

CARDINAL CRITICAL ENGINEERING TECHNOLOGIES



PREMIUM EQUIPMENT SUPPLY PORTFOLIO PUMPING STATIONS

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NEXT COOLING TOWERS



Gruppo Aturia



CARDINAL

Founded in 2010, CARDINAL has established itself as a trusted supplier of original equipment and genuine spare parts, serving key industries across the Middle East and European regions. With regional offices in Qatar and Dubai and Headquartered in Belfast, Ireland, we are strategically positioned to provide efficient, reliable, and responsive service to our clients.

Our Expertise

We specialize in the procurement and supply of high-quality components, sourced directly from leading international manufacturers. By emphasizing:

- Authenticity
- Traceability
- Performance

Every product we deliver meets the highest standards demanded by critical industries.

Industries We Serve

- Oil & Gas – Refinery, upstream, and downstream operations
- Power Generation – Turbines, generators, auxiliary systems
- Marine – Shipbuilding, repair, and maintenance
- Industrial Services – Process plants (WWTP & WTP), manufacturing, heavy industry
- Control System – Centralized Control Automation & Process Integration
- Instrumentation – Integration into Automation & Safety System.

Why Choose CARDINAL

- Technical Expertise: Knowledgeable team supporting equipment selection and application
- Customer Commitment: Responsive service ensuring timely delivery

Trusted Partner: Proven track record in supplying critical equipment and spare parts

Standards Compliance & Quality Assurance

All equipment supplied under the CARDINAL Supply Chain Portfolio is engineered, manufactured, tested, and certified in strict accordance with internationally recognized standards, including:

- **EN** – European Norms
- **ISO** – International Organization for Standardization
- **IEC** – International Electrotechnical Commission
- **DIN** – German Institute for Standardization
- **ASTM** – International Standards for Materials and Testing

Compliance is verified through factory acceptance tests (FAT), certified material traceability, and documented quality management systems. All manufacturing facilities operate under ISO 9001-certified quality frameworks, ensuring consistent performance, durability, and operational safety throughout the equipment lifecycle.

Manufacturer Qualification & Exclusivity

CARDINAL sources equipment exclusively from Grade-A Global Original Equipment Manufacturers (OEMs) with proven international references, long-term operational track records, and established reputations for engineering excellence.

All represented manufacturers are bound by formal and legally executed exclusive agency and representation agreements with CARDINAL. These agreements grant CARDINAL full authority for:

- **Commercial representation**
- **Technical coordination and interface management**
- **OEM-certified supply and logistics**
- **After-sales service and spare parts support**

This exclusive partnership structure ensures direct factory engagement, elimination of intermediaries, and full accountability across the entire supply chain.

Supply Chain Integrity & OEM Authenticity

Through its exclusive agency model, CARDINAL guarantees:

- **Supply of genuine OEM equipment only**
- **Full traceability of materials and components**
- **Direct manufacturer warranties**
- **Priority access to production capacity**
- **Long-term availability of original spare parts**

All equipment is delivered with complete technical documentation, including datasheets, drawings, certificates of conformity, testing reports, and operation & maintenance manuals.

Engineering Coordination & Project Integration

CARDINAL operates as a technical supply-chain integrator, ensuring seamless coordination between manufacturers, consultants, EPC contractors, and end users.

Our scope includes:

- **Equipment selection and sizing validation**
- **Interface coordination across mechanical, electrical, and automation disciplines**
- **Compliance review against project specifications and international codes**
- **Support during installation, commissioning, and start-up phases**

This integrated approach minimizes technical risk, ensures compatibility across systems, and optimizes overall project performance.

Lifecycle Support & After-Sales Services

CARDINAL provides full lifecycle support for all supplied equipment, including:

- **Commissioning supervision**
- **OEM-certified training programs**
- **Preventive and corrective maintenance support**
- **Long-term spare parts supply**
- **Performance optimization and upgrade recommendations**

This ensures sustained operational reliability and reduced total cost of ownership for the end user.

Client Value Proposition

By combining exclusive OEM representation, international standards compliance, and engineering-driven supply chain management, CARDINAL delivers:

- **Unmatched reliability and accountability**
- **Single-point responsibility for multi-vendor packages**
- **Reduced project risk and schedule certainty**
- **Long-term operational assurance**

CARDINAL is positioned as a trusted strategic partner for governments, utilities, EPC contractors, and private developers executing mission-critical infrastructure projects worldwide.



Pumping Station Equipment Municipal, Stormwater & Industrial Applications

Pumping Equipment

Submersible and Dry Installation Centrifugal Pumps

Scope of Supply

Heavy-duty centrifugal pumps designed for continuous operation in raw sewage, combined sewage, stormwater, and industrial wastewater pumping stations. The pumps are suitable for wet-well or dry-well installation and engineered for high reliability under variable hydraulic loading conditions.



Technical Characteristics

- Non-clog, vortex, or multi-channel impeller designs
- IP68 Ingress protection for submersible execution
- High-efficiency IE3 / IE4 motors

- Corrosion-resistant materials for aggressive wastewater
- Continuous-duty operation with thermal and moisture protection

Applicable Standards

EN · ISO · IEC · DIN · ASTM

Grade-A OEMs Exclusively Represented by CARDINAL

- **Grundfos** (Denmark)
- **Duchting Pumpen** (Germany)

Mechanical Pretreatment Equipment

Inlet Screening Systems

Scope of Supply

Automated mechanical screening systems installed at pumping station inlets for removal of coarse and fine solids, ensuring effective protection of downstream pumping equipment and pipelines.



Equipment Configuration

- Fixed or mechanically cleaned screens
- Channel-mounted or in-pipe installation
- Designed for continuous operation with minimal headloss

Construction Materials

- Stainless steel **SS304 / SS316L**
- Corrosion-resistant bearings and fasteners

Applicable Standards

EN · ISO

Grade-A OEM Exclusively Represented by CARDINAL

- **SFA Enviro** (France)
- **Beaudry** (France)

Flow Control & Isolation Systems

Valves (Isolation & Control)

Scope of Supply

A comprehensive range of isolation and control valves is installed on both suction and discharge pipelines to provide reliable system segregation, precise hydraulic regulation, and safe operational control under all operating conditions. These valves are engineered to facilitate secure equipment isolation during maintenance, protect pumps and downstream assets, and ensure stable and efficient hydraulic performance throughout the pumping station lifecycle.



Valve Types

- **Gate Valves**
- **Butterfly Valves**
- **Knife Gate Valves**
- **Non-Return (Check) Valves**
- **Swing Check Valves**
- **Ball Check Valves**
- **Nozzle (Spring-Assisted) Check Valves**
- **Air Release Valves** (Single, Double, and Combination Type)
- **Pressure Relief Valves**
- **Pressure Sustaining / Pressure Reducing Valves**
- **Isolation Globe Valves**

Applicable Standards

EN · DIN · ISO

Grade-A OEMs Exclusively Represented by CARDINAL

- **AVK** (Denmark)
- **Tecofi** (France)

Penstocks (Slide Gates)

Scope of Supply

Heavy-duty penstocks are installed to provide reliable flow isolation and control at wet wells, open channels, and inlet and outlet structures within the pumping station. These units are engineered to ensure effective sealing under varying hydraulic conditions, facilitate safe isolation during maintenance and emergency situations, and support-controlled flow management throughout the system. The penstocks are designed for robust performance, long-term durability, and ease of operation, ensuring dependable service across the full operational lifecycle of the facility.



Technical Characteristics

- Wall-mounted or channel-mounted execution
- Manual or electric actuation
- Watertight sealing in both directions

Materials

- Stainless steel SS304 / SS316L
- HDPE or elastomer sealing elements

Applicable Standards

EN · ISO

Grade-A OEMs Exclusively Represented by CARDINAL

- **Beaudrey** (France)
- **Waterfront** (UK)

Surge Protection Systems

Surge Vessels (Water Hammer Protection)

Scope of Supply

Hydro pneumatic surge vessels are provided as an integral surge protection measure to safeguard pumping station pipelines and associated hydraulic equipment from transient pressure fluctuations. These vessels are engineered to absorb and dampen pressure surges generated by rapid pump start-up and shutdown sequences, power failures, and sudden changes in flow conditions. By controlling water hammer effects and stabilizing system pressures, the surge vessels enhance hydraulic reliability, protect mechanical assets, and extend the service life of pipelines, valves, and pumping equipment.



Technical Characteristics

- Bladder or diaphragm-type vessels
- Carbon steel or stainless-steel construction
- Pre-charged with nitrogen
- Designed for high-pressure transient control

Applicable Standards

EN · ASME · ISO

Grade-A OEMs Exclusively Represented by CARDINAL

- **Ibaiondo** (Spain)
- **Henriques & Henriques** (Portugal)

Electrical Power & Energy Systems

Variable Frequency Drives (VFDs)

Scope of Supply

The VFD package supplied by CARDINAL includes, but is not limited to:

- VFD units suitable for continuous-duty wastewater pumping applications
- Integrated input/output filters and harmonic mitigation (where required)
- Bypass arrangements (manual or automatic, project-dependent)
- Communication interfaces for PLC/SCADA integration
- Local control panels with HMI (if specified)
- All required accessories for safe installation and operation



Technical Characteristics

- Output frequency control for precise pump speed modulation
- Soft start and soft stop functionality to minimize hydraulic transients
- High overload capacity suitable for wastewater pump starting torque
- Built-in motor protection (thermal, overcurrent, phase loss, short circuit)
- Advanced control algorithms for centrifugal pump applications
- Automatic restart and fault recovery logic
- High ingress protection ratings for harsh environments (IP54 / IP55 / IP66, as applicable)

Energy Efficiency & Lifecycle Optimization

VFD-controlled pumping systems significantly reduce energy consumption by matching pump speed to actual system demand rather than operating at constant full speed.

Key benefits include:

- Reduced power consumption during low-flow periods
- Lower peak electrical demand
- Improved power factor

- Reduced total cost of ownership (TCO) over the plant lifecycle

Applicable Standards & Compliance

All VFDs supplied under the CARDINAL portfolio comply fully with:

- **IEC** – Electrical and electromagnetic compatibility standards
- **ISO** – Quality and manufacturing standards
- **EN** – European electrical and safety standards

Compliance is verified through OEM certification and documented testing procedures.

Approved Grade-A OEMs Exclusively Represented by CARDINAL

- **Danfoss** (Denmark)



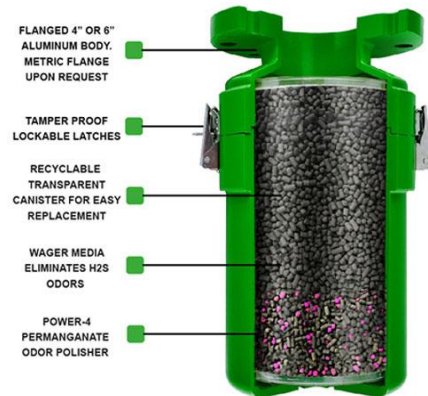
Odor Control & Ventilation

Odor Control Units

Scope of Supply

Odor control systems are provided to effectively capture, treat, and neutralize hydrogen sulfide (H₂S) and other odor-causing compounds generated within wet wells, valve chambers, and enclosed pumping station structures. These systems are engineered to prevent the release of corrosive and nuisance gases into the surrounding environment, safeguard personnel health and safety, and protect structural and mechanical components from long-term chemical degradation.

The odor control units are designed for continuous operation under variable airflow and contaminant loading conditions, ensuring consistent odor abatement and compliance with environmental and occupational safety requirements.



Technology

- Activated carbon filtration
- Multi-stage adsorption systems

Applicable Standards

EN · ISO

Approved Grade-A OEMs Exclusively Represented by CARDINAL

- **AmirAir** (UAE)

Lifting & Maintenance Systems

Overhead Cranes & Hoists

Scope of Supply

Overhead cranes and integrated hoisting systems are provided to facilitate the safe lifting, positioning, installation, and removal of pumps and other heavy mechanical components within the pumping station. These systems are engineered to ensure controlled load handling during installation, routine maintenance, and equipment replacement activities, while minimizing operational risk and ensuring compliance with applicable safety regulations. The crane and hoist assemblies are designed for the specified lifting capacities, duty classifications, and spatial constraints of the facility, providing reliable and efficient material handling throughout the operational lifecycle of the pumping station.



Technical Characteristics

- Single or double girder configuration
- Electric wire rope hoists
- Load limiters and safety interlocks

Applicable Standards

EN · ISO

Approved Grade-A OEMs Exclusively Represented by CARDINAL

- **KULI Hebezeuge** (Germany)

Fire Fighting Systems

Fire Protection & Suppression Systems

Scope of Supply

A comprehensive firefighting system is provided to ensure effective fire detection, suppression, and protection across all critical areas of the pumping station, including main buildings, electrical and control rooms, diesel generator enclosures, and auxiliary facilities. The system is engineered to mitigate fire risks associated with electrical equipment, fuel systems, and mechanical installations, while safeguarding personnel, infrastructure, and operational continuity. All firefighting components are designed and integrated in accordance with applicable fire safety codes and regulatory requirements, ensuring reliable and rapid response under emergency conditions.



System Components

- Fire water pumps
- Fire hose reels and hydrants
- Automatic sprinkler systems
- Fire extinguishers (CO₂, dry powder, foam)
- Fire detection and alarm panels

Applicable Standards

NFPA · EN · ISO

Approved Grade-A OEMs Exclusively Represented by CARDINAL

- **FINDER (Italy)**

Diesel Generator

Emergency & Standby Power Systems

Scope of Supply

The diesel generator package supplied under CARDINAL's scope includes, but is not limited to:

- Diesel engine coupled to alternator on a common base frame
- Automatic Transfer Switch (ATS) for seamless power changeover
- Integrated generator control panel with monitoring and protection
- Sound-attenuated canopy or containerized enclosure (as specified)
- Fuel system (day tank / base tank)
- Exhaust system with silencer
- Cooling system (radiator-mounted or remote)
- Battery, battery charger, and starting system
- All accessories required for safe installation and operation



Technical Characteristics

- Designed for **prime or standby duty** depending on project requirements
- Rapid automatic start upon loss of utility power
- Stable voltage and frequency regulation suitable for sensitive electrical equipment
- High short-circuits withstand capability
- Continuous operation capability under full load
- Designed for harsh environmental and outdoor installation conditions

Electrical & Control Integration

Diesel generator sets are fully integrated with the pumping station electrical architecture and include:

- Automatic Transfer Switch (ATS) for grid/generator changeover
- Interface with MCC and main LV distribution boards

- Communication with PLC/SCADA systems for remote monitoring
- Alarm and event reporting (status, faults, fuel level, run hours)
- Manual and automatic operating modes

Applicable Standards & Compliance

All diesel generator sets supplied by CARDINAL comply fully with:

- **ISO** – Engine, alternator, and quality standards
- **IEC** – Electrical performance and safety standards
- **EN** – European safety and mechanical standards

Compliance is validated through OEM certification, factory testing, and documented inspection procedures.

Approved Grade-A OEMs Exclusively Represented by CARDINAL

- **Atlas Copco** (Sweden)



Closing Declaration

All equipment described within this document is designed, selected, manufactured, supplied, and supported in full compliance with internationally recognized standards, including **EN, ISO, IEC, DIN, ASTM**, and all applicable local **regulatory requirements**.

The equipment is sourced exclusively from Grade-A global Original Equipment Manufacturers (OEMs) with proven international references, established manufacturing excellence, and long-standing operational track records in municipal, industrial, and infrastructure applications.

CARDINAL operates under formally executed exclusive agency and representation agreements with each listed OEM. These agreements grant CARDINAL full authority for commercial representation, technical coordination, supply chain management, and after-sales support within the designated territories. As a result, all equipment supplied through CARDINAL is genuine OEM equipment, delivered directly from the manufacturer with full factory certification and warranty.

CARDINAL assumes single-point responsibility for technical integrity, compatibility, and compliance with all supplied equipment packages. This includes equipment selection, sizing validation, interface coordination across mechanical, electrical, instrumentation, and automation disciplines, as well as alignment with project-specific design criteria and hydraulic requirements.

During project execution, CARDINAL provides comprehensive support covering manufacturing coordination, logistics management, factory acceptance testing (FAT), delivery supervision, installation guidance, commissioning assistance, and start-up support, ensuring that all equipment is integrated seamlessly and performs in accordance with contractual and technical expectations.

Following commissioning, CARDINAL ensures long-term lifecycle support, including OEM-certified spare parts supply, technical assistance, maintenance support, and operational optimization services. This lifecycle approach safeguards asset performance, minimizes operational risk, and reduces total cost of ownership over the service life of the pumping station.

Through this structured and accountable supply model, CARDINAL delivers full transparency, technical reliability, and contractual certainty, positioning itself as a trusted strategic partner for governments, utilities, EPC contractors, and private developers executing critical infrastructure projects.