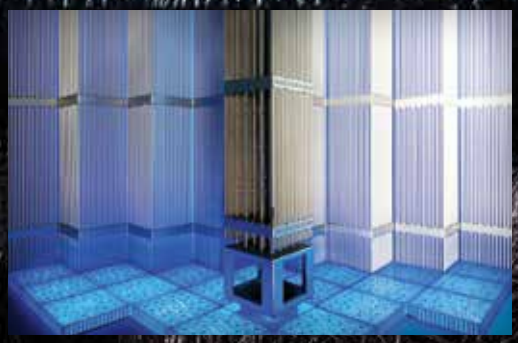
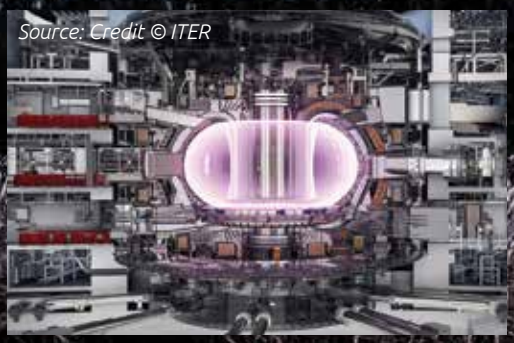
NUCLEAR POWER

ENGINEERED SOLUTIONS FOR DEMANDING ENVIRONMENTS®

Technetics GROUP





Source: Credit © ITER

Technetics, the industry leader, delivers sealing expertise and innovation safely and reliably throughout the nuclear life cycle.

At Technetics, our sealing and component solutions are custom engineered to your precise specifications. Our engineers work with you, adhering to your component designs with peerless attention to detail. Technetics has unsurpassed experience creating solutions for new nuclear power plants, existing nuclear power plants, spent fuel casks, fission reactors, enrichment plants and national laboratories.

OUR CREDENTIALS INCLUDE:

- Over 50 years as a global leader in nuclear RPV seal design and manufacturing.
- Seal design for all major spent fuel transportation and storage casks.
- Being at the forefront of all new reactor pressure vessel seal designs.
- Individual seal design and recommendations for newly built PWR and BWR units.

SUPERIOR SERVICE AND SUPPORT:

Your relationship with Technetics does not simply end with the sale of a product. We work with you, on site, to ensure you receive the highest level of satisfaction, including installation, inspection, laser scan and repairing of mating surfaces on RPV closure, head grooves and nuclear pressure vessel flanges.

QA SYSTEM ASSESSMENT

ISO 9001
Title 10 CFR 50 Appendix B
ANSI / ASME N45.2
Favorable audits by NUPIC Members
ANSI / ASME NQA-1
KTA 1401

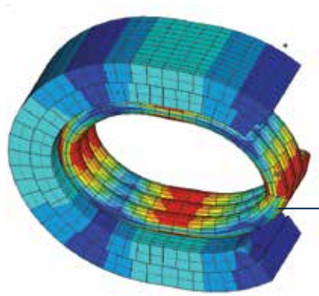
maestral: Technetics sealing laboratory to drive innovation.

maestral is the result of a successful collaboration since 1969 between Technetics and CEA (French Atomic Energy & Alternatives Energy Agency). This sealing lab is dedicated to the design and testing of high-end and critical sealing systems.

- **maestral** brings together the strengths of Technetics, the leader in the field of high-performance industrial sealing and CEA, a major player in research and innovative developments for energy technologies.
- **maestral** offers a multi-scale scientific approach combining tests, characterization and simulation in order to develop sealing solutions that meet present and future needs.
- **maestral** skills are constantly growing as a result of the real-life case studies and the lab's experts have the ability to quickly assess situations in order to offer suitable R&D programs and solutions. maestral technicians are experienced and certified to COFREND (French Confederation for Non-destructive Testing) II, Leak Testing.
- **maestral** has the latest generation test and characterization equipment, amply instrumented, offering the ability to quickly and thoroughly analyze the behavior of seals.
- **maestral** is committed to actively developing numerical simulation tools and resources applied to sealing.

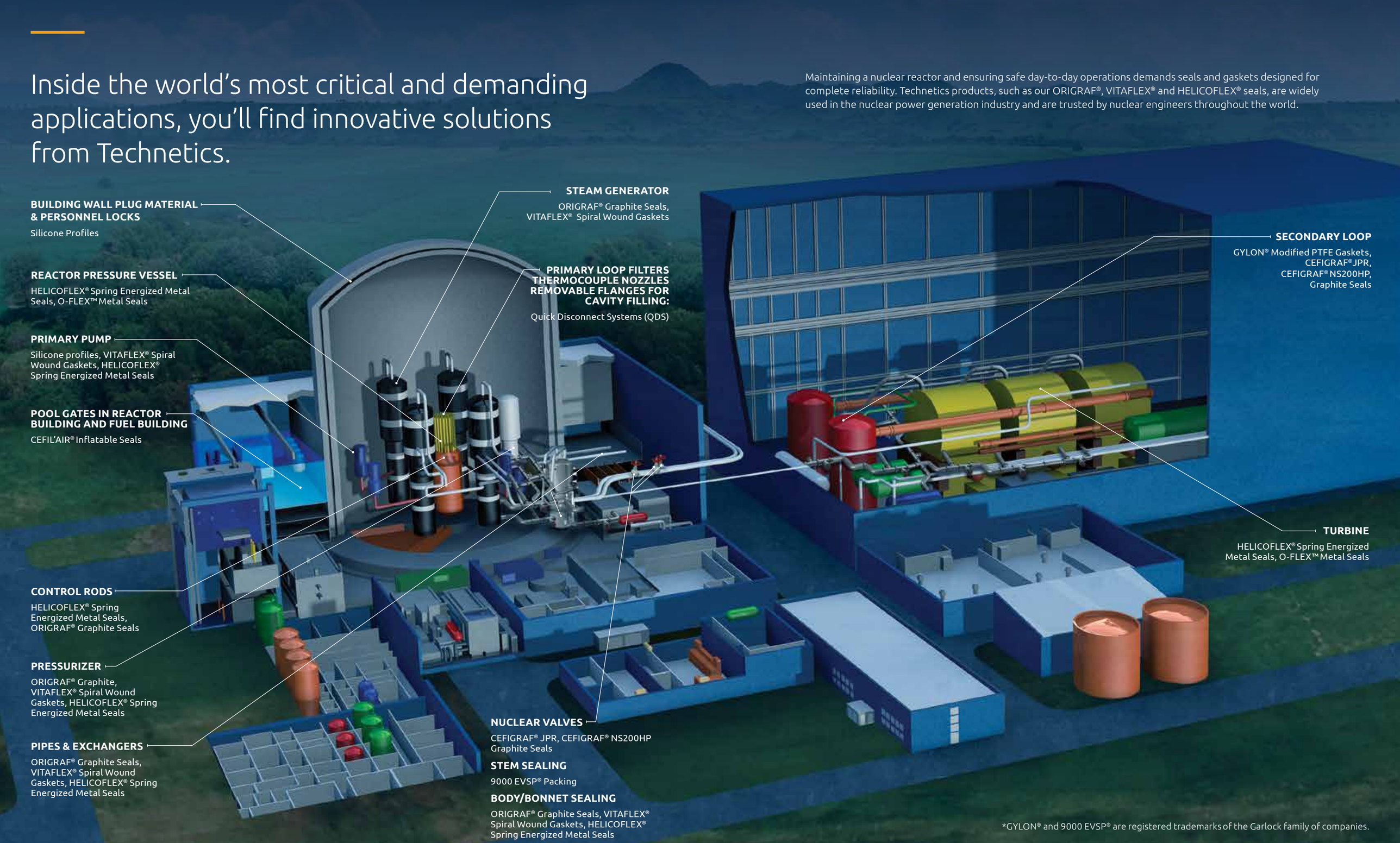
In order to develop product lines or for special applications, maestral designs and develops specific benches or mock-ups reproducing actual operating conditions. To do so, it calls on the advanced analytical skills of CEA and on the manufacturing and research abilities of Technetics.

Simulation does not replace tests on mock-ups but it allows the latter as well as experimental artifacts to be reduced. Simulation is an effective tool for designing and optimizing sealing systems by checking their performance in all circumstances, in order to resolve clients' problems. Today, prediction abilities of models are advanced enough to extrapolate life-size results when the size of the mock-ups or the duration of the tests makes them impossible in real conditions. Our modelers have particular expertise in the mechanics of very non-linear behavior, such as large deformations, creep, complex contacts with flanges and friction.



Inside the world's most critical and demanding applications, you'll find innovative solutions from Technetics.

Maintaining a nuclear reactor and ensuring safe day-to-day operations demands seals and gaskets designed for complete reliability. Technetics products, such as our ORIGRAF®, VITAFLEX® and HELICOFLEX® seals, are widely used in the nuclear power generation industry and are trusted by nuclear engineers throughout the world.



BUILDING WALL PLUG MATERIAL & PERSONNEL LOCKS

Silicone Profiles

REACTOR PRESSURE VESSEL

HELICOFLEX® Spring Energized Metal Seals, O-FLEX™ Metal Seals

PRIMARY PUMP

Silicone profiles, VITAFLEX® Spiral Wound Gaskets, HELICOFLEX® Spring Energized Metal Seals

POOL GATES IN REACTOR BUILDING AND FUEL BUILDING

CEFIL'AIR® Inflatable Seals

CONTROL RODS

HELICOFLEX® Spring Energized Metal Seals, ORIGRAF® Graphite Seals

PRESSURIZER

ORIGRAF® Graphite, VITAFLEX® Spiral Wound Gaskets, HELICOFLEX® Spring Energized Metal Seals

PIPES & EXCHANGERS

ORIGRAF® Graphite Seals, VITAFLEX® Spiral Wound Gaskets, HELICOFLEX® Spring Energized Metal Seals

STEAM GENERATOR

ORIGRAF® Graphite Seals, VITAFLEX® Spiral Wound Gaskets

PRIMARY LOOP FILTERS THERMOCOUPLE NOZZLES REMOVABLE FLANGES FOR CAVITY FILLING:

Quick Disconnect Systems (QDS)

NUCLEAR VALVES

CEFIGRAF® JPR, CEFIGRAF® NS200HP Graphite Seals

STEM SEALING

9000 EVSP® Packing

BODY/BONNET SEALING

ORIGRAF® Graphite Seals, VITAFLEX® Spiral Wound Gaskets, HELICOFLEX® Spring Energized Metal Seals

SECONDARY LOOP

GYLON® Modified PTFE Gaskets, CEFIGRAF® JPR, CEFIGRAF® NS200HP, Graphite Seals

TURBINE

HELICOFLEX® Spring Energized Metal Seals, O-FLEX™ Metal Seals

*GYLON® and 9000 EVSP® are registered trademarks of the Garlock family of companies.

Technetics offers custom engineered seals, specifically for your nuclear power application.

NUCLEAR APPLICATIONS INCLUDE:

- Reactor Pressure Vessels
- Steam Generation
- Primary Pumps
- Pool Gates
- Nuclear Valves
- Secondary Loops
- Turbines
- Control Rods
- Fuel Enrichment
- Pellet Processing
- Storage Casks
- Transportation Casks

HELICOFLEX® SPRING ENERGIZED METAL SEALS

High-performance, flexible metal seals that have exceptional compression and elastic recovery properties.

O-FLEX™ METAL SEALS

Offers optimum strength, spring back and resistance to radiation and corrosion

C-FLEX™ METAL SEALS

Based on the elastic deformation of a metal "C" substrate which, during the compression cycle, gives a contact point on each sealing surface.

QUICK DISCONNECT SYSTEMS (QDS)

Can be assembled and disassembled quickly while offering space saving features.

ORIGRAF® GRAPHITE SEALS

Unlike flexible graphite cut gaskets, the compression of the ORIGRAF® dieformed seal is limited by a mechanical stop: groove or inner and/or outer ring.

PMUC

CEFIL'AIR® INFLATABLE SEALS

Seals that satisfy the highest demands of temperatures from -100°C to + 250/280°C, as well as pressures from 10^{-1} to 10^{-3} mm Hg to several bar, in the presence of varied atmospheres or fluids.

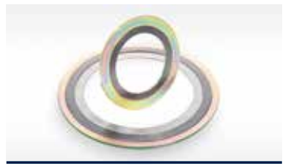
CUSTOM COMPONENTS AND VALUE ADDED SERVICES:

Technetics offers many solutions including elastomer seals, spiral wound gaskets, graphite seals, machined metal seals as well as value added on-site services.

ELASTOMER SEALS

Extruded or molded in a wide range of elastomer's and have an extremely high resistance to aging and radiations.

PMUC



VITAFLEX® GASKETS

Spiral-wound as per all existing standards as well as special designs. We offer VITAFLEX® BPA, low stress technology, and VITAFLEX® with controlled curve for specific applications.

PMUC

CEFIGRAF® GRAPHITE

High temperature and pressure resistance and is easy to handle due to the rigidity of its reinforcement.

PMUC

PREST/ON-SITE SERVICES

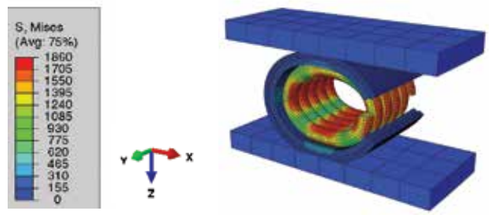
We offer a complete range of on-site solutions, including flange integrity management, technical assistance, and on-site machining.

Technetics high performance sealing solutions for dual purpose cask containers meeting high quality, reliability and long life requirements.

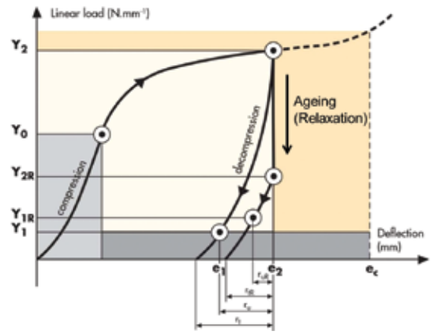
Technetics designs and manufactures high performance sealing solutions for spent nuclear fuel transport and storage cask.

Technetics can propose both HELICOFLEX® spring energized metal seals and elastomer seals (PMUC certified) for cask containers leads for long term storage solutions. All of our sealing solutions are reliable and high quality to ensure total efficiency for this critical application.

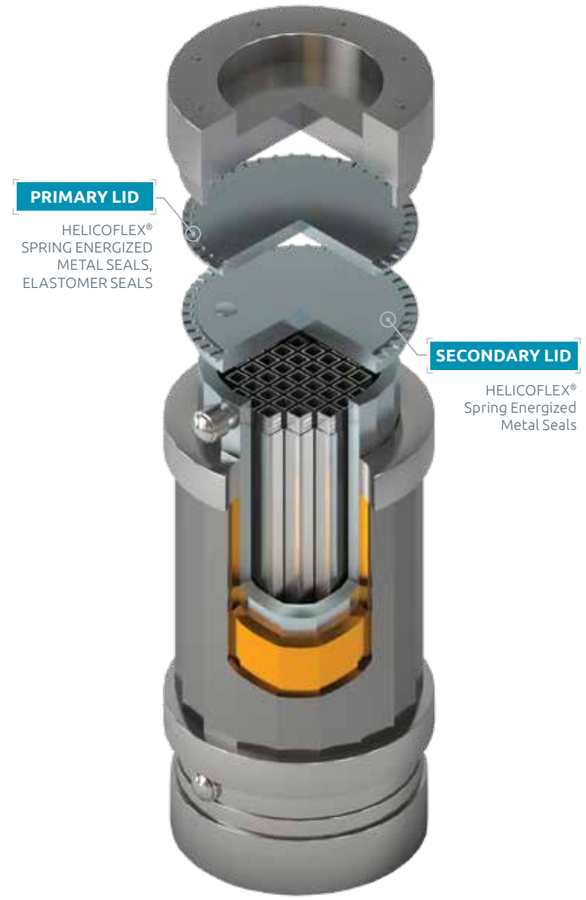
Technetics, through the R&D sealing lab maestral, has extended simulation capacities to forecast seals & containers lifetime. An experimental program has been carried out using both numerical simulation and mock-ups tests (100,000 hours aging tests) assessing the long-term sealing performances of HELICOFLEX® metallic seals in spent nuclear fuel storage casks (up to 300 years).



Loading-unloading curve of a HELICOFLEX® metallic seal



DUAL PURPOSE SPENT FUEL CASK CONTAINER



For more information on how Technetics supports the nuclear power industry, visit technetics.com/nuclear

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