

# MACOGA

ENGINEERED EXPANSION JOINTS



## ENGINEERED EXPANSION JOINTS

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ

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# MACOGA

ENGINEERED EXPANSION JOINTS

## Experience & Innovation

In 1960 Manuel Concheiro and his sons Mario and Carlos Concheiro founded a small company dealing with technical products for serving the Spanish industry. This space housed some of the company's first breakthrough expertise and big ideas that would later come into the present production of Expansion Joints.

Early in the 70's the first Expansion Joints were designed, manufactured and shipped from MACOGA.

Throughout its more than 40-year history, MACOGA has been a leader in developing technologies and in converting those technologies for use in commercial markets.



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## Experience & Innovation

During the course of our history, we have developed many innovative technologies and design and manufacturing of Expansion Joints became our area of expertise.

From bellows for jet engines to huge size units for the power generation sector or oil and gas projects MACOGA people are dedicated to turning ideas into leading products and services.

Today MACOGA is a worldwide leading supplier of Expansion Joints as well as comprehensive specific solutions. MACOGA manufactures and supplies state-of-the-art Expansion Joints.



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## Location

In a convenient location, in the **NW** part of **Spain**, close to:

### 2 Deepwater Oceanic Sea Ports

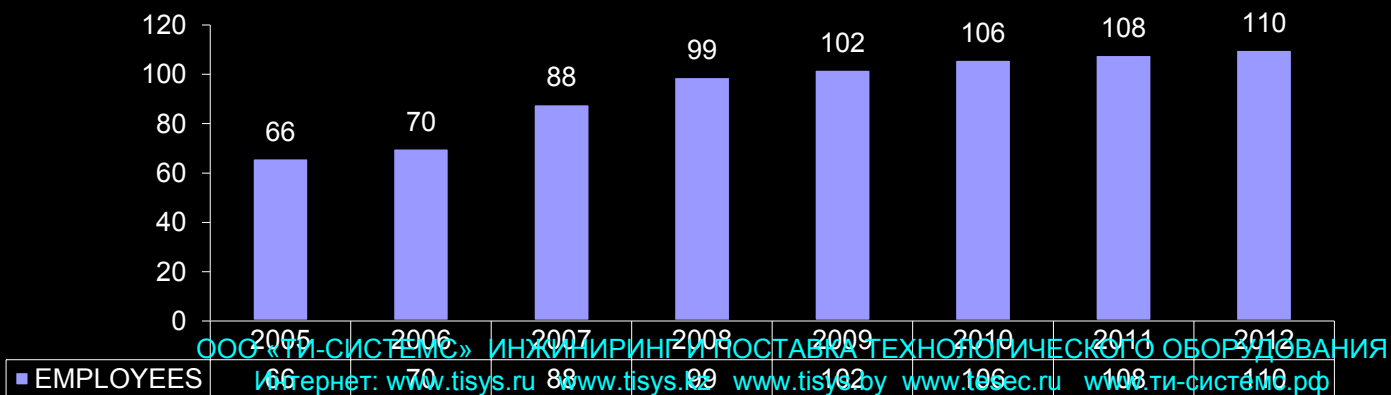
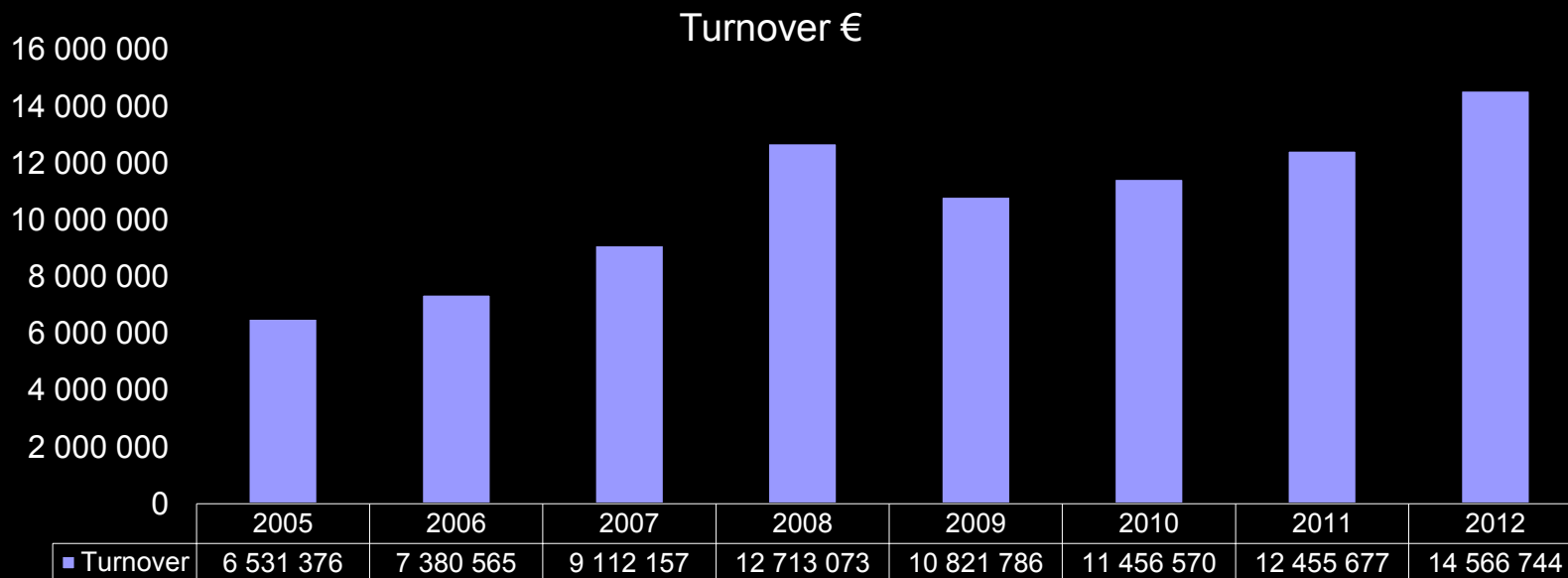
Vigo	80 Km
La Coruña	20 Km

### 2 International Airports

Santiago de Compostela	20 Km
La Coruña	20 Km



## Main Figures





## Facilities

- Offices: 1500 m<sup>2</sup>
- Production plant: 12.000 m<sup>2</sup>



## 100% Own production facilities

From raw material to final product  
in our own factory

- Large Stock of carbon steel, stainless & nickel alloys
- Plasma & Oxygen cutting
- Bending, rollers, presses, forming machines
- Machining equipment, lathes, etc.
- Hydraulic and mechanical forming
- Shotblast and painting cabins
- Testing benches & testing equipment
- Manufacturing of Packing
- Etc.



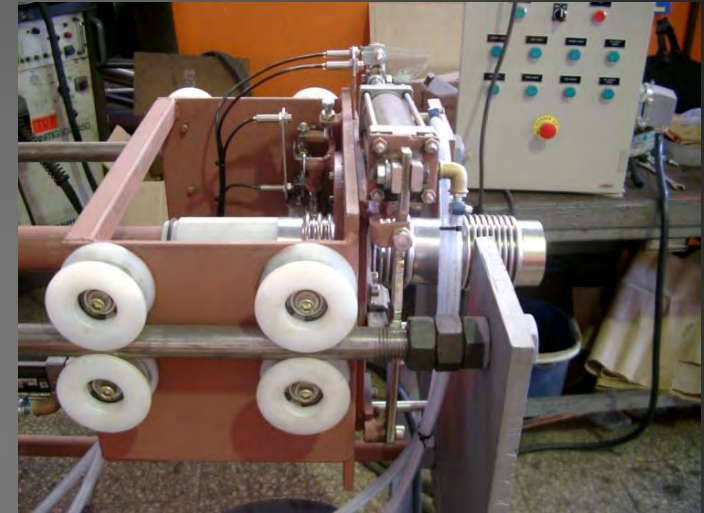


## Facilities

### Production facilities

#### Bellows forming machinery

- Hydraulic/Elastomeric forming
- Punching / Expander forming
- Rolling





## Facilities

### Welding equipment

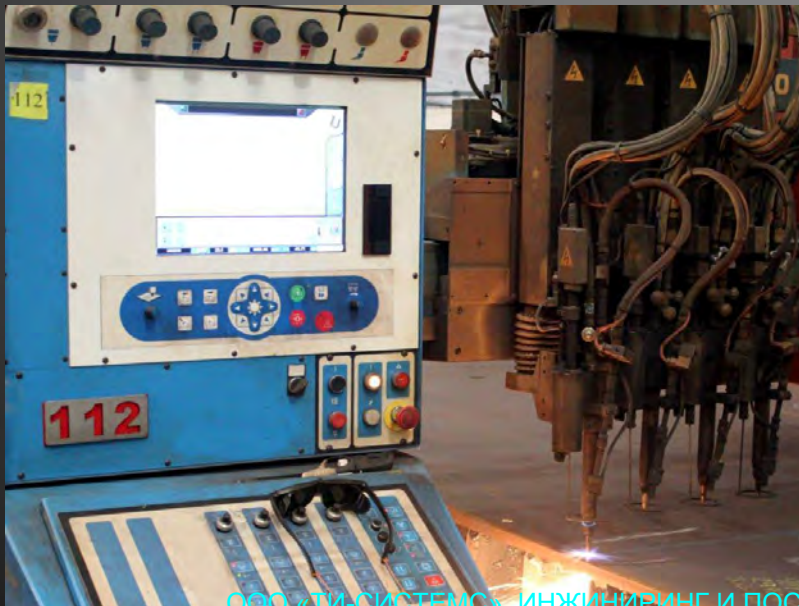
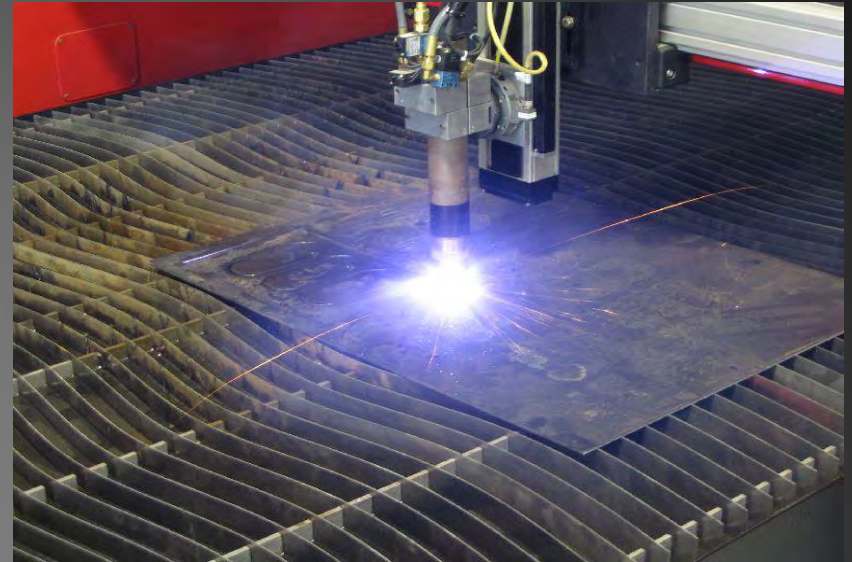
- 2 x Submerged Arc Welding
- 30 x TIG Welding Machines
- 28 x MIG Automatic & Semiautomatic



## Facilities

### Cutting equipment

- Plasma cutting
- Oxygen cutting





## Facilities

### Surface Treatment equipment

- Shotblasting cabin
  - Painting cabin
- with temperature & humidity controlled





## Facilities

### Testing

- Hydro Testing benches
- Pneumatic Testing benches
- X-Ray bunker
- Helium Leak Test area
- PMI
- Cycle life testing bench
- Etc.



## Facilities

### Packing area

- Own packing production facility





## Facilities

### Other facilities & equipment

- 10 x Hydraulic Presses from 2,5 to 600 Tons
- 12 x Drilling machines
- 4 x Milling/plate grinding machines up to 8 m
- 12 x CNC Lathes





## Facilities

### Other facilities & equipment

- 8 x Forklifts
- 22 x cranes (from 2,5 to 20 Tons)



## Products

Metallic

Expansion Joints



Rubber

Expansion Joints





## Metallic Expansion Joints

Designed, manufactured and  
tested in accordance with:

- E.J.M.A. Standards
- ASME VIII, Div. I, App. 26
- EN 14917

Production Range:

Round units: 15 mm up to 8 meters

Rectangular units: Limitless





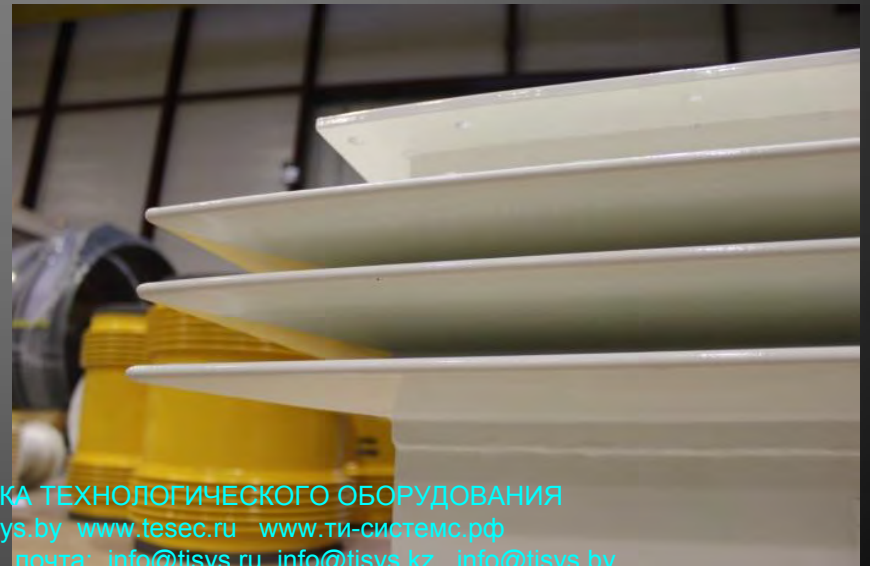
## Metallic Expansion Joints

### Round

- Axial
- Hinged
- Gimbal
- Lateral
- Pressure Balanced
- Jacketed
- Externally Pressurized
- M-Lens
- Flanged and Flued

### Rectangular Expansion Joints

- V-shaped - Camera Corner
- V-shaped - Miter Corner
- U-shaped - Rounded Corner



## Metallic Expansion Joints

### Materials

#### Stainless steel

304  
304L  
316  
316L  
316H  
316Ti  
321  
904L  
254 SMO  
304H  
321H  
309S  
310S  
253 MA

#### Nickel Alloys

Inconel 600  
Monel 400  
Inconel 625  
Inconel 625LCF  
Incoloy 800  
Incoloy 800H  
Incoloy 825  
Hastelloy C4  
Hastelloy C-22  
Hastelloy C-276





## Quality Control & Testing

### In-House NDE & DE facilities

#### Non-Destructive

- Radiographic Examination
- Liquid Penetrant Examination
- Ultrasonic Examination
- Magnetic Particle Examination
- Hydraulic Pressure Test
- PMI (Positive Material Identification)
- Chemical & Mechanical Analysis of materials
- Spring Rate Test
- Helium Leak Detection Test

#### Destructive

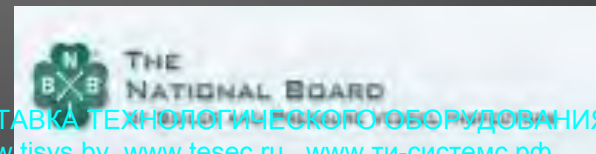
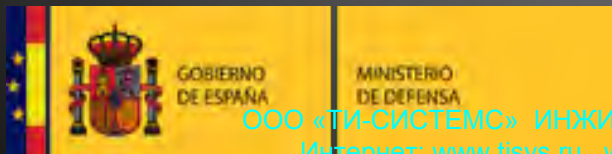
- Fatigue Life Testing
- Squirm Testing
- Meridional Yield Rupture Testing
- Burst Test





## Quality Approvals & Certifications

- ISO 9001:2008
- ISO 14001:2004
- ISO 3834
- PED 97/23/CE, Module H
- TÜV / AD 2000-Merkblatt HP0 EN 729-2
- U-Stamp ASME
- Certificate of Authorization “NB”
- BV Type Approval Certificate
- Lloyd’s Register Type Approval
- Det Norske Veritas Type Approval
- Spanish Ministry Defence & NATO



## Rubber Expansion Joints

Designed, manufactured and  
tested in accordance with:

- Pressure Equipment Directive PED 97/23/EC
- FSA (Fluid Sealing Association) Non-Metallic Expansion Joints Division
- ASME F-1123 Standard Specs. for Non-Metallic Expansion Joints



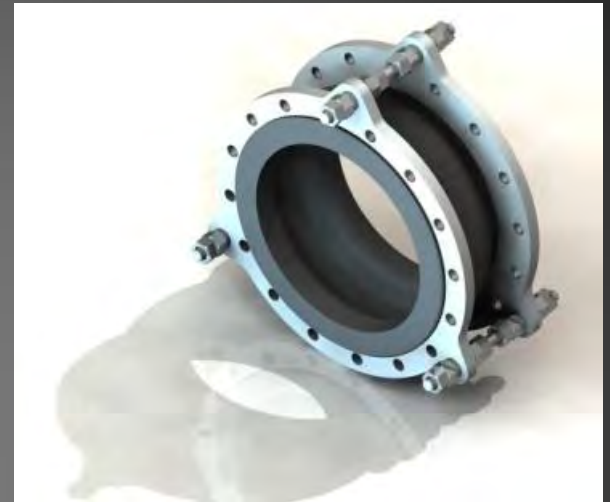
## Rubber Expansion Joints

### Materials

- EPDM
- EPDM HT
- NITRILE
- SPEC. NITRILE
- WHITE NITRILE
- HYPALON
- NEOPRENE
- VITON



MAC-W Series



MAC-F Series





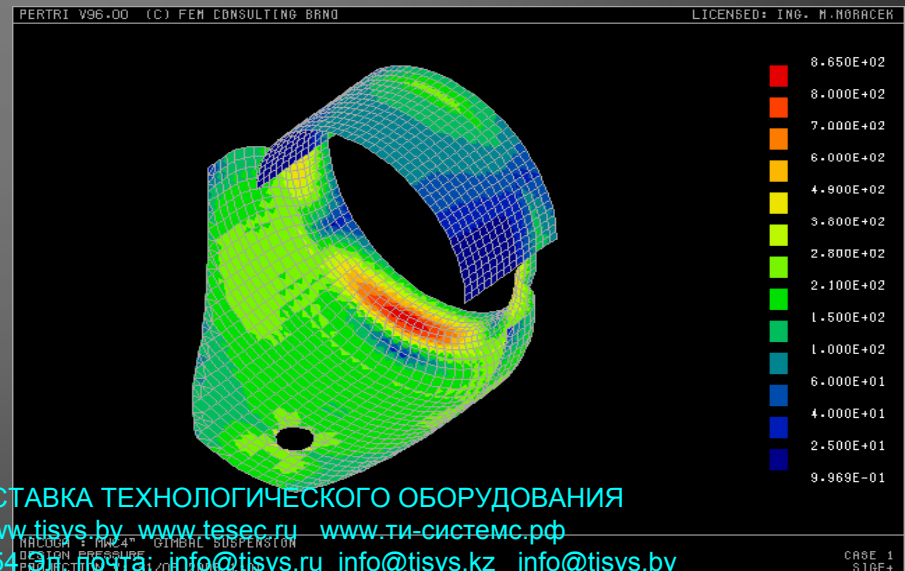
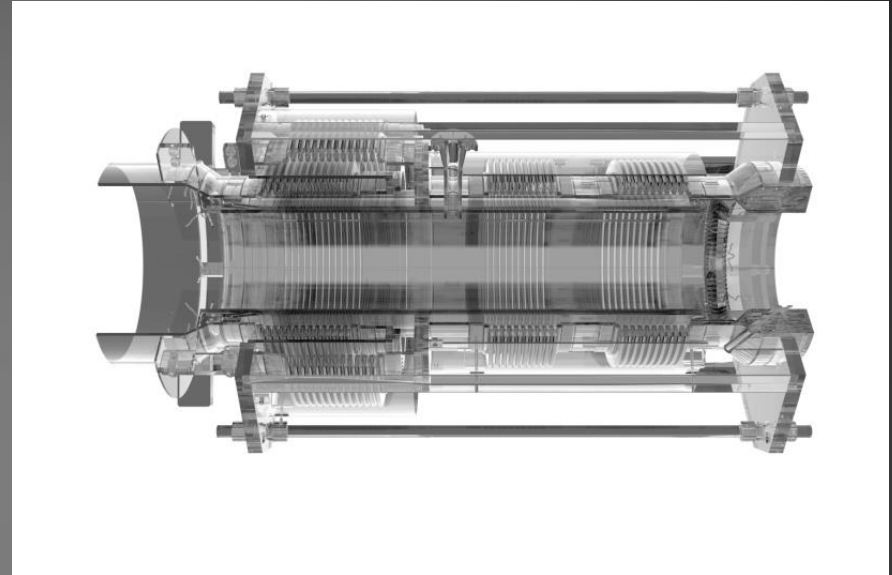
## Our Service

### Design & Calculation

Our analysis and design practices include:

Design calculations:

- EN, EJMA, ASME
- AD-Merkblatter, etc.
- Finite Element Analysis (FEA)
- Pipe Stress Analysis
- CAD
- 3-D Modelling

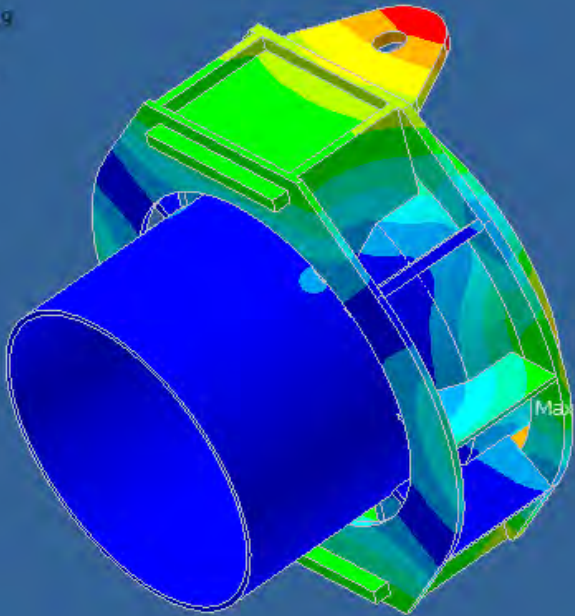


## Our Service

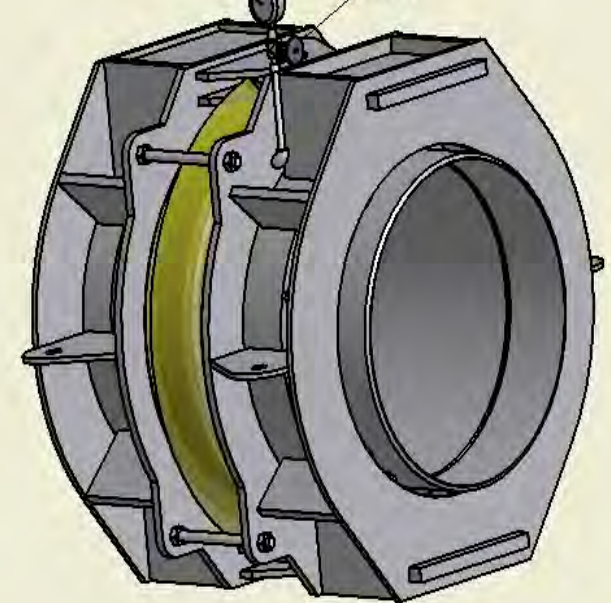
### FEA

Deformation  
Type: Deformation  
Unit: mm  
27/06/2012 15:19

0,4322 Max  
0,36418  
0,33616  
0,28814  
0,24011  
0,19209  
0,14407  
0,096045  
0,048023  
0 Min

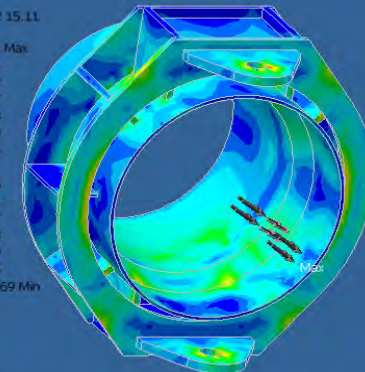


PRESSURE GAUGE  
VALVE



Equivalent Stress  
Type: Equivalent Stress  
Unit: MPa  
27/06/2012 15:11

36,961 Max  
34,326  
31,692  
29,057  
26,423  
23,789  
21,154  
18,52  
15,885  
13,251  
10,617  
7,9823  
5,3479  
2,7135  
0,079059 Min



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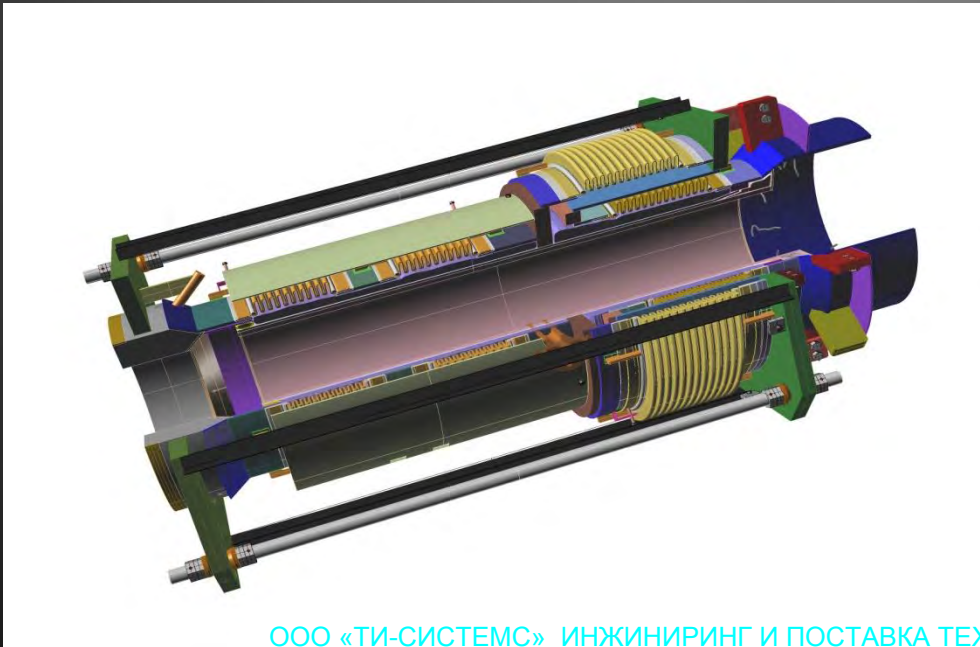
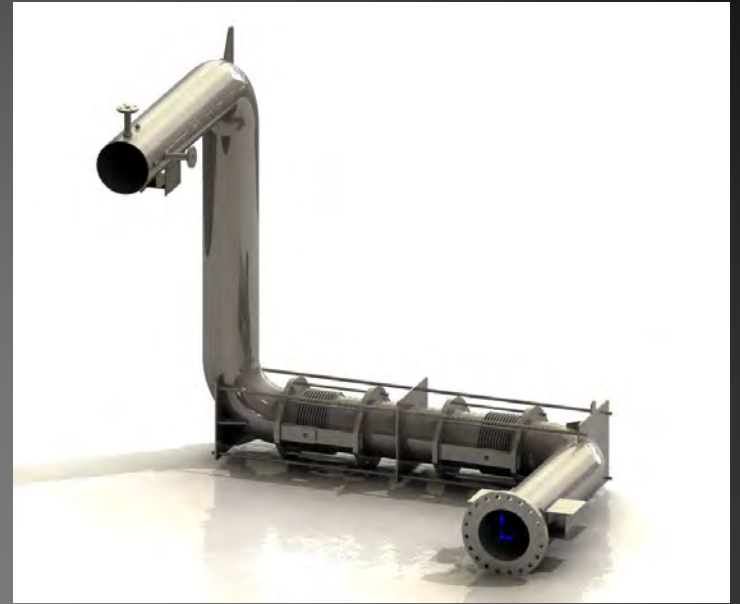
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## Our Service

### 3D Modeling



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## Our Service

### On-Site Service

We offer our customer custom made and professional solutions to solve their site needs

- Supervising Package
- Assembly Package
- Erection Package



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## Our Service

### Material Delivery

With deliveries to over 80 different countries every year we can offer our customers cost-effective freight logistics solutions. We can organize for you:

- Air freight
- Sea freight
- Oversize cargoes
- Express deliveries
- Road transportation



## Industries we serve

Energy  
Engineering Companies  
LNG, LPG  
Petroleum Refining  
Petrochemical  
Aerospace  
Military  
Cryogenic  
Engines & Turbines  
Air-Conditioning  
Aircraft Engines  
Cement Plants  
Co-generation Services  
Electrical Apparatus  
Energy/Public Utilities  
Food Industry  
Gas Compression Equipment  
General Bldg Contractors

Heavy Construction  
Hydraulic plants  
Iron & Steel Foundries  
Metal Mining  
Metal Working  
Mining  
Natural Gas  
Nuclear  
OEMs  
Offshore  
Paper Mills  
Pharmaceutical  
Ship Building  
Steel Mills  
Steel Works,  
Water Transportation



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## Some of our Customers

### Oil & Gas

ÖMV · BP · TOTAL · EXXONMOBIL · SHELL · REPSOL YPF · PETROBRAS · SONATRACH · PDVSA · NESTE OIL · ESSO · HELLENIC PETROLEUM · GAS NATURAL · PERTAMINA · CHEMOPETROL · UNIPETROL · ELF · ATOCHEM · ANGARSK PETROCHEMICAL COMPANY · YUKOS · ANCAP · TEXACO NORTH SEA · KALA NAFT COMPANY · NATIONAL IRANIAN OIL CO. · PETROGAL · WINGAS

### Engineering

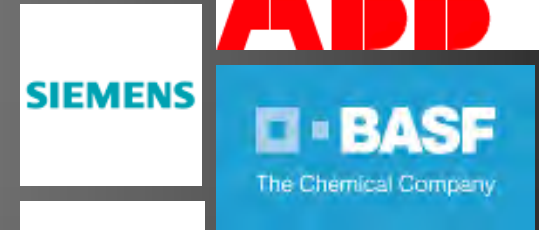
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### Power Engineering

ABB · GENERAL ELECTRIC · AUSTRIAN ENERGY & ENVIRONMENT · SIEMENS · ELECTRABEL · ENERCON · CEZ · A.S. · ALSTOM POWER · SKODA · INOVA · ANSALDO · CHIYODA · TECHNIP · GEA · SPX · MITSUBISHI · TRACTEBEL ENERGY ENG. · FOSTER WHEELER ENERGIA · EDISON · BECHTEL · BLACK & VEATCH · SARGENT & LUNDY · ROLLS ROYCE INDUSTRIAL POWER GROUP · IBERDROLA · STONE & WEBSTER · THERMODYN · DOOSAN HEAVY INDUSTRIES AND CONSTRUCTIONS · MHI · REYKJAVÍK ENERGY · GAMA POWER · ENDESA

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### Steel

ARCELOR MITTAL · SSAB · BRITISH STEEL · KVAERNER METALS · NIPPON STEEL · UNITED STATES STEEL CORPORATION · NORTH AMERICAN STAINLESS · NUCOR CORPORATION · THYSSENKRUPP · OUTOKUMPU · SIDOR · TATA STEEL · DIRECT IRON REDUCTION CO · SIDERPERU · VOESTALPINE · SALZGITTER · CORUS · SALDANHA STEEL · DSD DILLINGER · US STEEL

### Shipbuilding

NAVANTIA · STX FINLAND CRUISE OY · BLOHM + VOSS · FINCANTIERI · ENVC SHIPYARD · ROTTERDAM DRYDOCK COMPANY · ROYAL SCHELDE · ASMAR TALCAHUANO · ORSKOV YARD A/S · SHANGHAI EDWARD SHIPBUILDING

### Defense

PATRIA · LOCKHEED MARTIN · RAYTHEON · ARMADA DE CHILE · AIR WARFARE DESTROYER AUSTRALIA · NAVANTIA · KOKUMS SWEDEN

#### Chemical

BASF · DUPONT · DSM · HUNTSMAN · BAYER · NESTE CHEMICALS · DOW · SHELL CHEMICALS · BAYER · REPSOL QUIMICA · INEOS · LYONDELL CHEMICAL · KEMIRA · AIR LIQUIDE · EVAL · SOLVAY · GE PLASTICS · BASF SONATRACH PROPANCHEM

### Cryogenic

PRAXAIR · AIR LIQUIDE · UNION CARBIDE · ARGON · S.E. CARBUROS METÁLICOS

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## Some of our Customers

### Paper

RENOVA · ENCE · STORA ENSO · MILLIKOSKY · SVENSKA CELLULOSA · INDAH KIAT PULP & PAPER CO · WEYERHAEUSER PAPER MILL · METSO PAPER · KVAERNER PULPING

### Food

NESTLE · UNILEVER · SAN MIGUEL · COREN · AVENTIS ANIMAL NUTRITION · HELIOS · KRAFT

### Pharmaceutical

PFIZER · CELTIA · GLAXOSMITHKLINE · NOVARTIS · ABBOTT · MERCK · PROCTER & GAMBLE · AKZO NOBEL · SOLVAY

### Others

CODELCO · ENAMI · DEMAG DELAVAL · SULZER · SKODA AUTOMOBILLOVA · DÜRR · LEYBOLD · MITSUBISHI HI LTD. · KAWASAKI HI · DOOSAN · ACCIONA · FCC · ALCAN ALUMINIUM · BABCOCK POWER · JORDAN PHOSPHATES · FAUJI FERTILIZERS · FERROVIAL · GENERAL MOTORS · EUROPEAN GAS TURBINES SA · FERRYTERRANEE · AUDI AG · BABCOCK BSH · BMW AG · DAIMLER CHRYSLER AG · DEUTSCHE BABCOCK GMBH · DEUTZ · MDW · ROCKWOOL MINERALWOLLE · STEIN HEURTEY · STEINMÜLLER · OPEL AG · BHEL INDIA · SLOVNAFT · CITROEN · MICHELIN · VOLVO PENTA · ABB ATOM · ALFA LAVAL · DSM · NBM · STORK WÄRTSILÄ · DUBAI ALUMINIUM · TOYOTA · BRICMONT · FAIRBANKS MORSE · FORMOSA PLASTICS · KAISER ALUMINIUM · MPG INGREDIENTS · ZINC CORP. OF AMERICA

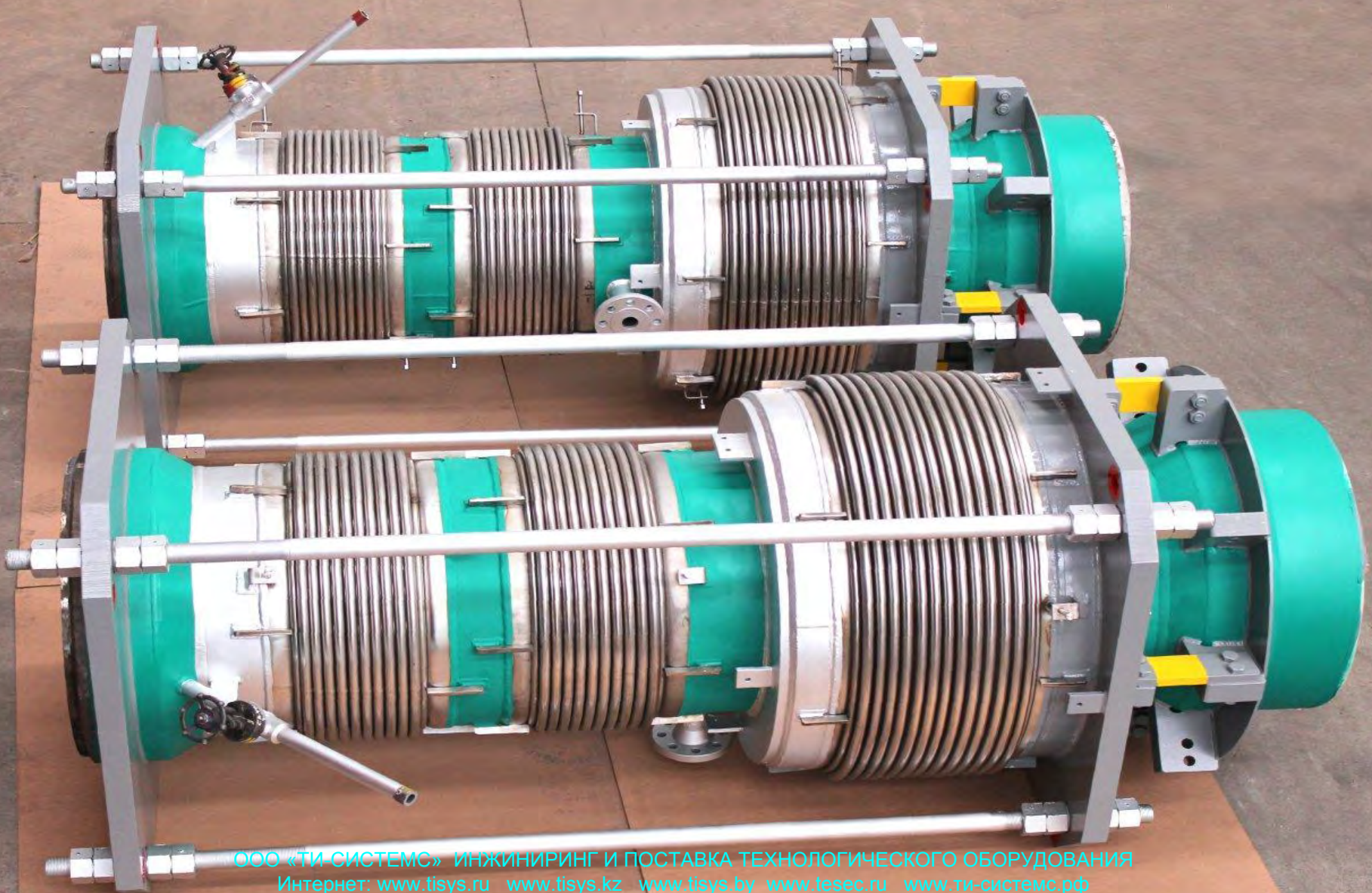


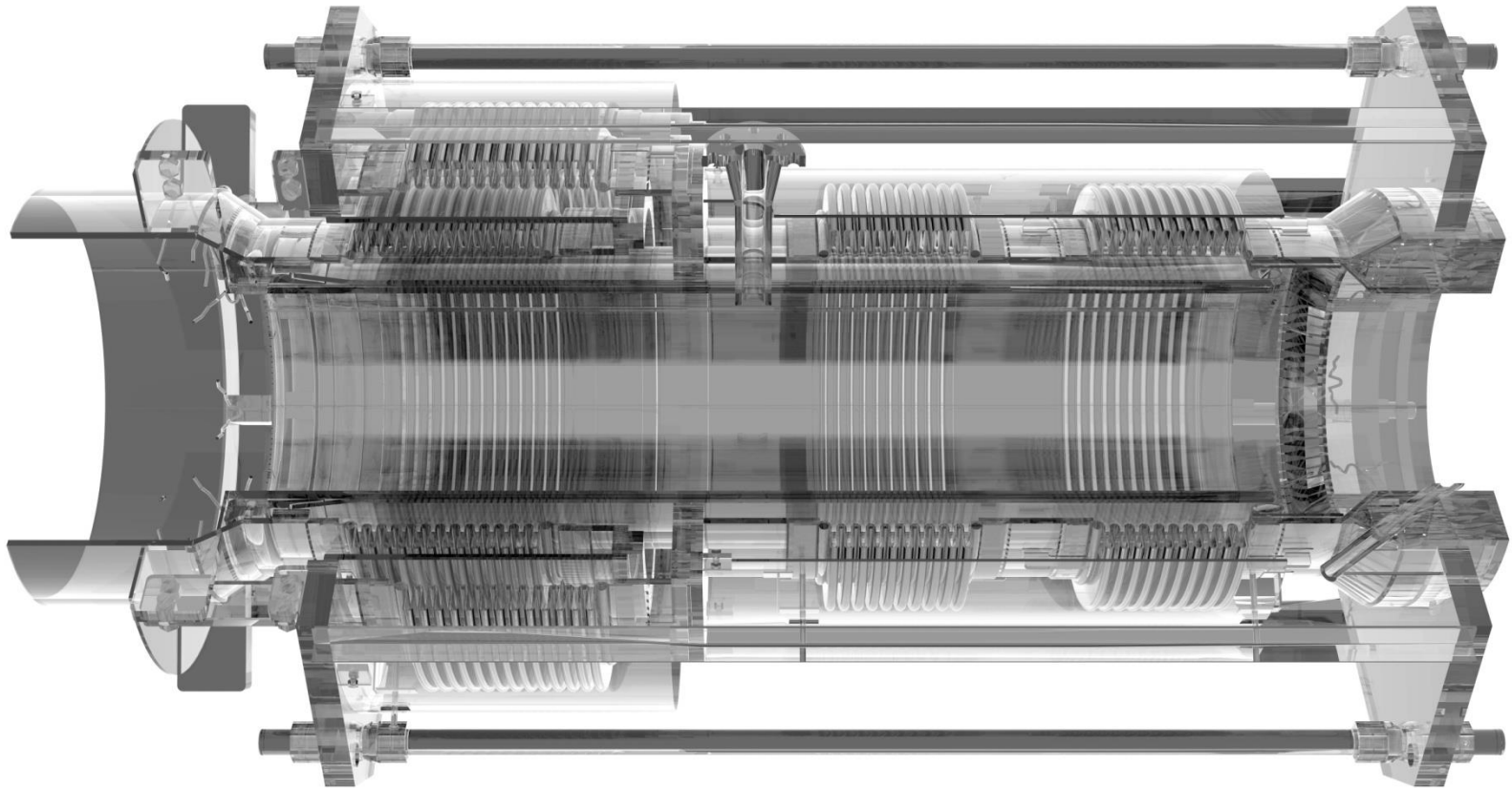
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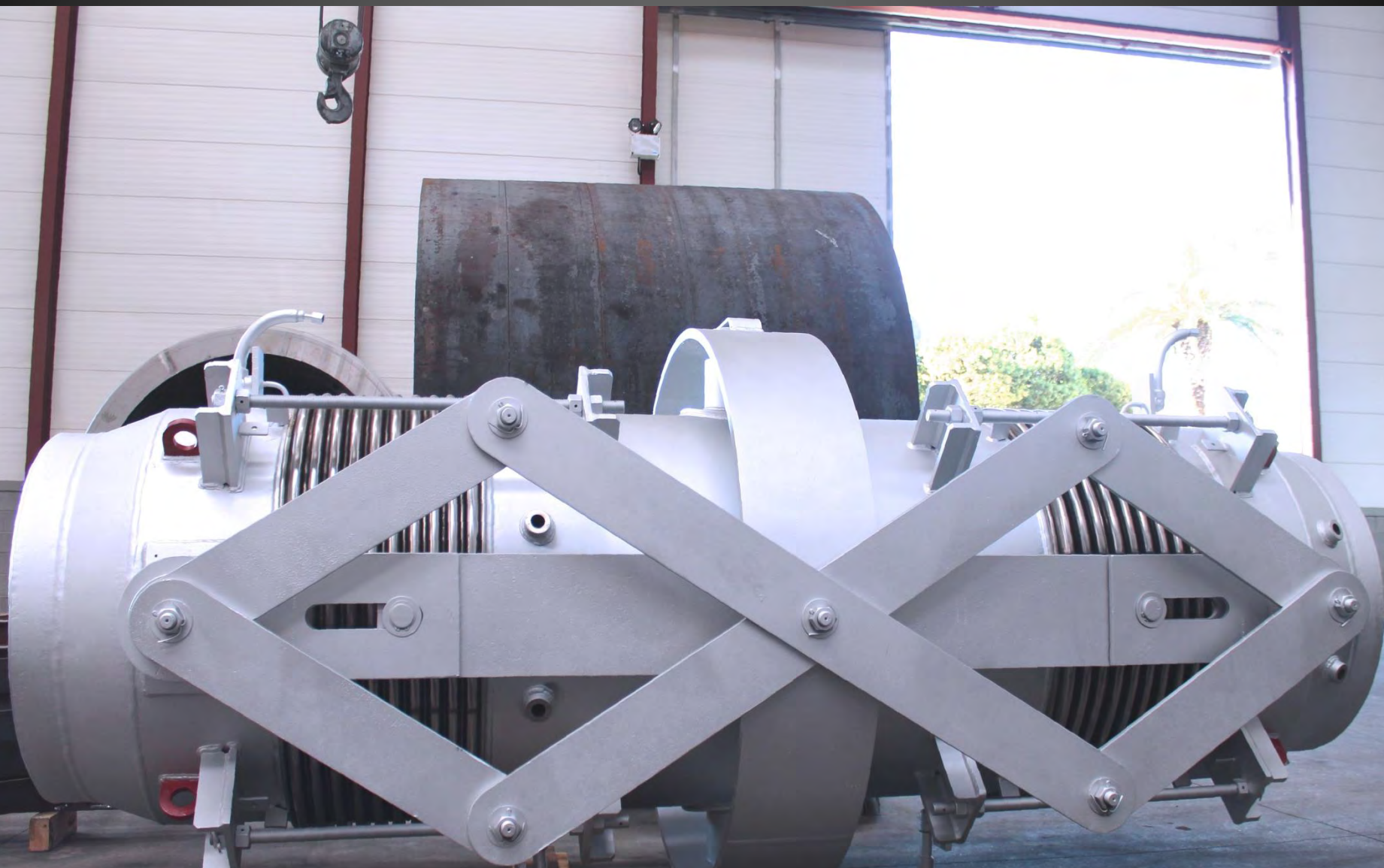
# MACOGA

ENGINEERED EXPANSION JOINTS

FCCU Expansion Joints for

Ceska Rafineska

UOP Specs.



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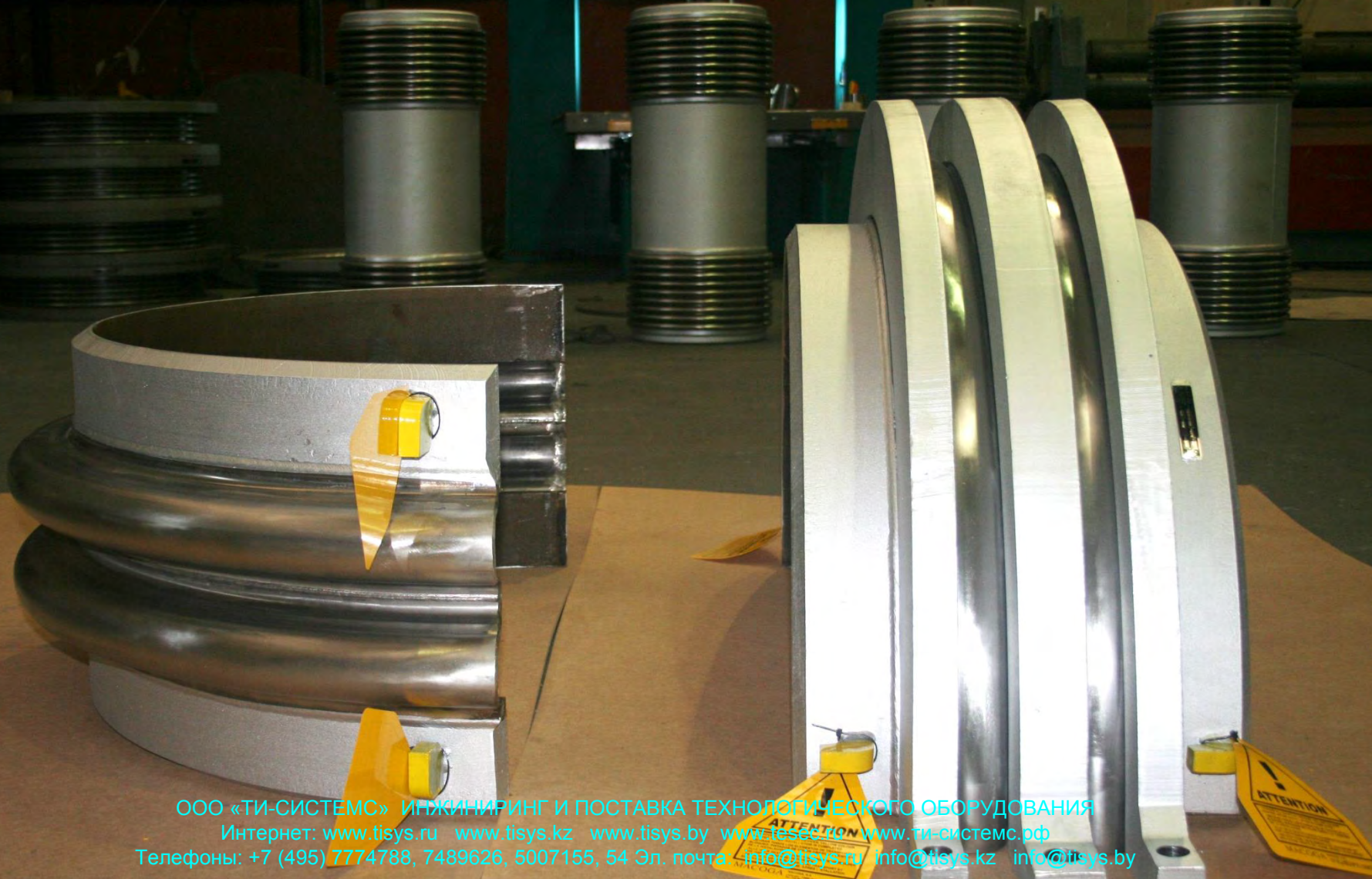


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