



KARARA MINING LIMITED

Karara Mining Limited

Knuckle Boom Lift

曲臂升降机

JUL-2025

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KNUCKLE BOOM LIFT 曲臂升降机

SYNOPSIS

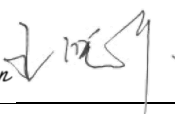
This document has been prepared for the procurement of the knuckle boom lift to support production operations at the Karara Mining processing plant in Western Australia. The specification outlines the technical, operational, safety, and regulatory requirements for the equipment to ensure it meets both site-specific needs and applicable Australian standards.

本文件为采购曲臂升降机而编制，用于支持西澳大利亚卡拉拉矿业选矿厂的生产运营。技术规范明确了该设备的技术、运行、安全及合规要求，以确保其满足现场特定需求并符合适用的澳大利亚标准。

Disclaimer

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KNUCKLE BOOM LIFT – TECHNICAL SPECIFICATION

REV	DESCRIPTION	ORIG	MANAGER APPROVAL	THIRD PARTY APPROVAL	COMMERCIAL DEPARTMENT APPROVA	DATE
A	Issued for Review	JINDONG YAN <i>Jindong Yan</i>				Jul- 25

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1 SCOPE OF APPLICATION 适用范围

This technical specification outlines the requirements for the procurement of the knuckle boom lift to be used at the Karara Mining Processing Plant in Western Australia. The equipment is intended to support various elevated work tasks conducted by the maintenance department, including operations in areas with gravel roads and muddy terrain.

The scope of this specification includes but is not limited to:

- General design and performance standards
- Compliance requirements with Australian standards and Western Australian mining regulations
- Environmental adaptability and safety requirements
- Transportation, installation, commissioning, and acceptance procedures
- Documentation, certification, and labelling requirements
- Reference to Karara internal engineering standards and relevant industry codes

This specification serves as the technical basis for supplier selection, tender evaluation, and final equipment acceptance, ensuring that the procured boom lift is fully suitable for Karara's operational environment.

本技术规范概述了采购曲臂升降机的要求，该设备将用于西澳大利亚卡拉拉矿业选矿厂。该设备旨在支持维修部门在高空位置开展的各类作业任务，适用于碎石路面、泥泞地形等复杂工况环境。

本规范的适用范围包括但不限于以下内容：

- 一般设计与性能标准
- 对澳大利亚标准及西澳矿业法规的符合性要求
- 环境适应性与安全性要求
- 运输、安装、调试与验收流程
- 文件、认证及标签要求
- 参考卡拉拉内部工程标准及相关行业规范

本技术规范将作为供应商遴选、投标评估及设备最终验收的技术依据，确保所采购的曲臂升降机完全适用于卡拉拉矿区的实际运行环境。

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2 DESCRIPTION OF THE KNUCKLE BOOM LIFT

曲臂升降机描述

The diesel-powered knuckle boom lift is engineered for high-altitude operations across Karara's iron ore processing plant and mining areas. Its articulated boom structure provides excellent obstacle clearance in confined areas, while robust 4WD/4WS drivability ensures performance over gravel, mud, and sloped terrain. The platform integrates power and compressed air interfaces to support on-platform maintenance tools.

Key features of the knuckle boom lift include:

- Articulated boom design: 3-section boom with 80°+ up-and-over capability (vs. telescopic boom).
- Enhanced manoeuvrability: 4WD + 4WS + oscillating axles for 45% gradeability.
- Platform capacity: 230 kg (standard).
- Continuous 360° rotation with hydraulic platform levelling.
- Tier 4 Final diesel engine (75 kW) + integrated 6.0 kVA generator.
- Operational range: -20°C to +55°C with thermal management.

曲臂升降机是一种由柴油驱动的伸缩式高空作业平台，专为在卡拉拉矿区进行高空作业而设计。三节式关节臂结构具备优异的越障能力，适用于狭小作业空间；强劲的四轮驱动/四轮转向系统确保设备可在碎石路、泥地及坡道上稳定运行。平台配备电源与气源接口，以支持维修工具作业，提升现场维护效率。

曲臂升降机的主要特点包括：

- 关节臂设计：采用三节式臂架结构，具备 80°以上越障能力，优于伸缩臂架类型。
- 机动性能增强：配备四轮驱动、四轮转向及摆动桥，具备 45%爬坡能力，适应复杂地形。
- 平台载重能力：标准模式下为 230 kg。
- 作业平台支持 360°连续旋转，并配备液压自动调平功能。
- 搭载符合 Tier 4 Final 排放标准的 75 kW 柴油发动机，集成 6.0 kVA 发电机。
- 适用环境温度范围为-20°C 至+55°C，内置热管理系统确保高温或低温下稳定运行。

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3 BASIC REQUIREMENTS

基本要求

Knuckle boom lifts must be robust, safe, and reliable aerial work platforms, offering exceptional mobility and adaptability to the harsh environmental conditions at the Karara Mine site, including high dust levels, saline corrosion, and ambient temperatures ranging from -20°C to $+50^{\circ}\text{C}$. The equipment shall possess Vehicle Import Approval (VIA) for use in Australia and shall fully comply with the following standards:

- AS 1418.10:2025 (Mobile elevating work platforms – Design, testing, and safety)
- AS 2550.10:2020 (Cranes and hoists – Safe use of mobile elevating work platforms)
- AS 4024.1-2018 (Safety of machinery)

曲臂式高空作业平台必须具备坚固耐用、安全可靠的结构设计，具备优异的机动性，能够适应卡拉拉矿区恶劣环境条件，包括高粉尘、盐雾腐蚀以及 -20°C 至 $+50^{\circ}\text{C}$ 的环境温度范围。设备必须取得澳大利亚车辆进口许可（VIA），并全面符合以下标准要求：

- AS 1418.10:2025（移动式高空作业平台——设计、测试与安全）
- AS 2550.10:2020（起重设备——移动式高空作业平台的安全使用）
- AS 4024.1-2018（机械设备的安全）

3.1 Performance Parameters 性能参数

- $\geq 13.7\text{m}$ working height, $\geq 7.0\text{m}$ horizontal outreach, $\geq 7.5\text{m}$ up-and-over clearance (per AS 1418.10:2025 dynamic stability tests).
作业高度 ≥ 13.7 米，水平延伸 ≥ 7.0 米，跨越高度 ≥ 7.5 米（符合 AS 1418.10:2025 动态稳定性测试）。
- Max 7km/h with 4WD; auto-limit to $\leq 3\text{km/h}$ if boom not fully retracted (AS 2550.10 safety interlock).
最大时速 7km/h（四驱）；臂架未收回时自动限速 $\leq 3\text{km/h}$
- Platform load capacity:
Standard mode – $\geq 230\text{ kg}$
平台载重能力：标准模式： ≥ 230 公斤
- Platform dimensions: $\geq 0.9\text{ m} \times 1.8\text{ m}$
平台尺寸： ≥ 0.9 米 $\times$ 1.8 米
- Drive system: Four-wheel drive (4WD) and four-wheel steering (4WS)
驱动系统：四轮驱动（4WD）和四轮转向（4WS）
- Power source:
Tier 4 Final emissions ($\text{PM} \leq 0.025\text{g/kWh}$, $\text{NOx} \leq 3.5\text{g/kWh}$) compliant with ADR 80/03; dual-stage air pre-filter (99.9% efficiency) for iron ore dust.

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- Tier 4 Final 排放 (PM $\leq$ 0.025g/kWh, NO $\leq$ 3.5g/kWh), 符合 ADR 80/03; 双级空气预滤器 (99.9%过滤效率) 适应铁矿粉尘。
- Off-road capability: Max gradeability 45%, suitable for rough terrain
越野能力: 最大爬坡度 45%, 适应崎岖地形
- Other features:
 - 360° continuous rotating turret
 - Self-levelling platform
 - Hydraulic platform rotation
 - Extendable chassis for transport and stability
 - Platform includes AC outlet and air hose connection
 - Emergency descent system (EN 81-40 certified, manual descent during power loss)其他功能:
 - 360°连续旋转转台
 - 自调平平台
 - 液压平台旋转
 - 可伸缩底盘, 便于运输和稳定性
 - 平台配备交流电插座和气管接口
 - 紧急下降系统 (EN 81-40 认证, 断电时可手动降至地面)
- Fire suppression system: Compliant with AS 5062:2022, covers engine bay and hydraulic tank
灭火系统: 符合 AS 5062:2022 标准, 覆盖发动机舱和液压油箱
- Seatbelts: Compliant with AS 2593:2021, corrosion-resistant webbing
安全带: 符合 AS 2593:2021 标准, 满足抗腐蚀织带要求
- Fall arrest anchors: Dual anchor points per AS/NZS 1891.4:2020
防坠落锚点: 双锚点设计, 符合 AS/NZS 1891.4:2020 标准

3.2 Environmental Adaptability Requirements 环境适应性要求

- Protection Rating: Key electrical components of the lift, including the control cabinet, motor junction boxes, external sensors, and all wiring harness connectors, shall comply with a protection rating of IP67. Internal components within the control cabinet shall have a minimum rating of IP54. All wiring harnesses must be equipped with flame-retardant insulation to ensure safe operation under harsh conditions involving dust, humidity, and high vibration.
防护等级: 升降机关键电气部件 (控制柜、电机接线盒、外部传感器) 及所有线束连接器应达到 IP67 防护等级; 控制柜内部组件不低于 IP54。所有线束须采用阻燃绝缘层, 确保在多尘、潮湿、高振动的严苛工况下安全运行。
- Corrosion Resistance: Key components must be treated against corrosion in accordance with AS 4312:2008 to withstand exposure to dust, humidity, and salt spray typical of mining environments.

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耐腐蚀性：关键部件按 AS 4312:2008 标准进行防腐处理，适应矿区潮湿、多尘和盐雾环境。

- **Temperature Range:** The equipment must reliably operate in ambient temperatures ranging from -20°C to $+55^{\circ}\text{C}$.
工作温度范围： -20°C 至 $+55^{\circ}\text{C}$ ，确保在极端温度条件下运行。
- **Zone 22 certification (AS/NZS 60079) + spark arrester (mesh $\leq 0.5\text{mm}$)** if used in crushing/screening areas (**WA Mines Regulation 4.5**).
若用于破碎/筛分区，需 Zone 22 防爆认证（AS/NZS 60079）及火花捕捉器（网孔 $\leq 0.5\text{mm}$ ）（西澳矿山条例 4.5 条）。

3.3 Standards Compliance 标准合规性

3.3.1 Structural safety standards 结构安全标准

- **AS 1418 series (crane design standards):** Ensures structural strength, stabilising leg design, and load testing
AS 1418 系列标准（起重机设计标准）：确保升降机结构强度、稳定支腿设计及负载测试
- **AS 1418.10**
- **AS 2550 series (safe use of lifting equipment):** Covers operational procedures, periodic inspections, and emergency procedures
AS 2550 系列标准（起重设备安全使用）：涵盖操作流程、定期检验和应急程序
- **ISO 16368: Design, calculation, stability and test standards for aerial work platforms**
ISO 16368：高空作业平台设计、计算、稳定性和测试标准
- **AS/NZS 1891 series: Standards for use and testing of personal fall protection systems**
AS/NZS 1891 系列标准：个人防坠落系统的使用和测试标准。

3.3.2 Engine and emission standards 发动机与排放标准

- **Emissions:** Diesel engine must meet Australian non-road emission standards (US EPA Tier 4 Final).
排放标准：柴油发动机应符合澳大利亚非道路机械排放标准（US EPA Tier 4 Final），以减少有害排放物。

3.4 Lifting Standards & Compliance Requirements 吊装标准与合规要求

- The machine must have dedicated lifting points on top to allow safe handling during transport and deployment at mining sites.
设备顶部配备专用吊装点，便于在矿区安全吊装。

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- AS 4991-2004 (Lifting Devices): Specifies the design, manufacture, testing, and use of lifting devices.
AS 4991-2004 《吊装装置》：规定吊装装置的设计、制造、测试和使用要求。
- The supplier shall provide:
 - Static load test report at 125% of the Safe Working Load (SWL), and dynamic load test report at 110% of SWL.
 - Lifting point layout, including SWL markings and angle limitation specifications.
供应商须提供以下资料：
 - 静载测试报告（125% 安全工作载荷 SWL）及 动载测试报告（110% SWL）
 - 吊点位置图，标明安全工作载荷（SWL）及角度限制说明
- Lifting Operation Requirements
 - All lifting operations must be carried out by personnel holding a valid High-Risk Work Licence (Advanced Rigging).
 - The supplier shall provide a Lifting Procedure Manual for reference and compliance.
操作规范
 - 吊装作业必须由持有有效高风险作业许可证（高级吊装资质）的人员执行。
 - 供应商须提供吊装作业程序手册，供现场使用与合规审查。

3.5 Certification Requirements 认证要求

3.5.1 Registration and Certification 注册与认证

The equipment design must be registered with WorkSafe WA. The supplier shall provide the following documentation:

- Explosion-proof certification, where applicable
- Noise test report, in accordance with AS/NZS 1269

设备设计需经 WorkSafe WA 注册。供应商须提供以下文件：

- 防爆认证（如适用）
- 噪声测试报告，符合 AS/NZS 1269 要求

3.5.2 Regulatory Compliance Statement 法规合规声明

A formal compliance declaration is required to confirm that the equipment meets the WHS Act 2020 requirements and the obligations of a Person Conducting a Business or Undertaking (PCBU).

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供应商需提供正式的合规声明，确认设备符合《2020 年职业健康与安全法（WHS Act 2020）》的要求，以及经营单位责任人（PCBU）的法定责任。

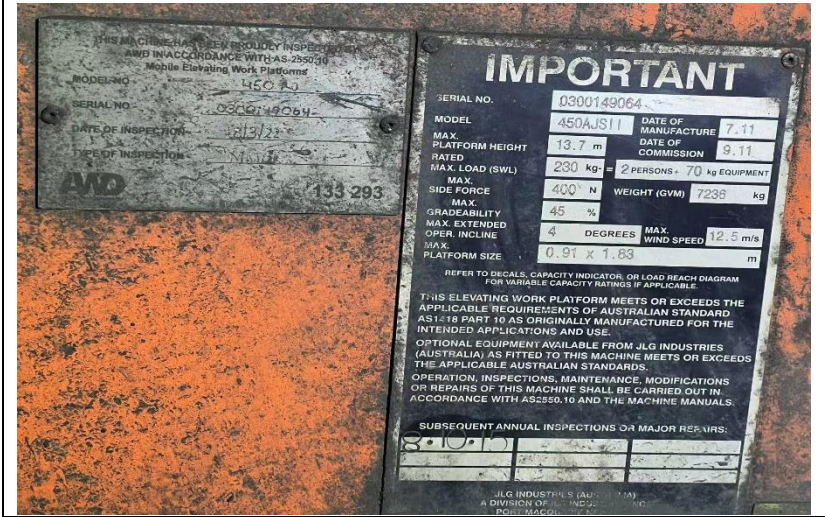
3.6 Warranty Period 质保期

- The machine must be covered by a full warranty of 24 months or 4,000 operating hours, whichever comes first.
提供 24 个月或 4,000 小时的整机质保，以先到者为准。

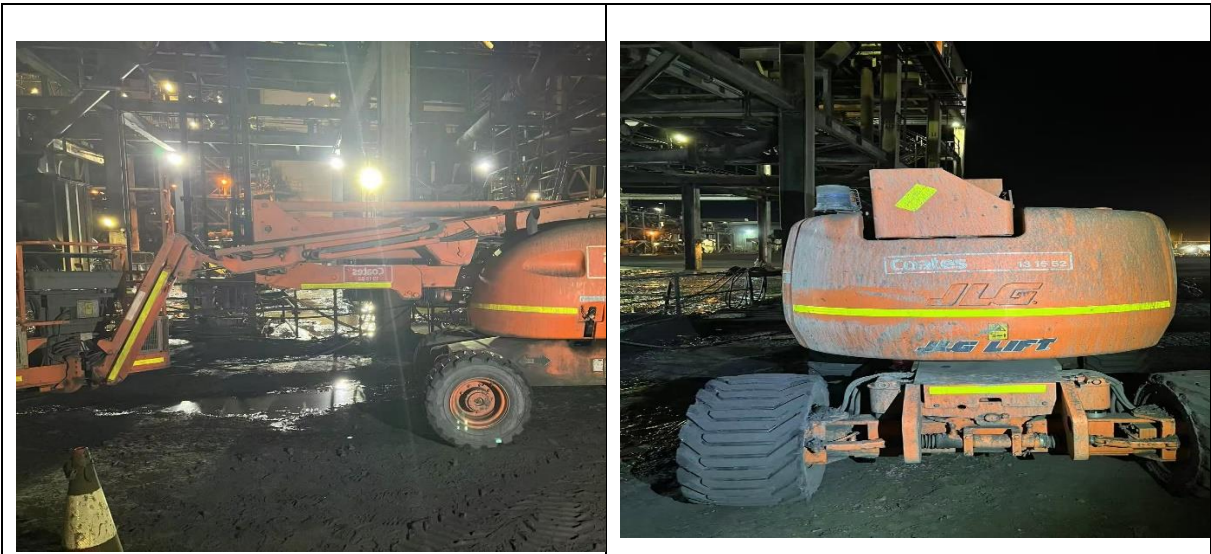
3.7 Reference Brand 参考品牌: JLG 450AJ



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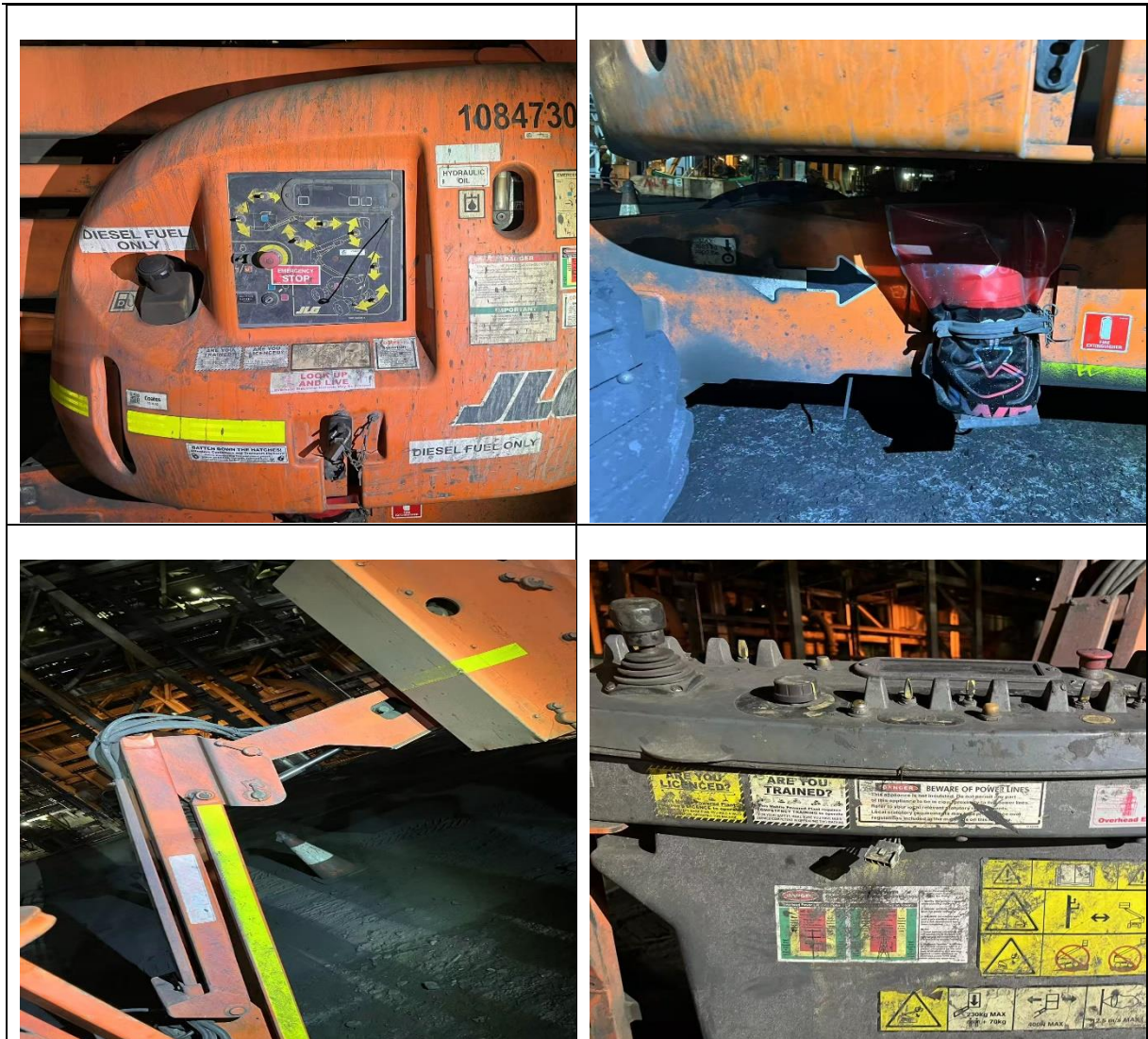


Reference picture 参考图片:



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3.8 Others 其他

3.8.1 Reverse Alarm 倒车警报

- AS 1319:1994 (Acoustic signals for mobile machinery).
AS 1319:1994 (移动机械声响信号)
- The reverse alarm must emit a pulsed signal of 105–110 dB(A) at a distance of 1 meter, clearly distinguishable from background noise, in compliance with AS/NZS 1269.3:2005.
1 米距离处 105–110 dB(A)脉冲报警，声频与环境噪音显著区分（符合 AS/NZS 1269.3:2005）。

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- Distinctive dual-tone pulse pattern is required, such as 0.5 seconds on / 0.5 seconds off.
特征性间歇双音调（如 0.5 秒开/0.5 秒关）。

3.8.2 Rotating Warning Light 旋转警示灯

In accordance with AS/NZS 1906.4:2010 and AS 4282:2019 (supplementary requirements for heavy vehicle warning lights), the equipment shall meet the following specifications:

- Luminous intensity $\geq 1.0 \text{ cd/lx/m}^2$ (ensures visibility in high-dust environments)
- Flash frequency: 1.5–3.0 Hz (optimized for human visual alert response)
- Mounting position: Unobstructed 360° visibility at a minimum height of 2.5 m above ground level

警示灯需符合 AS/NZS 1906.4:2010 与 AS 4282:2019（重型车辆附加要求）标准，满足以下性能参数：

- 光强： $\geq 1.0 \text{ cd/lx/m}^2$ （保障粉尘环境下可视性）
- 闪烁频率：1.5–3.0 Hz（符合人眼警觉响应频率）
- 安装位置：顶部 360°无遮挡，且距地面 ≥ 2.5 米

Western Australia Mining Mandate

西澳矿区强制项：

In case of failure of the primary beacon, an automatic backup LED light must activate. The redundancy system must comply with AS 4024.1603 (Fail-Safe Design).

必须配备双系统冗余警示装置：主警示灯发生故障时，备用 LED 灯组应自动激活，整体系统需符合 AS 4024.1603 故障安全设计标准。

3.8.3 "Etc." Items (Critical Additions for WA Mines) “其他”项目（西澳矿山关键补充项）

- Fire Extinguisher 便携式灭火器
Must comply with:
 - AS 1851:2012 (Routine service of fire protection systems and equipment)

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- AS 5062:2022(Fire protection for mobile and transportable equipment, including mounting bracket standards)

灭火器必须符合以下标准:

- AS 1851:2012 (消防系统和设备的定期维护)
- AS 5062:2022 (移动设备灭火系统标准, 包括固定支架要求)

Capacity: Minimum 9 kg ABE dry chemical powder, suitable for engine and hydraulic oil fire protection

Mounting bracket must pass a 5g vibration test (simulating mine site transport conditions)

Mounting location: Within 1 m of the operator station, accessible without tools for rapid deployment

容量: 不小于 9 kg ABE 干粉型灭火器, 可有效覆盖发动机及液压油火灾

支架: 必须通过 5g 振动测试 (模拟矿区道路运输环境)

安装位置: 距操作台不超过 1 米, 并可无需工具快速取用

- Seatbelts 安全带

AS/NZS 1891.1:2007 (Industrial fall-arrest systems and devices) and shall be applied to dynamic load conditions associated with elevated work platforms.

AS/NZS 1891.1:2007 (工业防坠落系统与装置), 适用于升降平台使用过程中可能产生的动态负荷工况。

Harness Requirements: A four-point safety harness must be provided, equipped with:

- Integrated shock absorber
- Double-locking buckles
- The harness must comply with AS 1891.4.

安全带要求: 提供四点式安全带, 具备以下配置:

- 内置减震装置
- 双锁止插扣
- 安全带须符合 AS 1891.4 标准要求。

- Lighting 照明

Must comply with:

- ISO 12508:2017 (Lighting, signals, and indicators for MEWPs)
- AS 1418.10:2025 Annex D (Lighting requirements specific to mobile elevating work platforms)

设备照明系统需符合以下标准:

- ISO 12508:2017 (升降平台照明与信号)

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- AS 1418.10:2025 附录 D（升降平台专用照明要求）

Lighting Type 照明类型	Specification 要求
LED Work Lights LED 工作灯	Front/rear ≥ 2 sets each; $\geq 3,500$ lumens per lamp; 5,000 K color temperature (daylight) 前/后各不少于 2 组，单灯光通量 $\geq 3,500$ 流明，色温 5000K（白昼光）
Platform Task Light 平 台作业灯	360° adjustable; ≥ 50 lux @ 10 m; provide light distribution diagram 360°可调，照度不低于 50 lux @ 10 米，需提供光照分布图
Emergency Lighting 应急照明	Auto-activated upon power loss; ≥ 30 minutes runtime; complies with AS/NZS 2293.2 断电自动点亮，持续照明时间不少于 30 分钟，符合 AS/NZS 2293.2 标准

- Collision Warning System
 - Radar/ultrasonic sensors with detection range ≥ 5 m
 - Audio-visual alarms in operator cab, compliant with ISO 21815

碰撞预警系统

- 雷达/超声波传感器，探测范围不少于 5 米
- 驾驶室内设有声光报警装置，符合 ISO 21815 要求

- Platform Emergency Escape Ladder
 - Foldable design
 - Load capacity ≥ 150 kg
 - Compliant with AS 1657 (Fixed platforms, walkways, stairs)

平台紧急逃生梯

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- 折叠式设计
 - 载重不低于 150 kg
 - 符合 **AS 1657** 阶梯类标准

 - Automatic Fire Suppression System (Engine Compartment)
 - Certified to AS 5062-2006
 - Thermally activated agent release
 - Minimum agent capacity: ≥ 2 kg, MSDS must be provided
- 发动机舱自动灭火系统
- 符合 AS 5062-2006
 - 热感应触发
 - 灭火剂容量不低于 2 kg，并提供化学品安全数据表（MSDS）

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4 TRANSPORTATION, INSTALLATION, COMMISSIONING, AND ACCEPTANCE 运输、安装、调试与验收

4.1 Transportation 运输

4.1.1 Ocean Freight & Customs Clearance 海运与清关

- The supplier shall arrange sea transportation to Western Australia Port and provide real-time access to a logistics tracking system.
- Suppliers must complete Australian biosecurity inspections, including AQIS BMSB treatment, and submit customs duty exemption applications under Section 123 of the Mining Act 1978 (Mining Equipment Exemption).
- 供应商应安排海运至西澳港口并提供物流追踪系统的实时访问权限。
- 必须完成澳大利亚生物安全检验（包括 AQIS BMSB 处理），并根据《1978 年采矿法》第 123 条提交采矿设备关税豁免申请。

4.1.2 Inland Transport 内陆运输

- Main Roads WA Oversize Transport Permit must be obtained, including full dimensional and weight details.
- Transport route must avoid Aboriginal heritage areas per the Aboriginal Heritage Act 1972, with submission of route plans.
- 须取得 Main Roads WA 颁发的超限运输许可（包括设备尺寸与重量说明）。
- 运输路线应避开土著文化保护区，并根据《1972 年土著文化遗产法》提交路线图纸。

4.2 Installation 安装

- The supplier shall supervise unloading and mechanical positioning of the equipment at the designated mine site installation area.
- Lifting operations must follow AS 1418.8-2008 for loader lifting points and AS 4991-2004 for lifting devices.
- Electrical connections must comply with AS/NZS 3000:2018 and be inspected by Western Power prior to energisation.
- 供应商需负责监督设备在矿区指定安装区域的卸载与就位。
- 吊装作业需符合《AS 1418.8-2008 装载机吊点要求》及《AS 4991-2004 吊装装置》标准。

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- 电气连接须符合《AS/NZS 3000:2018》规范，并由 Western Power 检验通过后方可通电。

4.3 Commissioning 调试

- knuckle boom lift validation, engine parameter calibration, and safety interlock checks.
- Real-time emission interface shall be connected to the mine monitoring system for verification.
- Mechanical guarding for all rotating parts must be in place as per *Work Health and Safety (Mines) Regulations 2022*, Clause 47.
- 设备需完成初始调试，包括液压系统验证、发动机参数校准及安全联锁测试。
- 实时排放数据接口应接入矿区监控系统并完成验证。
- 所有旋转部件必须安装机械防护罩，符合《2022 年矿山健康与安全条例》第 47 条。

4.4 Acceptance 验收

In addition to complying with applicable Australian standards and certifications, the knuckle boom lift must also meet the regulatory requirements of the state government where the mine is located. These include, but are not limited to: the *Product Emissions Standards Act 2017*, the *Product Emissions Standards (Customs) Charges Act 2017*, and the *Product Emissions Standards (Excise) Charges Act 2017*.

该曲臂升降机除需满足澳大利亚相关标准及认证外，还必须符合矿区所在地州政府的法规要求，包括但不限于：《2017 年产品排放标准法》、《2017 年产品排放标准（海关）收费法》及《2017 年产品排放标准（消费税）收费法》等。

Factory Acceptance Test (FAT) 工厂验收	• Tipping Load Test (ISO 14397-1) • Hydraulic Peak Pressure Test $\geq 110\%$ of design pressure	FAT report signed by third-party laboratory (English) 第三方实验室签署的英文报告
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Site Acceptance Test (SAT) 现场验收	72-hour continuous operation test (≤ 1 failure) - CAT Mine System integration check	SAT log + compatibility certificate 试运行记录+系统兼容性证明
Regulatory Certification 合规认证	- ROPS/FOPS compliance - Noise level ≤ 82 dB(A) - Audit Tier 4 Final emissions data against Product Emissions Standards Act 2017	Certificates issued by WorkSafe WA- authorised body 由 WorkSafe WA 授权机构出具的合规证书

4.5 Notes 说明

4.5.1 Third-Party Verification Framework 第三方验证框架

Verification Authority 验证机构资质

- Must hold NATA accreditation (ISO/IEC 17025) and WorkSafe WA authorization for mining equipment certification.
需持有 NATA 认证 (ISO/IEC 17025) 及 WorkSafe WA 矿山设备授权。
- Scope includes Design review, FAT/SAT witnessing, compliance auditing.
服务范围涵盖：设计审查、工厂/现场验收见证、合规审计。

4.5.2 Contractual Obligations 合同义务

1. Third Party as Karara's Technical Agent 第三方作为卡拉拉技术代理

- Review all design documents for AS 1418.10:2025 compliance.
审核全部设计文件是否符合 AS 1418.10:2025。
- Hold veto power on SAT approval if safety standards are breached.
若违反安全标准，对 SAT 验收拥有一票否决权。

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2. Deliverables 交付物

- Signed FAT/SAT certificates with NATA logo.
签署带 NATA 标识的 FAT/SAT 证书。
- ROVER registration package submitted to DMIRS within 30 days.
30 日内向 DMIRS 提交 ROVER 注册包。

3. Cost & Liability 费用与责任

- Verification costs borne by supplier (per WA Mines Regulation 12A).
验证费用由 供应商承担（依据西澳矿山条例 12A 条）。
- Third party liable for negligent certification (Civil Liability Act 2002).
第三方对 认证过失 承担法律责任（《2002 民事责任法》）。

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5 DOCUMENTATION AND LABELLING 文档与标识

All product nameplates and labels shall be in English. All relevant technical documentation shall be provided in English. All products shall be accompanied by English labels that comply with regulatory requirements.

所有产品的铭牌、标识均应用英文标示。所有相关的技术文档均应提供英文版本。所有产品均应附带符合法规要求的英文标识。

5.1 Nameplates & Labels 铭牌与标签

All nameplates and safety labels shall be written in 100% English, in compliance with Chapter 2.6 of the *Competition and Consumer Act 2010*.

语言：

所有铭牌及安全标签必须为 100%英文，符合《2010 年竞争与消费者法》第 2.6 章要求。

Mandatory Contents:

- Equipment serial number and date of manufacture
- ROPS/FOPS certification number (per ISO 16358 & AS 1418)
- NTC emission compliance code (Tier 4 Final)
- Electrical safety rating (IP67 + AS/NZS 3000:2018)
- WA registration mark (RAV Entry Approval No.)

强制内容：

- 设备序列号、出厂日期
- ROPS/FOPS 认证编号（符合 ISO 16368 与 AS1418）
- NTC 排放认证码（Tier 4 Final）
- 电气安全等级（IP67 + AS/NZS 3000:2018）
- 西澳注册标识（RAV Entry Approval No.）

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Durability:

All plates must be laser-etched on stainless steel, resistant to salt spray corrosion per AS 4312:2008.

耐久性:

铭牌必须使用不锈钢激光蚀刻工艺，具备抗盐雾腐蚀能力，符合 AS 4312:2008 标准。

5.2 Technical Documentation 技术文档

Documentation shall be provided in English as the primary language. A Chinese version may be provided as a reference only and shall have no legal effect.

语言:

技术文档以英文为主，中文仅作为参考辅助，不具备法律效力。

Submission Timeline:

- Draft version: Due at least 45 days before Factory Acceptance Test (FAT)
- Final version: Due 7 days before delivery

交付时效:

- 初稿: 需在工厂验收 (FAT) 前 45 天提交
- 终稿: 需在交付前 7 天提交

5.3 Required Document List 核心文件清单

Document Type 文档类型	Additional Compliance Requirement 新增合规要求	Reference 依据
Declaration of Conformity 符合性声明	Must be signed by a licensed Australian engineer, covering AS/NZS 3000, ISO 3471, AS 5062:2022	<i>Work Health and Safety Act 2020</i>

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Factory Acceptance Procedure 工厂验收程序	Must include video of tipping load test (ISO 14397-1) and hydraulic peak pressure curve	<i>DEMIRS MDG 41</i>
Inspection Report 检验报告	Corrosion coating to be tested via $\geq 1,000$ -hour salt spray test per AS 4312:2008	<i>WA Mine Corrosion Guidelines</i>
Noise Test Report 噪音测试报告	Must be issued by WorkSafe WA accredited lab and include full-condition sound profiles (unloaded/loaded/steering)	<i>AS/NZS 1269.1:2005</i>
IOM Manual 使用维护手册	Dedicated section on maintenance in high-dust WA environments (HEPA filter change cycle ≤ 250 hours)	<i>AS 3691</i>
Maintenance Strategy 维护策略	Include critical component life prediction based on AS 4457.1-2018 mining equipment lifecycle model	<i>AS 4457.1</i>

5.4 Specific Supplementary Clauses 补充条款

5.4.1 Electrical Safety Certification 电气安全认证

- Requirement:
All electrical schematics must bear a Western Power compliance stamp as required by the *WA Electricity Regulations 1991*.
- 要求:
所有电路图须加盖 Western Power 合规印章, 符合《1991 年西澳电气法规》(*WA Electricity Regulations 1991*) 要求。

5.4.2 Documentation Upload Obligations 文件注册义务

Requirement:

The supplier shall assist in uploading the following documents into the DEMIRS ROVER system as part of equipment registration:

- Noise test report (PDF format and original .CSV data file)

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- Fire suppression system certificate compliant with *AS 5062:2022*

要求:

供应商需协助将以下文件上传至 DEMIRS ROVER 系统作为设备注册材料之一:

- 噪音测试报告 (PDF 格式及原始.CSV 数据文件)
- 灭火系统合规证书 (符合 *AS 5062:2022* 标准)

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The supplier must possess ISO 9001 Quality Management System certification.

供应商需具备 ISO9001 质量管理体系认证。

This specification ensures that the design, manufacturing, installation, and commissioning of the knuckle boom lift fully comply with the safety and environmental regulations of the Australian mining area. For any other unspecified requirements related to design, installation, certification, etc., the supplier must clarify with the owner's senior project engineer or technical personnel of equivalent or higher qualification.

本规范确保曲臂升降机的设计、制造、使用全面符合澳大利亚矿区的安全和环保法规。其它未尽的设计、安装、认证等的要求供应商须与业主方项目高级工程师或以上资格的技术人员澄清。

The equipment needs to comply with Australian standards and Australian mining area usage standards, including but not limited to:

该设备需符合澳大利亚相关标准及澳大利亚矿区使用标准，包括但不限于：

Document No. 文件编号	Document Title 文件名称
AS 1418.1	sets requirements for design, construction, safety, and testing of mobile elevating work platforms
AS 1418.10:2025	Mobile elevating work platforms
AS 3000:2018	Electrical installations
AS 3012:2019	Electrical installations - Construction and demolition sites
AS 2550.10	Cranes, hoists and winches - Safe use
AS/NZS 3760	In-service safety inspection and testing of electrical equipment and RCDs
AS 1319:2018	Safety signs for the occupational environment (Reconfirmed 2018)
ISO 16368:2010	Mobile elevating work platforms — Design, calculations, safety requirements and test methods

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	<i>Mines Safety and Inspection Act 1994 (WA)</i>
	<i>Work Health and Safety (Mines) Regulations 2022 (WA)</i>

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7 KML STANDARD 卡拉拉设备标准列表

Document No. 文件编号	Document Title 文件名称
CORP-GE-SPC-1001_1	EQUIPMENT LABELLING SPECIFICATION
CORP-GE-SPC-1002_0	SPECIFICATION FOR PACKING, MARKING AND DOCUMENTATION REQUIREMENTS
CORP-GE-SPC-1004_1	SPECIFICATION FOR SURFACE TREATMENT OF STRUCTURAL STEELWORK AND PIPEWORK
CORP-GE-SPC-1005_0	TECHNICAL SPECIFICATION FOR SHOP DETAILING OF STRUCTURAL AND MECHANICAL ITEMS
CORP-EL-SPC-1008_0	SPECIFICATON FOR ELECTRIC MOTORS
CORP-IN-SPC-1001_0	SPECIFICATION FOR GENERAL INSTRUMENTS
CORP-IN-SPC-1002_0	SPECIFICATION FOR CONTROL AND INSTRUMENTATION FOR PACKAGES
CORP-IN-SPC-1007_0	SPECIFICATION FOR INSTRUMENTATION INSTALLATION
CORP-IN-SPC-1016_0	SPECIFICATION FOR CONTROL SYSTEM HARDWARE
CORP-IN-SPC-1018_0	SPECIFICATION FOR CONTROL SYSTEM SOFTWARE