Tailor made Bellows and Expansion Joints for fusion reactors, cryogenics and high vacuum applications
Swiss Engineering and Production

Kompaflex ag is a Swiss company founded in 1981, specialised in the design and production of metallic bellows and expansion joints for fusion reactors, cryogenics and ultra high vacuum applications.

Welding and testing

**In house test facilities**

- Life cycle testing
- Pressure tests up to 700 Bar
- X-Rays, Ultrasonic tests
- Vacuum stability test
- Helium leakage detectors (eg. EN1779 methods A2, A3)
- Vacuum chambers for testing (eg. EN1779 methods A1 / B3 / B5 / B6)
- Special packaging for UHV bellows

**Welding competences**

- UHV tight welding seams according to specified leakage rates
- Certified welders and procedures (EN, ASME, etc...)
- TIG welding
- Plasma welding
- Welding without any gaps
- Manufacturing in a pressurised clean room
Testing at Kompaflex ag

Water pressure tests of expansion joints for a nuclear power plant

Bellows life cycle testing under temperature and vacuum

Vacuum test chamber (EN1779 methods A1 / B3 / B5 / B6)
Vacuum chambers for accelerators

Kompaflex also specialises in manufacturing high precision vacuum chambers for accelerators.

- Chamber made in 0.4 mm Inconel 625 or Inconel X750
- Inside and outside tolerances +/- 0.3 mm
- TIG welding of 2 x 0.4 mm
- Helium leakage test at $10^{-9}$ mbar*l/s
Contribution to major fusion programmes

**ITER : Engineering and prototyping contract**

- Design of bellows
- Validation by FEM for over 11 load cases
- Full scale prototype 3.2 x 3.6 m
- Helium leakage test
- Pressure test
- Spring rate test
- Life cycle test

85 large rectangular multiply-bellows

ITER Cryostat 28m tall x 28m high
Kompaflex has successfully designed and manufactured all 254 multi-ply bellows in circular, oval and rectangular shapes for the Wendelstein 7-X Stellarator.

Kompaflex multi-ply bellows in ultra-high vacuum conditions offer:

- High flexibility allowing large movements
- Low spring rates
- Permanent leakage control
- Extensive fatigue life
Tailor made bellows

Kompaflex can do any shape of bellows for any research application.

Oval and rectangular bellows installed at the LHC CERN

Circular bellows for the Wendelstein 7-X

Helium leakage test on a pressure balanced expansion joint for SF6 gas application

Example of a bellows with permanent leakage control installed at Wendelstein 7-X

Rectangular UHV multi-ply bellows 459/140 with reinforcement rings for 1.7 bar g pressure
References

Accel GmbH, Bergisch-Gladbach
ALD Vacuum Technik GmbH, Hanau
Areva TD
Babcock Noell
CERN, Switzerland
DESY Deutsches Elektronen-Synchroton, Hamburg
Forschungszentrum Karlsruhe
Forschungszentrum Jülich, Fusionsreaktorprojekt ANKE / ANLESA
GEVA GmbH, Berlin
GSI Gesellschaft für Schwerionenforschung
Ilmvac GmbH, Ilmenau
IPP Max-Planck-Institut für Plasmaphysik, Greifswald
ITER Cadarache, France
KLM Rapid Prototyping, Ellwangen
Linde Kryotechnik
Medauatron, Wiener Neustadt
Paul-Scherrer-Institut, Villingen
Pfeiffer Vacuum GmbH, Asslar
Research Instruments GmbH
Systec GmbH, Karlstadt
Trinos GmbH, Göttingen
University of S-Lund, Max Lab
Universität Dortmund, DELTA Accelerator
VAI Fuchs GmbH, Duisburg
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