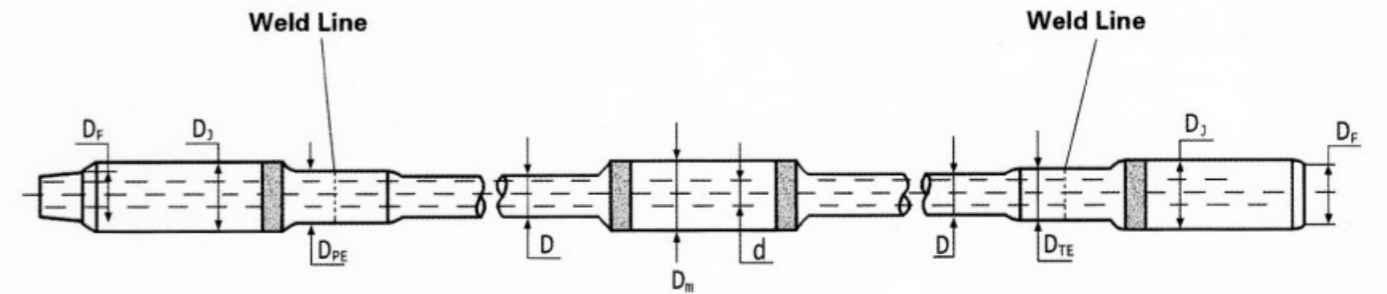
□ Markers are used to easily access the information, and assist the classification management.

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## Heavy Weight Drill Rod

Heavy weight drill rod has two types: welded type and integral type. Welded type heavy weight drill rod body is welded with male and female thread joints through friction welding; integral type heavy weight drill rod has no welding seam. During drilling, the heavy weight drill rod is between the drill rod and drill collar on the drill string. Heavy weight drill rod is used to effectively alleviate the stress concentration arising from section abrupt change on the drill collar and drill rod connection part. Heavy weight drill rod can be used in the slim hole to replace the drill collar to enable convenient operation. It can substitute most of drill collars in the directional well, so as to reduce the adhesion and pipe-sticking etc. Heavy weight drill rod mainly assumes loads like torsion, bending, internal pressure, external pressure, controlled stretching, and vibration during the use. When the drift occurs for the performance in the drill string, heavy weight drill rod also needs to assume compression and bending loads.



Spec.	Pipe Body				Thread Type	Joint			Single Pipe Weight
	Outer Diameter D (mm)	Inner Diameter d (mm)	Thickened Size			Outer Diameter D3 (mm)	Inner Diameter ID (mm)	Side Angle Diameter DF (mm)	
			Midieum Dm (mm)	End d (mm)					
3 1/2	88.9	52.4	116.3	98.4	NC38 ( 3 1/2IF )	127	55.6	116.3	312
3 1/2	88.9	57.2	116.3	98.4	NC38 ( 3 1/2IF )	127	58.7	116.3	282
4	101.6	65.1	114.3	106.4	NC40 ( 4FH )	133.4	68.3	127.4	370
4 1/2	114.3	69.9	127	119.1	NC46 ( 4IF )	158.8	73	145.3	558
5	127	76.2	139.7	130.2	NC50 ( 4 1/2IF )	168.3	77.8	170.7	672
5 1/2	139.7	92.1	152.4	144.5	5 1/2FH	184.2	88.9	170.7	776
6 5/8	168.3	114.3	184.2	171.5	6 5/8FH	203.2	117.5	195.7	964

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## Thermal Production Well Casing Series

### Applicable Range:

TT series heavy oil thermal production well pipe is applicable for exploration and production of different heavy oil wells in China, such as, Liaohe, Xinjiang (Karamay), and Shengli oil fields, etc.

### Product Feature:

Its material has good thermal stability, and its strength specifications still can stay very stable at 350°C ambient temperature, with strong capability to resist collapsing and faulted deformation, and excellent sealing property at high temperature. It also has easy operation and other advantages, specially served for the heat environment of heavy oil and extra heavy oil thermal production wells.

### Machining Range:

Variety	Outer Diameter (mm)	Wall Thickness (mm)	Steel Grade	Thread Form	Manufacturing Method	Typical Usage
Thermal Production Well Casing Series	114.30~339.70	5.21~15.88	TT90H	S/L/B /TT Series	Seamless (S)	Heavy oil thermal production well
			TT100H			
			TT110H			

### Main Specifications:

#### (1) Harmful Elements Control

Steel Grade	P	S	Cu
TT90H	<0.020	≤0.015	≤0.20
TT100H	≤0.020	≤0.012	≤0.20
TT110H	≤0.020	≤0.010	≤0.20

#### (2) Mechanical Specifications



Steel Grade	Yield Strength (Mpa)		Tensile Strength (Mpa)		Elongation (%)		Impact Energy (J) Full Size 0°C	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
TT90H	910	710	-	800	-	13	-	45
TT100H	950	750	-	850	-	13	-	50
TT110H	990	790	-	890	-	13	-	55

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### (3) Usage Specifications (177.80 × 9.19mm, BTC)

Steel Grade	Slippage Strength (klps) min	Pipe Body Yield Strength (klps) min	Pipe Body Collapsing Strength (Psi)	Inside Yield Strength (Psi) min
TT90H	790	770	6000	9300
TT100H	842	820	6200	9840
TT110H	886	860	6300	10300

Steel Grade	Color Marker, Coupling Pipe Body	Coupling	Pipe Body
TT100H		Completely coated in white	Two white rings + one blue ring
TT110H		Completely coated in white	One white ring + one blue ring



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## Drill Collar

**Standard:** API Spec-7-1

**Product Features:**

High-quality material is selected, and intermediate frequency heat treatment device, non-destructive test equipment, mechanical properties test equipment are adopted as to ensure the production of high-quality ordinary drill collars, spiral drill collars and non-magnetic drill collars satisfying API Spec-7-1 requirements.



**Specification of Drill Collar:**

Model of Drill Collar Thread	Outer Diameter D		Inner Diameter d		Length L (mm)	Ledge Chamfering Diameter Df (mm)	Reference Bending Strength Ratio
	mm	in	mm	in			
NC31-41(2-7/8F)	104.8	4-1/8	50.8	2	9150/9450	100.4	2.43:1
NC35-47	120.7	4-3/4	50.8	2	9150/9450	114.7	2.58:1
NC38-50(3-1/2IF)	127.0	5	57.2	2-1/4	9150/9450	121.0	2.38:1
NC44-60	152.4	6	57.2	2-1/4	9150/9450	144.5	2.49:1
NC44-60	152.4	6	71.4	2-13/16	9150/9450	144.5	2.84:1
NC44-62	158.8	6-1/4	57.2	2-1/4	9150/9450	149.2	2.91:1
NC46-62(4IF)	158.8	6-1/4	71.4	2-13/16	9150/9450	150.0	2.63:1
NC46-65(4IF)	165.1	6-1/2	57.2	2-1/4	9150/9450	154.8	2.76:1
NC46-65(4IF)	165.1	6-1/2	71.4	2-13/16	9150/9450	154.8	3.05:1
NC46-67(4IF)	171.4	6-3/4	57.2	2-1/4	9150/9450	159.5	3.18:1
NC50-70(4-1/2IF)	177.8	7	57.2	2-1/4	9150/9450	164.7	2.54:1
NC50-70(4-1/2IF)	177.8	7	71.4	2-13/16	9150/9450	164.7	2.73:1
NC50-72(4-1/2IF)	184.2	7-1/4	71.4	2-13/16	9150/9450	169.5	3.12:1
NC56-77	196.8	7-3/4	71.4	2-13/16	9150/9450	185.3	2.70:1
NC56-80	203.2	8	71.4	2-13/16	9150/9450	190.1	3.02:1
6-5/8REG	209.6	8-1/4	71.4	2-13/16	9150/9450	195.7	2.93:1
NC61-90	228.6	9	71.4	2-13/16	9150/9450	212.7	3.17:1
7-5/8REG	241.3	9-1/2	76.2	3	9150/9450	223.8	2.81:1
NC70-97	247.6	9-3/4	76.2	3	9150/9450	232.6	2.57:1
NC70-100	254.0	10	76.2	3	9150/9450	237.3	2.81:1

□ Variety of Drill collar thread: NCXX-numeric type, IF-inner flat type, REG-regular type, and those in the brackets are the exchangeable drill collar thread varieties.

□ Bending strength ratio: A ratio between anti-bending section modulus of internal thread dangerous section and anti-bending section modulus of external thread dangerous section.

□ NC50-67 (4 -1/2 1F) only is applicable to C type drill collar.

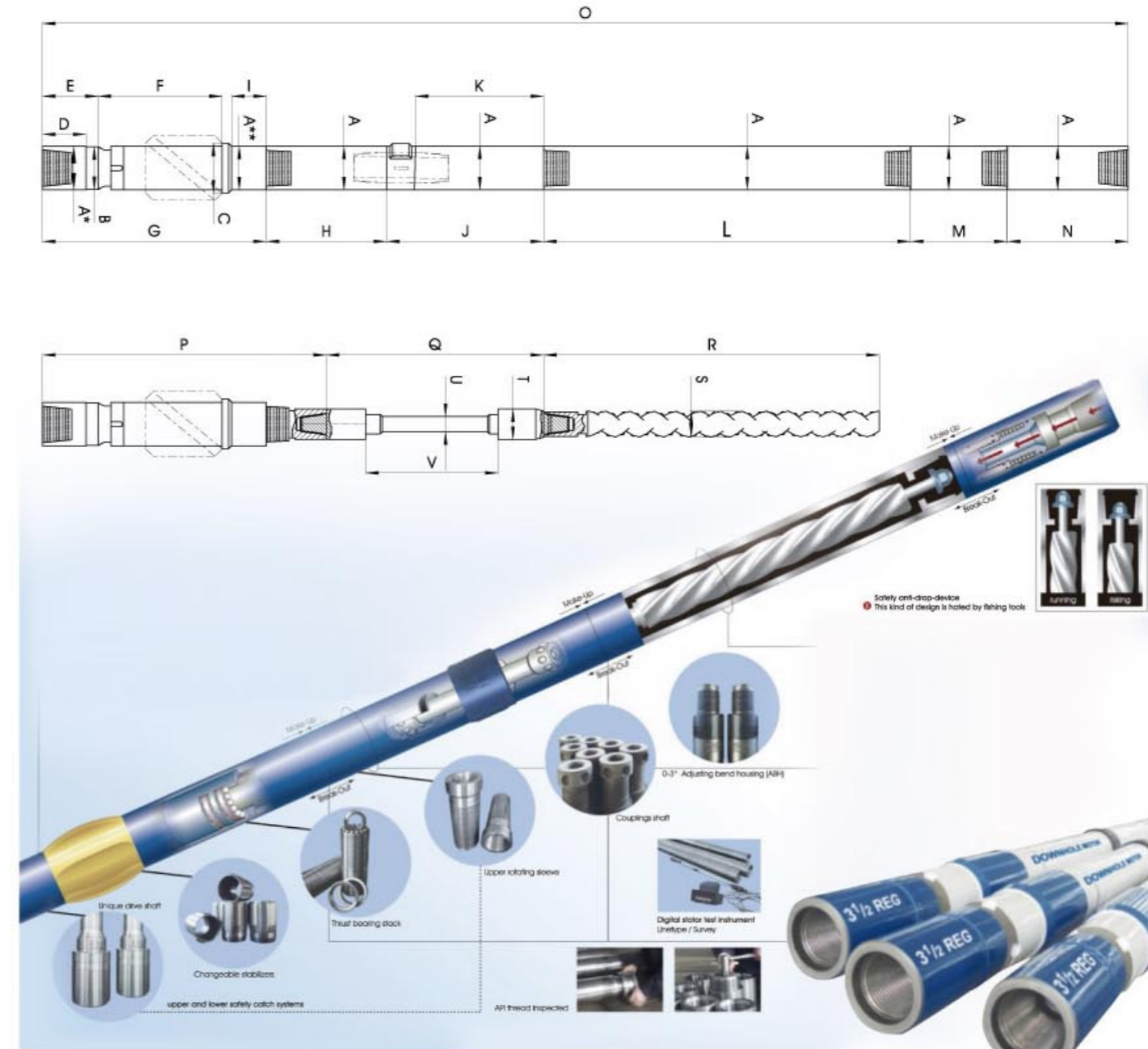
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## Screw Drill

Screw drill is a positive displacement downhole drill tool, with the drilling fluid as driving force, after transferring the liquid pressure into mechanical energy. When the mud from sludge pump flows into motor through bypass valve, it will generate a certain pressure difference to push rotor rotating around the stator axis, and deliver the rotation speed and torque to the drill bit through cardan shaft and drive shaft, so as to run the drilling operation. Four major assemblies, bypass valve, hydraulic motor, cardan shaft, and drive shaft, constitute screw drill, which is main part for the drill tools.

Single-headed screw drill and multi-headed screw drill can be divided by their rotor/stator sub helix head. Various types of screw drill can be produced in our company, such as, single-headed LZ127×7.0, multi-headed 5LZ172×7.0L-4 and other types.



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## High-strength and high-toughness Series Casing

### Product Description:

This series product has better impact energy than ordinary API series casing. Their outstanding usage performance is displayed during the operation for deep wells and ultra-deep wells with their high strength and high toughness. Cr and Mo steels are the main material to make this series of casing, with heat treatment and thread anti-gluing technologies.


### Mechanical Specifications:

Steel Grade	Yield Strength MPa	Tensile Strength MPa	Elongation %	Charpy Impact Energy (J)			
				Sample Size	Conversion Factor	Horizontal	Longitudinal
TT110	758-965	≥862	API 5CT	10×10×55	1.00	≥60	≥80
				7.5×10×55	0.80	≥48	≥60
				5.0×10×55	0.55	≥33	≥44

### Physical Impact Energy Value:

SN	Specification	Impact Value (J)
1	177.8×10.36	89-100
2	177.8×11.51	110-120
3	177.8×12.65	120-130

### Product Marker:

Steel Grade	Color Marker, Coupling Pipe Body	Coupling	Pipe Body
TT100		Completely coated in white	Two white rings

### Grain Size and Inclusions

Grain size ≥ Grade 7, and see the below table for inclusions requirements: Limit Value of Inclusions Micro-examination

### Result

Sulfide (A)		Alumina (B)		Silicate (C)		Spherical Oxide (D)		Total
Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	
≤2.0	≤2.0	≤1.5	≤2.0	≤1.0	≤1.0	≤1.5	≤2.0	≤8.0

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## Slotted Screen

### Introduction:

Slotted screen is the vertical or spiral straight row and stagger gap with a certain specification slotted by many methods on the oil casing or pipe. It has 0.2-5mm gap widths, with slotting layout as parallel, stager, and spiral three types, generally used for the sand control and cracking resistance environment, such as, horizontal wells.

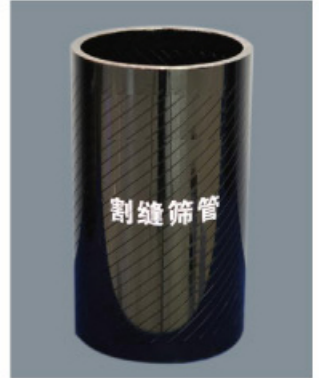
### Product Features:

Slotted edges have good verticality, with smooth and uniform gap without burr.

Big inner diameter, easy for pipe string configuration.

High strength without easy deformation.

Laser technology with wide applications.



### Anti-collapsing Strength Index:

API Standard Casing			Inner Diameter mm	Lenth m	Slot Length mm	Slot No NO./m	Slot Width mm	Slot Width Precision mm	Valid Filter Area cm/m	Max Strength KN		
Spec. mm	Wall Thickness mm	Weight per Meter Kg/m										
60.32	5	6.84	50.3	3	≤80	0.2-5	0.1			48	512.54	
73.02	5.5	9.15	62							240	57.6	688.55
88.9	6.5	13.22	75.9							280	67.2	995.1
101.6	6.5	15.22	88.6							300	72	1151.2
114.3	7	18.47	100.3							320	76.8	1400.4
127	7.52	22.13	112	340						81.6	1673.8	
139.7	7.72	25.11	124.3	10						360	86.4	1900.2
	9.17	29.48	121.4							360	86.4	2232.4
168.3	8.94	35.09	150.4							400	96	2672.95
177.8	8.05	33.68	161.7							440	105.6	2559.2
	9.19	38.19	159.4		440	105.6	2940.7					

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## TT Series High Anti-collapsing Casing

### Product Description:

TT series high anti-collapsing casing is the casing with high resistance to collapsing which is independently developed by Tianjin Dehua Petroleum Equipment Manufacturing Co., Ltd. It can be used to develop the oil field with complex geologic conditions, high difficulty exploration, and offshore, especially for the rock salt layer, the outside collapsing load and axial load assumed by the casing require the outstanding overall performances of the casing: high tensile and connection strength, excellent collapsing capability and good sealing property, the most importantly, is anti-collapsing feature.

### Anti-collapsing Strength Index

Outer Diameter (In)	Wall Thickness (In)	Weight (lb/ft)	Guaranteed Value of Anti-collapsing (Psi) min		
			TT80T	TT95T	TT110T
5-1/2	0.304	17.00	7890	8980	10200
5-1/2	0.361	20.00	10240	11560	13900
5-1/2	0.415	23.00	12300	14520	16400
5-1/2	0.476	26.00	/	17390	18400
5-1/2	0.530	28.00	/	19160	20300
7	0.317	23.00	5500	5650	5700
7	0.362	26.00	7110	7800	8300
7	0.408	29.00	8580	9780	11500
7	0.453	32.00	10050	11340	13600
7	0.498	35.00	11310	13010	15800
7	0.540	38.00	12700	15110	16900
9-5/8	0.395	40.00	4230	4230	4300
9-5/8	0.435	43.50	5500	5600	5600
9-5/8	0.472	47.00	6430	7100	7100
9-5/8	0.545	53.50	8180	9350	10800
9-5/8	0.595	58.40	/	10660	12800
9-5/8	0.625	61.10	/	11400	13700

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### Mechanical Specifications

Steel Grade	Yield Strength		Tensile Strength (MIN.)		Elongation MIN.
	KSI	MPa	KSI	MPa	
TT80T	80—110	552—758	100	689	Satisfied API 5CT
TT95T	95—125	655—860	115	793	Satisfied API 5CT
TT110T	110—140	758—965	125	862	Satisfied API 5CT

### Machining Range

Variety	Outer Diameter (mm)	Wall Thickness (mm)	Steel Grade	Thread Form	Typical Usage
High Anti-collapsing Series	114.30~339.70	5.21~15.88	TT80T TT95T TT110T	S/L/B/TT Series	For the environment with higher requirement for collapsing value

### Color Marker

Steel Grade	Color Marker (Coupling Pipe Body)	Coupling	Pipe Body
TT80T		Completely coated in red + one green ring	One red ring + two green ring
TT95T		Completely coated in brown	One brown ring + one green ring
TT110T		Completely coated in white	One white ring + one green ring

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