NEOTISS
HIGH PERFORMANCE TUBE

NUCLEAR INDUSTRY

UNDERSTANDING YOUR BUSINESS

Reliable tube solutions for every critical heat exchanger in nuclear power plants

A Demanding Industry

In nuclear power, nothing is left to chance. Every component must combine absolute reliability, long-term durability, and flawless performance under some of the harshest operating conditions in the energy sector. Shell-and-tube heat exchangers are at the very heart of this environment — whether in the Moisture Separator Reheater, the Condenser, or the Feedwater Heater. Their tubes are constantly exposed to high pressures, fluctuating temperatures, aggressive steam and water chemistries, corrosion risks, and mechanical stresses that accumulate over decades of service.

The Challenges You Face

Operators and OEMs alike share the same concerns:

- ensuring plant safety
- maintaining the highest possible efficiency
- extending service life while reducing the risk of costly outages.

Heat exchanger tubing is a decisive factor. From erosion and flow-accelerated corrosion, to fouling, vibration, and stress cracking, the challenges are multiple and unforgiving.

The Neotiss Answer

Neotiss has been supplying nuclear plants worldwide for decades, bringing a deep understanding of these challenges and the specific needs of each exchanger.

Our portfolio of titanium, ferritic and austenitic stainless steel, duplex, and nickel-based alloys is tailored to withstand the full spectrum of operating conditions found in nuclear applications. Whether resisting seawater corrosion in condensers, ensuring erosion resistance in MSRs, or combating SCC (stress corrosion cracking) in feedwater heaters, Neotiss tubes are engineered to deliver reliability, efficiency, and peace of mind.

Through strict nuclear-grade quality standards, precise dimensional control, and materials optimized for durability, Neotiss supports utilities and OEMs in achieving long-term, safe, and cost-effective plant performance.

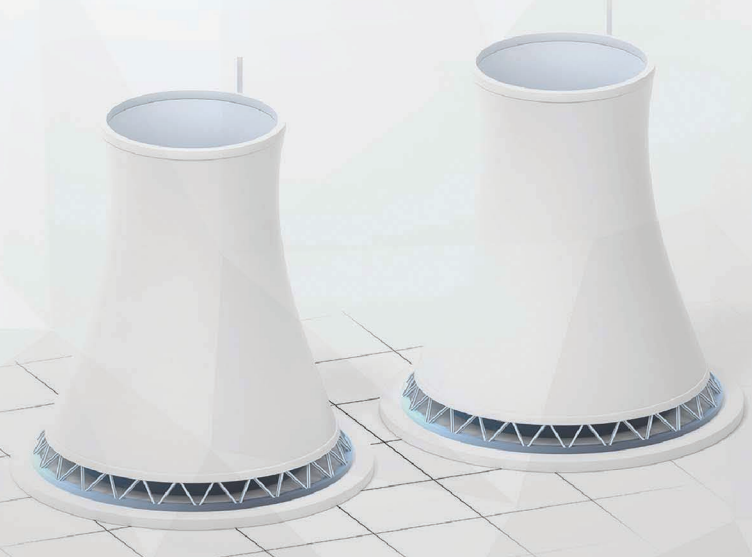
Why Neotiss?

Neotiss was born for nuclear excellence — with over 50 years of experience, more than 60% of reactors equipped, full coverage of all reactor technologies, and Non-destructive test standards that are 30% stricter than the norm.

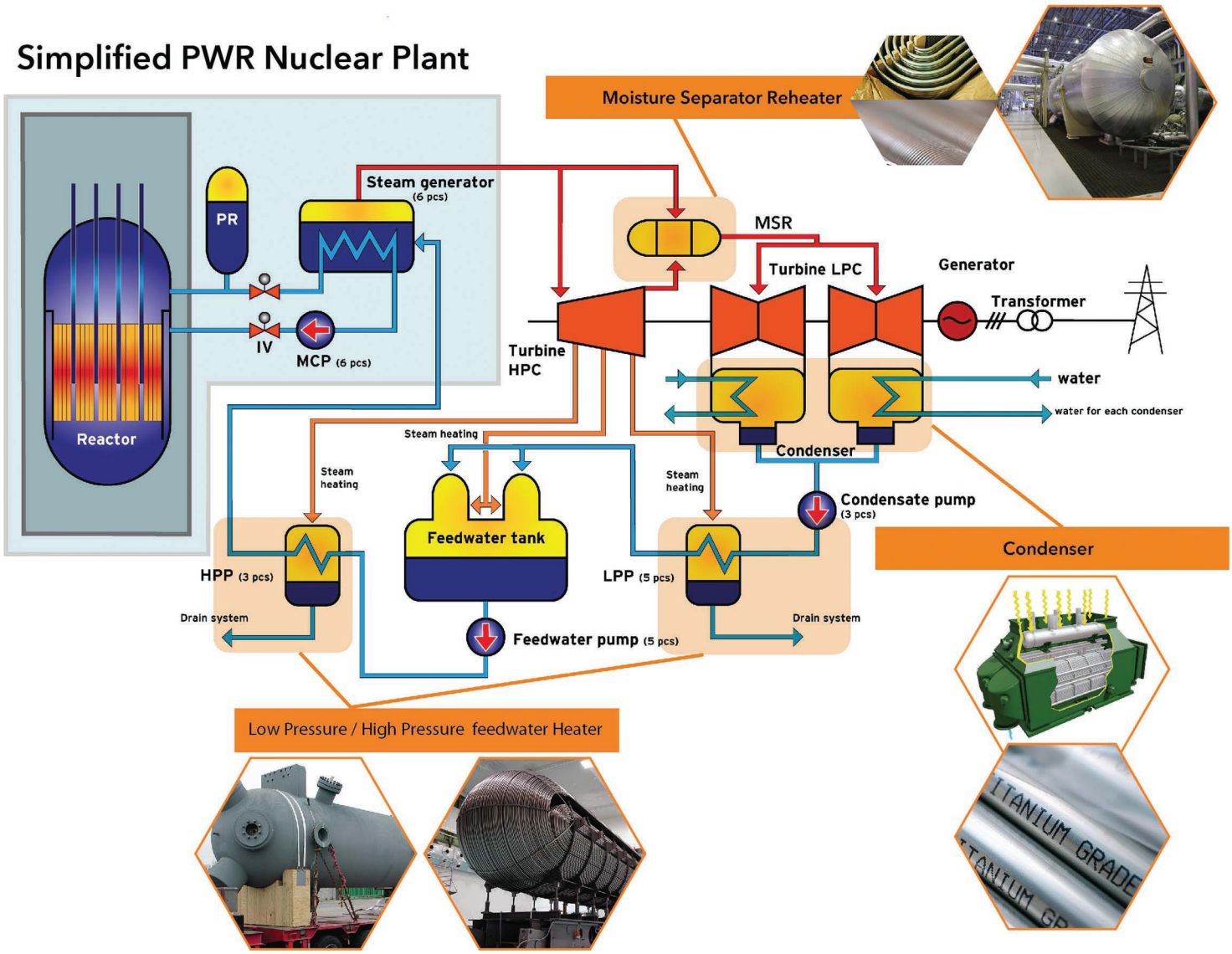
With proven global references across PWR, BWR, and new-build projects, Neotiss combines material expertise, thermal design know-how, manufacturing excellence, and a commitment to nuclear safety.

More than a supplier, we are a partner who understands your business and delivers solutions you can trust — today and for the decades ahead.

Provider of Heat Exchangers Tubes and Service for the Nuclear industry



Simplified PWR Nuclear Plant



Moisture Separator Reheater (MSR)

After steam leaves the high-pressure stage of the turbine, it contains tiny water droplets and has lost some of its heat. The MSR first removes this moisture (to avoid damaging the turbine), then reheats the steam so it carries more useful energy. By delivering dry, high-quality steam, the MSR ensures the low-pressure turbine runs efficiently and increases the electricity output generated by the turbo-alternator.

Feedwater Heaters

Before this water returns to the steam generator, it is gradually preheated in feedwater heaters. These different steps improve the thermodynamic efficiency of the system. By “recycling” heat from other parts of the cycle, feedwater heaters save energy and reduce the heat generation needs from the reactor.

Condenser

Once the steam has passed through the turbine and delivered its energy, it needs to be turned back into water. The condenser cools the steam by running it over tubes filled with cold water from the cooling system. The steam condenses back into liquid water, ready to be reused in the cycle.

Tubes to make the difference

MSR Heat Exchanger

Low Finned Tube – Maximum Efficiency, Proven Reliability

Key Features

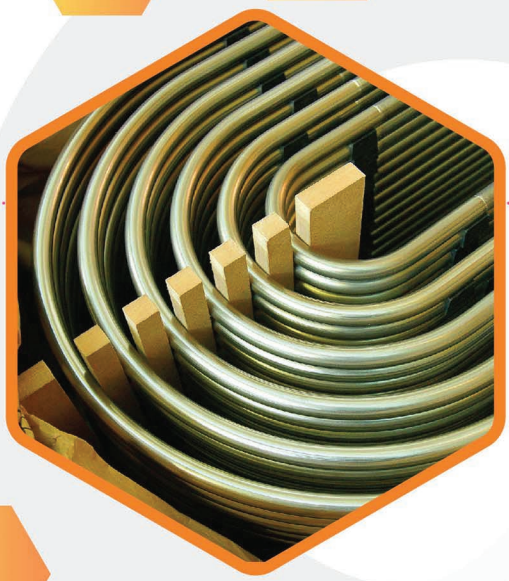
- **Material Excellence:**
  Ferritic Stainless Steel (Grade 439) for good corrosion resistance and longevity.
- **Dimensions:**
  Standard OD 19,05 mm x 1,65 mm WT. (0,75inch x 0,065inch) – other OD and WT available upon request
- **Total length available :**
  up to 43m (141ft)
- **Design:**
  Low finned tubes with smooth bore for optimized heat transfer.
- **Exclusive Options:**
  27 or 32 fins (Neotiss proprietary expertise).
- **Flexibility:**
  Available in U-bent or straight configurations.

Why Choose This Tube?

Up to **3x Higher** Surface Area compared to smooth tubes – more efficiency without increasing footprint.
Compact & Cost-Effective Design – achieve the same duty with smaller equipment.
Boosted Thermal Duty – higher output within the same shell size.
Reduced Fouling – longer operating cycles, less downtime.
Tailored for MSR – ideal for demanding shell-side controlled heat exchanger applications.

Performance You Can Trust

- **Superior Weld Strength** – tested and proven mechanical reliability.
- **+13%** Thermal Transfer Performance (32 fins vs. 27 fins).
- **Minimal Pressure Drop** – efficiency without compromise.



Proven Track Record

Over **50 years** of expertise in heat transfer solutions.

More than **200 MSRs** equipped and **35,000 km** of tubes installed worldwide.

Condenser

Smooth Titanium or Patented Helix™ Tube – Energy Efficient, Low Emissions

Key Features

- **Material Strength:**
  Titanium Grade 2 – outstanding corrosion resistance in the toughest environments.
  Stainless Steel (304 / 316L) – excellent durability and corrosion resistance for a wide range of applications.
  Duplex 2205 – exceptional strength and stress corrosion cracking resistance in demanding conditions.
- **Dimensions:**
  OD 16 mm to 25,4 mm (0,063 to 1 inch), wall thickness 0,5 to 1,24mm (0,02 to 0,049inch).
- **Options:**
  Available in smooth or patented Helix™ corrugated design.
- **Flexibility:**
  Straight or U-bent configurations to fit your system.

Benefits That Matter - Helix™ tube

- +30% Heat Transfer Gain* – higher performance without enlarging the system.
- Energy Efficiency = Lower CO_2 Emissions* – proven in field tests.
- Minimal Pressure Drop – efficient operation without added resistance.
- Easy Cleaning & Maintenance – smooth surfaces and optimized geometry.
- No Acoustic Rumble – lower natural frequency ensures quiet, reliable operation.
- Standards-Compliant – designed to meet **ASTM** dimensional tolerances and compatible with standard tubing operations.

Performance Proven by Industry

- US Southern Company field tests (Feb. 2024) confirmed +30% heat transfer and lower CO_2 emissions under real operating conditions using Helix TM tubes.
- Robust material selection for long service life in harsh condenser environments.

The Result

- More than 648,000 km of tubes installed worldwide
- A condenser tube solution that delivers more performance, saves energy, reduces emissions, and extends equipment reliability — all backed by patented Helix™ innovation.

*Source : US southern Company - 2024

Feedwater heater

Smooth Tube – Reliable Performance in Every Steam Cycle

Key Features

- **Material Options:**
  - **Low Pressure:** Austenitic Stainless Steel TP304L
  - **High Pressure:** Ferritic Stainless Steel TP439
- **Dimensions:**
  OD 15 mm to 20 mm (0,59 to 0,79 inch), wall thickness 0.9 mm to 1.5 mm (0,035 to 0,059 inch)
- **Design:**
  Smooth tubes for optimal flow and heat transfer.
- **Configuration:**
  U-Bent to fit compact and custom layouts.

Benefits That Matter

- Outstanding Steam Erosion Resistance – protects tubes under high-velocity conditions.
- Robust Mechanical Properties at High Temperatures – performs reliably in demanding applications.
- Excellent Stress Corrosion Cracking Resistance – longer service
- life with minimal maintenance.
- Consistent Wall Thickness – uniform quality for predictable performance.

Performance You Can Count On

- **Superior Welding Performance –** strong, reliable joints.
- **Excellent Corrosion Resistance** – withstands aggressive feedwater environments.
- **High-Temperature Reliability** – engineered for demanding thermal conditions.

The Result

- A feedwater heater tube that delivers durability, efficiency, and long-term reliability — the trusted choice for high- and low-pressure
- More than 101,000 km of tubes installed worldwide

Neotiss Nuclear Expertise

Quality Management

NEOTISS focus on quality is assured by the several international qualifications achieved: **ISO 9001:2015, ISO 14001:2015; ISO 45001:2018; PED 2014/68/EU; AD 2000-Merkblatt W0.**

4 in-house modernly equipped labs and a complete array of testing devices, along with trained and skilled personnel, ensure the superior level of its tubing and certifies the international success of the company.

ISO 14001: 2015

ISO 9001:2015

ISO 45001:2018

PED CERTIFIED

AD 2000-Merkblatt W0

Nuclear Safety

At **Neotiss**, nuclear safety is at the heart of our expertise.
We cultivate a strong safety culture where every employee is committed to vigilance, accountability, and strict adherence to international standards.

Our rigorous **CFSI** (Counterfeit, Fraudulent and Suspect Items) policy ensures full traceability and quality control across our supply chain, preventing non-compliant materials from entering nuclear applications.

By embedding safety and integrity into every process, Neotiss delivers tube solutions that meet the highest expectations for reliability and nuclear safety.

Raw Material Excellence

NEOTISS applies a unified global raw material specification across all its entities, ensuring the highest quality and performance standards. Our specifications include strict requirements in areas such as:

- **Dimensional Tolerances** – precise control to guarantee consistency and fit.
- **Chemical Composition** – certified alloy composition for nuclear-grade reliability.
- **Mechanical Properties** – tested for strength, ductility, and durability.
- **Defects and Surface Aspects** – rigorous visual and microscopic inspections.
- **Finishing** – superior surface treatments to meet stringent nuclear requirements.

All **NEOTISS** suppliers are carefully qualified through a comprehensive testing program, which includes specific nuclear-grade criteria to ensure full compliance and traceability.

Non-Destructive Testing (NDT)

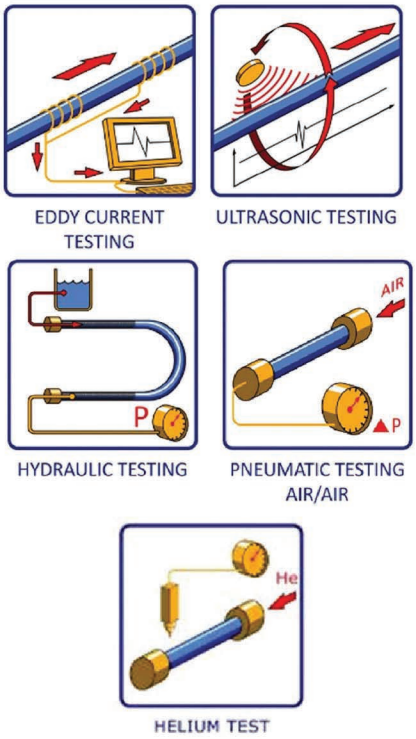
Quality assurance is embedded at every stage of production. **NEOTISS** conducts multiple non-destructive tests (NDT) to verify the integrity and performance of our products, applying acceptance thresholds that are 30% stricter than standard norms specifically for Eddy Current and Ultrasonic tests, ensuring exceptional reliability for nuclear applications.

Defect Detection (Intrinsic Quality):

- **Eddy Current Testing** (ECT) (EN ISO 10893-1 / EN ISO 10893-2 / ASTM E426 / ASTM E309 / ASTM E571) – detects surface and sub-surface discontinuities.
- **Ultrasonic Testing** (UT) (EN ISO 10893-10 / EN ISO 10893-11 / ASTM E213) – ensures internal consistency and defect-free structures.

Leak and Pressure Integrity:

- **Hydrostatic Testing** (ASTM E515 / EN 1593) – confirms structural strength under high-pressure water conditions.
- **Pneumatic Testing** – validates leak-tightness under pressurized conditions
- **Helium Testing** – detects microscopic leaks using helium's small molecular size and high sensitivity in leak detection methods



100% of NEOTISS tubes are tested using criteria that are 30% more stringent to guarantee defect-free delivery.

Destructive Testing (DT)

NEOTISS performs a range of destructive tests (DT) in our internal laboratory to assess the mechanical properties and performance limits of our products, ensuring they consistently meet the stringent requirements of nuclear applications.

Mechanical Strength Tests – Assess the material's resistance to forces and deformation:

- Tensile Test (ASTM E8 / EN ISO 6892-1)
- Hardeness Tests (ASTM E18 / ASTM E92 / EN ISO 6507-1 / EN ISO 6508-1)

Formability and Ductility Tests – Measure the ability to deform without failure:

- Flattening Test (EN ISO 8492 / ASTM A370)
- Reverse Flattening Test (ASTM A370)
- Flaring Test (ASTM A370)
- Flange Test (ASTM A370)

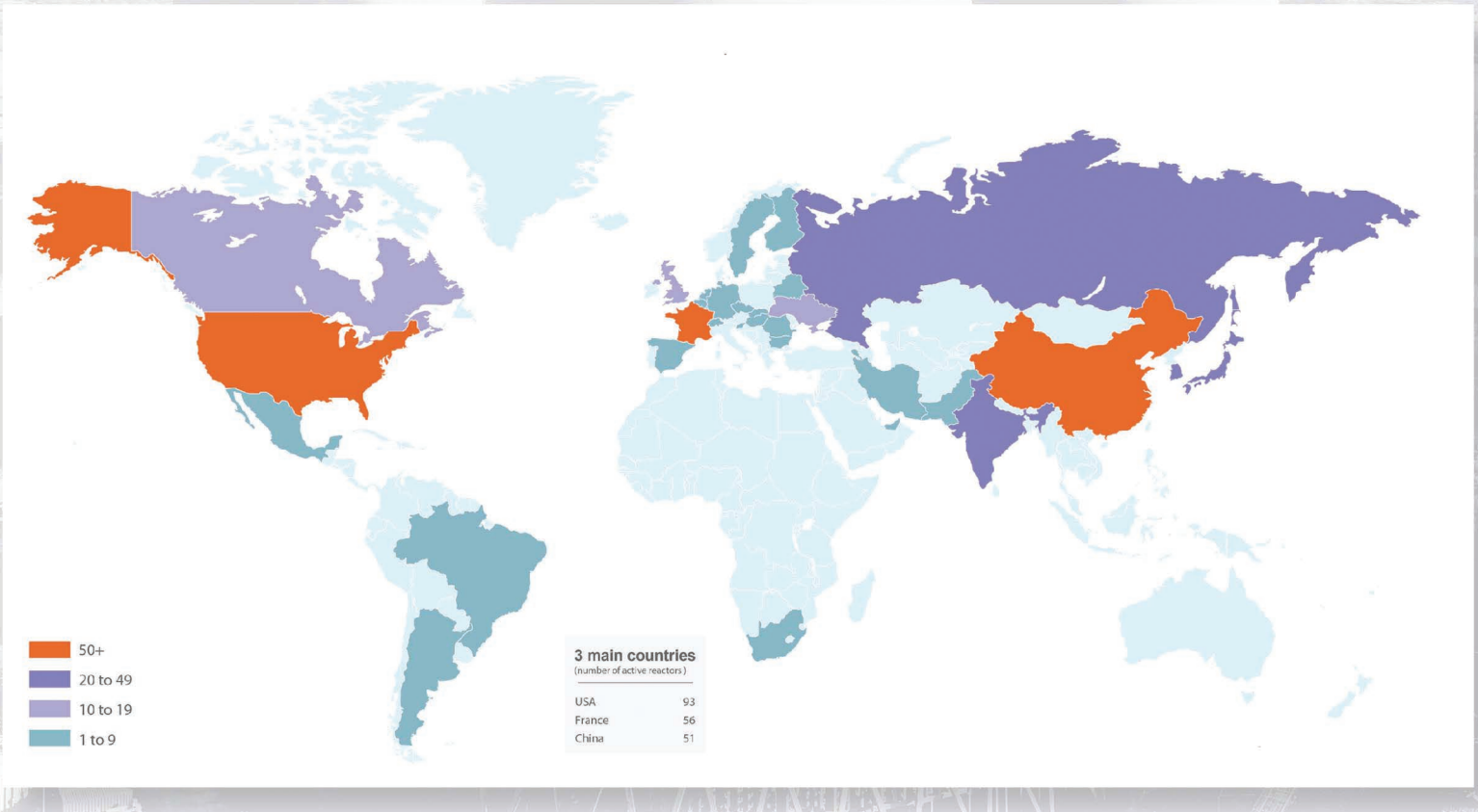
Weld Integrity Tests – Evaluate the mechanical performance of welded joints:

- Reverse Weld Bend Test (EN ISO 5173 / ASTM A370)

Neotiss delivers trusted, high-quality, and nuclear-safe tubing solutions globally.

Global Nuclear Power at a Glance

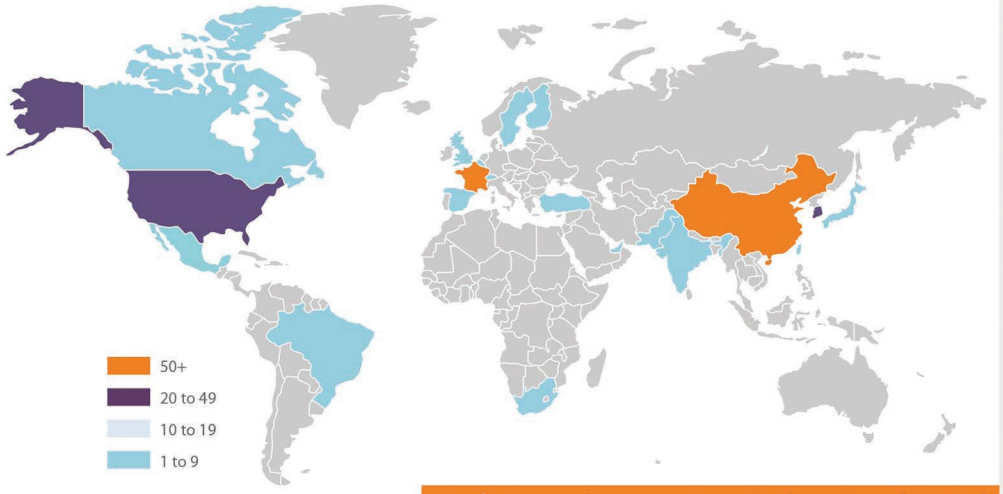
- **417 active reactors worldwide***
- **62 under construction***



Source : AIEA – January 2025
Source map : AIEA - www.connaissancedesenergies.org

NEOTISS Tubes, a Global Footprint

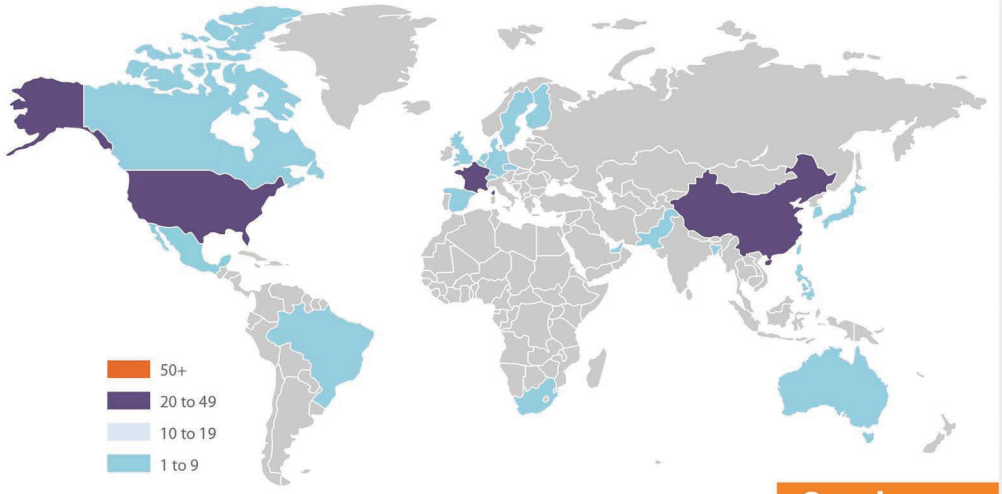
Number of project delivered by country



Moisture Separator Reheater (MSR)

More than 200 MSR equiped

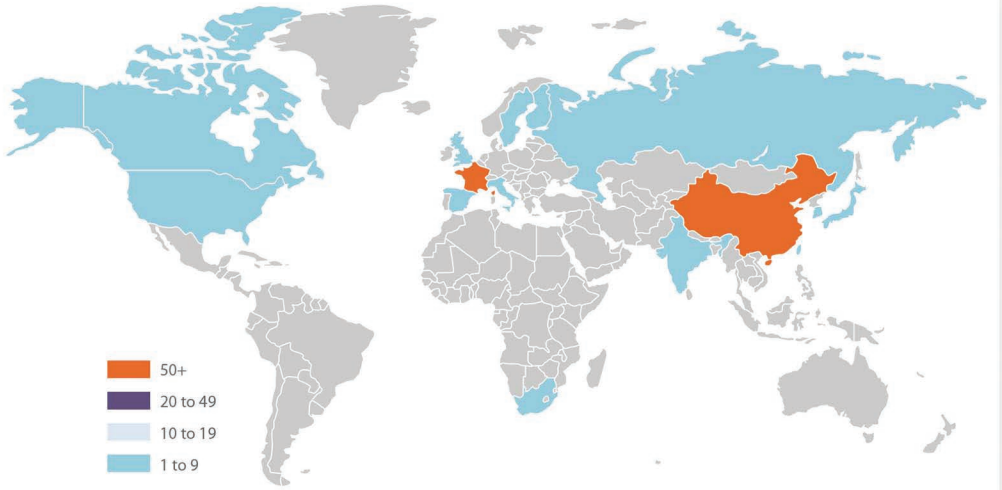
Number of project delivered by country



Condenser

More than 185 Ti condenser equiped

Number of project delivered by country



Feedwater Heaters

over 223 Low Pressure / High Pressure Feedwater Heater equiped or retrofit

NEOTISS – Your Partner for High-Performance Tube Solutions

Why Us?

Because we turn expertise into your success: **reliable, innovative, and global.**

Our Strengths

- **50+** years in the nuclear industry
- **3,000+** projects delivered, **790,000 km** of tubes produced
- Expertise across all nuclear heat exchangers: **MSR | Condenser | Feedwater Heater**
- High-performance welded tubes with rigorous quality control
- **4 factories worldwide** – global reach, local support

Why Choose Neotiss?

- End-to-End Service: Design → Manufacturing → Logistics → On-site Support
- Innovation: Optimized thermal performance & cutting-edge tube technology
- Reliability: Full process control, premium materials, non-destructive testing
- Global Agility: Raw material stock ready for fast delivery anywhere

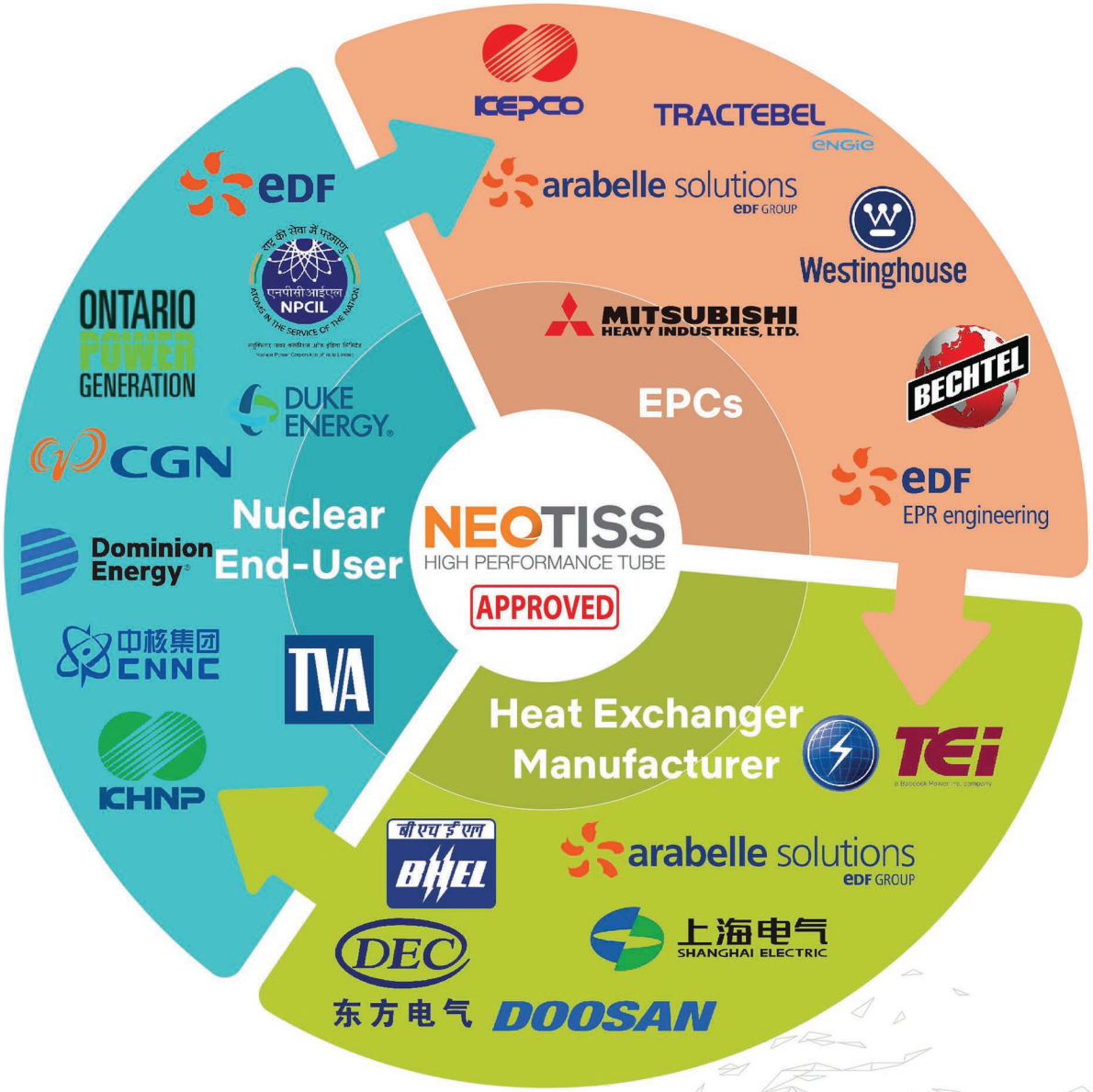
What We Deliver

- **Design Excellence** – Thermal optimization for maximum efficiency
- **Production Mastery** – High-quality tubes, tested to the highest standards
- **Seamless Logistics** – Worldwide shipping with rapid response
- **Technical Expertise** – On-site support for every stage of your project

NEOTISS
HIGH PERFORMANCE TUBE

Experience. Innovation. Quality. Your success.

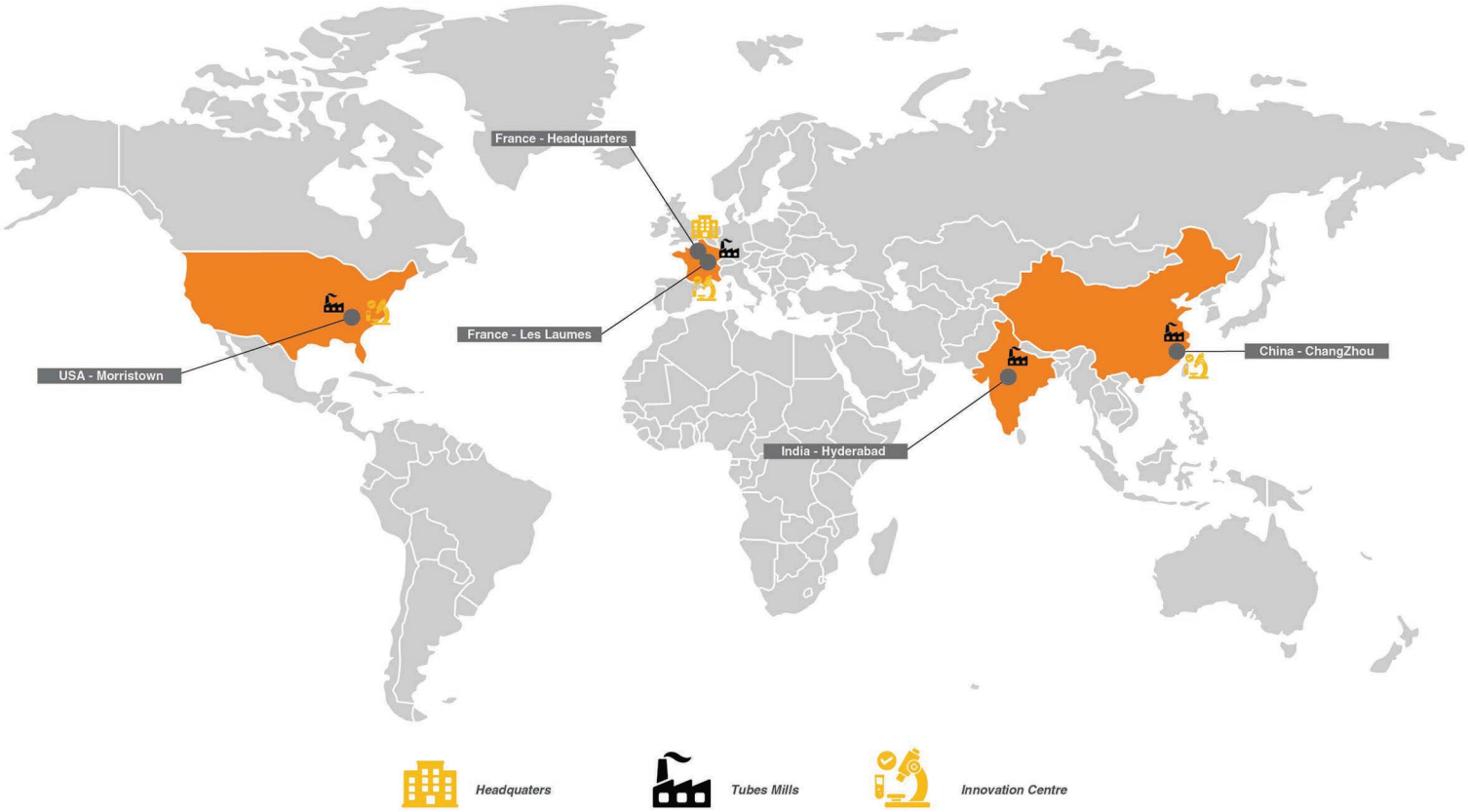
Trust and Credibility



Neotiss is the only tube manufacturer approved and referenced by all key stakeholders of the nuclear supply chain — from nuclear plant operators to EPC contractors and heat exchanger manufacturers.

This unique recognition reflects Neotiss's proven reliability, technical excellence, and long-term commitment to the highest standards of nuclear quality and safety.

We've got Nuclear covered !



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