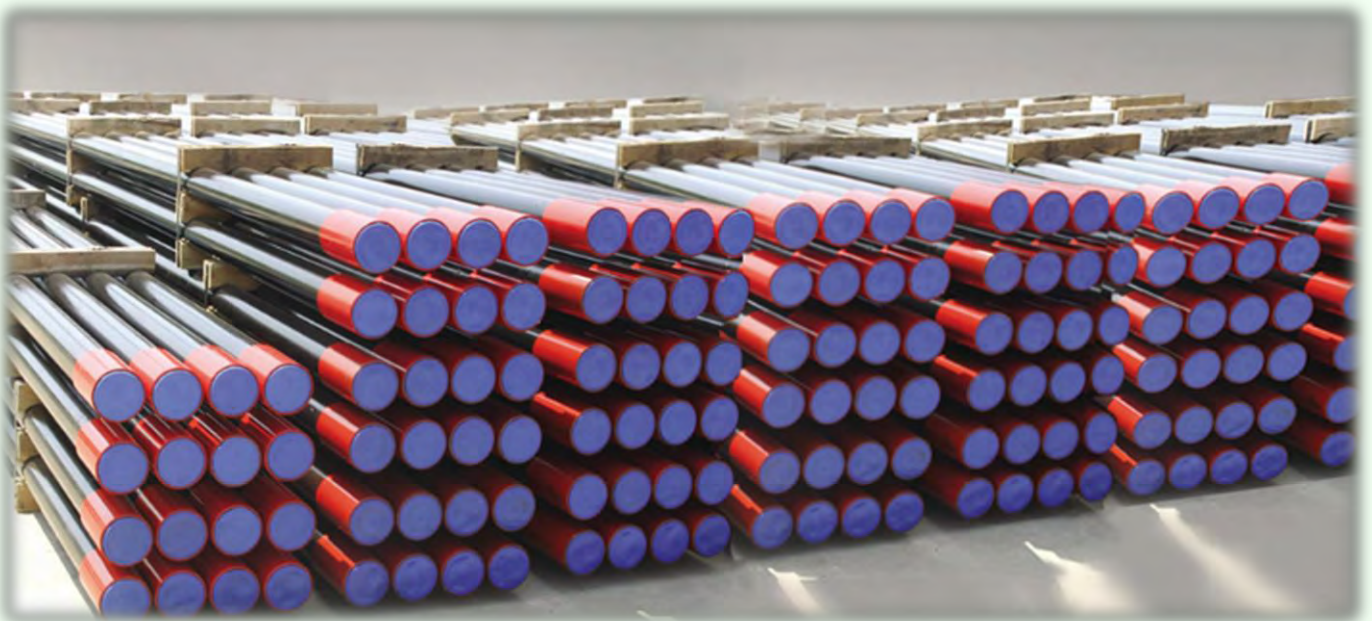




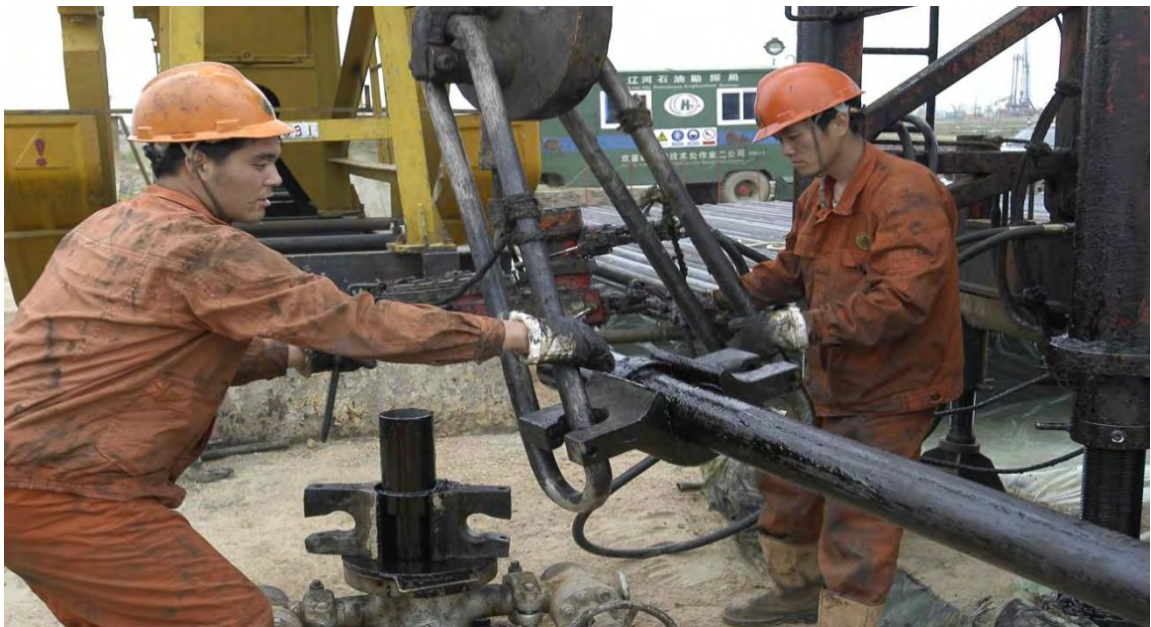
PetroPi Industries Ltd.

Pre-Stressed Vacuum Insulated Tubing/Casing



Introduction

The Pre-stressed Vacuum Insulated Tubing/Casing is innovative Tubing/Casing for thermal recovery of heavy oil or bitumen. It is used in **Steam Assisted Gravity Drainage (SAGD)** and **In Cyclic Steam Stimulation (CSS)**. It reduces the heat loss of the high temperature steam during injection phase. And keep oil hot during production phase. The build-in pre-stress feature can compensate the thermal stress on tubing/casing induced from hot steam, prevent the casing and cement mantle damage from high temperature, and increase tubing casing service life.



Advanced Facilities



The Company has over 1220 sets of production equipment (newness coefficient 0.64) including 60 sets of CNC machining equipment, 120 sets of conventional machining equipment, with maximum machining length of 8000mm and maximum machining diameter of 3000mm.

Specialized Production



Four production lines for pre-stressed insulated tubing/casing will provide specialized production with high efficiency.

Advanced Inspection Device



The Company has state of art Laboratory to perform mechanical properties inspection, chemical analysis, metallographic analysis, NDT inspection, and product performance inspection for drilling & completion equipment. A variety of equipment includes conventional inspection equipment, testing instrument, metallurgical microscope, direct-reading spectrum analyzer, infrared carbon and sulfur analyzer, universal testing machine, digital thermometer, digital hardness tester, X-ray detection machine, digital ultrasonic flaw detector, and heat-insulation coefficient inspection device for insulated tubing / casing etc. The testing lab is certified by Provincial Enterprise Inspection Agency and Product Quality Inspection Agency.

Heat Treatment and Other Capacity



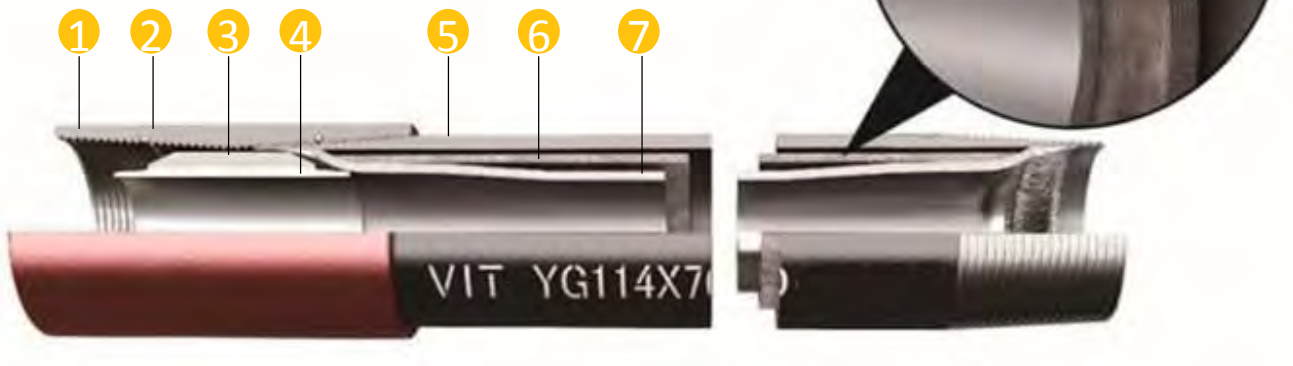
The Company has an annual capacity of 15000 ton for quenching, high-frequency hardening, annealing, carburization, seasoning, nitridation, phosphating, blackening, galvanization, compound plating, and chemical plating.

Pre-Stressed Vacuum Insulated Tubing/Casing Type 1 Connection: through Outer Tube

Features

- The coupling is connected by threaded outer tube.
- Multi threaded connection are available.
- Heat loss from coupling can be reduced by an insulation sleeve

- ① Coupling
- ② Seal ring
- ③ Insert
- ④ Insulation sleeve
- ⑤ Outer tube
- ⑥ Insulating material
- ⑦ Inner tube



VACUUM INSULATED TUBING/CASING

Pre-Stressed Vacuum Insulated Tubing/Casing

Type 1 Connection: through Outer Tube

型号 Model	隔热等级 Insulation Grade	外管外径 (mm) Outer Tube OD	内管内径 (mm) Inner Tube ID	钢级 Grade of steel	连接螺纹 Connecting Thread	最大工作温度 (°C) Max. Working Temperature	最大工作压力 (MPa) Max. Working Pressure	下井深度 (m) Running Depth
YG73 x 40	B、C、D	73.02	40.9	J55、N80、 L80、P110、 BG80H、 BG110H	NU、 EU、 BC、 USS、 HT4040	390	35	300-4600
YG88 x 50	D、E	88.9	50.66					
YG114 x 59	D、E	114.3	59					
YG114 x 62	D、E	114.3	62					
YG114 x 76	D、E	114.3	76					
YG139 x 88	C、D、E	139.7	88.3					
YG139 x 101	C、D、E	139.7	101.6					
YG177 x 124	B、C、D、E	177.8	124.26					

INSULATING GRADE	B	C	D	E
λ (W/m. °C) Apparent Coefficient of Heat Conductivity (λ) (W/m. °C)	$0.06 >$ $\lambda \geq 0.04$	$0.04 >$ $\lambda \geq 0.02$	$0.02 >$ $\lambda \geq 0.006$	$0.006 >$ $\lambda \geq 0.002$



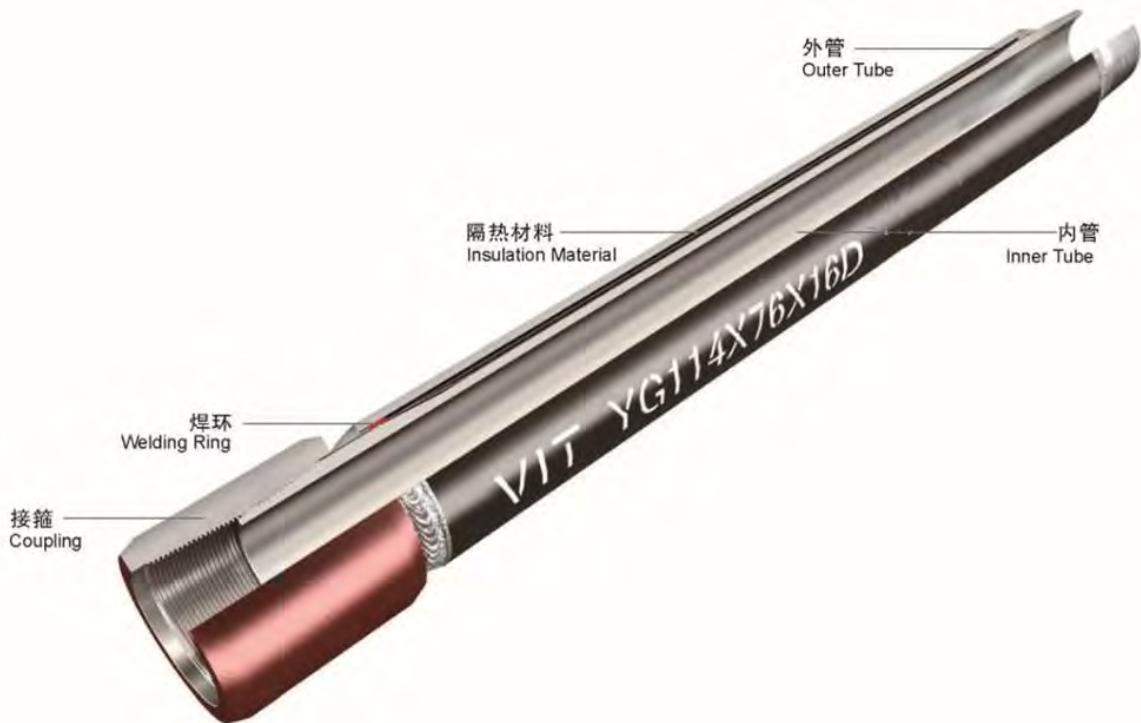
VACUUM INSULATED TUBING/CASING

Pre-Stressed Vacuum Insulated Tubing/Casing

Type 2 Connection: through Inner Tube

Features

- The coupling is connected by threaded inner tube.
- Weld seam don't contact injection fluid which can cause weld seam corrosion.
- Coupling outer diameter can be reduced significantly compared to outer tube connection (Type 1 connection).



型号 Model	隔热等级 Insulation Grade	外管外径 (mm) Outer Tube OD	内管内径 (mm) Inner Tube ID	钢级 Grade of steel	连接螺纹 Connecting Thread	最大工作温度 (℃) Max. Working Temperature	最大工作压力 (MPa) Max. Working Pressure	下井深度 (m) Running Depth
YG88X50	D、E	88.9	50.66	J55、N80、	NU	350	21	300 – 2300
YG114X62	D、E	114.3	26	L80、P110、	EU			
YG114X76	D、E	114.3	76	BG80H、	BC			
YG130X76	C、D	139.7	101.6	BG110H	USS			
YG177X124	B、C、D	177.8	124.26		HT4040			

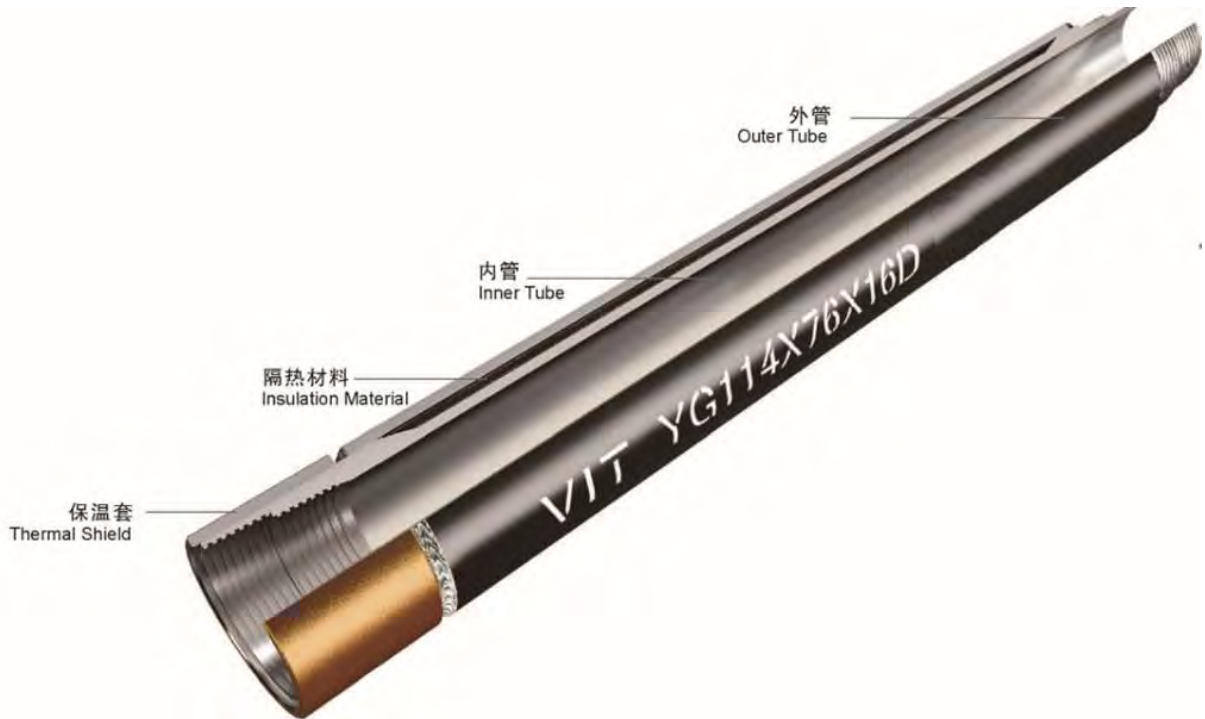
VACUUM INSULATED TUBING/CASING

Pre-Stressed Vacuum Insulated Tubing/Casing

Type 3 Connection: through Inner Tube (No Coupling)

Features

- Connection through threaded inner tube.
- No coupling needed.
- Heat loss from connection can be controlled by using thermal shields around connections.



型号 Model	隔热等级 Insulation Grade	外管外径 (mm) Outer Tube OD	内管内径 (mm) Inner Tube ID	钢级 Grade of steel	最大工作温度 (°C) Max. Working Temperature	最大工作压力 (MPa) Max. Working Pressure	下井深度 (m) Running Depth
YG88X50	D、E	88.9	50.66	J55、N80、 L80、P110、 BG80H、 BG110H	350	21	300 – 2300
YG114X62	D、E	114.3	62				
YG114x76	D、E	114.3	76				
YG139x101	C、D	139.7	101.6				
YG177x124	B、C、D	177.8	124.26				