设计和技术要求 Design and technical requirements

1.1 环境和设计条件 Environment and design condition

采购产品必须适应项目地点的气候环境。

The product must be adapted to the climatic conditions of the project.

1.1.1 项目基本情况 Basic project information

表1-1 项目基本情况表

Table 1-1. Basic project information

线聚焦型光热电站关键技术研究 Research on the Key Technology of Line Focused CSP Project of the CSNP Co., Ltd. in Urat Middle Banner	
项目地 Project site	试验场地位于内蒙古自治区巴彦淖尔市乌拉特中旗境内，试验场地西北距乌拉特中旗政府所在地海流图镇约8km。 The planned project is within Urat Middle Banner, Bayan Nur City, Inner Mongolia Autonomous Region. The seat of the Urat Middle Banner government is about 8 kilometers northwest of the plant site.
主要气象特征 Main meteorological characteristics	乌拉特中旗海拔约1200m； About-1,200-meter elevation of Urat Middle Banner; 年平均气温5.3℃； Average annual temperature is 5.3℃; 近30年极端高温是38.7℃，极端低温-34.4℃； The extremely high temperature is 38.7℃ and the extremely low temperature is -34.4℃ for the past 30 years; 多年平均风速1.1 m/s ； Average wind speed of 1.1 m/s in multiple years;

	50年一遇最大风速31 m/s（在10m高度处，测得10min内的平均风速）； Maximum wind speed of 31 m/s (At the height of 10m, the average wind speed within 10 min was measured) in 50 years; 多年最大积雪深度 11cm； Maximum snow depth of 11 cm in multiple years; 平均相对湿度42%； Average relative humidity of 42%. 多年平均气压87140Pa。 Average atmospheric pressure 87140Pa

1.2 旋转接头技术要求 Technical requirements for ball joints

旋转接头由壳体、壳体转换接头、球头、外密封环、密封垫、内密封环、密封填料接头、密封填料等组成，产品要具有耐高温、耐压、耐腐蚀的性能，同时保证工作期间无泄漏。

The ball joint is composed of a shell, a shell change-over joint, a ball head, an outer sealing ring, a sealing gasket, an inner sealing ring, a sealing packing joint, a sealing packing, etc. All parts of the product shall have high temperature resistance, pressure resistance and corrosion resistance, and shall ensure no leakage during operation.

1.2.1 旋转接头的几何参数 Geometric parameters of the ball joint

表1-2旋转接头运动参数

Table 1-2 Motion parameters of the ball joint

	参数名称 Parameters	要求范围 range	单位 Unit
1	旋转接头允许摆动角度 Allowable swing angle	+/-15	度 degrees
2	允许最大转角 Allowable maximum rotation angle	+/-360	度 degrees

表1-3旋转接头外形尺寸

Table 1-3 Dimension of the ball joint

旋转球头类型 type	球头侧接口尺寸/mm Dimensions of ball	球壳侧接口尺寸/mm Dimensions of shell	长度/mm length
单头 Single Ball Joint#	3 寸（Φ88.9*5.49）	3 寸（Φ88.9*5.49）	220
双头 Double Ball Joint#	3 寸（Φ88.9*5.49）	3 寸（Φ88.9*5.49）	450

备注：

- 公差按 EN-ISO-13920-AE 执行
- 碳钢 Sch 40 级

Note:

- Tolerances according to EN-ISO-13920-AE
- Carbon Steel Sch 40
- Double ball joint can be welded by two single ball joint. If the welding needs to be completed by the purchaser, the supplier shall provide relevant standards, specifications, post weld treatment and inspection requirements to ensure that the ball joint can meet the performance requirements after welding

以上壁厚尺寸仅供参考，最终壁厚尺寸根据工作压力温度等参数由供应商自行设计。旋转接头尺寸生产前图纸需经采购方确认。

The above thickness size is for reference only. The final thickness size is designed

by the supplier according to the working pressure, temperature requirement, and etc. The drawing of ball joint must be confirmed by the purchaser before production.

1.2.2 流通介质 The performance of the circulation medium

内部循环介质为71.5%的联苯醚与26.5%的联苯的共熔混合物。

The circulation medium is the thermal oil consisting of 71.5% diphenyl ethers and 26.5% biphenyls.

1.2.3 旋转接头性能要求 The performance requirements of ball joint

最高工作压力：4.0 MPa；

Maximum working pressure: 4.0 MPa；

试验压力：5.85 MPa;

Test pressure: 5.85 MPa;

最高工作温度：430℃；

Maximum operating temperature: 430℃;

工作环境温度：-40℃至70℃；

Ambient temperature when operating: -40℃ to 70℃;

重量：12～15 kg(单球头); 26～30 kg（双球头）

Weight: 12～15 kg(Single); 26～30 kg（Double）

主体材质: ASTM A 105/A106B

Main body material: ASTM A 105/A106B

工作压力波动范围（一天）：0.2 MPa ~ 4 MPa；

Oscillation range of working pressure (per day): 0.2 MPa to 4 MPa；

工作温度波动范围（一天）：50℃ ~ 400℃；

Oscillation range of working temperature (per day): 50℃ to 400℃；

最大扭矩：≤430 Nm（冷态，填充石墨后的测量值）

Max Torque：≤430 Nm（Cold state, After filling graphite）

使用频率(最低限度)：每天最少2个循环（≤+/-360度旋转和≤+/-15度摆动）；

Frequency of use (minimum): two cycles per day (≤+/-360 degrees rotation and ≤+/-15 degree oscillation)；

与管道连接方式：焊接；

Connection with the pipe: Welding;

供应商应提供旋转接头与连接管道焊接的相关标准、规范、焊后处理及检验要求，以保证焊接后旋转接头可以满足性能要求。

The supplier shall provide relevant standards, specifications, post weld treatment and inspection requirements for the welding of ball joint and connecting pipe to ensure that the ball joint can meet the performance requirements after welding.

旋转接头应有保护措施防止生锈；

Ball joints shall have protective treatment against rust；

使用寿命：>35年

Life span: > 35 years

旋转接头在供应商保证的工况运行时，不得出现跑、冒、滴、漏的不正常现象和结构破坏性损伤。在项目地自然环境、无极端自然灾害（地震）和外力破坏情况下，旋转接头工作寿命为至少 15400 循环（+/-360 °旋转），保证导热工质无泄漏。

When ball joints are operating under the conditions guaranteed by the supplier, there must be no abnormal phenomena such as running, emitting, dripping, leaking, and structural destructive damage. Under the natural environment of the project site(without extremely natural disasters (earthquake) and external force damage), the designed service life of each ball joint is at least 15400 times under the actual operation condition,

and guarantees that the heat conduction working fluid is to be free from leakage at the same time.

供应商应提供旋转接头扭矩的测试标准和测试方法。

The supplier shall provide the test standard and method of ball joint torque.