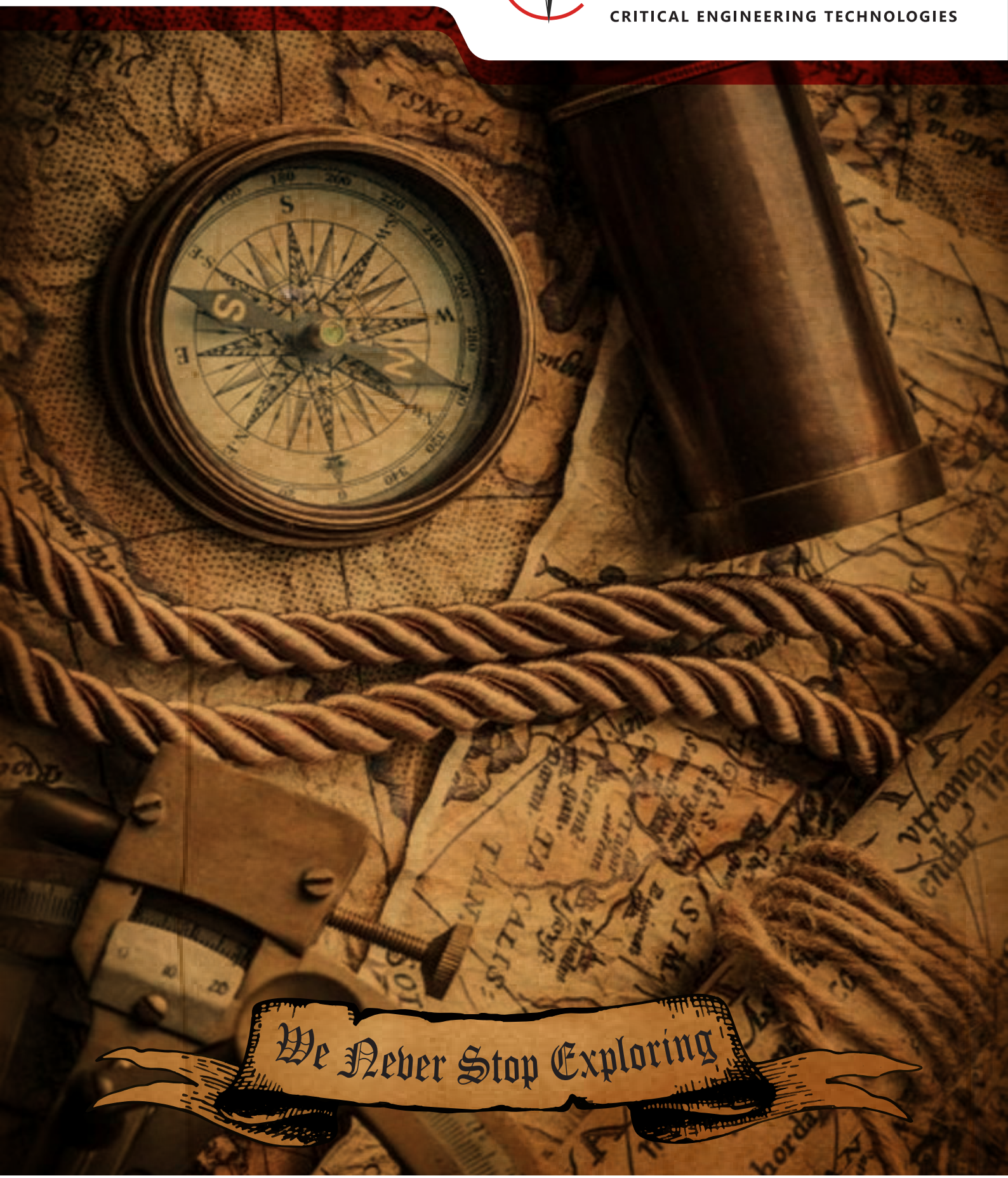
CARDINAL

CRITICAL ENGINEERING TECHNOLOGIES



Supplying Excellence for Energy and Industry

Our Offices :

CARDINAL
CRITICAL ENGINEERING TECHNOLOGIES

Howden
A Chart Industries Company

SIEMENS energy

BELLELI
ENERGY Critical Process Equipment

GRUNDFOS

walter tosto
WTB

Atlas Copco

NEXT COOLING TOWERS

Danfoss

SIEMENS
AUTOMATION

IMI REMOSA

MITA
cooling technologies

KROHNE

SEMCO
maritime

BÖRGER
EXCELLENCE – MADE TO LAST

TANK CONNECTION

GEA

NOOTER ERIKSEN

RENNER
Kompressoren

Gruppo Aturia
aturia · Rotos · Marelli · AUDOLI & BERTOLA · ARIS CHIAPPA · POMPE CERAPELLI · FINDER

Nano H_2O · LG Chem

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 Hamburg, Germany**, we are strategically positioned to provideefficient, 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, 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

Our Supply Capabilities

We represent a wide range of equipment and manufacturers, delivering solutions that cover:

- Pumps & Compressors
- Valves & Actuators
- Heat Exchangers & Cooling Systems
- Turbines & Generators
- Boilers
- Low temperature energy recovery system
- Instrumentation & Control Systems
- Air Compressors & Blowers
- Pressure Vessels & Storage Tanks

Each product is sourced from reputable international brands, ensuring quality, reliability, and compliance with industry standards.

Our Reach

CARDINAL's strategic presence across the region enables:

- Fast response to client requirements
- Seamless logistics and delivery
- Full technical support and after-sales service

API PUMPS

API 610 – Centrifugal Pumps

Manufacturing Origin : Germany, Italy, Turkey, Netherland, Japan, USA, Denmark, South Korea, Spain & Belgium

Application : Oil & Gas, Refinery, Chemicals & Seawater Injection

- **Overhung (OH) Types**
  - OH1: Frame-mounted, end-suction, horizontal pump
  - OH2: Centerline-mounted, single-stage, horizontal (most common in refineries)
  - OH3–OH5: Vertical inline variants
- **Between Bearings (BB) Types**
  - BB1: Axially split, double suction
  - BB2: Radially split, single- or multistage
  - BB3: Axially split, multistage
  - BB4: Radially split, multistage, segmented
  - BB5: Barrel, high-pressure multistage (boiler feed, pipeline)
- **Vertically Suspended (VS) Types**
  - VS1–VS7: Vertical can, sump, and inline designs

API 685 – Sealless Pumps

Application : Hazardous / Toxic chemicals & Hydrocarbons

- Low- & High-Pressure Magnetic Drive pumps
- Direct Driven & Canned Motor Pumps
- Vertical Suspended Sealless Magnetic Drive Pumps

- Non mechanical seal Pumps

API 676 – Rotary Positive Displacement Pumps

Application : Heavy crude, asphalt, polymers

- Screw pumps
- Gear pumps

API 674 & 675 – Reciprocating Positive Displacement Pumps

Application : Dosing of acids, caustics, catalysts, gas injection, boiler feed & water injection

- Plunger/piston type
- Controlled-volume diaphragm/plunger
- Chemical dosing & injection
- High-pressure injection (gas, water, boiler feed).

ROTARY LOBE PUMPS

Manufacturing Origin : Borger GMBH

Core Technology:

Rotary Lobe Pumps—robust, positive displacement pumps with self-priming, reversible flow, and solids-handling capability

Engineering & Customization:

- Fully ATEX-compliant designs for Zone 1 hazardous Areas.
- Specialized handling of heating oil, gasoil, naphtha, refinery sludge, oily water, tar, and oil-water emulsions.
- Heated and protected variants for high-temperature fluids (e.g. 256 °C tar)

with stainless casing, FFKM seals, and thermosyphon cooling.

- Mobile, trailer-mounted, or hand-cart pump units with integrated drive, filtration, and monitoring controls—ideal for sludge transfer, pigging, tank cleaning in refinery operations

Typical Applications in Oil & Gas:

- **Refinery fluid transfer**: pumps for oil, diesel, waste oil, fuel blends (flow 10–60 m^3/h, pressure ~4 bar).
- **Tank cleaning & residue removal**: ATEX-rated mobile units with adjustable flow (20–100 m^3/h), integrated filters, and remote control safety systems.
- **Tar sludge extraction**: multistage Macerator + Rotary Lobe pump systems (flow 5–25 m^3/h, pressures up to 8 bar) for thick, solid-laden sludge

NON-API PUMPS

Manufacturing Origin : Germany, Italy, Turkey, Netherland, Japan, USA, Denmark, South Korea, Spain & Belgium

ANSI/ASME B73.1 / B73.2 (USA Standards)

Applications: Water, solvents, general chemical duty, lower-pressure services.

- Horizontal End-Suction Pumps (B73.1) – frame mounted.
- Vertical In-Line Pumps (B73.2).

ISO 2858 / ISO 5199 (International Standards)

Applications: General chemicals, utilities, water circulation, non-critical process services.

- ISO 2858: Defines pump dimensions and interchangeability.
- ISO 5199: Defines design and construction features.

DIN 24255 (Europe / Germany)

Applications: Water supply, HVAC, light chemical services.

- Standard end-suction centrifugal pumps (close-coupled, foot-mounted).

FIRE PUMPS

Manufacturing Origin : Italy (**Audoli & Bertola**)

FIRE PUMPS:

1. End Suction Fire Pumps
2. Horizontal Split Case Fire Pumps
3. Vertical Turbine Fire Pumps
4. Multi Stage Fire Pumps

Certified to NFPA 20 / UL / FM

LOW & HIGH VOLTAGE SYNCHRONOUS MOTORS

Manufacturing Origin : Germany, Italy, Brazil, Switzerland

Low-Voltage (LV) Synchronous Motors – upto 1kV

- Permanent Magnet (PM) Synchronous Motors
- Synchronous Reluctance Motors

High-Voltage (HV) Synchronous Motors – 3.3kV to Higher

- Cylindrical Rotor Synchronous Motors
- Salient Pole Synchronous Motors
- Brushless Excitation HV Synchronous Motors
- Synchronous Condensers (special use)

POWER GENERATORS

Low & Medium Power Generators

Manufacturing Origin : Sweden & Germany (**Atlas Copco** & **Heinkel**)

Key Features:

- Power Range: Typically, up to 3500 kVA, suitable for various industrial applications.
- Engine Options: Equipped with advanced engines for optimal performance.
- Fuel Type: Diesel, ensuring efficiency and reliability.
- Design: Robust construction to withstand challenging environments.
- Serviceability: Designed for easy maintenance and long service intervals.
- Noise Level: Engineered for quiet operation, reducing noise pollution.

ESSENTIAL STATIC EQUIPMENTS

Manufacturing Origin : Italy (**Belleli Energy**)

A wide range of static equipment is essential for various industrial applications. These include:

- **Reactors**: Hydrocracking, hydrotreating, methanol, ethylene oxide, and GTL reactors, with capacities ranging from 200 to 1,350 tons.
- **Pressure Vessels**: High-pressure separators and vessels
- **Heat Exchangers**: High-pressure heat exchangers, including Breech-Lock type and tubular designs, with weights between 20 and 200 tons.
- **Columns**: Distillation and absorption columns for chemical processing.
- **LPG Bullets**: Storage vessels for liquefied petroleum gas.
- **Waste Heat Boilers**: Systems designed to recover and utilize waste heat from industrial processes.
- **Ammonia Converters**: Equipment used in the production of ammonia.
- **Synthetic Gas Equipment**: Components for gasification and syngas production.
- **Radiant Syngas Coolers**: Specialized equipment for cooling syngas in integrated gasification combined cycle (IGCC) plants.
- **EB/SM Equipment**: Equipment for ethylene and styrene monomer production.
- **Steam Generators**: Systems for generating steam in power and industrial plants.

COMPRESSORS

GAS COMPRESSORS:

Manufacturing Origin : Germany ,Italy, Sweden, Japan, Switzerland

1. Reciprocating Gas Compressors (Piston Type)
2. Centrifugal Gas Compressors (Dynamic/Turbo)
3. Screw Gas Compressors (Rotary Positive Displacement)
4. Diaphragm Gas Compressors
5. Axial Gas Compressors
6. Integrally Geared Gas Compressors

AIR COMPRESSORS:

Manufacturing Origin : Germany ,Italy, Sweden, Japan, Switzerland

1. Reciprocating Air Compressors
2. Centrifugal Air Compressors – Dynamic Type
3. Rotary Screw Air Compressors
4. Scroll Air Compressors
5. Portable Diesel Driven Air Compressors

HEAT EXCHANGERS

Manufacturing Origin : Italy, Germany, Netherland & China

1. Shell & Tube Heat Exchangers
2. Palte Heat Exchangers
3. Air Cooled Heat Exchangers
4. Double Pipe Heat Exchangers
5. Spiral Heat Exchangers
6. Plate Fin Heat Exchangers
7. Hairpin & Waste Heat Recovery Heat Exchangers

Standards : TEMA + ASME , API 661 for Air Cooled Heat Exchangers.

COOLING TOWERS

Manufacturing Origin : Italy, Switzerland, Romania, Germany & China

1. Natural (*Hyperbolic*) / Mechanical Draft Cooling Tower
2. Cross Flow / Counter Flow Cooling Tower
3. Open-Circuit (Wet) Cooling Tower
4. Closed-Circuit (Dry) Cooling Tower
5. Hybrid Cooling Tower
6. Skid Mounted – Packaged Cooling Tower
7. Scalable unit type – Modular Cooling Tower

VALVES

Manufacturing Origin : Denmark, Turkey, Germany, Czech Republic, Spain, USA & Italy

1. Gate Valve
2. Globe Valve
3. Ball Valve
4. Plug Valve
5. Butterfly Valve
6. Check (Non-Return) Valve
7. Pressure Relief / Safety Valve
8. Control Valve (Automated)

Standards : API 600, API 602, API 6D | API 623, BS1873 | API 608, API 6D | API 599 | API 609 | API 594 | API 520,API 526

VALVE CONTROL SYSTEM

Manufacturing Origin : IMI REMOSA , Italy

IMI Remosa (Italy, part of IMI Critical Engineering) specializes in custom-engineered valves and integrated actuation systems for severe service applications.

SCOPE OF SUPPLY

1. Severe-Service Control Valves
2. Triple-Eccentric Butterfly Valves
3. Isolation / Clapet Valves
4. Integrated Hydraulic Power & Control Systems
5. Active Purging Systems

INSTRUMENTATION & CONTROL SYSTEM

Manufacturing Origin : KROHNE GMBH, **SIEMENS** GMBH

Scope of Supply:

1. Flow Meters.

- Coriolis Flowmeters.
- Electromagnetic Flowmeters (OPTIFLUX)
- Ultrasonic & Vortex Flowmeters

2. Level Measurement

3. Temperature Measurement

4. Pressure & Differential Pressure Instruments

5. Process Analytics & Smart Control

6. Sampling & Custody Transfer Solutions

7. Engineering & Lifecycle support of Commissioning & digital transformations.

8. Control System & Automation :

- Process Instrumentation
- Distributed Control Systems (DCS) & PLCs
- Industrial Communications for Self-Explosion Networks on Pipeline Platform
- Process Safety & Valve Actuation Control.
- Digital Lifecycle & Asset Management for Cybersecurity.

PRESSURE VESSELS

Manufacturing Origin : Germany, Italy & Spain

1. API 650, API 620 - Storage Tank Type
2. API 12J, 12F, 12D - Separators, production vessels
3. API 661 - Air-cooled heat exchangers
4. Heavy Reactor Pressure Vessels
5. Helical Coil Reactor Pressure Vessels

TURBINES

Manufacturing Origin : Germany, USA & Italy

1. Steam Turbine
2. Gas Turbine
3. Hydro Turbine
4. Hybrid Turbine (Steam-Gas Combined)

BLOWERS

Manufacturing Origin : Germany, Sweden, UK, Czech Republic, Switzerland & Italy

1. Centrifugal Blowers
2. Positive Displacement Blowers
    - Roots / Lobe / Screw
3. Axial Flow Blowers
    - Dynamic / Axial
4. Multistage / High Pressure Blowers
    - Positive Displacement / Dynamic
5. Centrifugal Vacuum Blowers
    - Positive Displacement / Centrifugal

TANKS

Manufacturing Origin : USA, Germany, Portugal, Austria, UK, China, India & Turkey

1. Storage / Effluent Tanks (Oil & Gas)
2. Process Tanks (Oil & Gas)
3. Pressure Tanks (Oil & Gas)

INTEGRATED ENGINEERING & MAINTENANCE PARTNER

Origin : SEMCO MARITIME , Denmark

SCOPE OF SUPPLY:,

1. Engineering, Procurement & Construction (EPC)
2. Installation & Commissioning
3. Service & Maintenance
4. Asset Management & Operations Support
5. Telecommunication & IT Integration
6. Fabrication Facilities
7. Decommissioning Solutions

TYPICAL APPLICATION IN OIL & GAS:

- Offshore rig upgrades, platform modifications, and new-build modules.
- Testing and certification campaigns for safety equipment and valves.
- Structural steel and piping fabrication for offshore topsides.
- Telecom and fire/gas system integration on FPSO, marine vessels, and Oil & Gas platforms.
- Operation & maintenance campaigns, manpower support with multi-skilled field teams.

ENERGY RECOVERY SOLUTION FOR OIL & GAS

Manufacturing Origin : Nooter Erikson , Italy

Customized HRSGs, OTSGs, LTERS, EOR steam generators, waste heat boilers, and low-temperature economizers for refineries, petrochemical plants, LNG, and upstream operations. Delivering efficient steam and power generation while reducing emissions and fuel costs.

SCOPE OF SUPPLY :

1. Heat Recovery Steam Generators (HRSGs)

Refineries and petrochemical plants using gas turbines for cogeneration (power + process steam). Steam for hydrocrackers, reformers, and distillation columns.

2. Once-Through Steam Generators (OTSGs)

Compact steam generation for offshore platforms and FPSOs where space is limited. Process plants requiring quick start/stop flexibility.

3. Enhanced Oil Recovery (EOR) Steam Generators

Heavy oil fields (onshore/offshore) where steam injection is required to mobilize crude. Integration with to produce steam for injection wells.

4. Waste Heat Boilers (WHBs)

Process units (catalytic crackers, reformers, hydrogen plants) where flue gas carries valuable heat. Coke ovens and sulfur recovery units.

5. Low-Low Temperature Economizers (LLTE)

Refinery fired heaters and petrochemical furnaces where flue gases exit at 110–140 °C.

Combined heat & power units in LNG and petrochemical plants.

6. Low-Temperature Energy Recovery System (LTERS)

Broader concept of recovering energy from low-grade heat sources.

Can include waste heat from flue gas, cooling water, exhaust air, or industrial processes, usually in the low-to-medium temperature range (<200°C).