

# INDUSTRIAL SUBCONTRACTING

Solutions to meet all of your industrial challenges

- Components of large dimension & complex machining
- Industrial boilers
- Polyurethane & Composite components
- Electromechanical systems
- Welded structures





Performance  
Quality  
Flexibility

## CNIM GROUP, THE INDUSTRIAL EXPERTISE AT YOUR SERVICE

### 160 years of industrial expertise

Created from the Forges & Chantiers Navals de la Méditerranée company established in 1856, CNIM designs and manufactures innovative turnkey industrial capabilities with high added value for important public or private clients both in France and throughout the world.

For the last 160 years, CNIM teams have been innovating and implementing solutions for our clients in the fields of Energy, Defense, Nuclear, Industry and Environment.

### A stable family shareholding

CNIM is based around a stable, family shareholding that guarantees its development. Shareholders have an active involvement in business management & development.

### CNIM Key figures (2016)

€ 540 | million turnover

55 | % export revenue

2500 | Employees

### Industrial subcontracting for high demanding sectors

We are able to manufacture and assemble **your systems so that you can meet your greatest challenges.**

CNIM work within all business sectors that have a high level of required quality and performance.



AERONAUTICS



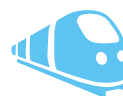
SPACE



NUCLEAR



ENERGY



OTHER  
INDUSTRIES



## WORLDWIDE INDUSTRIAL FACILITIES AT YOUR FINGERTIPS

Offering you the best industrial, technical and economic model.

CNIM manufacturing facilities are organized around three industrial sites located in France, China and Morocco. **Complementary** through their global location, manufacturing facilities and skill sets, we are able to offer **the most efficient industrial and technical/economic model**.



France

### Cutting-edge Manufacturing

- Large-scale Machining
- Stainless, Aluminium, Noble Metal works & boiler making
- Polyurethane & Composite
- Turnkey Manufacturing

60,000 m<sup>2</sup> of workshops  
Direct access to the sea  
500 employees



Morocco

### Boiler making

- Industrial boiler making
- Heat exchangers and Pressurized equipment
- On site services

6,000 m<sup>2</sup> of workshops  
130 employees  
Presence in Morocco since 1948  
CNIM Babcock Morocco, CNIM subsidiary since 1990.



China

20 000 m<sup>2</sup> of workshops  
160 employees  
CTE, subsidiary of CNIM since 2005

### Mechanical welded components and mechanical assemblies

- Electromechanical & control command systems
- Metal Structures
- Non-standard conveyors
- Turnkey Manufacturing





# OUR INDUSTRIAL FACILITIES COMMITTED TO PERFORMANCE

CNIM has efficient industrial facilities, adapted to the manufacturing of large-scale components, ensuring a high level of quality is maintained, suitable for prototyping, small and medium-volume manufacturing. CNIM invests and maintains all its industrial facilities to offer the highest quality subcontracting service to its clients.



France

## Industrial subcontracting for your largest projects

Design - Machining - Welding - Testing & Checking - Assembly - Inspection



### Large dimension & complex machining

- ▶ Lathing, Milling (<36 m), Boring
- ▶ Local machining
- ▶ 5-axis heads
- ▶ Electrospindle
- ▶ High Speed Machining

### Composite & polyurethane components

### Stainless, Aluminium, Noble Metal work & boiler making

- ▶ Mastery of welding techniques: manual (TIG, MIG), automatic (TIG, TIG Narrow Gap, MIG, Orbital), submerged arc, laser, electron beam welding
- ▶ Materials: all types of Steel, Stainless, Aluminum (including AG3NET, 6061), Titanium, Duplex, Inconel
- ▶ Welding facilities up to 230 m<sup>3</sup>

- ▶ ISO 9001: 2008
- ▶ OHSAS 18001: 2007
- ▶ CEFRI

- ▶ LLOYD'S REGISTER RULES FOR THE CLASSIFICATION OF SHIPS
- ▶ EDF-certified supplier
- ▶ Codes used: RCCM, RCCMX, ASME, CODAP, EN1090, DESP



Marocco

## 65 years of experience and knowledge in the industrial boiler making

Mastery of all black plate boiler making techniques, associated with budgetary control.

Methods / Scheduling - Assembly - Machining - Welding - Inspection - Sign-off



### Boilers & pressurized equipment

Examples of equipment

- ▶ Plasma & Oxycutting bench
- ▶ Portable boring machine with vertical post and 20 T rotary table
- ▶ 4 submerged arc welding booms
- ▶ Heat treatment machine

### Site Service

Capability to carry out industrial projects with dedicated specialist teams on the clients site.

### Industrial Subcontracting

▶ Standards: AFNOR, ASME, CODAP.



China

## Your industrial partner for high quality in China

Our skills in design, sourcing, welding, machining, assembly and quality assurance enable us to manufacture your products at our facilities, on the basis of your assembly drawings, for worldwide delivery.



### Machining & Metal Works

Example of equipment: laser cutting, CNC folding bench, rotary tables, isolated stainless welding workshop.

### Assembly

- ▶ Electromechanical
- ▶ Custom made assembly lines for large volumes

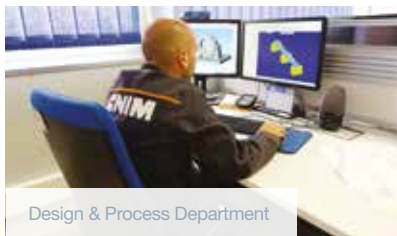
### Supplier selection & qualification

- ▶ ISO 9001
- ▶ ISO 14001
- ▶ OHSAS 18001
- ▶ AEO certification
- ▶ CNNC qualified supplier



## HIGHLY QUALIFIED TEAMS

Unique  
know-how and  
expertise at  
your fingertips



Design & Process Department



3D inspection



ISO7 clean room





# INDUSTRIAL FACILITIES & SUBCONTRACTING EXAMPLES



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Complex parts  
Large-scale

## CUTTING-EDGE MANUFACTURING

Stainless, Aluminium, Noble metal works  
& boiler making



CNIM's skills in boiler making meet the most demanding standards of the Industry.  
We manufacture assemblies for major industrial customers in sectors that require the highest quality level.



### Experimental tanks & Vacuum vessels

Nuclear, Research  
& Development

- Nuclear standard & Codes
- ▶ Electron beam welding on 3G Alu Net parts



### Supporting structure for new aircraft engine test bench

Aeronautics

Mastery of big size welding  
Integration of equipment inside the tower.

- ▶ From manufacturing to on-site delivery
- ▶ WPQR & WPS welding qualification

#### Other significant references in Aeronautics

- ▶ Manufacturing of 3 fuselage assembly tools for A319, A320 and A321 AIRBUS aircraft
- ▶ Manufacturing of AIRBUS A380 aircraft spars



Dimensions: L 8.5 m x W 6.5 m x H 18 m - Weight: 95 t



## Large dimension & complex machining



CNIM industrial tooling can be used in your largest projects. We have the capacity to machine large-scale components (up to 36 m), with complex geometry, to a very high level of precision and quality.

### ITER Radial Plates

Nuclear

**Coil armatures for the ITER nuclear fusion reactor magnetic field**

- ▶ Flatness tolerance (0.1 to 1 mm)
- ▶ Construction of a dedicated 3,000 m<sup>2</sup> air conditioned workshop
- ▶ Compliance with delivery times
- ▶ Industrial development, material procurement, finished part delivery



### Ariane V hoses

Space

Since 1995, CNIM has been manufacturing hoses for the Ariane V rocket; and those for VEGA since 2013.



### Jules Horowitz test reactor



# CUTTING-EDGE MANUFACTURING

## Organic components



CNIM designs and produces very high-performance assemblies in polyurethane (PU) and composite.

## Polyurethane, a very high level of expertise

Our systems meet the quality & performance requirements of our customers: high level of sealing, resistance to the strongest earthquakes, constant pressure, suspension and damping.

### Suspension systems

- ▶ Very high-safety suspension in handling and storage phase
- ▶ Earthquake-resistant pads

### Sealing membranes

under significant mechanical stresses

## ADVANTAGES OF POLYURETHANE



- ▶ Ease of implementation
- ▶ Life cycle in external environment, or under significant mechanical stress.



### Earthquake-resistant pads

#### Civil Engineering

- ▶ Laminated polyurethane
- ▶ Can bear constant loads of up to 800 T
- ▶ Resistant to earthquakes of a magnitude of 9 on the Richter Scale
- ▶ Above 50 years of service life

#### Other significant references of suspension systems

- ▶ Handling and storage of sensitive weaponry (PU)
- ▶ Submarine craft propulsion frame (composite)



## Chernobyl shelter membrane

Nuclear

Provides sealing between existing civil engineering and the new confinement arch

- ▶ 2 km of membrane with a width of 1.5 m.
- ▶ Design and production of molds
- ▶ Development of a tear stopping system for the exceptional case of damage to the membrane.
- ▶ Creation of an automated manufacturing robot unit.



Automated manufacturing line dedicated to PU projection



Hanging Chernobyl membrane



## Fixation flanges

Renewable energy

Ocean Thermal Energy is a new way of generating energy, by using the temperature difference between the surface and deep water.

Pipelines of up to one kilometer in length are required.

CNIM manufactures fixation flanges for the pipelines, ensuring their sealing when submerged in the ocean.





## CUTTING-EDGE MANUFACTURING

### Organic components



#### Launching systems

##### Defense

CNIM has been involved in French Deterrence since 1961, responsible for manufacturing and integration of nuclear submarine launching systems.

CNIM also produces sealing membranes isolating the missile from water before launching.

For providing the suspension and guidance functions, CNIM has developed a polyurethane lining system.



Installation of polyurethane lining systems



## Composites

CNIM produces composite components to gain a significant reduction in weight and more efficient corrosion resistance. Composite components offer the most effective technical and economical compromise.

### Techniques mastered:

Filament winding - Infusion - Pre-impregnation - Autoclaves - Process automation

### Missile launching tube



Filament winding on the missile launch tube



### Metal-composite Bolster assembly

Transport

#### Research, development, prototype, test bench support

The bolster cross member is the component linking the train body and the bogie.

The current steel structure weighs 650 kg.

The metal-composite cross member developed by CNIM weighs 350 kg.







## BOILER MAKING

### 65 years of Babcock expertise



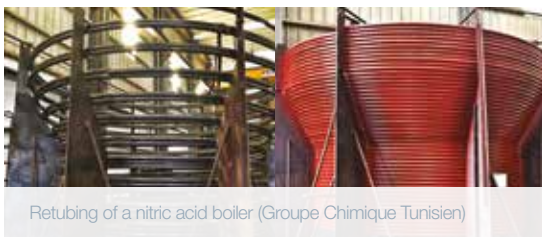
Marocco

CNIM Babcock Morocco offers industrial boilers and pressurized equipment manufacturing and servicing throughout Africa.

Our clients work in demanding sectors, such as refineries, phosphate mining and chemical engineering. Our solutions are also suitable for large-scale industry (electricity generation, agri-food industry).

## Boilers

Boiler manufacturing and commissioning are CNIM Babcock Morocco's historical activities. We also undertake maintenance, replacement and reconditioning of boilers from all brands.



Retubing of a nitric acid boiler (Groupe Chimique Tunisien)

### Fire tubes

- ▶ Exclusively in Morocco, Standard products
- ▶ Customer choice of burner
- ▶ Option of water treatment
- ▶ Boiler rental



### Water tubes

- ▶ Boiler audit
- ▶ Manufacturing of sub-assemblies (superheater, evaporator, power saver, screen)
- ▶ Maintenance & Servicing of all boilers

## Heat exchangers and Pressurized equipment

- ▶ Client process adaptation (Design Office)
- ▶ Fabrication in accordance with drawings







## On Site Services

CNIM Babcock Morocco works on all types of boiler (all power ratings and brands), in Maghreb countries and Sub-Saharan Africa.

- ▶ Supply and installation of boiler components
- ▶ New boiler installation
- ▶ Maintenance, reconditioning, retubing and repair of boilers



### Manufacturing & assembly of a 120 T recovery boiler

- ▶ Excellence award granted by the Office Chérifien des Phosphates in 2016\*cv

### Retubing and provision of pressurized equipment

- ▶ 25 team members deployed. Significant delivery time challenge
- ▶ Client: Compagnie Sucrière Sénégalaise - CSS



### Coal-powered thermal power plant boiler maintenance

Mobilization of expert teams

Client: TAQA Morocco, supplier of 50% of electricity to Morocco



## Industrial subcontracting

CNIM Babcock Morocco manufactures metallic parts and mechanically welded components for third-party and within CNIM Group.

- ▶ Methods / Scheduling - Assembly - Machining - Welding - Inspection - Treatment



Nuclear tubes handling tool  
(Vallourec Group)

## WELDED & MECHANICAL ASSEMBLIES



China

CTE, the CNIM group subsidiary in China, can be your key industrial partner to face cost and quality challenges. CTE will support you throughout the entire industrial chain with its expertise in welding, assembly, machining and quality, from design up to the commissioning and maintenance of your equipment and systems. We manufacture European products in China, using locally sourced materials and equipment. Our manufacturing processes are bilingual. We guarantee intellectual property protection and confidentiality of your projects. You are delivered European quality at competitive price anywhere in the world.

## Electromechanical systems



### Production lines

#### Nuclear

Manufacturing and installation of a stainless nuclear tubes production line in the VALINOX Chinese plant.

Partnership with French ATS company (automated production line designer) for a comprehensive offer, automated production line Design, Manufacturing & Installation.

### Spent fuel cask transfer facility

Manufacturing, Assembly, and On-site Installation of the system for the two new EPRs Taishan nuclear plant (China).

- ▶ Weight of loaded system: 130 t
- ▶ 50 years service life.
- ▶ 8 m high

#### Other electromechanical system projects:

- ▶ Automated systems (train doors, medical waste sterilization equipment)
- ▶ Equipment for the Nuclear industry (Enrichment stations for the Areva GBII plant, silencers, sump stainers)
- ▶ Custom made conveyors







## Metal Structures

Suppliers & initial components localized in China to optimize industrial costs maintaining European quality levels and standards.

### Precision-engineered bridge structure

Civil Engineering

High-precision structural panels for modular bridges for Matière (French manufacturer, constructor of bridges since 1932)



### Handling tools

Nuclear

High-precision welding and control of structure deformation. Non-destructive test and load test of the ITER project radial plate.



### Industrial ovens

Local purchases and assembly (product originally manufactured in Europe)



#### Other metal structure projects:

- ▶ High-precision frame for expanded polystyrene molding presses (KURTZ) made of thick steel plates
- ▶ Nuclear tubes handling tool (Vallourec Group)
- ▶ Custom designed equipment for nuclear plants overhead cranes.
- ▶ Ovens for drying beverage can paint.





## Electromechanical Assemblies



China

For the past 50 years, CNIM delivers Mass Transit Systems with escalators and moving walkways in Europe and worldwide.

CNIM manufacture electromechanical systems for more than 50 years to clients requirements

- ▶ Production up to 200 escalators/year
- ▶ 100 % made in China
- ▶ Manufacturing of the instrumentation and control system
- ▶ Pre-assembly and 100% testing in our workshops
- ▶ On-site installation and final testing
- ▶ Maintenance and spare parts
- ▶ Worldwide after-sales service



Test bench



They entrust us with their industrial subcontracting projects



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- Industrial boilers
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- Electromechanical systems
- Welded structures



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