

Karara Mining Limited

Primary Grinding Cyclone Clusters DI017 and DI019 Replacement

一段磨矿旋流器组 DI017 和 DI019 更换

NNNN-DD-TYP-NNNN – PROJECT TITLE					
REV	DESCRIPTION	ORIG	REVIEW	APPROVED	DATE
A	Issued for Internal Review	<i>Jindong Yan</i> Jindong Yan	<i>Yunxin WU</i> Yunxin WU	<i>Xiaodong Wang</i> Xiaodong Wang	JUL -26

CONTENTS

1.	PURPOSE AND TENDERING PRINCIPLES 项目目的与招标原则	1
2.	EQUIPMENT IDENTIFICATION AND QUANTITY 设备编号及数量	2
3.	SCOPE OF SUPPLY 供货范围	3
4.	SITE VERIFICATION AND INTERFACE MANAGEMENT 现场核实与接口管理	4
5.	DESIGN BASIS AND PERFORMANCE REQUIREMENTS 设计基础与性能要求	5
6.	FEED DISTRIBUTOR 入料分配器	6
6.1	General and Wear Lining 总体设计及耐磨内衬	6
6.2	Maintainable Feed Branches 可维护入料支管	6
6.3	Feed Sampling and Instrumentation 入料取样及仪表	6
7.	OVERFLOW LAUNDER 溢流箱	8
8.	UNDERFLOW LAUNDER 底流箱	9
9.	EXTERNAL SURFACE PROTECTION 外表面防护	10
10.	PLATFORMS, ACCESS AND MAINTENANCE SAFETY 平台、通道和检修安全	11
11.	STRUCTURAL, MECHANICAL AND LIFTING DESIGN 结构、机械及吊装设计	12
12.	FABRICATION AND WELDING 制造与焊接	13
13.	PRE-ASSEMBLY, INSPECTION AND TESTING 工厂预组装、检验和试验	14
14.	WARRANTY AND PRO-RATA CREDIT 质保与按比例信用补偿	15
14.1	General Equipment Warranty 一般设备质保	15
14.2	Overflow Launder Extended Warranty 溢流箱延长质保	15
14.3	Underflow Launder Extended Warranty 底流箱延长质保	15
14.4	Credit Calculation and Administration 信用补偿计算与执行	15
14.5	Warranty Operating Conditions 质保适用运行条件	16

15.	DOCUMENTATION AND DELIVERABLES 文件及交付资料	17
16.	KARARA RESPONSIBILITIES KARARA 责任	18
17.	MANDATORY MINIMUM REQUIREMENTS 强制性最低要求	19

1. PURPOSE AND TENDERING PRINCIPLES 项目目的与招标原则

This Scope of Work defines the minimum technical, engineering, manufacturing, quality, documentation, delivery and technical-support requirements for the replacement of Primary Grinding Cyclone Clusters 1306-DI-017 and 1306-DI-019 at Karara Mining Limited. The procurement is intended to be open, fair and competitive.

本工作范围规定卡拉拉矿业有限公司一段磨矿旋流器组 1306-DI-017 和 1306-DI-019 更换项目在技术、工程设计、制造、质量、文件、交货及技术支持方面的最低要求。本项目旨在采用公开、公平和具有竞争性的采购方式。

References to a particular manufacturer, trade name, product or material establish a reference level of function or performance only and shall be read as including “or approved equivalent”, except where a nominated item is essential for compatibility with existing plant interfaces.

除为保证与现有设备接口兼容所必需的情况外，文件中提及的任何特定制造商、商标、产品或材料仅用于定义参考功能或性能水平，均应理解为包含“或经批准的同等产品”。

The objective is to procure safe, reliable and abrasion-resistant replacement clusters that fit the existing plant, support practical maintenance, reduce shutdown exposure and minimise whole-of-life cost.

项目目标是采购安全、可靠、耐磨且与现场现有装置兼容的替换旋流器组，同时改善检修便利性、减少停机作业风险并降低全生命周期成本。

2. EQUIPMENT IDENTIFICATION AND QUANTITY 设备编号及数量

The Supplier shall design, manufacture and supply two complete cyclone cluster assemblies (cyclone separators excluded): one for 1306-DI-017 and one for 1306-DI-019.

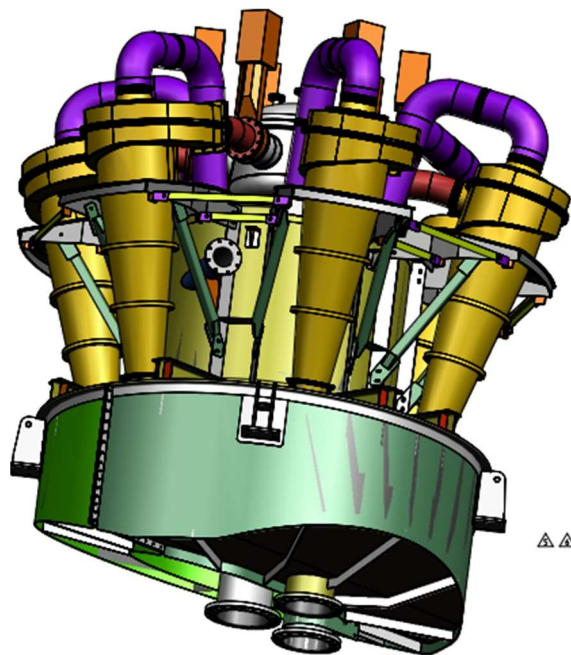
供应商应设计、制造并供应两套完整旋流器组总成(不含旋流器): 一套用于 1306-DI-017, 另一套用于 1306-DI-019。

Each cluster shall be a six-position arrangement compatible with the existing 650 mm-class cyclone bodies and current process, piping, structural, lifting and access interfaces. The reference arrangement is a six-position 650CVX13 cluster; manufacture by a particular OEM is not mandatory when all interface and performance requirements are met.

每套旋流器组应为六工位布置, 与现场现有 650 mm 级旋流器本体及现有工艺、管道、钢结构、吊装和检修通道接口兼容。参考布置为六工位 650CVX13 旋流器组; 在满足全部接口和性能要求的前提下, 不强制要求由特定原设备制造商制造。

Unless included as a separately priced option, the cyclone bodies and cyclone internal wear parts are excluded from the base scope. The Supplier remains responsible for correct mechanical fit with the existing cyclone bodies, feed branches and overflow and underflow connections.

除非作为单独报价选项列入, 否则旋流器本体及其内部耐磨件不包括在基础范围内。供应商仍应负责确保所供设备与现有旋流器本体、入料支管、溢流及底流接口正确匹配。



3. SCOPE OF SUPPLY 供货范围

For each cluster, the base scope shall include design, manufacture, shop assembly, inspection, testing, surface protection, preservation, packaging, delivery and the documentation necessary to provide a complete and installable assembly.

对于每套旋流器组，基础供货范围应包括设计、制造、工厂预组装、检验、试验、表面防护、保存、包装、交付，以及形成完整可安装总成所需的全部文件。

- Feed distributor, inlet spool as required, six cyclone feed branches and complete wear-protection system.
入料分配器、所需入口短节、六个旋流器入料支管及完整耐磨防护系统。
- Representative feed-sampling points, wear-resistant take-off, isolation valve and sample piping.
具有代表性的入料取样口、耐磨取样短管、隔离阀及取样管路。
- Local pressure gauge and separate pressure-transmitter connection.
现场压力表及独立压力变送器接口。
- Overflow launder with internal rubber lining and specified external protective coating.
带内部橡胶衬里及规定外部保护涂层的溢流箱。
- Underflow launder with rubber backing and ceramic wear protection.
带橡胶底衬和陶瓷耐磨层的底流箱。
- Supporting frame, level maintenance platform, stairs, handrails, gates and toe plates.
支撑框架、水平检修平台、楼梯、栏杆、安全门及踢脚板。
- Lifting lugs, maintenance lifting points, proprietary fasteners, gaskets, seals and assembly hardware.
吊耳、检修吊点、专用紧固件、垫片、密封件及装配附件。
- GA drawings, interface drawings, installation instructions, ITP, MDR, O&M manuals and warranty certificates.
总布置图、接口图、安装说明、检验与试验计划、制造商资料报告、运行维护手册及质保证书。
- Items normally necessary for safe assembly, installation, maintenance and operation shall not be omitted merely because they are not individually listed.
对于安全装配、安装、维护和运行通常必需的项目，不得仅因本文件未逐项列出而将其排除。

4. SITE VERIFICATION AND INTERFACE MANAGEMENT **现场核实与接口管理**

Before final design, the Supplier shall complete a site inspection and dimensional survey covering centre lines, elevations, support points, pipe and cyclone interfaces, outlet orientation, access restrictions, lifting paths, maintenance clearances and laydown constraints.

在最终设计前，供应商应完成现场踏勘和尺寸测量，核实中心线、标高、支撑点、管道及旋流器接口、出口方向、通行限制、吊装路径、检修空间和预组装场地限制。

The equipment shall fit within the existing plant envelope and use existing principal supports and process connection locations wherever reasonably practicable. Major changes to existing primary steelwork, beams or process pipework shall not be assumed.

设备应安装在现有装置空间范围内，并在合理可行的情况下利用现有主要支撑点和工艺接口。投标方案不得默认需要对现有主要钢结构、梁或工艺管道进行重大改造。

Any unavoidable interface modification shall be listed as a deviation with supporting drawings, shutdown impact, structural requirement and separate price. Karara drawing review does not relieve the Supplier of responsibility for fit, accuracy, function or compliance.

任何不可避免的接口改造均应列为偏差，并提供图纸、停机影响、结构要求及单独报价。Karara 对图纸的审查不免除供应商对安装匹配、准确性、功能及符合性的责任。

5. DESIGN BASIS AND PERFORMANCE REQUIREMENTS 设计基础与性能要求

The clusters shall be designed for continuous primary-grinding classification service in abrasive magnetite or iron ore slurry. Materials, plate thickness, linings, supports and connections shall suit the final Karara-approved duty data, including maximum foreseeable pressure, flow, slurry density, solids concentration, particle size, impact and credible upset conditions.

旋流器组应按磨蚀性磁铁矿或铁矿浆一段磨矿连续分级工况进行设计。材料、钢板厚度、内衬、支撑及接口应适用于 Karara 最终批准的工况数据，包括最大可预见压力、流量、矿浆密度、固体浓度、粒度、冲击及可信异常工况。

Reference data indicates a cluster feed flow of approximately 1,648 m³/h at approximately 72 kPa, with four cyclones operating under the referenced model condition. These figures are preliminary only; the final approved duty data sheet governs.

参考数据表明，旋流器组入料流量约为 1,648 m³/h、压力约为 72 kPa，并在所参考模型工况下按四台旋流器运行。上述数据仅为初步参考，最终以批准的工况数据表为准。

Any process-performance guarantee offered by a Tenderer shall state the guaranteed parameters, operating conditions, test method, measurement tolerance, exclusions and contractual remedy. No process guarantee shall be implied solely from mechanical supply.

如投标方提供工艺性能保证，应明确保证参数、运行条件、试验方法、测量公差、排除条件及合同补救措施。不得仅依据机械设备供货而默认工艺性能保证。

6. FEED DISTRIBUTOR 入料分配器

6.1 General and Wear Lining 总体设计及耐磨内衬

The distributor shall provide stable and reasonably uniform slurry distribution to all six cyclone positions over the specified operating envelope, while avoiding unnecessary turbulence, solids accumulation and abrupt geometry that accelerates local wear.

分配器应在规定运行范围内向六个旋流器工位提供稳定且合理均匀的矿浆分配，并避免不必要的湍流、固体积聚以及导致局部加速磨损的几何突变。

All wetted surfaces shall use premium abrasion-resistant natural rubber or an approved equivalent elastomer. The principal distributor body lining shall be 20 mm THK minimum unless the Supplier demonstrates that an alternative system provides equal or superior service life. High-wear transitions may use thicker rubber, ceramic inserts or approved composite protection.

所有过流表面应采用优质耐磨天然橡胶或经批准的同等弹性体材料。分配器主体内衬最低应为厚度 20 mm，除非供应商能够证明替代系统具有相同或更优的使用寿命。高磨损过渡区域可采用加厚橡胶、陶瓷嵌件或经批准的复合耐磨防护。

6.2 Maintainable Feed Branches 可维护入料支管

The branch wear system shall allow a locally worn liner, sleeve or spool to be replaced without removing the complete distributor wherever reasonably practicable. A proprietary bushing design is not mandatory; replaceable sleeves, spools, modular liners or equivalent maintainable arrangements are acceptable.

在合理可行的情况下，支管耐磨系统应允许局部磨损的衬套、套筒或短节单独更换，而无需拆除整个分配器。不强制采用某一专利衬套结构；可更换套筒、短节、模块化衬板或同等可维护设计均可接受。

The Tenderer shall describe the replacement sequence, access needs, lifting equipment, resources and estimated replacement duration.

投标方应说明更换顺序、检修空间、起吊设备、所需资源及预计更换时间。

6.3 Feed Sampling and Instrumentation 入料取样及仪表

Each distributor shall have one representative feed-sampling connection comprising a replaceable wear-resistant take-off, full-bore isolation valve, sample pipe, safe discharge point and provision for flushing or clearing blockage. The location shall minimise exposure to pressurised slurry and is subject to Karara safety-in-design review.

每台分配器应设置一个具有代表性的入料取样接口，包括可更换耐磨取样短管、全通径隔离阀、取样管、安全排放点及冲洗或清堵设施。取样位置应尽量降低人员接触带压矿浆的风险，并须通过 Karara 设计安全审查。

Provide a locally readable pressure gauge and a separate pressure-transmitter connection, with the range, wetted materials, isolation and connection standard confirmed during design review.

应提供现场可读压力表及独立压力变送器接口；量程、接液材料、隔离方式及连接标准应在设计审查期间确认。

7. OVERFLOW LAUNDER 溢流箱

The overflow launder shall be fabricated from carbon steel of sufficient thickness and stiffness for operating, maintenance, transport, lifting and credible upset loads. Its geometry shall promote drainage, minimise solids accumulation and provide safe access for inspection and maintenance.

溢流箱应采用具有足够厚度和刚度的碳钢制造，以承受运行、检修、运输、吊装及可信异常载荷。其几何结构应有利于排放、减少固体沉积，并提供安全的检查和维护条件。

All wetted surfaces shall be lined with 25 mm THK premium abrasion-resistant natural rubber. Linatex rubber is the reference material only; an approved equivalent hot-vulcanised natural-rubber lining is acceptable where equivalent or superior abrasion resistance, tear resistance, bonding performance and slurry-duty suitability are demonstrated.

所有过流表面应采用厚度 25 mm 优质耐磨天然橡胶衬里。Linatex 橡胶仅作为参考材料；如能够证明耐磨性、抗撕裂性能、粘接性能及矿浆工况适用性等同或更优，则可采用经批准的同等热硫化天然橡胶衬里。

The lining shall be factory applied using a controlled bonding or vulcanising process. Joints, corners, penetrations and terminations shall prevent slurry ingress behind the lining. Adhesion, continuity, THK and visible defects shall be inspected before dispatch.

内衬应采用受控粘接或硫化工艺在工厂施工。接缝、转角、贯穿口及收口应防止矿浆进入衬里背面。发货前应检查粘接质量、连续性、厚度及外观缺陷。

8. UNDERFLOW LAUNDER 底流箱

The underflow launder shall be designed for severe abrasion and impact from coarse, high-density cyclone underflow. Geometry shall encourage discharge and minimise stagnation, hang-up and direct impact onto unprotected steel.

底流箱应针对粗颗粒、高浓度旋流器底流造成的严重磨蚀和冲击进行设计。几何结构应有利于排放，并尽量减少滞流、积料及对无保护钢板的直接冲击。

The minimum wear-protection system on principal impact and flow surfaces shall comprise 20 mm THK abrasion-resistant rubber backing and 25 mm THK ceramic wear lining installed above the rubber.

主要冲击区和过流区域的最低耐磨系统应包括厚度 20 mm 耐磨橡胶底衬，以及安装在其上方的厚度 25 mm 陶瓷耐磨衬板。

The Tenderer shall nominate ceramic composition, hardness, dimensions, attachment method, backing system and expected wear characteristics. No fixed alumina percentage is mandated where an alternative ceramic or composite system demonstrates equivalent or superior service performance.

投标方应说明陶瓷成分、硬度、尺寸、固定方式、背衬系统及预期磨损特性。如替代陶瓷或复合系统能够证明具有相同或更优的使用性能，则不强制规定固定的氧化铝含量。

Ceramic protection shall be divided into maintainable sections so local wear can be repaired without replacing the complete launder. Removable sections shall have a safe handling method appropriate to mass; individual lifting lugs are not mandatory where a safer equivalent method is provided.

陶瓷耐磨层应划分为可维护分区，使局部磨损可在无需更换整个底流箱的情况下修复。可拆卸模块应根据其重量设置安全搬运方式；如提供更安全的同等方法，则不强制每块单独设置吊耳。

The Tenderer shall separately price an underflow wash-water ring or equivalent shutdown-cleaning system and state pressure, flow, connection size, nozzle arrangement and isolation requirements. Use for process-density adjustment requires Karara Process Engineering approval.

投标方应对底流箱环形冲洗水系统或同等停机清洗装置进行单独报价，并说明压力、流量、接口尺寸、喷嘴布置及隔离要求。用于调整工艺浓度时须获得 Karara 工艺工程批准。

9. EXTERNAL SURFACE PROTECTION 外表面防护

All carbon-steel surfaces shall be prepared and coated to the latest Karara-approved paint specification. The applicable revision of project specification 1300-GE-SPC-1002 shall be confirmed at award.

所有碳钢表面应按照 Karara 最新批准的涂装规范进行表面处理和涂装。项目规范 1300-GE-SPC-1002 的适用版本应在授标时确认。

Overflow- and underflow-launders external surfaces exposed to slurry splash, washdown or wet-process conditions shall receive an additional 3 mm THK polyurea coating over a compatible prepared substrate or coating system recommended by the coating manufacturer.

溢流箱和底流箱外部暴露于矿浆飞溅、冲洗或湿法工艺环境的表面，应增加厚度干膜 3 mm 的聚脲涂层，并施工在与聚脲相容的已处理基材或由涂层制造商推荐的配套涂层系统上。

10. PLATFORMS, ACCESS AND MAINTENANCE

SAFETY 平台、通道和检修安全

Each cluster shall include a complete platform providing safe access for cyclone inspection, valve operation, instruments, feed and overflow sampling and routine maintenance. Working surfaces shall be level wherever reasonably practicable.

每套旋流器组应提供完整平台，以满足旋流器检查、阀门操作、仪表维护、入料和溢流取样及日常检修的安全通行要求。在合理可行的情况下，人员工作面应采用水平布置。

Platforms shall include grating or flooring, stairs or approved access, handrails, midrolls, self-closing gates where required and toe plates, in accordance with applicable Australian requirements and Karara site standards.

平台应包括格栅或铺板、楼梯或经批准的通道、栏杆、中间横杆、必要时设置的自闭式安全门及踢脚板，并符合适用的澳大利亚要求和 Karara 现场标准。

Platform steelwork shall be hot dip galvanised unless otherwise approved. Persistent slurry-splash zones shall receive additional protection in accordance with the approved coating schedule, e.g. the platform braces above the underflow launder. Polyurea over all galvanised members is not mandatory unless justified by exposure assessment.

除非另有批准，平台钢结构应热浸镀锌。长期受到矿浆飞溅的区域应按批准的涂层表进行附加防护，例如位于底流箱上方的平台斜撑。除非环境暴露评估证明有必要，否则不强制要求所有镀锌构件均涂覆聚脲。

The design shall avoid confined-space maintenance wherever reasonably practicable and shall support replacement of modular wear parts without personnel entering the launders.

在合理可行的情况下，设计应避免受限空间检修作业，并应支持在人员无需进入箱体的情况下更换模块化耐磨件。

11. STRUCTURAL, MECHANICAL AND LIFTING DESIGN

结构、机械及吊装设计

The complete assembly shall be designed for operating, contained-slurry, maintenance, lifting, transport, blocked-flow and credible dynamic or eccentric loads. Design calculations shall be provided when requested and shall state load cases, materials, support reactions, lifting loads and safety factors.

完整总成应按运行、所容纳矿浆、检修、吊装、运输、堵料及可信动态或偏心载荷进行设计。Karara 要求时应提交计算书，并说明载荷工况、材料、支座反力、吊装载荷和安全系数。

Equipment lifting lugs shall be designed, inspected and rated for intended use and permanently identified. Maintenance lifting points shall be provided where manual handling of removable liners, spools or panels would be unsafe.

设备吊耳应按预定用途设计、检验和定额，并进行永久标识。对于人工搬运不安全可拆卸衬板、短节或模块，应设置检修吊点。

12. FABRICATION AND WELDING 制造与焊接

Fabrication shall comply with approved drawings, nominated Australian Standards and qualified welding procedures. The Tenderer shall identify the manufacturing standard and welding quality category. Welders shall be qualified for the applicable process, material and position.

制造应符合批准图纸、所采用的澳大利亚标准及合格焊接工艺。投标方应说明制造标准和焊接质量等级。焊工应针对所采用的工艺、材料及焊接位置具备相应资格。

All welds shall receive 100% visual inspection. Critical lifting-attachment welds shall receive 100% surface-crack examination by magnetic-particle as applicable, supplemented by ultrasonic testing only where technically suitable for the joint geometry and failure mode.

所有焊缝均应进行 100% 外观检查。关键吊装附件焊缝应根据材料条件进行 100% 磁粉表面裂纹检测；仅在接头几何结构和潜在失效模式适合时增加超声波检测。

The proposed NDT method and extent shall be defined in the ITP. A blanket requirement for ultrasonic testing shall not be applied where the method is unsuitable for the weld configuration.

拟采用的无损检测方法和比例应在检验与试验计划中明确。对于不适合超声波检测的焊缝结构，不应笼统规定超声波检测。

13. PRE-ASSEMBLY, INSPECTION AND TESTING 工厂预组装、检验和试验

Each cluster shall be shop assembled to the maximum practical extent to confirm dimensional compatibility, fit-up, cyclone interface positions, platform geometry and discharge orientation before dispatch. Transport modules shall be match marked and supported by a site reassembly sequence.

每套旋流器组应在发货前进行最大合理程度的工厂预组装，以确认尺寸兼容性、装配情况、旋流器接口位置、平台几何结构及排放方向。运输模块应进行配对标识，并提供现场重新组装顺序。

- Dimensional inspection against approved drawings and verification of all process interfaces.
按批准图纸进行尺寸检验并核实所有工艺接口。
- Visual weld inspection and specified NDT of lifting and critical structural welds.
焊缝外观检查及对吊装和关键结构焊缝进行规定的无损检测。
- Rubber-lining thickness, continuity and visual inspection.
橡胶内衬厚度、连续性 & 外观检查。
- Ceramic material, fixing and installation inspection.
陶瓷材料、固定及安装检查。
- Paint, galvanising and polyurea THK and quality inspection.
油漆、镀锌层及聚脲厚度和质量检查。
- Verification of sampling, pressure-gauge and transmitter connections.
核实取样、压力表及变送器接口。
- Final completeness inspection and packing release.
最终完整性检查及包装放行。
- The Supplier shall state whether leak, hydrostatic or other pressure-integrity testing is proposed for the distributor and launders. Any exclusion shall be technically justified. Karara hold and witness points shall be defined in the approved ITP.
供应商应说明是否对分配器和箱体进行泄漏、水压或其他承压完整性试验。任何排除均应提供技术依据。Karara 的停检点和见证点应在批准的检验与试验计划中明确。

14. WARRANTY AND PRO-RATA CREDIT 质保与按比例信用补偿

14.1 General Equipment Warranty 一般设备质保

Unless a longer term is specified below, the complete supply shall be warranted against defects in design, materials and workmanship for at least 12 months from commissioning or 18 months from delivery, whichever occurs first.

除下文规定更长质保期的部分外，全部供货设备应至少提供自投运之日起 12 个月或自交货之日起 18 个月的设计、材料和制造缺陷质保，以先到者为准。

14.2 Overflow Launder Extended Warranty 溢流箱延长质保

The Supplier shall provide a 10-year pro-rata warranty for the overflow-laundry structural shell and complete internal rubber-lining system, covering premature structural failure, lining detachment, bonding failure and wear-through under the agreed normal operating conditions.

供应商应对溢流箱结构壳体及完整内部橡胶衬里系统提供 10 年按比例质保，涵盖在约定正常运行条件下发生的过早结构失效、内衬脱落、粘接失效及磨穿。

14.3 Underflow Launder Extended Warranty 底流箱延长质保

The Supplier shall provide an 8-year pro-rata warranty for the underflow-laundry structural shell and complete rubber-backed ceramic wear system, covering premature structural failure, ceramic-retention failure, widespread ceramic detachment, backing-system failure and wear-through under the agreed normal operating conditions.

供应商应对底流箱结构壳体及完整橡胶背衬陶瓷耐磨系统提供 8 年按比例质保，涵盖在约定正常运行条件下发生的过早结构失效、陶瓷固定系统失效、大面积陶瓷脱落、背衬系统失效及磨穿。

14.4 Credit Calculation and Administration 信用补偿计算与执行

If a warranted component fails before completing its warranted life, the Supplier shall provide a credit against the agreed original contract value of that affected component. Installation costs are excluded unless the final contract states otherwise.

如质保部件在完成保证寿命前失效，供应商应根据该受影响部件在原合同中约定的价值提供信用补偿。除非最终合同另有规定，不包括安装费用。

Pro-Rata Credit = Affected Component Value x Unexpired Warranty Period / Total Warranty Period. An overflow launder failing after five completed years receives 50% credit; an underflow launder failing after six completed years receives 25% credit.

按比例信用补偿 = 受影响部件价值 x 剩余质保期 / 总质保期。溢流箱在完整运行 5 年后失效时补偿 50%；底流箱在完整运行 6 年后失效时补偿 25%。

The pricing schedule shall separately identify each overflow- and underflow-launders value. At Karara's election, credit may be applied as a credit note, replacement component, repair contribution or offset against a future purchase order, subject to the final contract.

报价表应分别列明每台溢流箱和底流箱的价值。根据最终合同，Karara 可选择将补偿用于信用票据、替换部件、维修费用分担或抵扣后续采购订单。

14.5 Warranty Operating Conditions 质保适用运行条件

Before award, Karara and the Supplier shall agree the warranty operating envelope, including pressure, flow, slurry density, solids concentration, particle-size distribution and operating hours. Normal variation within that envelope shall not invalidate the warranty.

授标前，Karara 和供应商应确认质保适用的运行范围，包括压力、流量、矿浆密度、固体浓度、粒度分布及运行小时数。在该范围内的正常波动不得导致质保失效。

Any exclusion for abnormal operation shall be clearly defined and supported by objective operating data. Fair wear and tear shall not remove an expressly agreed pro-rata wear-life commitment.

任何基于异常运行的排除均应明确定义并以客观运行数据为依据。对于明确约定的按比例耐磨寿命承诺，不得以正常磨损为由排除责任。

15. DOCUMENTATION AND DELIVERABLES 文件及交付资料

The Tenderer shall submit a document schedule. Tender-stage deliverables shall include a preliminary GA, dimensions and masses, scope schedule, materials and lining schedule, maintainability description, delivery schedule, spare-parts recommendations, warranty statement, relevant references and a completed deviation schedule.

投标方应提交文件清单。投标阶段资料应包括初步总布置图、尺寸和重量、供货范围清单、材料和内衬清单、可维护性说明、交货计划、备件建议、质保声明、相关业绩及完整偏差表。

Post-award deliverables shall include the design basis, certified GA and interface drawings, structural and lifting calculations where required, lifting and centre-of-gravity drawings, lining and replacement drawings, welding qualifications, ITP, manufacturing schedule, coating and lining procedures, assembly instructions, O&M manual, spare-parts list, as-built drawings, MDR and separate overflow and underflow warranty certificates.

授标后资料应包括设计基础、经认证的总布置图及接口图、所需结构和吊装计算书、吊装及重心图、内衬及更换图、焊接资格文件、检验与试验计划、制造进度、涂层和内衬程序、装配说明、运行维护手册、备件清单、竣工图、制造商资料报告及溢流箱和底流箱单独质保证书。

Final deliverables shall be in English. Key installation, operation and maintenance documents may additionally be provided in Chinese; unless otherwise agreed, English is the contractual version.

最终交付文件应提供英文版本。主要安装、运行和维护文件可另外提供中文版本；除非另有约定，英文为合同执行版本。

16. KARARA RESPONSIBILITIES KARARA 责任

Unless otherwise stated in the final contract, Karara will provide reasonable site access, available existing drawings and operating information, final approved duty data, induction and permit requirements, document review, shutdown and isolation coordination where site work is included, and identification of the delivery and laydown area.

除非最终合同另有规定，Karara 将提供合理的现场通行条件、可用的现有图纸和运行资料、最终批准工况数据、入场培训和许可要求、文件审查、包含现场作业时的停机和隔离协调，以及交货和预组装场地。

Karara's provision of information does not relieve the Supplier of verifying the physical interfaces applicable to its design.

Karara 提供资料不免除供应商核实其设计所涉及现场实体接口的责任。

17. MANDATORY MINIMUM REQUIREMENTS 强制性最低要求

- Two complete replacement clusters for DI017 and DI019, compatible with six existing 650 mm-class cyclone positions.
为 DI017 和 DI019 提供两套完整替换旋流器组，并与六个 650 mm 级旋流器工位兼容。
- Representative distributor feed-sampling point with safe isolation, pressure gauge and transmitter connection.
分配器设置具有代表性的入料取样口、安全隔离、压力表及变送器接口。
- Maintainable distributor branch wear system.
分配器支管采用便于维护的耐磨系统。
- Overflow launder with 25 mm premium natural rubber or approved equivalent hot-vulcanised rubber.
溢流箱采用 25 mm 优质天然橡胶或经批准的同等热硫化橡胶。
- Underflow launder with 20 mm rubber backing and 25 mm ceramic, or an approved performance-equivalent system.
底流箱采用 20 mm 橡胶底衬和 25 mm 陶瓷，或经批准的同等性能系统。
- Replaceable underflow wear sections and level, safely accessible maintenance platform.
可更换底流耐磨模块及水平、安全可达的检修平台。
- 3 mm THK polyurea on nominated external wet-area surfaces.
指定外部湿区表面采用厚度 3 mm 聚脲。
- Ten-year pro-rata overflow warranty and eight-year pro-rata underflow warranty.
溢流箱 10 年按比例质保及底流箱 8 年按比例质保。
- Separate component pricing to support warranty-credit calculation.
分项报价，以支持质保信用补偿计

