

Jia Xing JCC Piping Engineering & Construction
Co.,Ltd

High Pressure Pipeline Fabrication Summary





项目 Projects undertake

高压管线项目 HIGH PRESSURE PIPELINE (NOV-SH)

- HERCULES B322 & B323
- Transocean B326 & B327
- HHI NOBLE #1 2505
- HHI DIAMOND #1 2503
- HHI DWDS1 (HHI 2546)
- SEADRILL T15/16/17
- KFELS Ensco B329
- HHI NOBLE #2 2506
- HHI DIAMOND #2 2504
- KFELS Ensco B330/346
- COSCO #1 & #2
- CMHI #1 & #2
- Transocean B335
- ZHENHUA Jack Up
- HHI Diamond #3 2512
- HHI NOBLE #3 2507
- HHI ROWAN #1 2559



执行标准 Manufacture Standards

执行标准：

ASME B31.3

Process Piping for Chapter IX “High Pressure Piping”

ASME IX

Welding and Brazing Qualifications

API 6A

Specification for Wellhead and Christmas Tree Equipment

NACE MR0175

Petroleum and natural gas industries—Materials for use in
H₂S containing Environments in oil and gas production—
Parts 1, 2, and 3



材料追溯-钢管 Material Tracing - Pipe



Project Name

材料堆放区
Material Storage Area



Mark

Material
Size
Heat number
Batch number



STAMP

H: Heat number
B: Batch number



材料追溯-法兰 Material Tracing -Flange

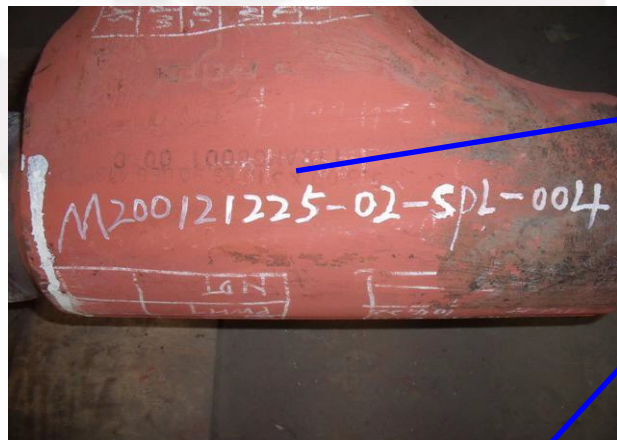


STAMP

Size
Material
Heat number
Batch number



材料追溯-管件 Material Tracing -Fittings



STAMP

Size

Material

H: Heat number

B: Batch number

Supplied By NOV



法兰与管件 Material Tracing -Fittings



STAMP

Manufacturer's name
Size
type and number
Material



下料切割 Material Cutting -Pipe



带锯床
Band sawing machine

禁止采用火焰切割



下料切割 Material Cutting -Pipe

坡口机 Beveling machine





组对 Fit-up



按照WPS严格控制组对间隙

Control root opening in
according as WPS.



组对 Fit-up



利用工装控制三维尺寸

Control 3D dimension

Support for Fit-up



组对 Fit-up



利用摸具控制空间尺寸

Control 3D dimension

Moulds for Fit-up



组对 Fit-up





焊接 Welding

预热温度 Preheating **165~230°C**





焊接 Welding



合格焊工
Qualified Welder

12 Welders approved by DNV

6 Welders approved by ABS



焊接 Welding

WPS Approved by DNV

JCCCSH Steel Piping Super Service Provider		Welding Procedure Specification 焊接工艺规程(WPS)		WPS No: 2009-001 Rev 版次: 4 SHEET: 1 OF 2																																	
Pre'd 编制人: <u>田光明 Tian Guangming</u> Date 日期: <u>2012.05.14</u> App'd 批准人: <u>李海龙 Li Hailong</u> Date 日期: <u>2012.05.14</u> PQR No. 工艺评定报告编号: <u>HP2009-001</u> Welding Method 焊接方法: ☒ SMAW ☒ GTAW ☐ GMAW ☐ FCAW ☐ SAW Other 其它 _____ Type 机械化程度: ☒ Manual 手工 ☐ semi-automatic 半自动 ☐ Automatic 自动 Applicable Code 标准: <u>ASME-IX</u>																																					
Joints 焊接接头(QW-402): Joint Design 坡口形式: <u>See Detail 见详图</u> Backing 衬垫: ☒ Yes 有 ☐ NO 无 Backing Material(Type) 衬垫材料 (型式) ☐ 金属 ☐ 不熔金属 ☐ 非金属 ☐ 其它材料 ☐ Metal Nonfusing Metal Nonmetallic Other NACE MRO175-2005 Compliance ☒ YES ☐ NO		Detail 详图: 接头形式简图: Joint Detail: 																																			
Base Metal 母材(QW-403): P-No. 类别号: _____ Group No. 组号: _____ to 与 P-No. 与类别号: _____ Group No. 组号: _____ or 或 Specification type and grade 钢号和等级: <u>ASTM A519 -4130 Q&T</u> to 与 Specification type and grade 钢号和等级: <u>ASTM A519 -4130 Q&T</u> or 或 Chem. Analysis and Mech. Prop. 化学成分和力学性能: _____ to 与 Chem. Analysis and Mech. Prop. 化学成分和力学性能: _____ Thickness 厚度范围: _____ Base Metal: Groove 对接焊缝: <u>5-60mm(without CVN) / 16-60mm(with CVN)</u> Fillet 角焊缝: <u>UNLIMITED 不限</u> Pipe Dia. 管径: <u>UNLIMITED 不限</u> Fillet 角焊缝: <u>UNLIMITED 不限</u> Other 其他: <u>每层焊道不允许超过 13mm (No Pass Greater than 13mm)</u>																																					
Filler Metals 焊接材料(QW-404): SFA No. _____ AWS No. 分类号: _____ F-NO. _____ A-NO. _____ Size of Filler Metals 焊条尺寸: _____ Weld Metal Thickness Range 熔敷金属厚度范围: _____ Groove 坡口焊缝: _____ Fillet 角焊缝: _____ Electrode-Flux (Class) 焊丝-焊剂 (分类号): _____ Flux Trade 焊剂商标: _____ Consumable Insert 可熔化嵌条: _____ Other 其它: _____		<table border="1"> <thead> <tr> <th></th> <th>AWS A5.28</th> <th>AWS A5.5</th> </tr> </thead> <tbody> <tr> <td>CHG-55B2 (ER80S-B2)</td> <td></td> <td>CHE707 (E10015-D2)</td> </tr> <tr> <td>6</td> <td></td> <td>4</td> </tr> <tr> <td>11</td> <td></td> <td>11</td> </tr> <tr> <td>2.0-3.0mm</td> <td></td> <td>2.5-5.0mm</td> </tr> <tr> <td>≤8mm</td> <td></td> <td>≤52mm</td> </tr> <tr> <td>all</td> <td></td> <td>all</td> </tr> <tr> <td>-</td> <td></td> <td>-</td> </tr> <tr> <td>-</td> <td></td> <td>-</td> </tr> <tr> <td>-</td> <td></td> <td>-</td> </tr> <tr> <td>-</td> <td></td> <td>-</td> </tr> </tbody> </table>				AWS A5.28	AWS A5.5	CHG-55B2 (ER80S-B2)		CHE707 (E10015-D2)	6		4	11		11	2.0-3.0mm		2.5-5.0mm	≤8mm		≤52mm	all		all	-		-	-		-	-		-	-		-
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2012/5/14

JCCCSH Steel Piping Super Service Provider		Welding Procedure Specification 焊接工艺规程(WPS)		WPS No: 2009-001 Rev 版次: 4 SHEET: 2 OF 2		
Position 焊接位置(QW-405) Position(s) of Groove 坡口位置: <u>6G</u> Welding Progression 焊接方向: ☒ Uphill 向上 ☐ Downhill 向下 Position(s) of Fillet 角焊缝位置: <u>6G</u>		PWHT 焊后热处理 (QW-407) Temp. Range 温度范围: <u>625±5 °C</u> Time Range 保温时间: <u>Min 2h (1HR/INCH)</u>				
Preheat 预热 (QW-406) Preheat Temp. Min. 最低预热温度: <u>165-230 °C</u> Interpass Temp. Max. 最大层间温度: <u>≤230 °C</u> Preheat Maintenance 预热保持方式: _____		Gas 气体(QW-408) (含量百分比 Per. composition) Gas (es) Mixture Flow Rate 气体 混合比 流量 Shielding 保护气: <u>Ar Pure Gas(99.9%) 12-25L-Min (GTAW)</u> Trailing 尾部保护气: _____ Backing 背部保护气: _____				
Electrical Characteristics 电特性(QW-409) Current 电流种类: ☒ DC 直流 ☐ AC 交流 Type Polar 极性: ☒ EP 正极 ☐ EN 正极 安培 (范围) Amps Range See Table Below 伏特 Volts (范围) See Table Below						
Weld layer (s) 焊接层数	Welding Process 焊接方法	Filler Metal 焊接材料	Current 焊接电流	Volt. 电压 (V)	Travel Speed 焊接速度 (cm-min)	Heat Input 热输入 (KJ/mm)
		Class 商标	Dia. 直径(mm)	Polar 极性	Amp. 电流(A)	
ROOT(1)	GTAW	CHG-55B2	2.5	DCEN	80-160	10-15
2	GTAW	CHG-55B2	2.5	DCEN	80-160	10-15
3	SMAW	CHE 707	3.2	DCEP	120-180	20-28
4-Other	SMAW	CHE 707	4.0	DCEP	120-180	20-28
CAP	SMAW	CHE 707	3.2	DCEP	80-160	20-28
Tungsten Electrode Size and Type 钨极规格及类型 Tungsten Electrode Size 钨极规格: <u>φ2.5</u> Type 类型: <u>Cerium Tungsten Electrode 铈钨极</u> Mode of Metal Transfer for GMAW 熔极气体保护焊熔滴过渡形式: ☐ Spray 喷射过渡 ☐ Short 短路过渡 Electrode Wire Feed Speed Range 焊丝送进速度范围: _____						
Technique 技术措施(QW-410) String or Weave Bead 摆动焊或不摆动焊: ☐ Weave 摆动焊 ☒ String 不摆动 Orifice or Gas Cup Size 喷嘴或喷嘴尺寸: _____ mm Initial and Interpass Cleaning 焊前清理或层间清理: <u>Clean rim of groove, remove dirt 清理坡口边缘, 去除铁锈, 油污, 水分等</u> Method of Back Gouging 背部清根方法: <u>NA</u> Oscillation 摆动方式: <u>Weave 摆动焊</u> Contact Tube To Work Distance 导电嘴与工作距离: _____ Pass 多道焊或单道焊: ☒ Multiple 多道焊 ☐ Single 单道焊 Electrode 多丝焊或单丝焊: ☐ Multiple 多丝焊 ☒ Single 单丝焊 Peening 锤击: ☐ Yes 有 ☒ No 无 Travel Speed Range 焊接速度范围: <u>5-10cm-min</u> Other 其它: _____						



2012/5/14



焊接 Welding

WPS Approved by ABS

JCCCSH Steel Piping System Service Provider		Welding Procedure Specification 焊接工艺规程(WPS)		WPS No: 2011-010 Rev 版次: 3 SHEET: 1 OF 2																																				
Pre'd 编制人: <u>胡光明 Tan Guangming</u> Date 日期: <u>2012.05.14</u> App'd 批准人: <u>李海龙 Li Xue Long</u> Date 日期: <u>2012-05-18</u> PQR No. 工艺评定报告编号: <u>2011-010</u> Welding Method 焊接方法: ☒ SMAW ☐ GTAW ☐ GMAW ☐ FCAW ☐ SAW Other 其它: _____ Type 机械化程度: ☒ Manual 手工 ☐ semi-automatic 半自动 ☐ Automatic 自动 Applicable Code 标准: <u>ASME SEC.IX, ASME B31.3, NACE MR017</u>																																								
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Electrical Characteristics 电特性(QW-409) Current 电流种类: ☒ DC 直流 ☐ AC 交流 Type Polar 极性: ☒ EP 正级 ☐ EN 负极 安培 (范围) Amps Range <u>See Table Below</u> 伏特 Volts (Range) <u>See Table Below</u>								
Weld layer (s) 焊缝层数	Welding Process 焊接方法	Filler Metal 焊接材料 Class 商标	Current 焊接电流 Polar 极性 Amp. 电流(A)	Volt. 电压 (V)	Travel Speed 焊接速度 (cm/min)	Max. Heat input (KJ/cm)		
ROOT(1)	GTAW	TIG-1CM	2.4	DCEN	80-160	12-16	5-8	23.0
2	GTAW	TIG-1CM	2.4	DCEN	80-160	12-16	5-8	23.0
3-其余 Other	SMAW	GB E7015	3.2, 4.0	DCEP	120-180	20-27	6-12	35.1
CAP	SMAW	GB E7015	3.2	DCEP	120-180	20-27	8-14	26.3
Tungsten Electrode Size and Type 钨极规格及类型 Tungsten Electrode Size 钨极规格: <u>φ2.5</u> Type 类型: <u>Cerium Tungsten Electrode 铈钨极</u> Mode of Metal Transfer for GMAW 熔化极气体保护焊熔滴过渡形式: ☐ Spray 喷射过渡 ☐ Short 短路过渡 Electrode Wire Feed Speed Range 焊丝送进速度范围: _____								
Technique 技术措施(QW-410) String or Weave Bead 摆动焊或不摆动焊: ☐ Weave 摆动焊 ☒ String 不摆动 Orifice or Gas Cup Size 喷嘴或喷嘴尺寸: _____ mm Initial and Interpass Cleaning 焊前清理或层间清理: ☐ Clean rim of groove remove dirt by grinding 采用砂轮清理坡口边缘, 去除铁锈、油污、水分等 Method of Back Gouging 背部清根方法: <u>NA</u> Oscillation 摆动方式: <u>String 不摆动</u> Contact Tube To Work Distance 导电嘴与工作距离: _____ Pass 多道焊或单道焊: ☒ Multiple 多道焊 ☐ Single 单道焊 Electrode 多丝焊或单丝焊: ☐ Multiple 多丝焊 ☒ Single 单丝焊 Peening 锤击: ☐ Yes 有 ☒ No 无 Travel Speed Range 焊接速度范围: <u>5-14cm/min</u> Other 其它: <u>NA</u>								

ATTACHMENT TO:			
REVIEWED	☒	REJECTED	☐
WITNESSED	☐	RETEST	☐
ABS NINGBO MLO			

19 June 2012



焊接 Welding



WELD BOX

SPL No.:

WPS:

Joint No.:

Welder ID:

Date:

PWHT:

Hardness:

MT:

RT



焊接 Welding

层间温度 Interpass Temperature
165~230℃





焊接 Welding



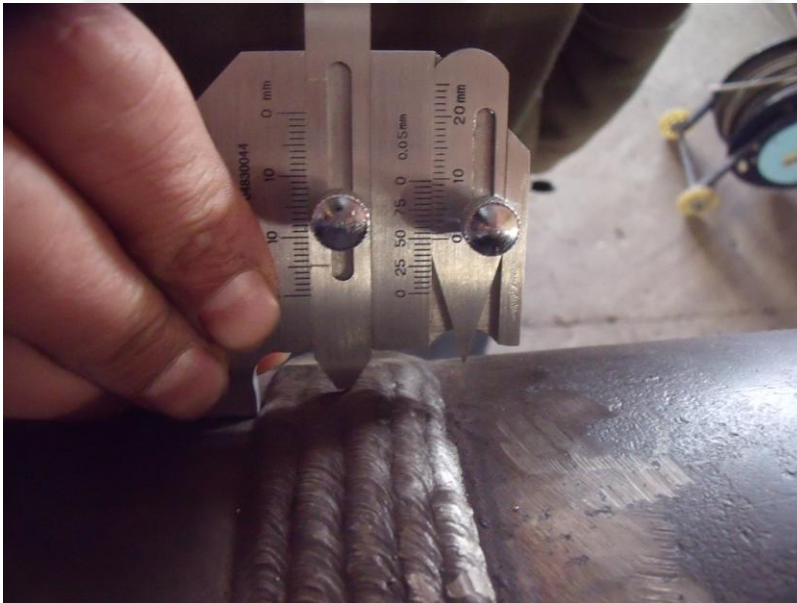
焊接辅助设备，在外观成型
及焊接效率上有很大改善。

**Auxiliary equipment for
welding**



焊接 Welding

焊缝外观检查 Weld Joints Visual Inspection





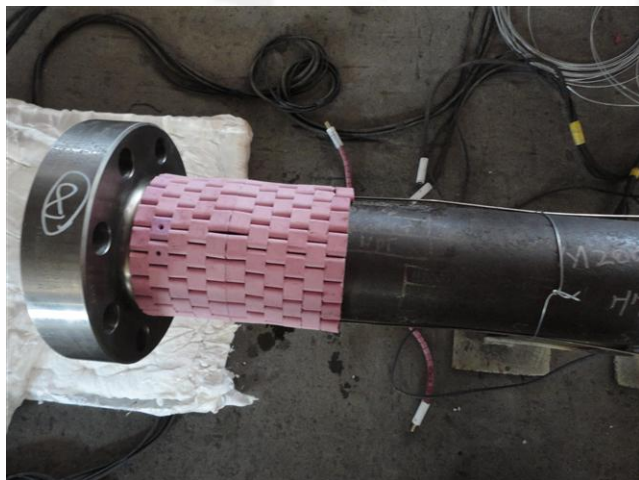
热处理 Heat Treatment

Non asbestos thermal insulation





热处理 Heat Treatment





硬度测试 Hardness Test





无损检测 NDT

钢管原材料超声波检测 Rude Material UT Testing





无损检测 NDT

PT for ring groove of flanges





无损检测 NDT

UT for Weld (before PWHT)



图纸没有焊缝的UT检验要求，为了控制热处理前的焊接质量，此项目属于我们的自检项目。



无损检测 NDT

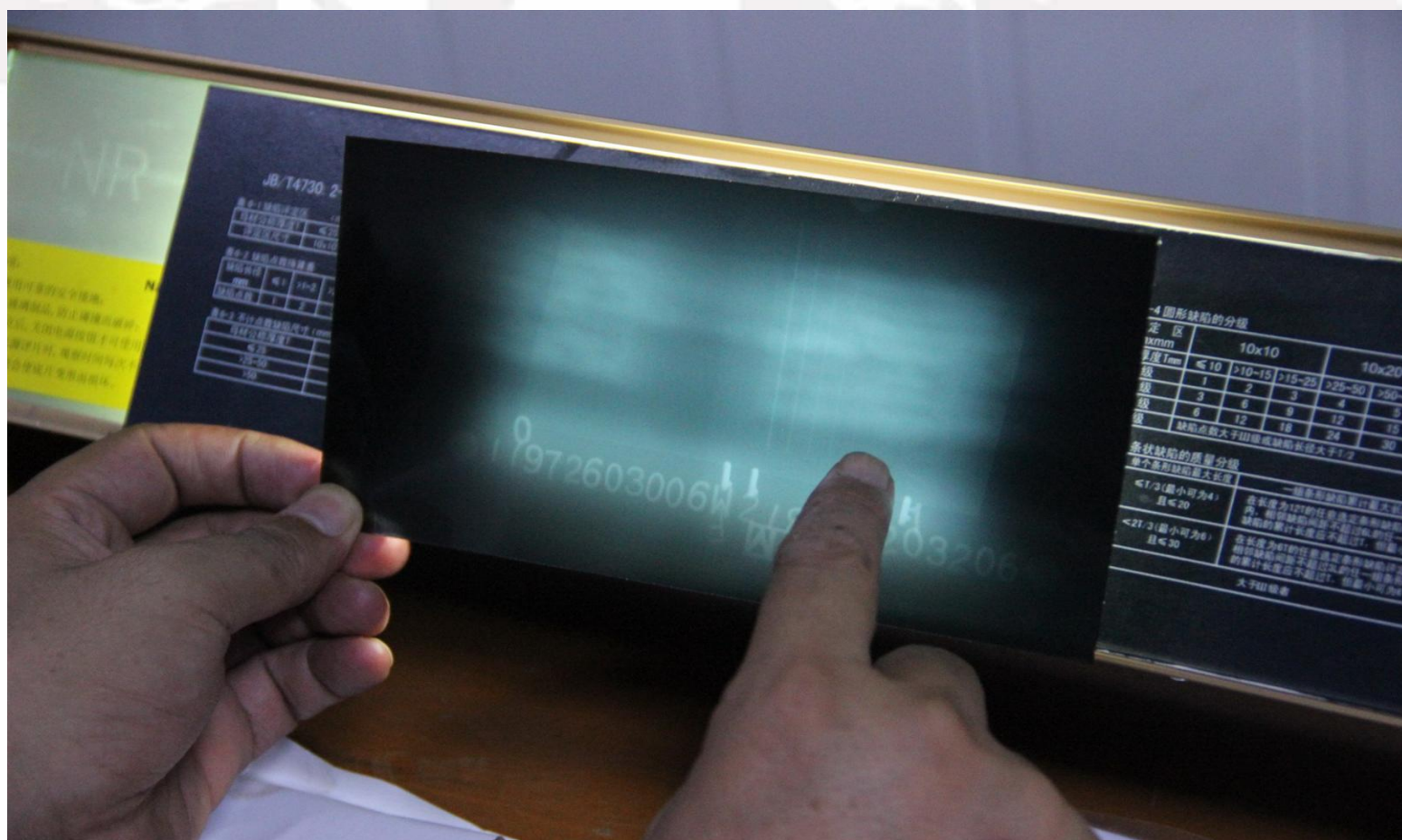
MT for Weld





无损检测 NDT

RT for films





水压测试 Hydrostatic Leak Test

操作室 Control Room



试压区 Test Zone



**Separated from control
room**



水压测试 Hydrostatic Leak Test

Check pressure gauges before
Testing

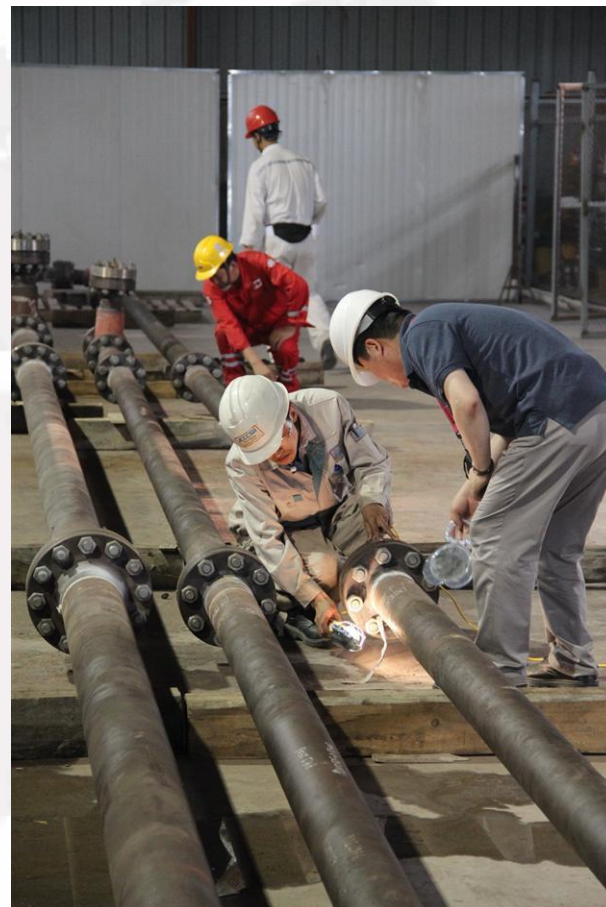




水压测试 Hydrostatic Leak Test



Inspection after hydrostatic test





油漆 Painting





Surface Inspection & Environment measurement





Coating Thickness Inspection





Adhesion Testing in the Sample





Cleaning and Dry for Pipelines





包装 Packing





Fabricate high pressure piping for **HERCULES B322 & B323**





Fabricate high pressure piping for Transocean B326 & B327





Fabricate high pressure piping for HHI NOBLE 2505 #1





Fabricate high pressure piping for HHI DIAMOND 2503 #1

