LOINTEK PRESENTATION

2016

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ООО "ТИ-СИСТЕМС"

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
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Strictly Private & Confidential

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- Design & Engineering
- Manufacturing.
  - Heat Exchangar & Feed Water Heaters
  - Reactors & Pressure Vessels
  - Boilers
  - Surface Condensers
  - Piping
  - Process Systems – Modular Plants
  - Offshore
  - Solar Thermal Plants

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GENERAL INFORMATION

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General Information

- Engineering and comprehensive solutions for Industry.
- Turnkey projects with heat transfer equipment. Design and manufacturing.
- Specialist in heat exchangers, boilers, condensers, FWH and pressure vessels.
- 2 Workshops: one located in Urduliz, (Vizcaya) and the other one at the Port of Bilbao
- Lointek USA Inc. and Lointek Mex.

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General Information

LOINTEK HEAVY INDUSTRIES

Port of Bilbao - Spain

Workshop

International Port of Bilbao

LOINTEK HEADQUARTERS

Urduliz - Spain

Workshops

Main Offices

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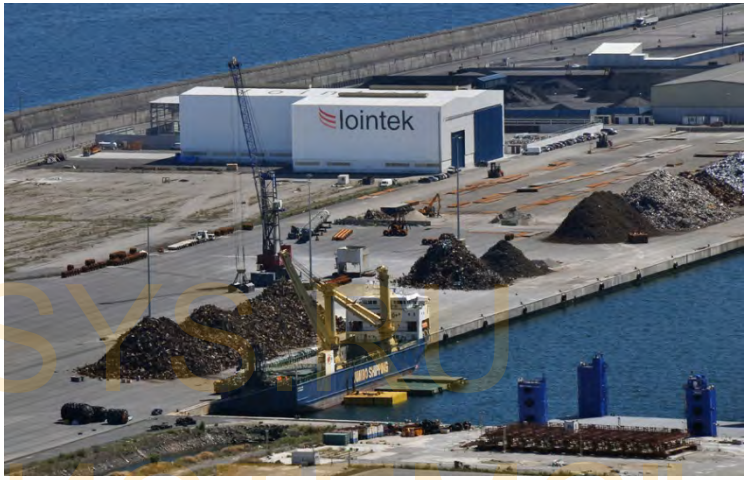
General Information

LOINTEK HEAVY INDUSTRIES

- Total area of 55.000 sq.m
- Direct load to ships
- Focused on oversize equipment and skids.



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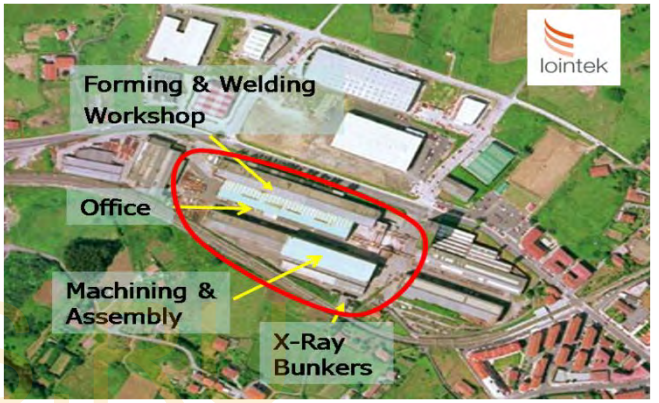
General Information

LOINTEK HEADQUARTERS

- Total area of 40.000 sq.m
- Offices
- Workshops, sandblasting and painting area...



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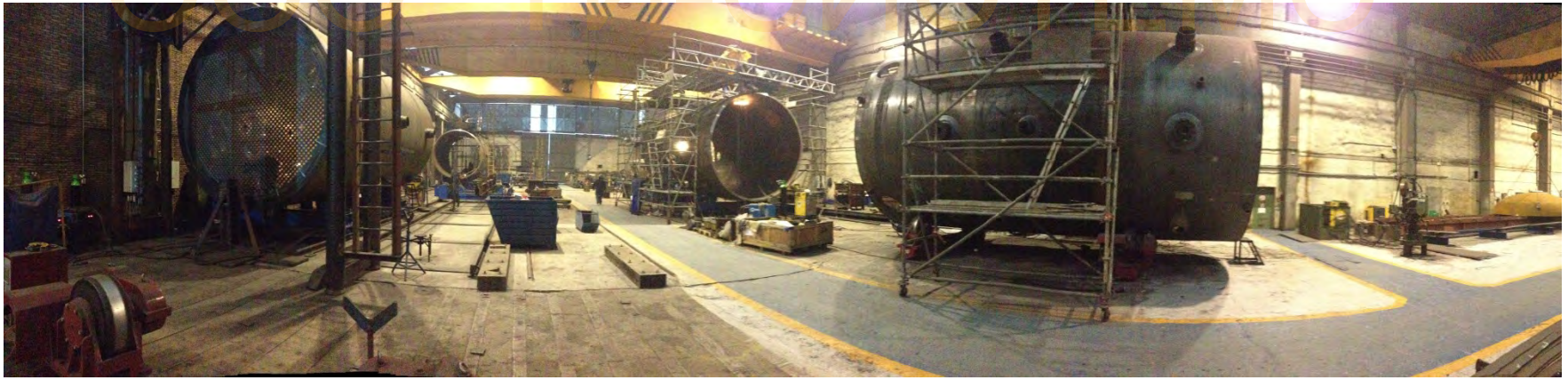
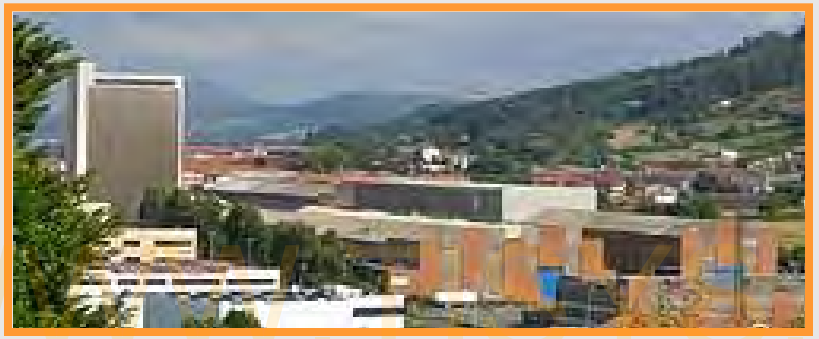


Advancement History



1918 — Babcock Wilcox Española (BWE) Founded

1962 — Mecanica de la Peña (MP) Founded

1996 — Lointek Founded

2000 — Lointek Completed 1st Turn-key project

2003 — Lointek Acquired Assets & Personnel of MP

2011 — Lointek Acquired Assets & Personnel of BWE

2012 — Lointek USA, Mexico Founded

2015 — Lointek Heavy Industries Founded

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Lointek Solutions

TURNKEY PROJECTS

- ✓ STEAM GENERATION SYSTEMS
- ✓ PROCESS SYSTEMS
- ✓ BOILERS
- ✓ PIPING

- ❖ REFINERIES & HYDROCARBONS
- ❖ GENERATION POWER PLANTS
- ❖ COMBINED CYCLE
- ❖ NUCLEAR POWER PLANT
- ❖ UPSTREAM PROCESS
- ❖ CHEMICAL PLANTS
- ❖ AMMONIA & UREA
- ❖ OFFSHORE
- ❖ SOLAR POWER PLANTS

EQUIPMENT DESIGN & SUPPLY

- ✓ REACTORS
- ✓ CONDENSERS
- ✓ FEED WATER HEATERS
  - ✓ CONVENTIONAL
  - ✓ SUPERCRITICAL
  - ✓ ULTRA SUPERCRITICAL
- ✓ HEAT EXCHANGERS
- ✓ BOILERS
- ✓ PIPING

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Lointek Solutions

TURNKEY PROJECTS

Engineering → Procurement → Construction → Erection → Commissioning

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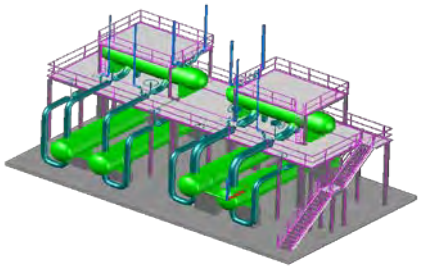
STEAM GENERATION SYSTEMS

BOILERS

PROCESS SYSTEMS



PIPING SYSTEMS

Lointek Solutions

EQUIPMENT DESIGN & SUPPLY

System Design → Thermal Design → Mechanical Design → Manufacturing → Delivery

REACTORS

FEED WATER HEATERS

CONVENTIONAL & SUPERCRITICAL

CONDENSERS

HEAT EXCHANGERS

BOILERS

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Lointek Solutions

ACTIVITY SECTORS

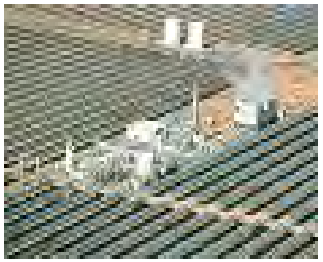
Refineries & Hydrocarbons

Combined Cycle & Nuclear Power Plants

OFFSHORE

Chemical Plants

Ammonia & Urea



Solar Power Plants

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Products & Applications

- **High Pressure/High Temperature Applications:**
  - Reactors (Urea, Ammonia, etc.)
  - Reformers,
  - Desulfurization, Hydrotreater, Hydrocracker
- **Gassification & GTL:**
  - Gassifier
  - Syngas Cooler
- **Boilers:**
  - WHB & HTF
  - Packaged Boiler (up to 200 t/h)
  - Fire-Tube Boilers (up to 40 t/h)
  - Biomass Boilers & Steam Superheaters

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Products & Applications

Solar Power Plants:

- SGS HX and Turn-key system
- Feed Water Heater
- Molten Salt HX
- Oil-Salt Thermal storage HX

Combined Cycle, Nuclear, Coal, and Biofuel Plants:

- HRSGs
- CCPP piping design, engineering, fabrication, assembly
- Feed Water Heater: Critical, Supercritical, Ultra-Super Critical
- Condensers and Deaerators
- Heat Exchangers and Steam Drums

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Materials

- Duplex & Super Duplex S. Steel
- High Nickel Alloys
- Austenitic S. Steel
- Titanium
- High Strength Carbon Steel
- Chrome Moly Alloy Steel
- Chrome Moly Alloy Steel + Vanadium

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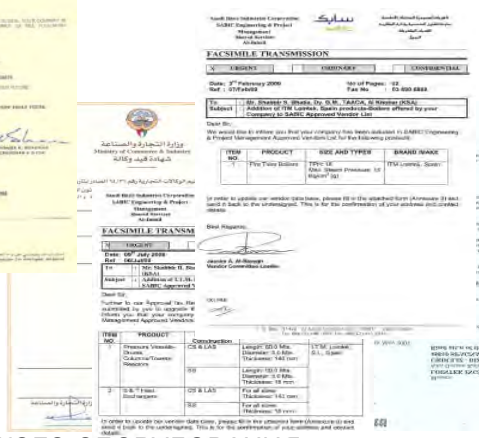
Quality Certifications



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DESIGN & ENGINEERING

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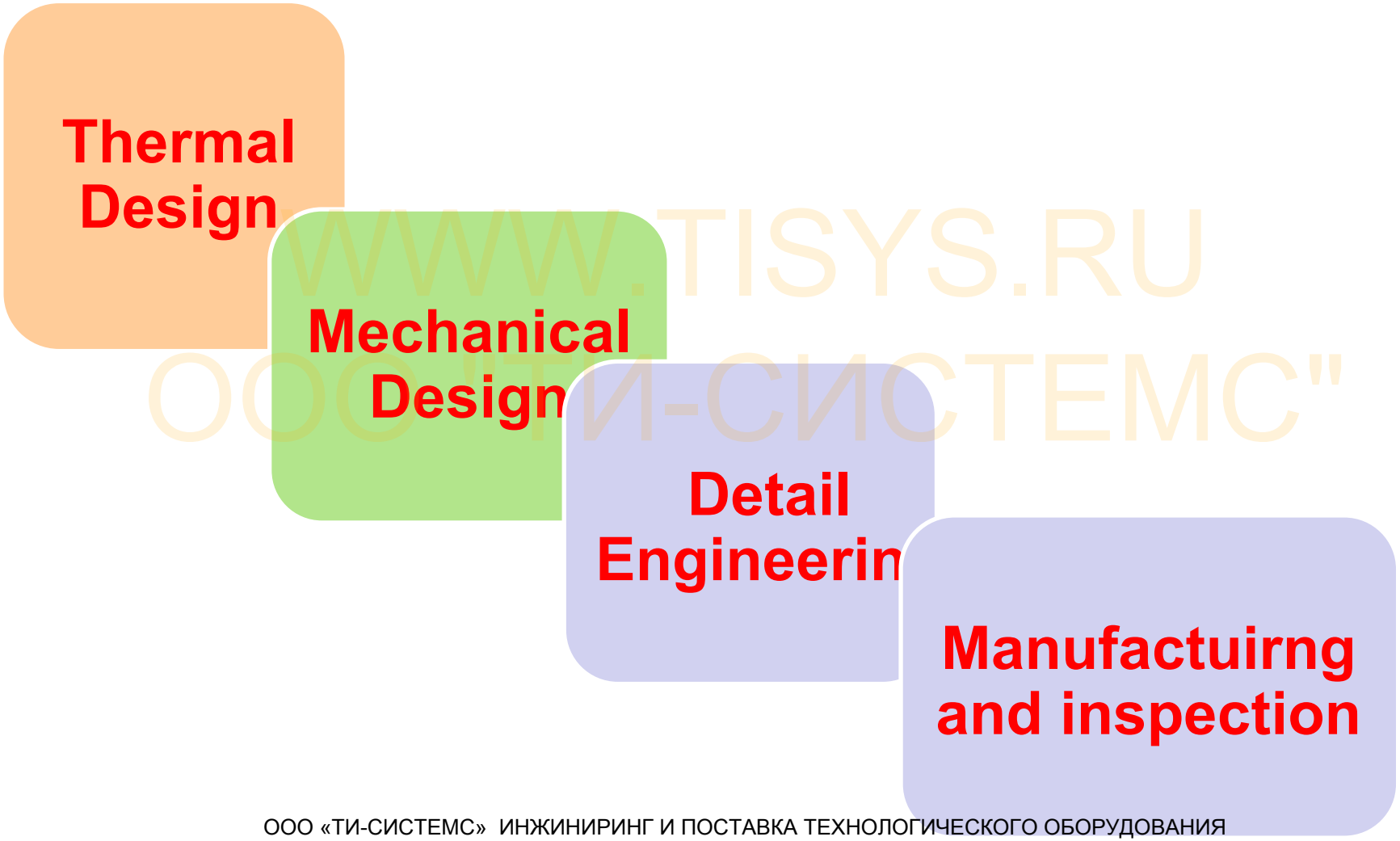
Engineering



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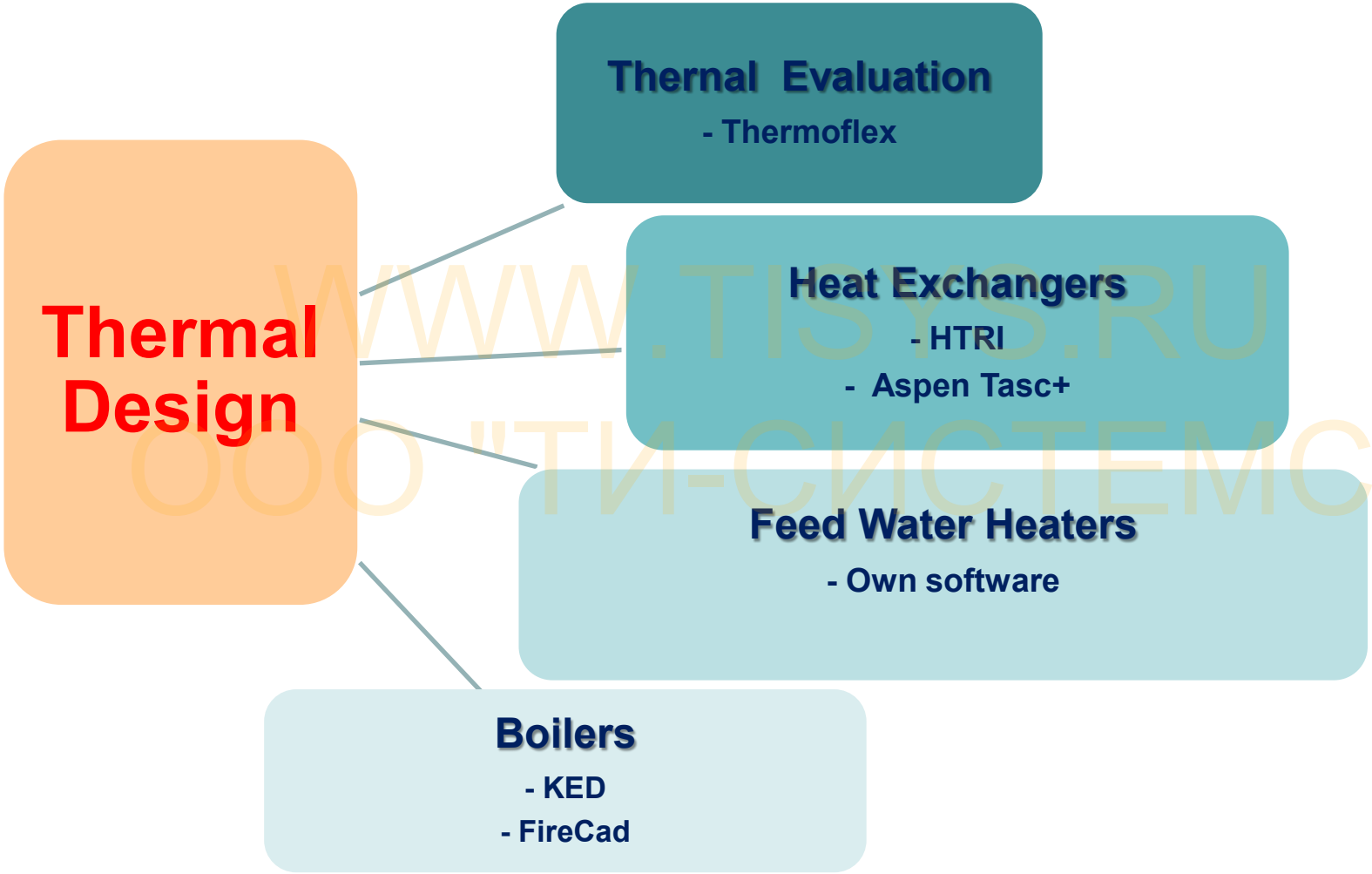
Engineering



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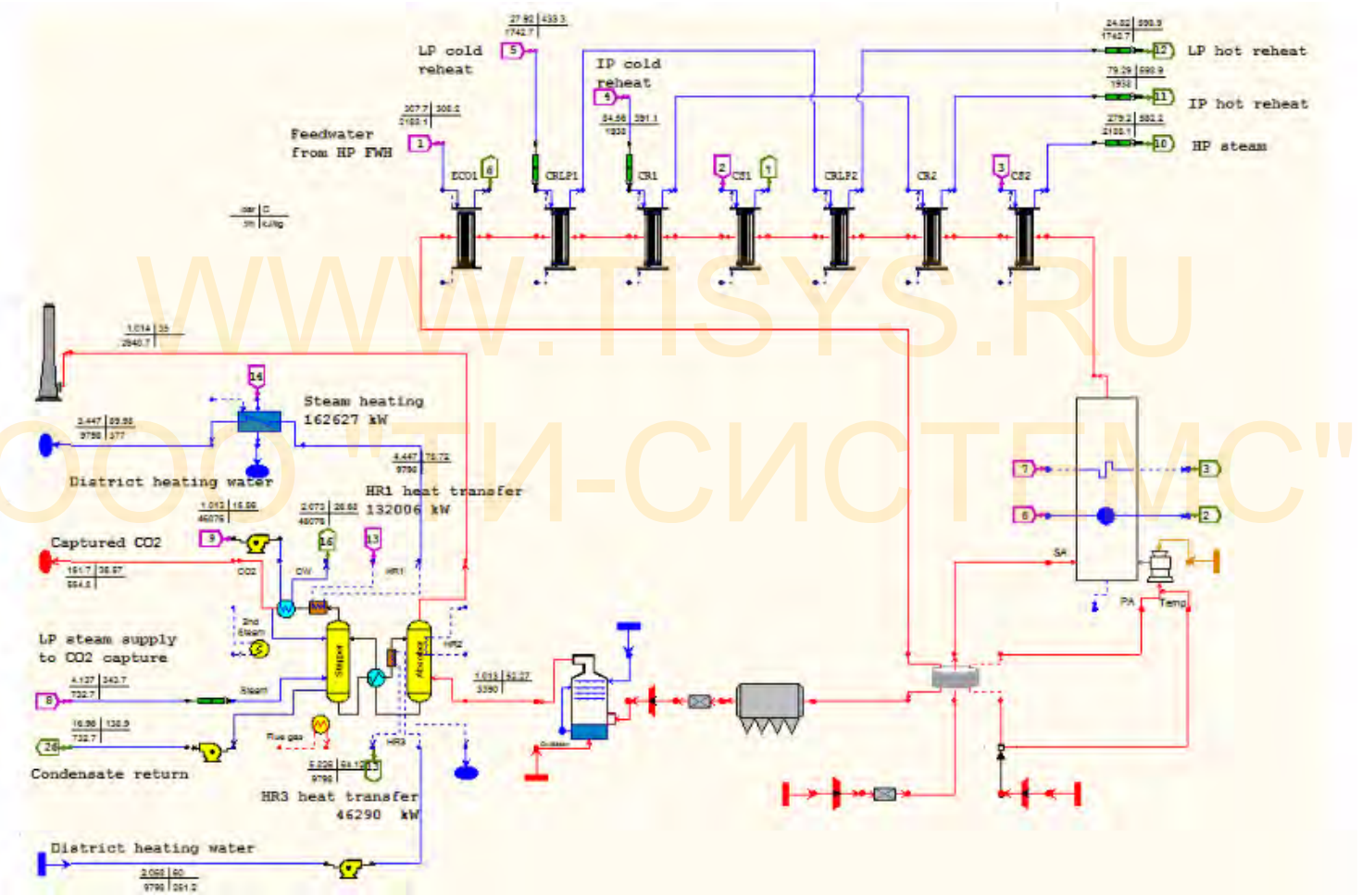
Thermal Evaluation Systems

- Thermoflex



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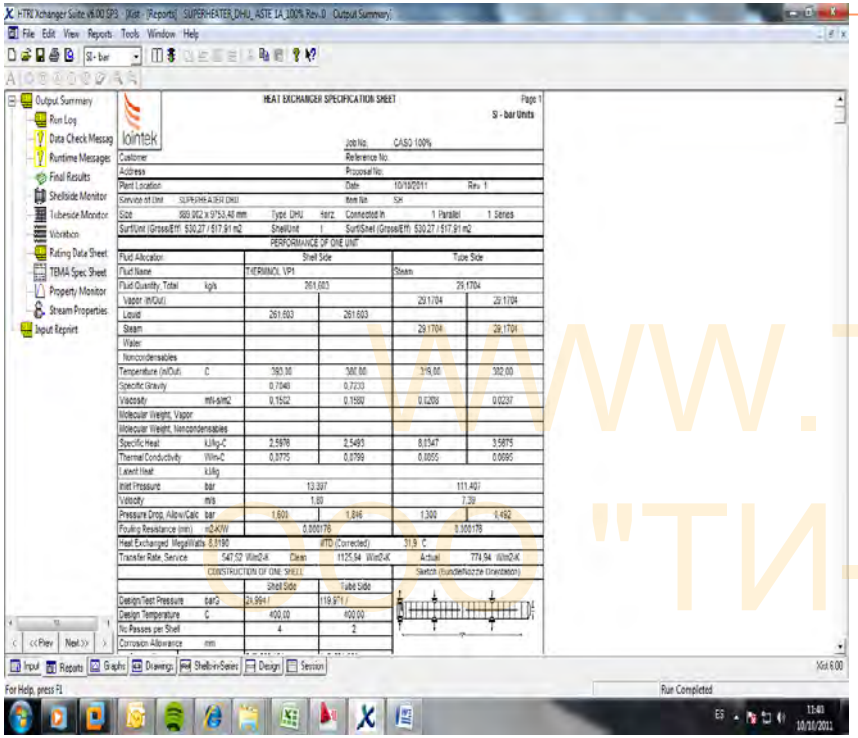
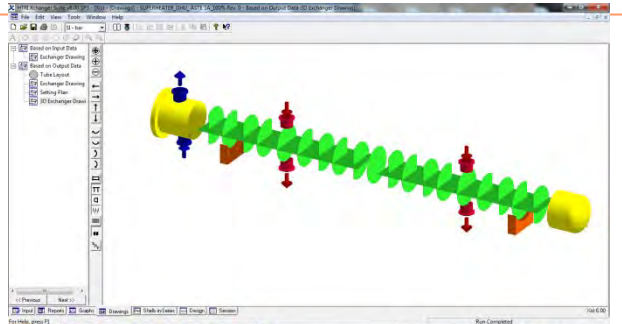
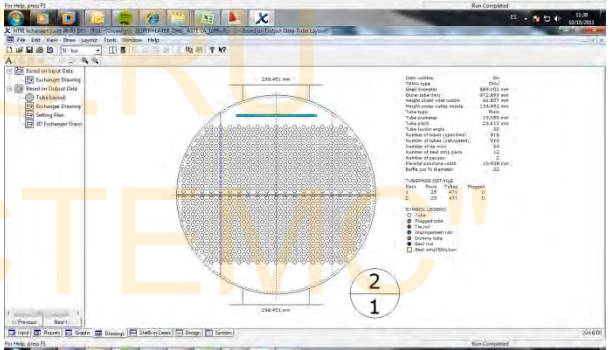
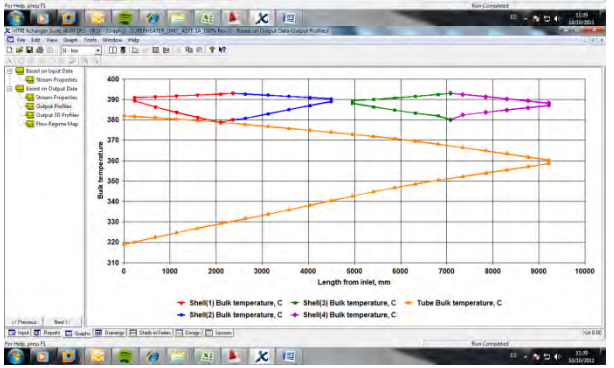
Heat Exchangers

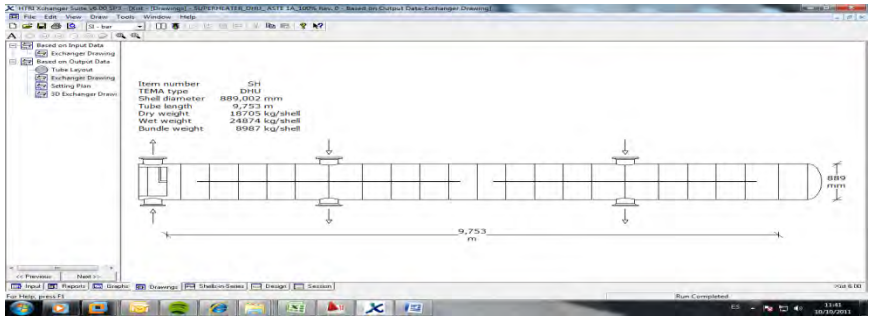
- HTRI
-TASC











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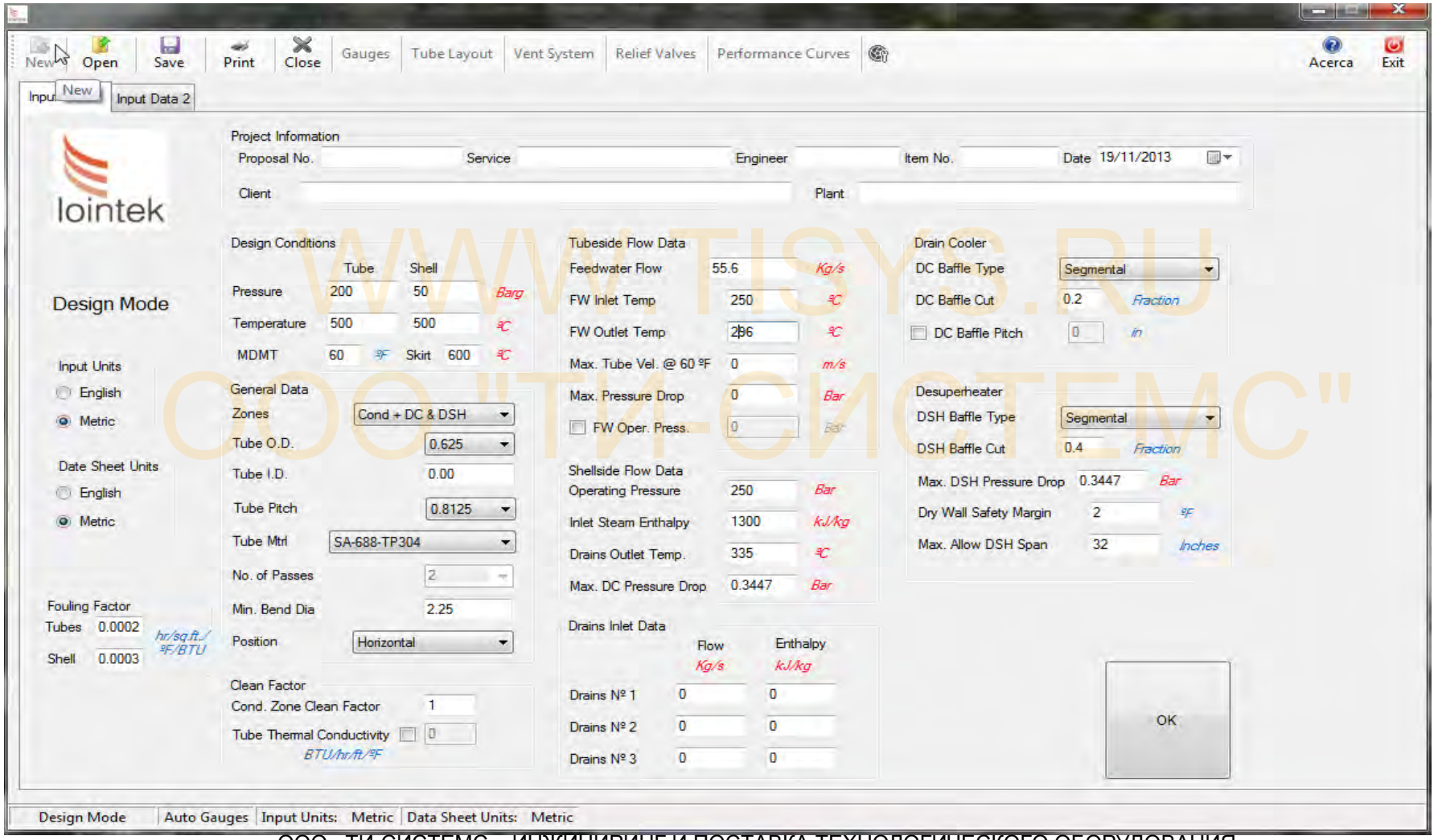
FWH – Water preheaters

- Own Software



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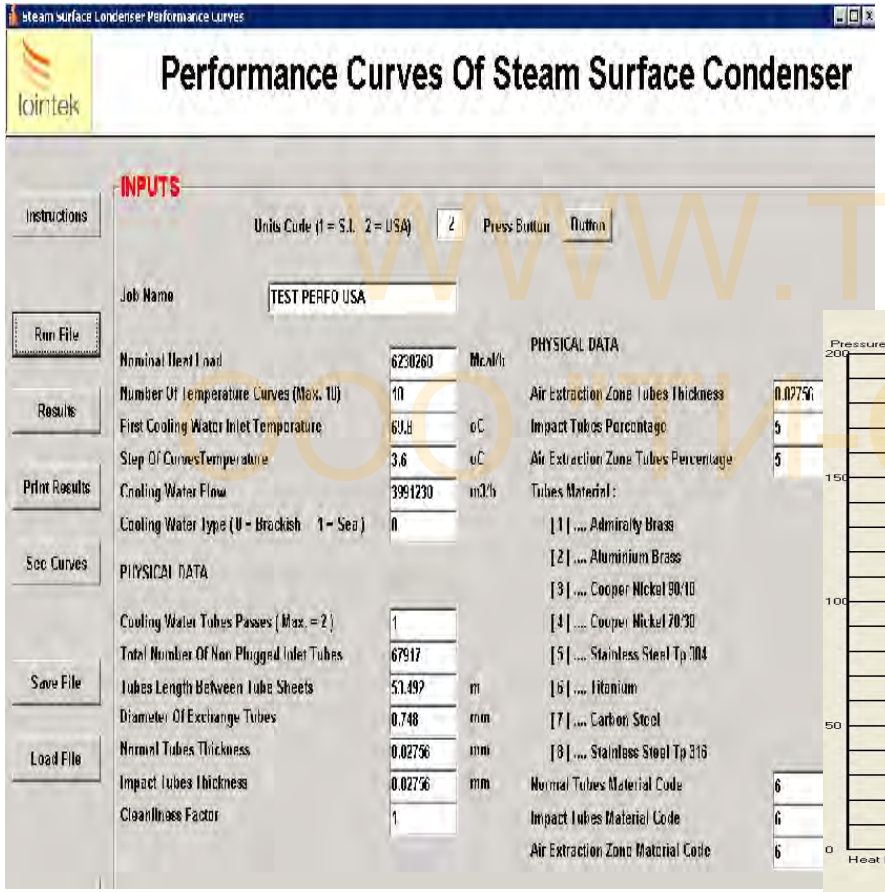
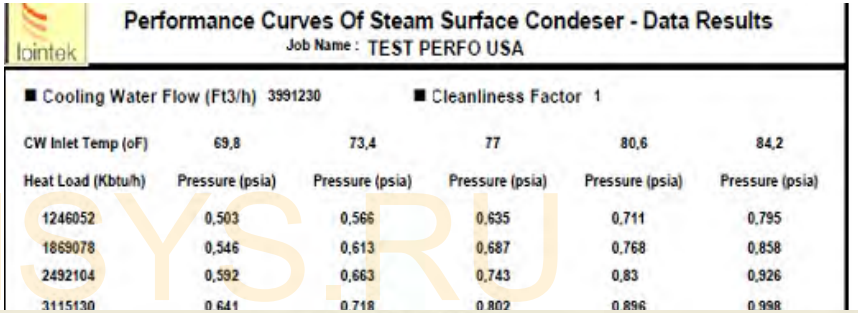
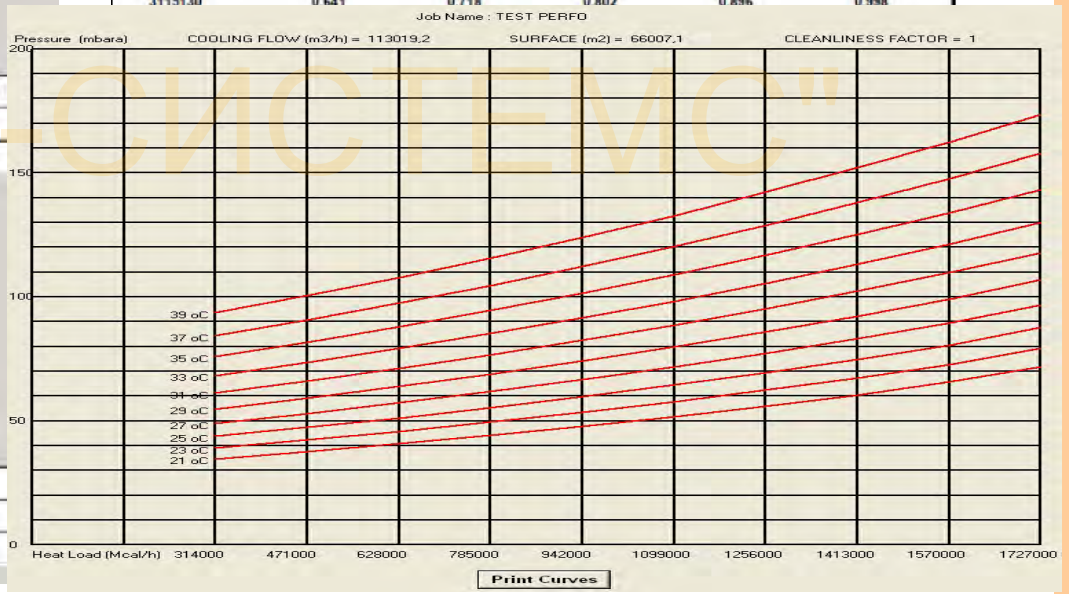
Condensers

- Own Software

Condensers design (Own Software)







Steam Surface Condenser Performance Curves

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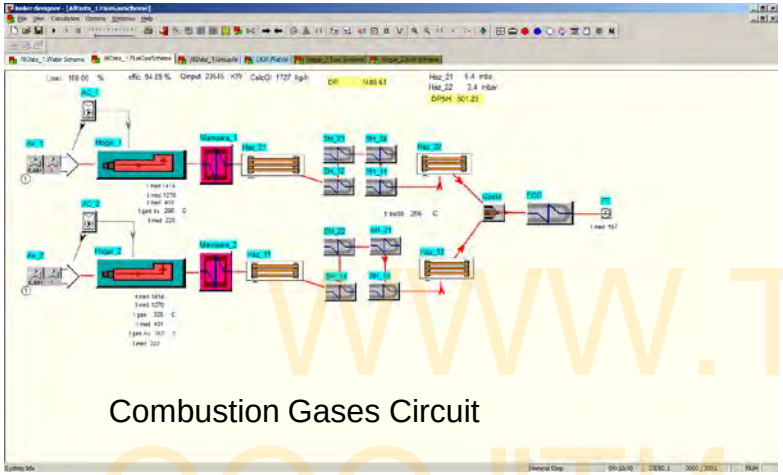
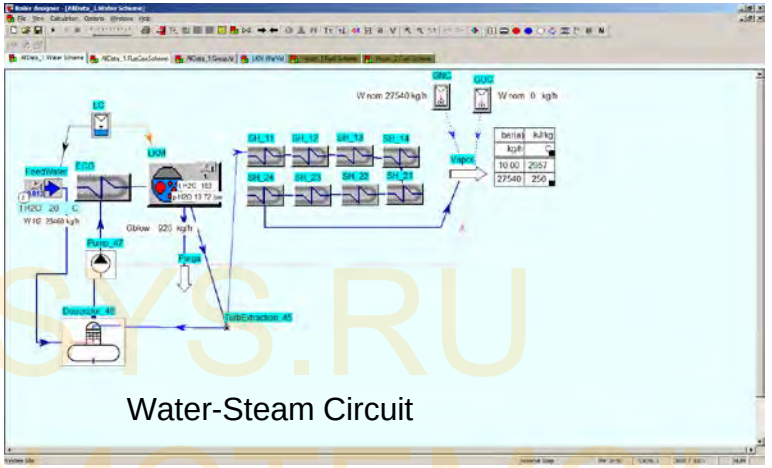
Boilers

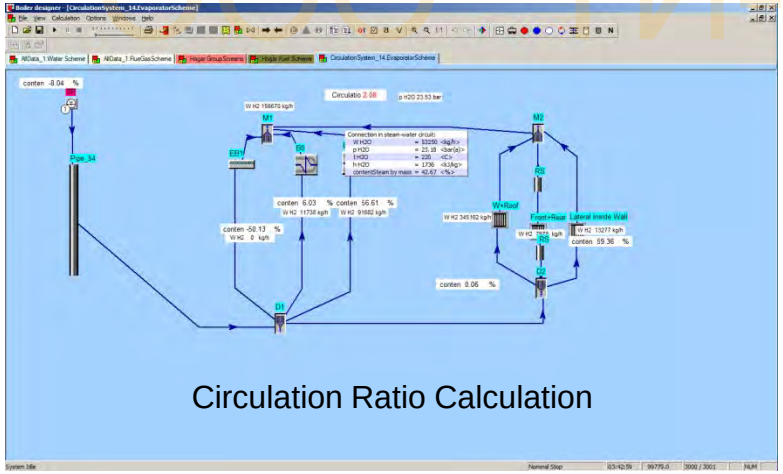
- KED Power Plant Simulator & Designer V11,3



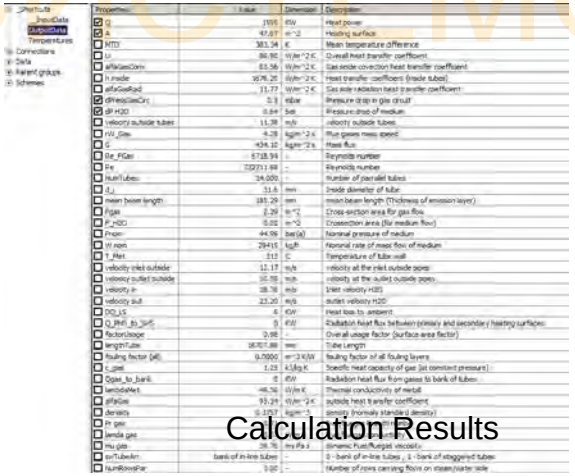
Combustion Gases Circuit



Water-Steam Circuit



Circulation Ratio Calculation



Calculation Results

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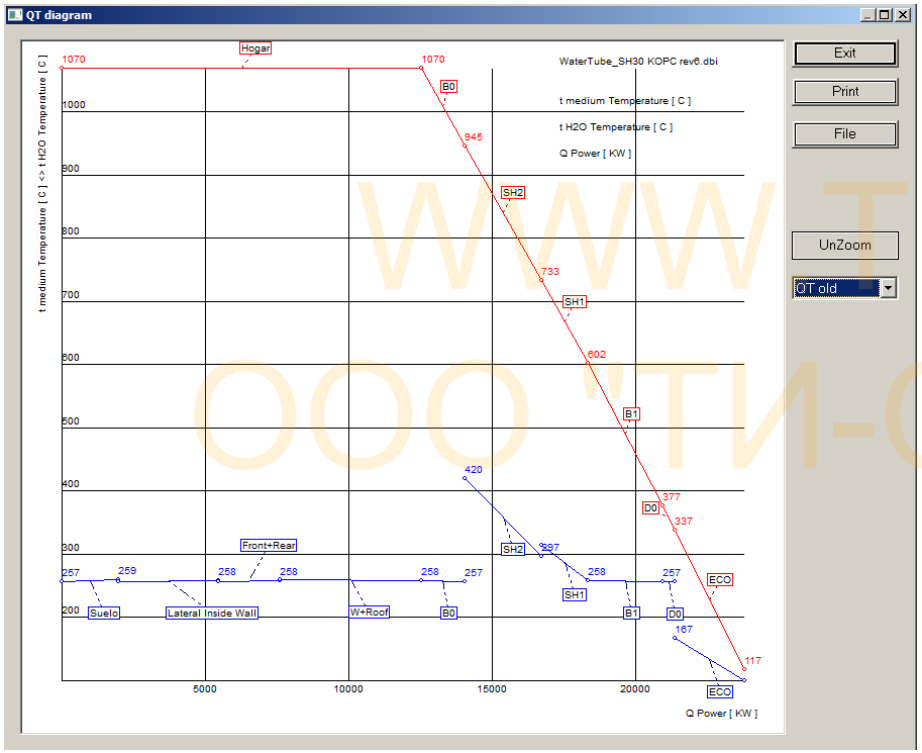
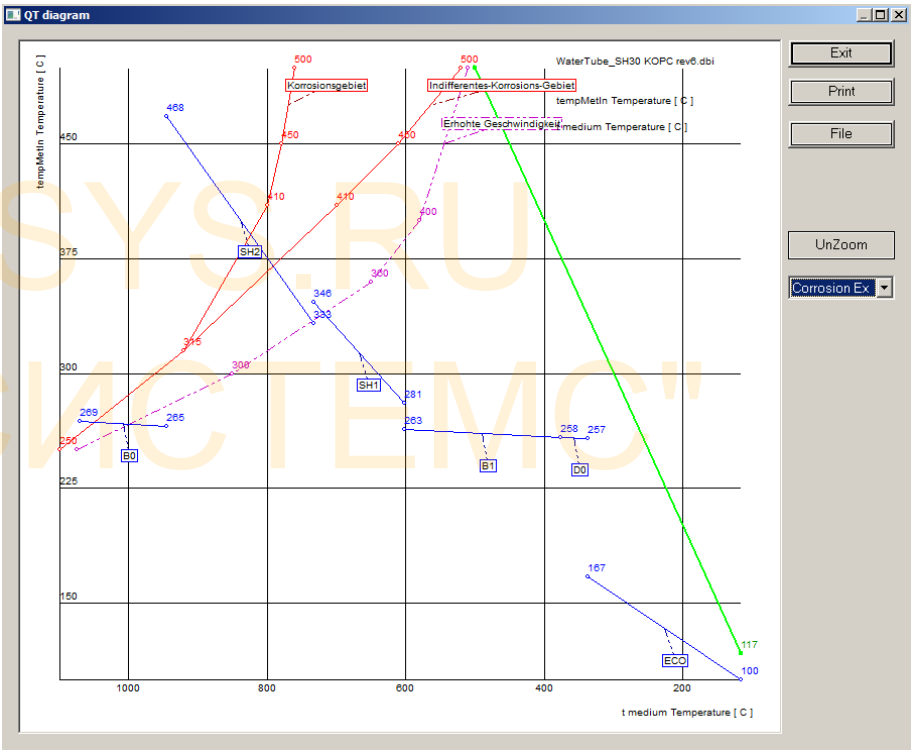
Boilers

- KED Power Plant Simulator & Designer V11,3





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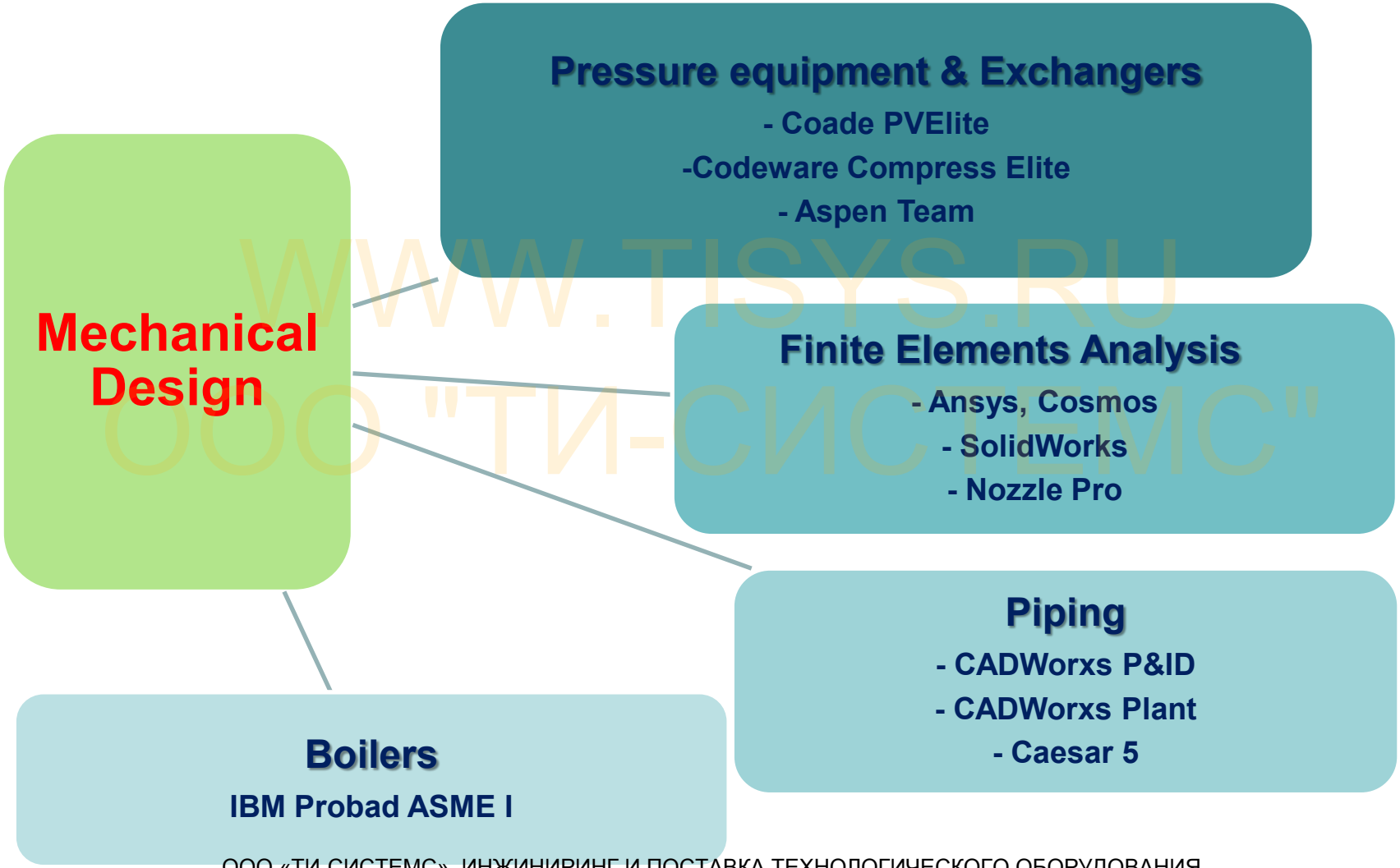
Engineering



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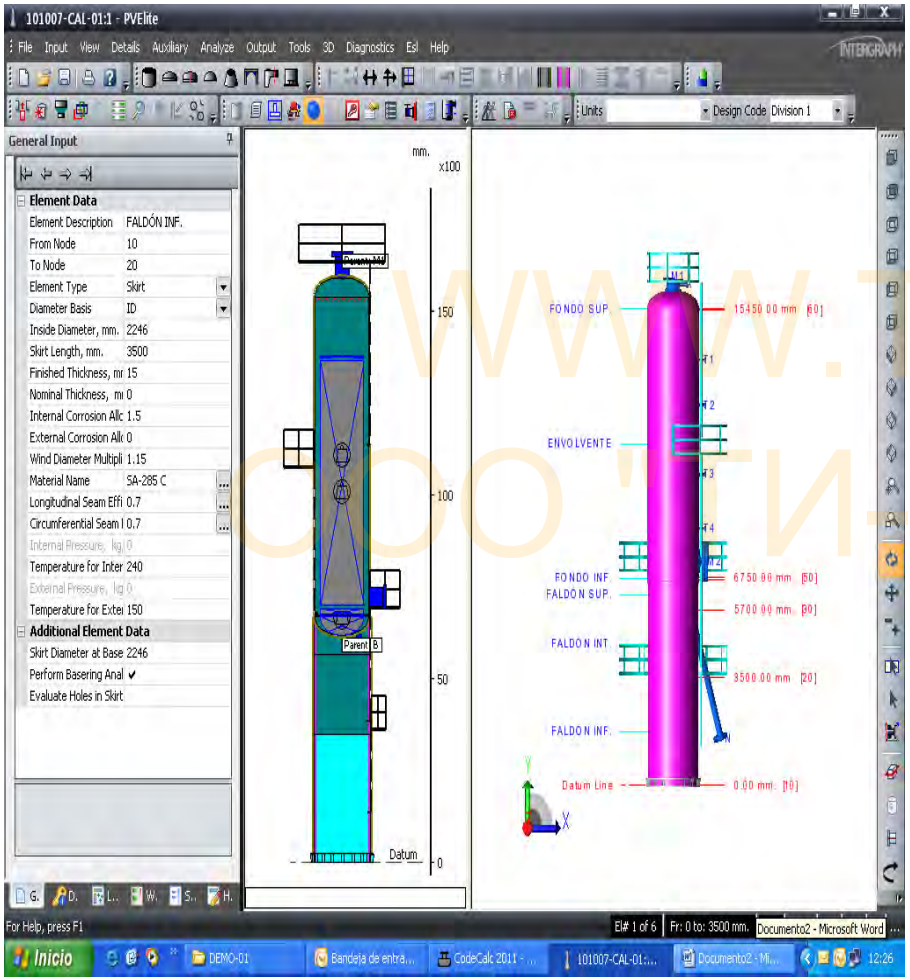
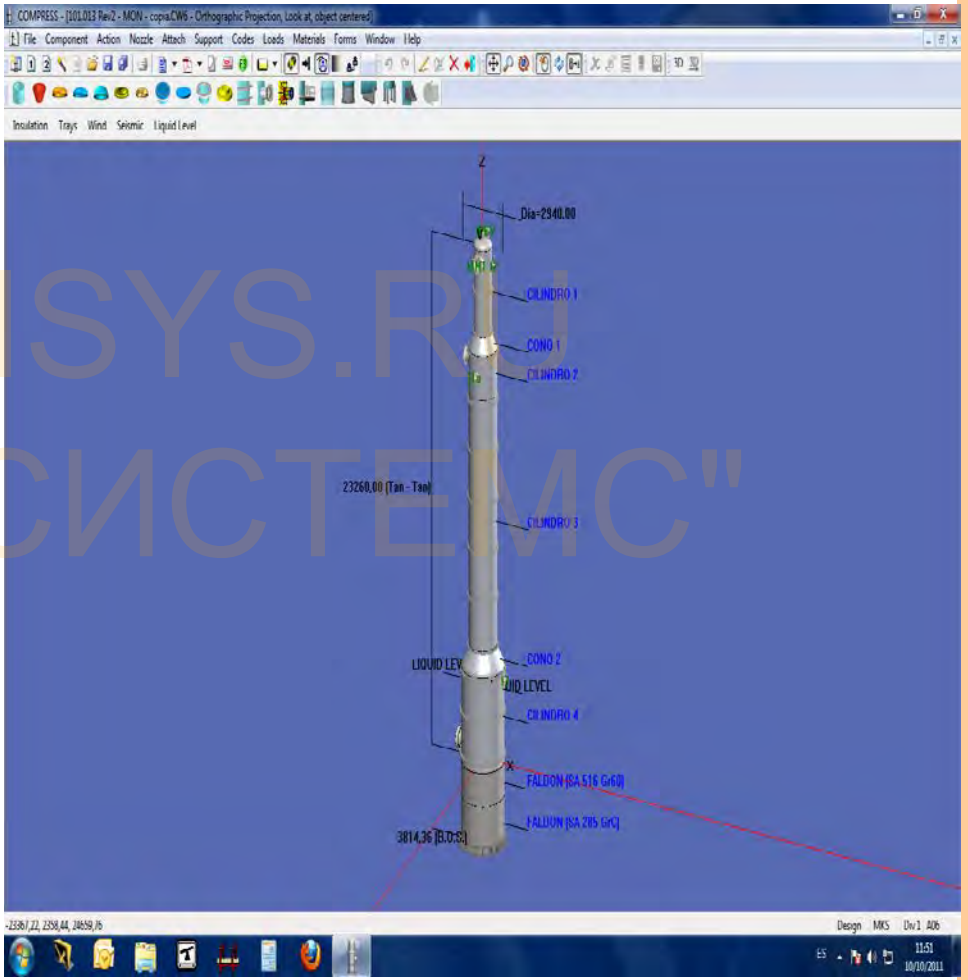
Pressure Equipment & Exchangers

- Coade PVElite



- Codeware Compress Elite



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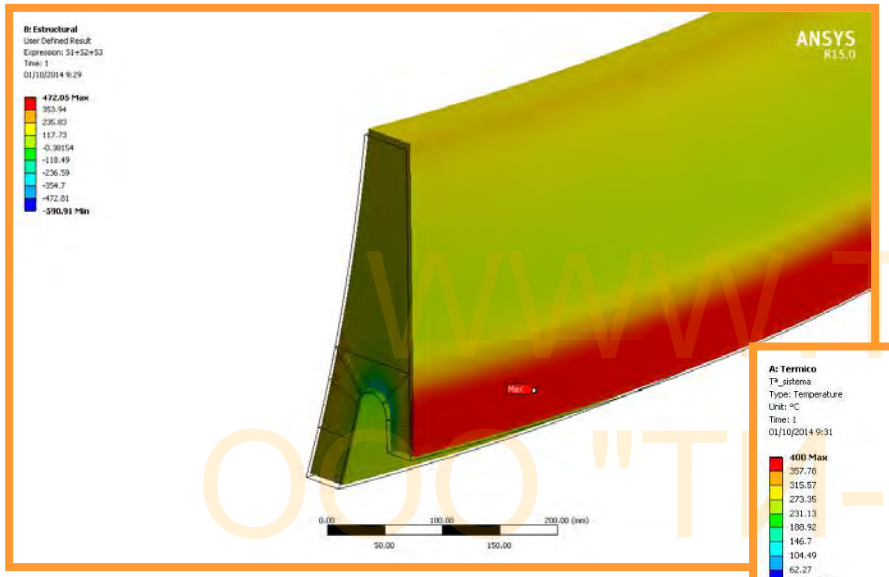
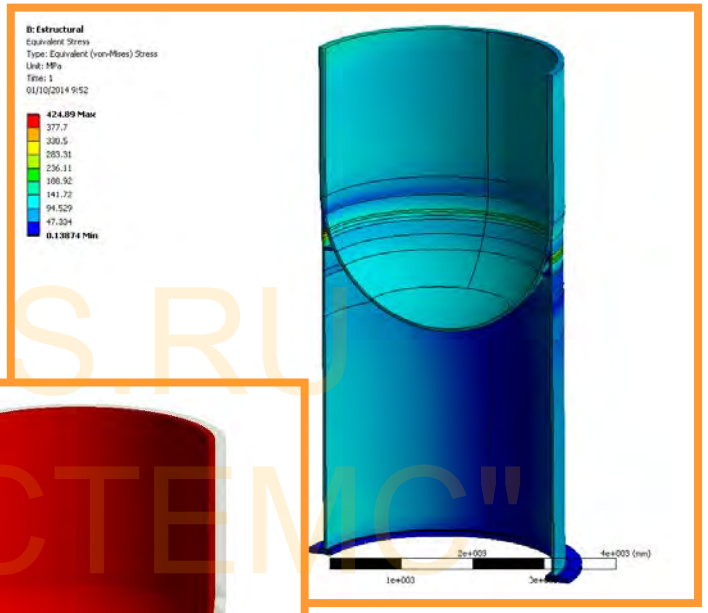
Finite Elements Analysis

- Ansys & Cosmos





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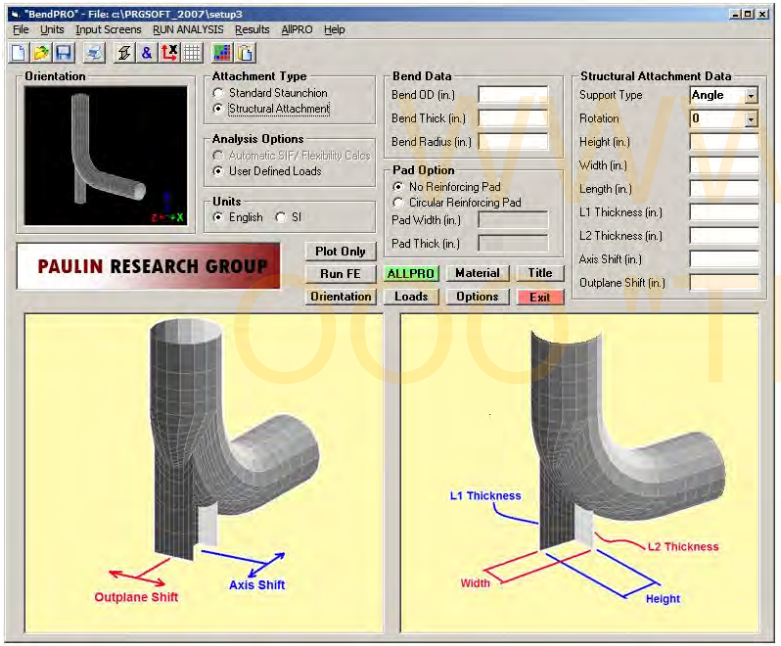
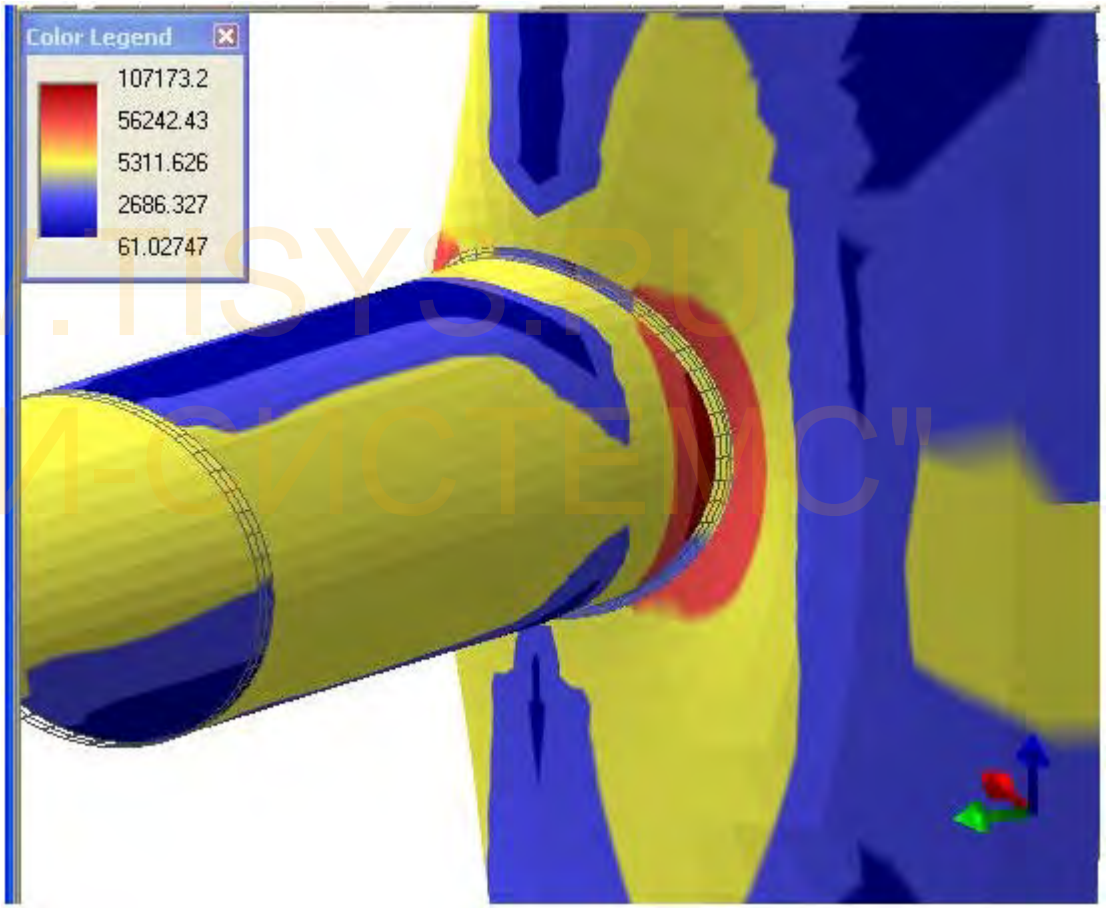
Finite Elements Analysis

- Nozzle Pro





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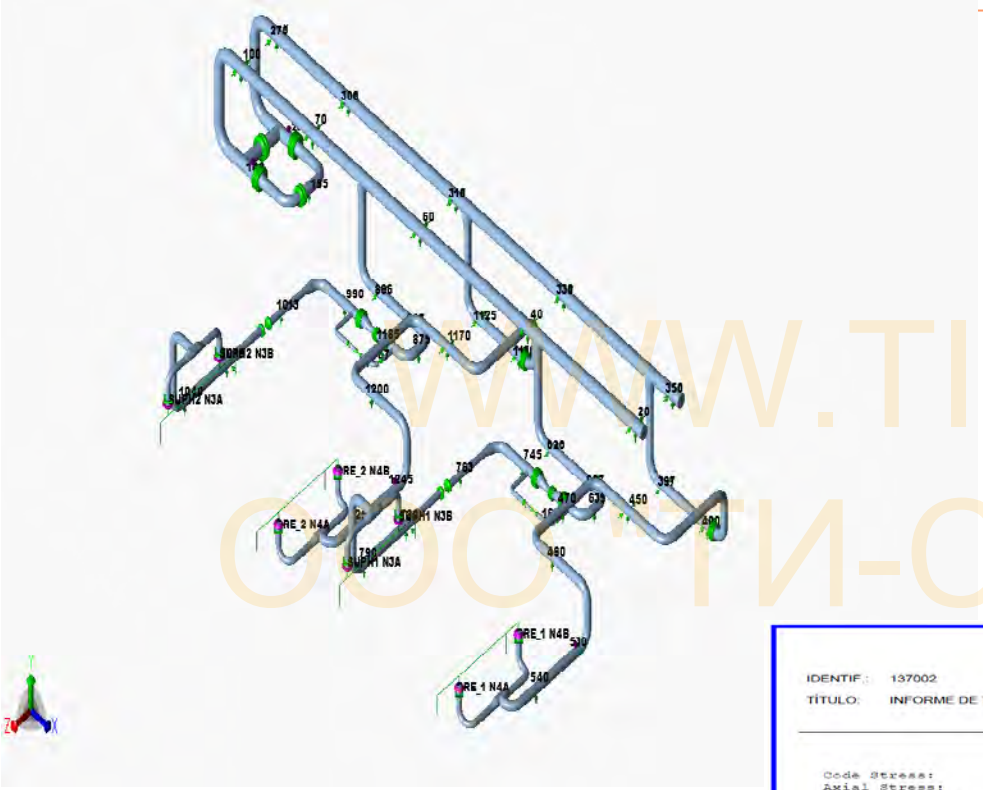
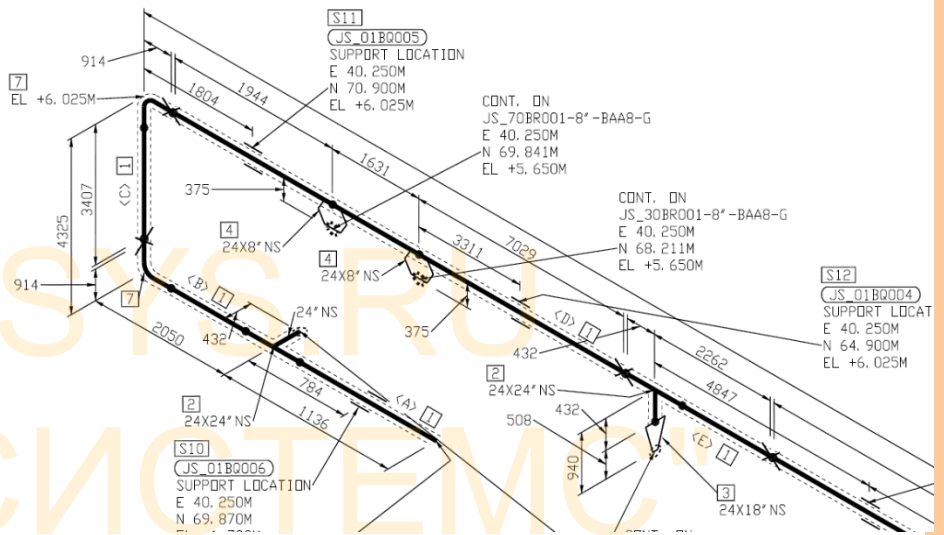
Piping

- Caesar 5





HOJA 35 de 429

IDENTIF.: 137002 FECHA: 08-04-11

TÍTULO: INFORME DE TENSIONES DE TUBERÍAS – CIRCUITO 1 REV.: 0

Code Stress:	147431.9	Allowable:	217955.2
Axial Stress:	2641.1	@Node	930
Bending Stress:	147371.8	@Node	415
Torsion Stress:	24595.3	@Node	417
Hoop Stress:	0.0	@Node	20
3D Max Intensity:	177124.3	@Node	415

CODE STRESS CHECK PASSED : LOADCASE 31 EXPANSION CASE MINIMUM TEMPERATURE

Highest Stresses: (KPa) LOADCASE 31 EXPANSION CASE MINIMUM TEMPERATURE

CodeStress Ratio (%):	11.3	@Node	385
Code Stress:	28533.6	Allowable:	251563.4
Axial Stress:	848.6	@Node	1015
Bending Stress:	28532.5	@Node	385
Torsion Stress:	1099.7	@Node	1220
Hoop Stress:	0.0	@Node	20
3D Max Intensity:	34072.3	@Node	385

CODE STRESS CHECK PASSED : LOADCASE 32 EXP NSION CASE DESIGN TO MINIMUM TEMPERATURE

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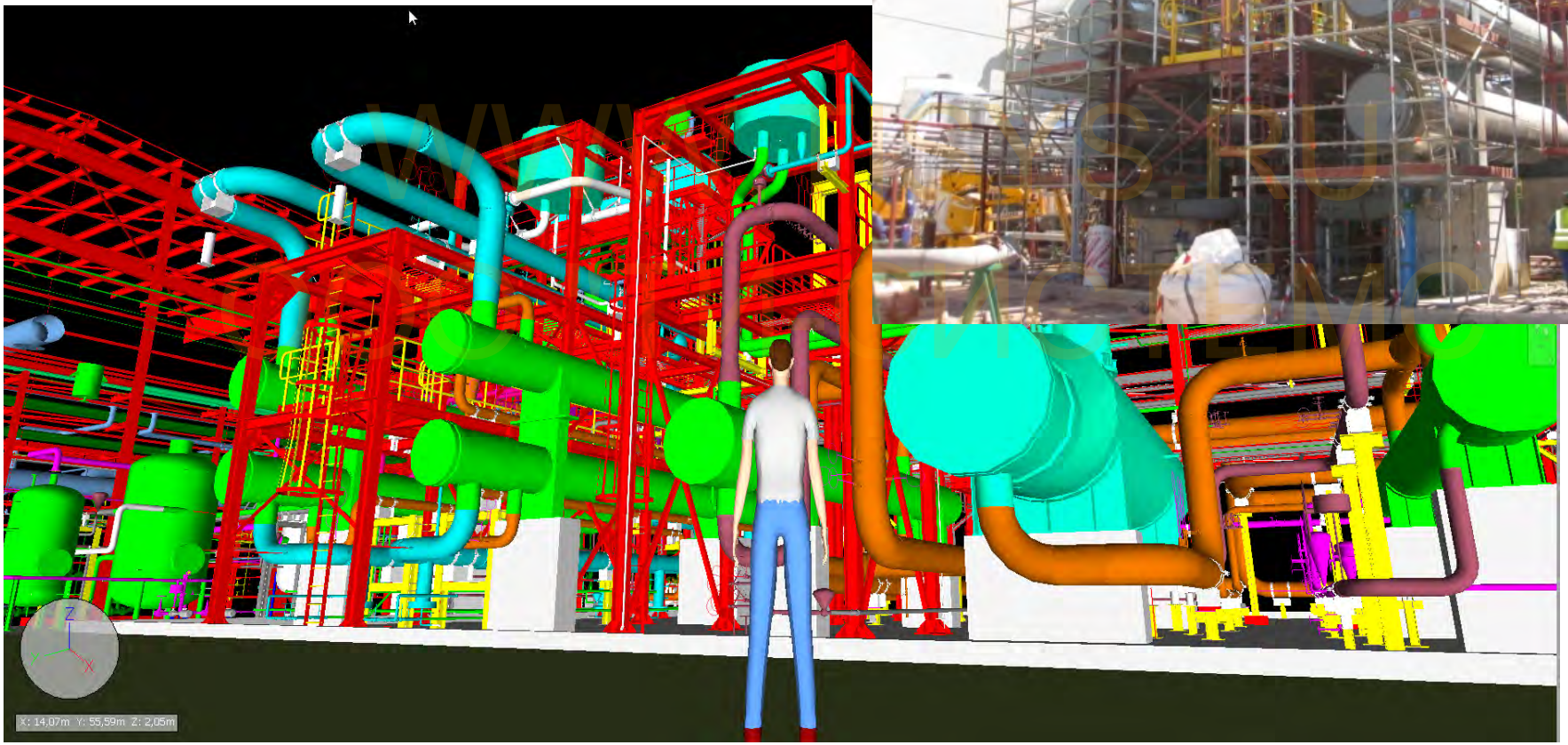
Piping

- CADWorks Plant



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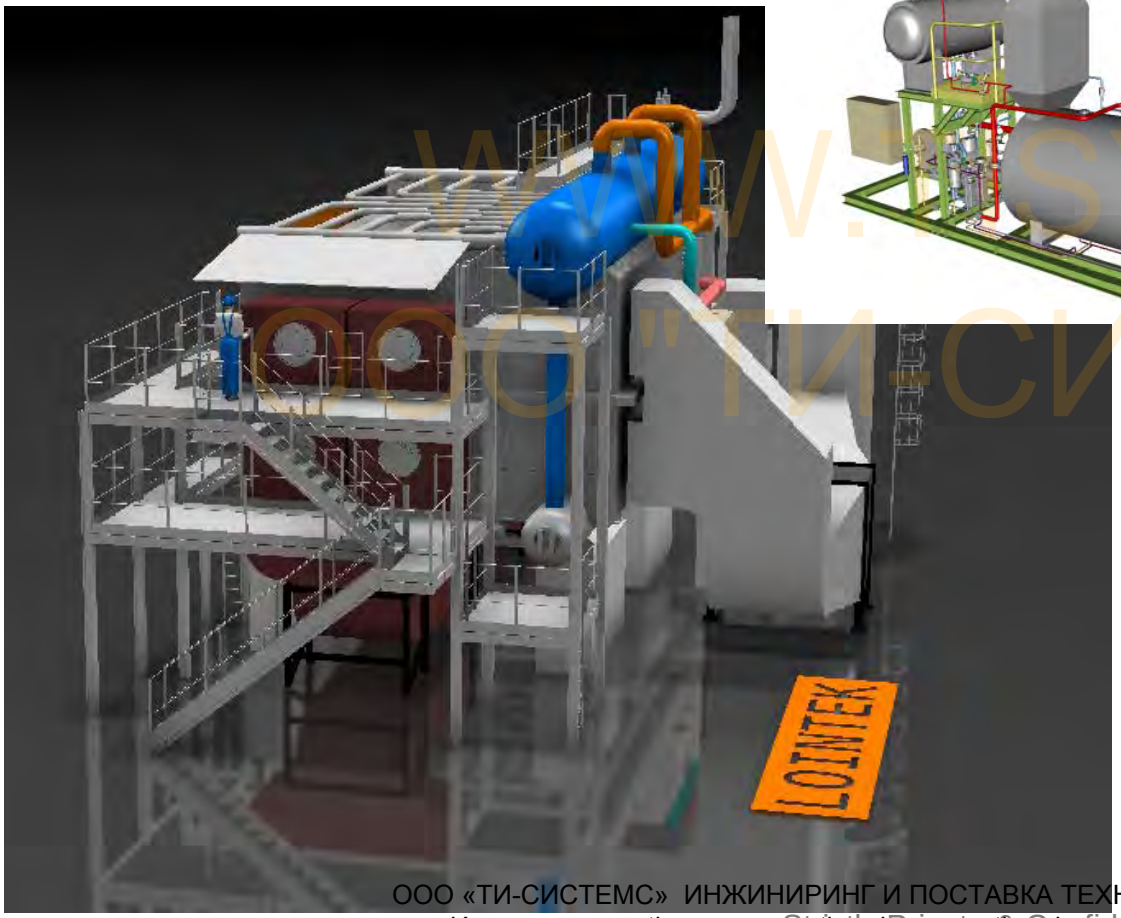
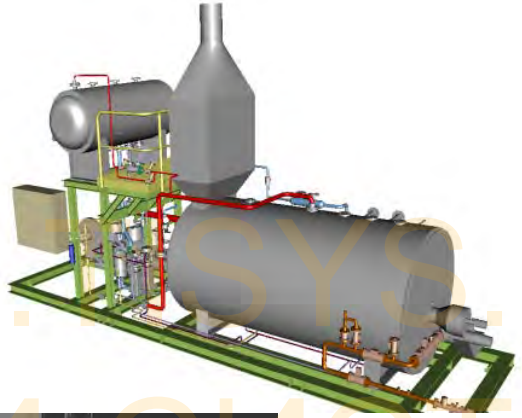
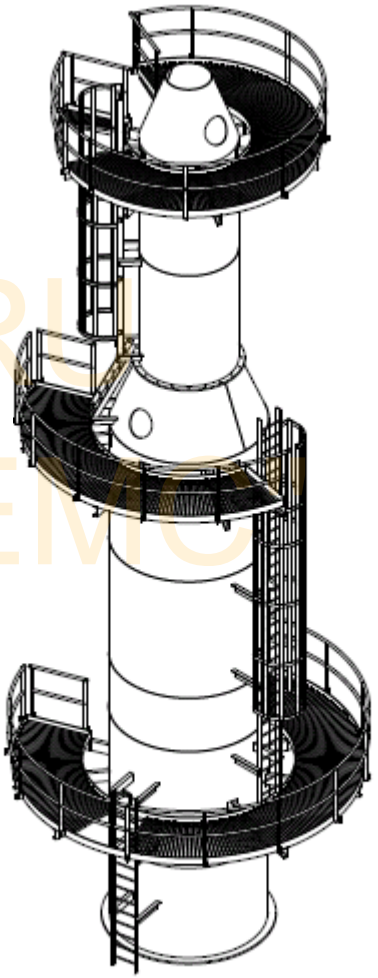
3D

- Catia y SolidWorks







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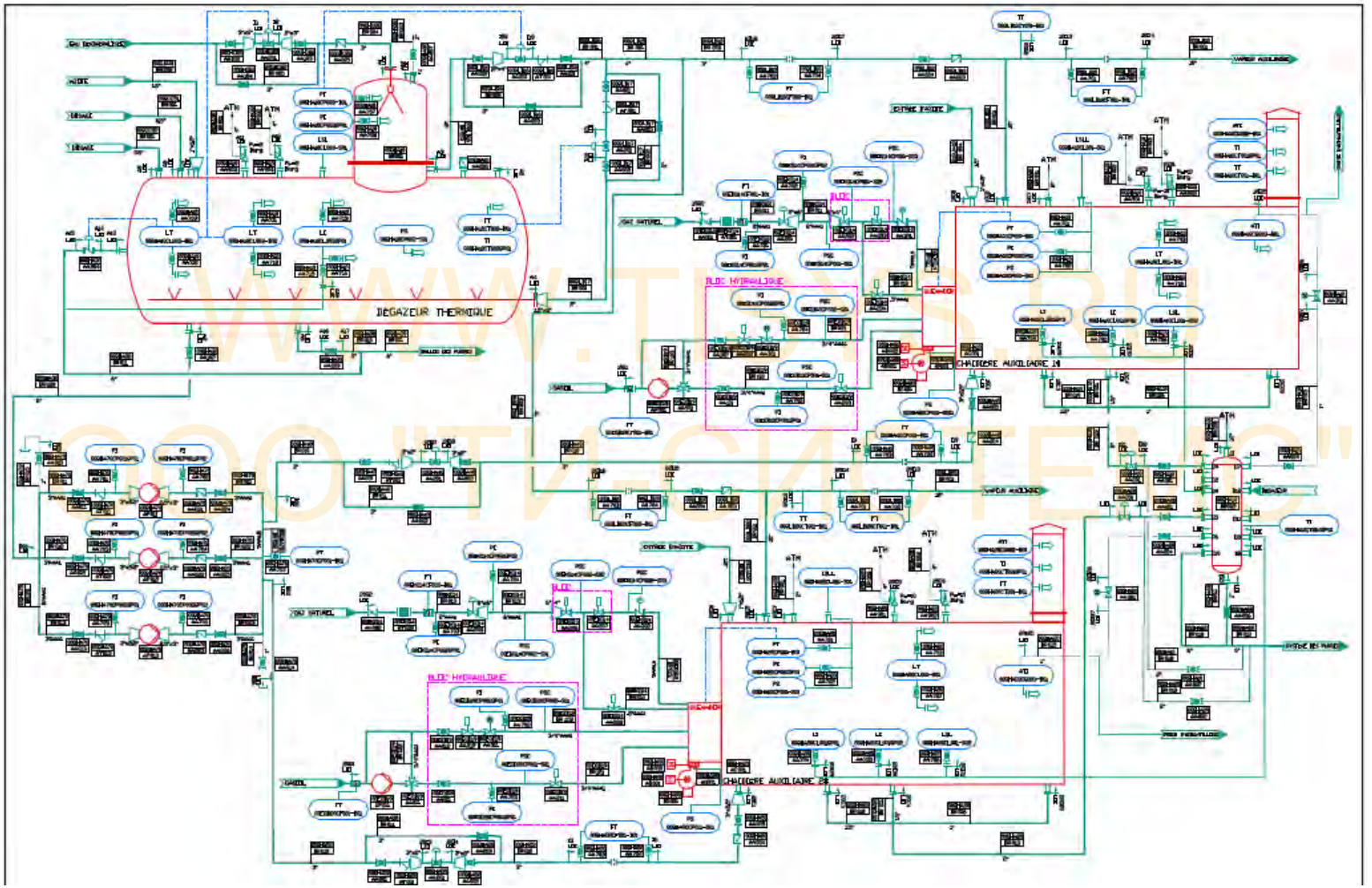
P&ID

- CADWorks P&ID



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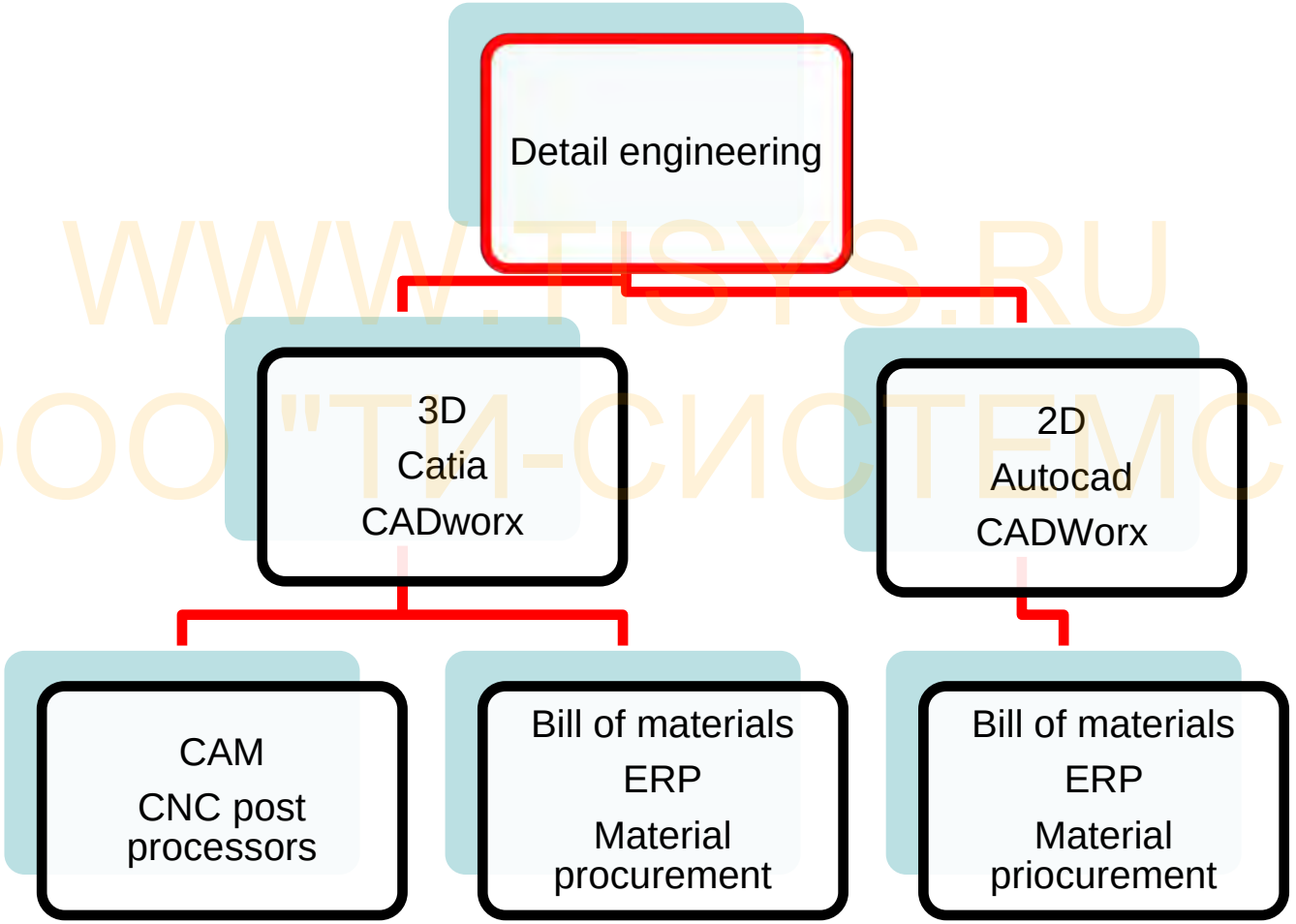
Engineering



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MANUFACTURING

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HEAT EXCHANGERS

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ООО "ТИ-СИСТЕМС"

Heat Exchangers

- Focused on design of **Tailor made equipment** to meet clients' need for a wide range of industries.

- Taking into account operating conditions, fluids and client requirements, Lointek design the best suited equipment and the **most efficient** solution.

- Most **advanced manufacture** technologies.

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Heat Exchangers

MATERIALS

Table example of some of the materials used in heat exchangers:

	Sheet	*Tube*	*Forge*
CARBON STEEL AND ALLOY			
Low Tª	SA516Gr70	SA-179	SA266Gr2
	SA516Gr70	SA-210-A1	SA350LF2
Media Tª	SA387Gr11Cl.2	SA-213T11	SA387F11Cl.2
High Tª	SA387Gr22Cl.2	SA-213T22	SA387F22Cl.3
STAINLESS STEEL			
	SA240tp304	SA213tp304	SA336tp304
	SA240tp316	SA213tp316	SA336tp316
	SA240tp321	SA213tp321	SA336tp321
	SA240tp347	SA213tp347	SA336tp347
TITANIUM			
	SA516Gr70+CladTi	B338Gr2	SA266Gr2+CladTi
SEA CURE®			
	SA387Gr22c.12+Clad Inconel	Inconel 825-B163/423	SA336F22+Clad Inconel

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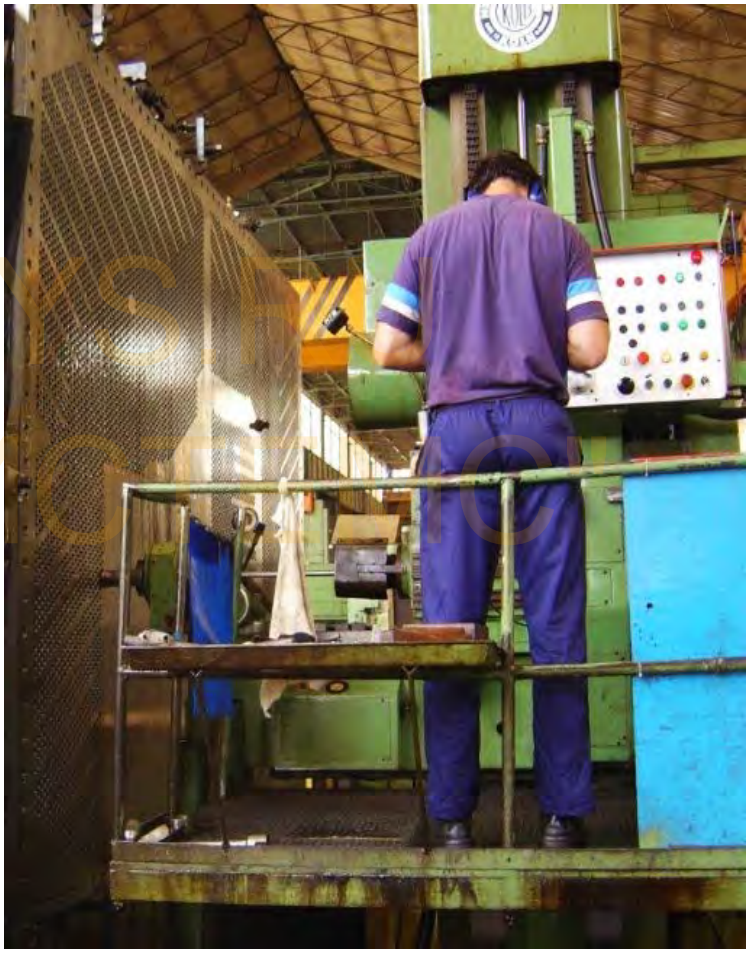
Heat Exchangers
Drilling and chamfering



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Heat Exchangers
Support Plates (Baffles) Machining

MACHINING OF SUPPORT PLATES (Baffles):

- **Plate Size: 4000x3000 mm**
- **Multi drill machine**

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Heat Exchangers
Tube-Tubesheet Automatic Welding

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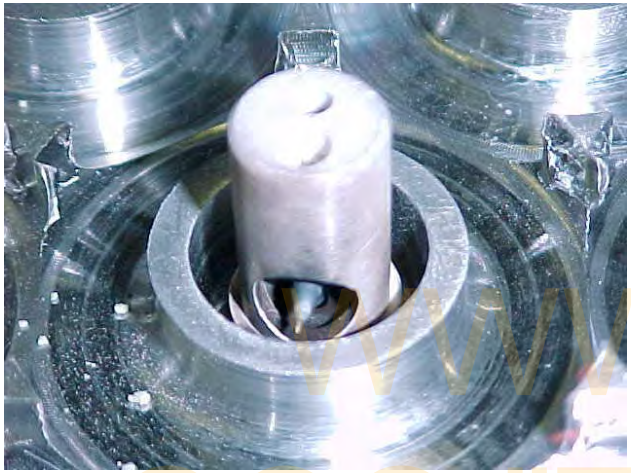
Heat Exchangers
Tube-Tubesheet Welding



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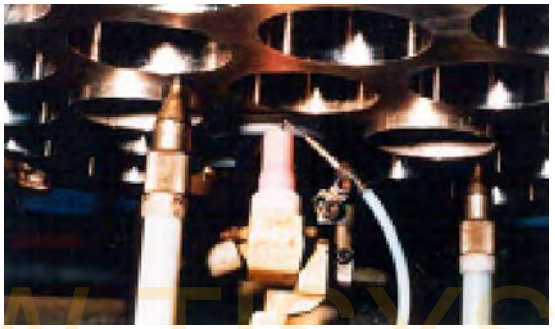
Heat Exchangers
Tube-Tubesheet Welding

WELDING 5F

TUBESHEET.: PLAQUEADO TITANIO

TUBES: TITANIO Gr2



WELDING 4F

TUBESHEET : SA 240 Tp304L

TUBES : SA 213 Tp304L

MOCK UP WELDING

TUBESHEET: SB 443

TUBES: SB 444

INTERNAL BORE WELDING

WELDING 2G

TUBESHEET : SA 387 F22

TUBES : SA 213 T22

WELDING 2G

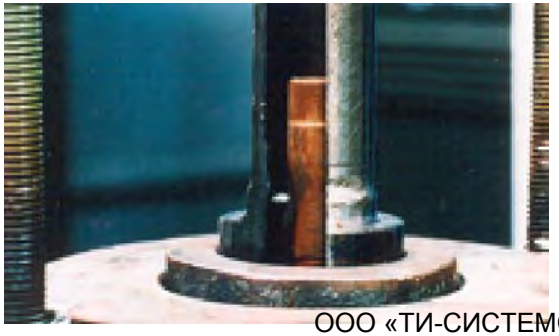
HEADER: TU 15CD 2.05

TUBES : TU 15CD 2.05

WELDING 2G

TUBESHEET : 1-2 S.S. Tp316L 3-4-5 TiGr2

TUBES : 1-2 S.S Tp316L 3-4-5 TiGr2



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Heat Exchangers

Lointek has a wide number of references on shell & tube heat exchangers

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Heat Exchangers

SPECIALIZED EQUIPMENT

Lointek has managed to optimize the exchangers basing on the experience of previous models, using as the most characteristic Kettle and Hairpin Type

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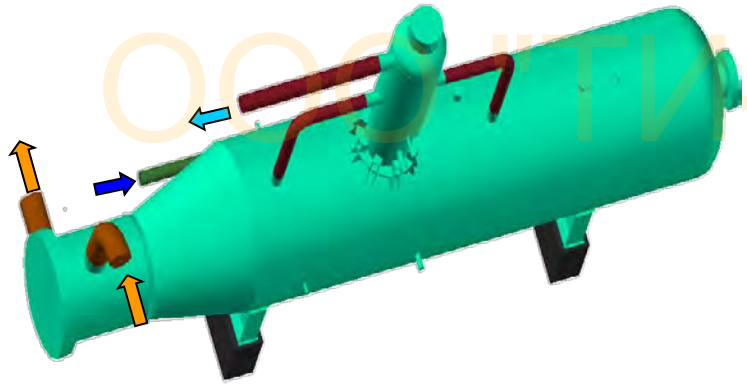
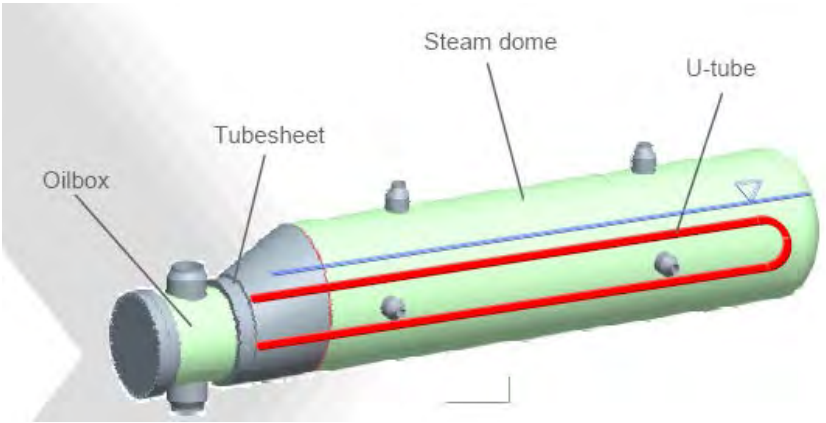
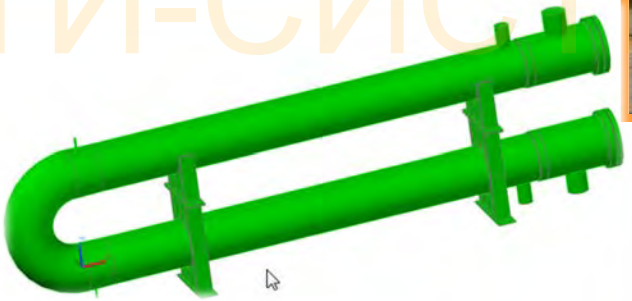




KETTLE BOILER

Design optimized for steam generation using only one equipment; lower costs

Heat Exchangers



HAIRPIN

This model developed by Lointek for SGS allows greater flexibility and increased performance

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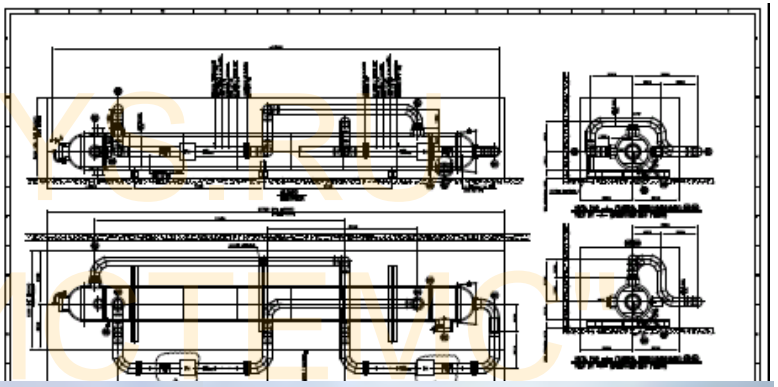
Heat Exchangers

POSTWELD HEAT TREATMENT UNDER INERT ATMOSPHERE



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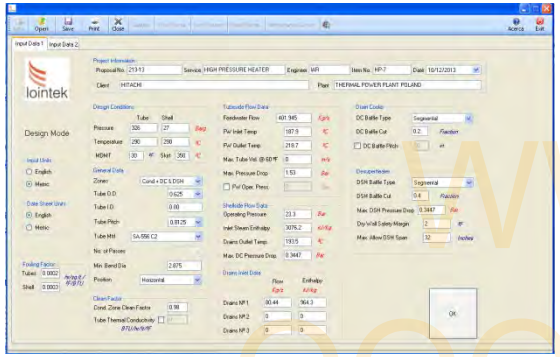
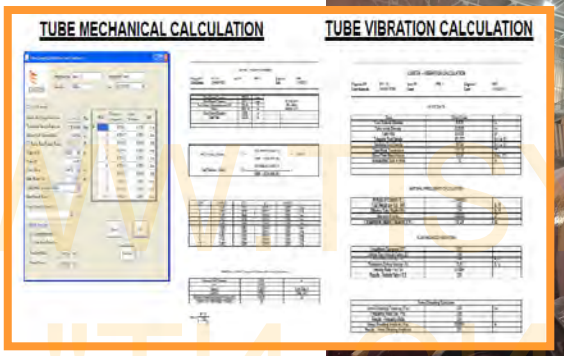
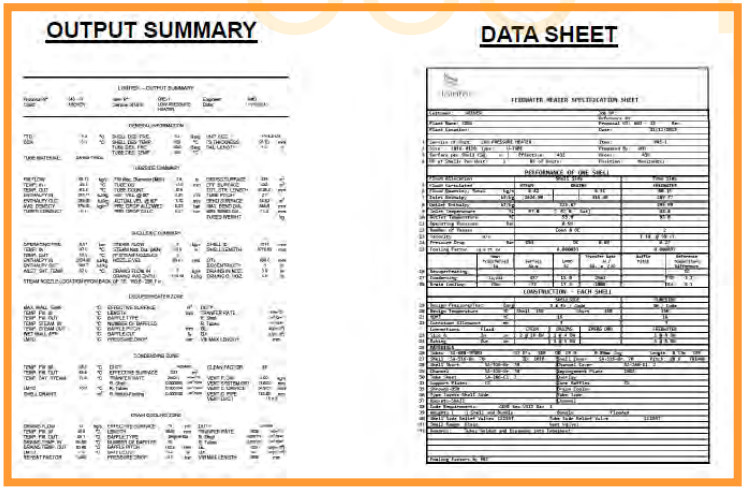
Feedwater Heater

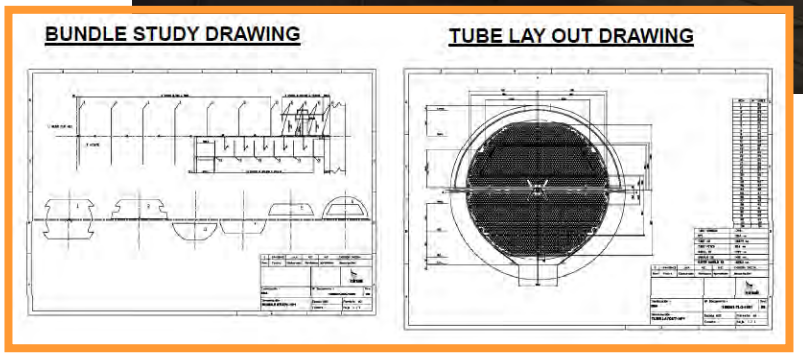
Own design software

"LOINTEK FWH DESIGN PROGRAM"









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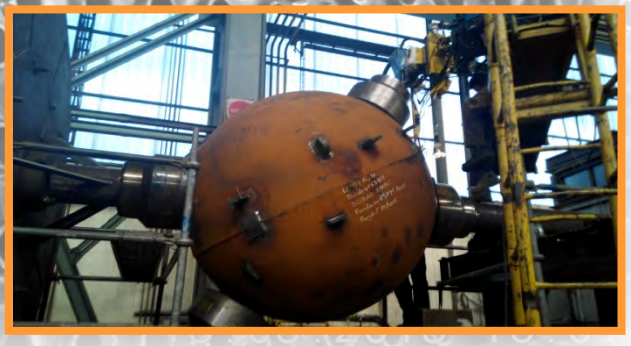
Feedwater Heater



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Heat Exchangers & Feedwater Heater

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Heat Exchangers & Feedwater Heater

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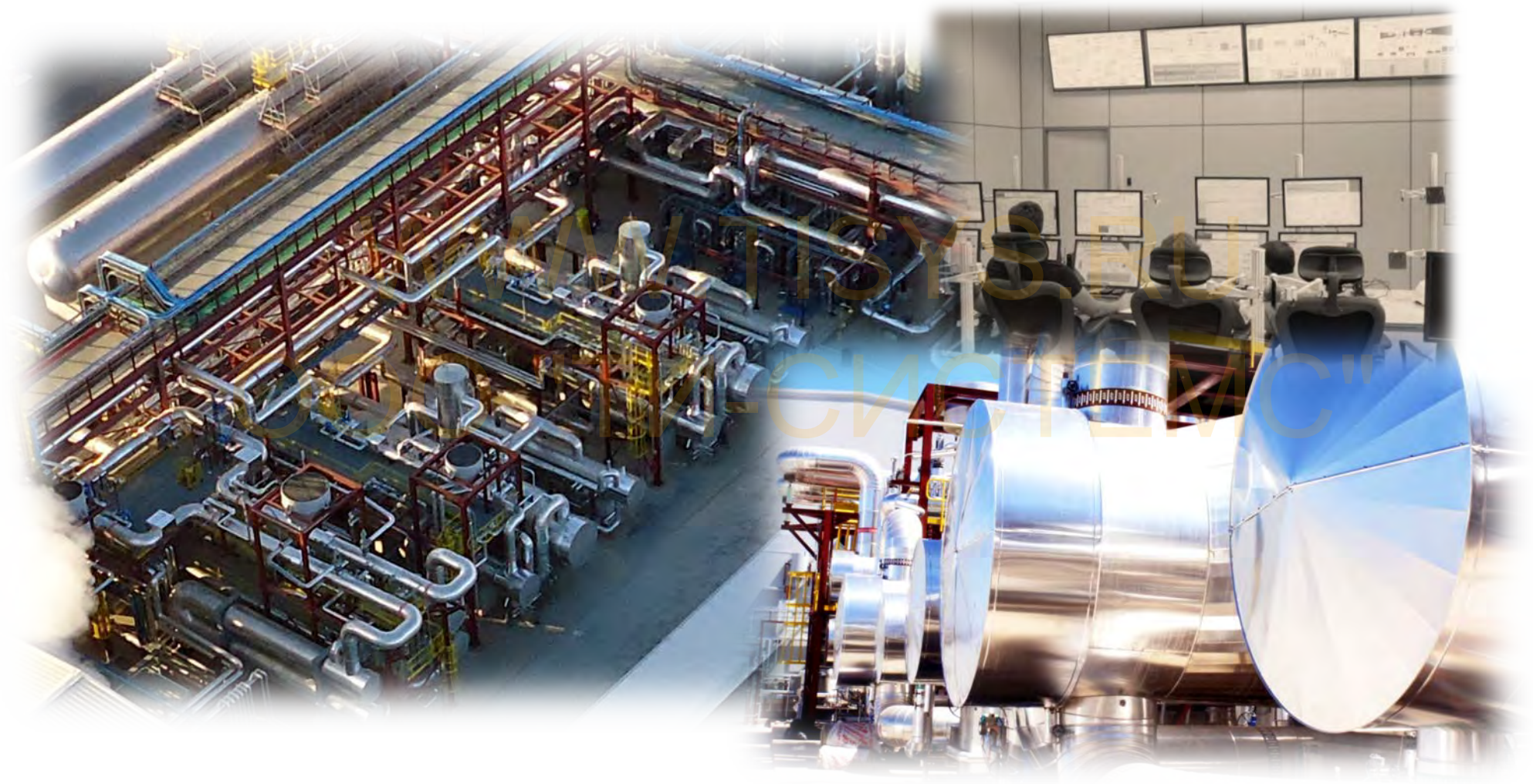
Private & Confidential

Heat Exchangers & Feedwater Heater



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ТИ-СИСТЕМС

REACTORS & PRESSURE VESSELS

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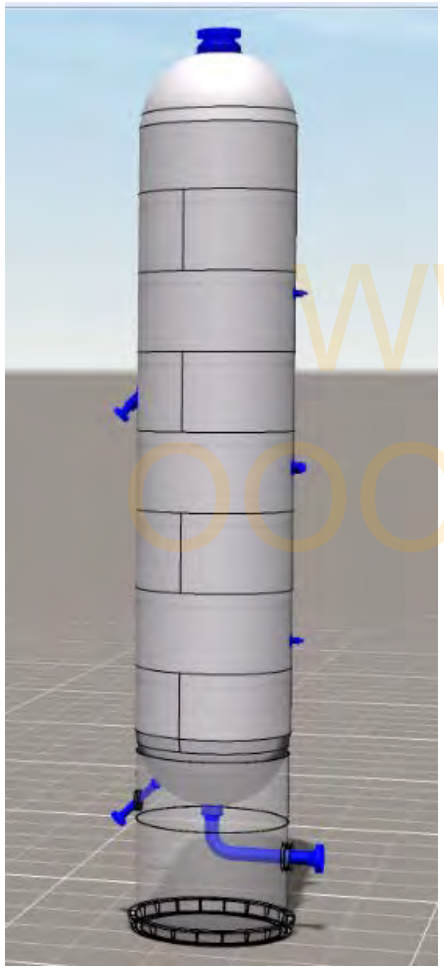
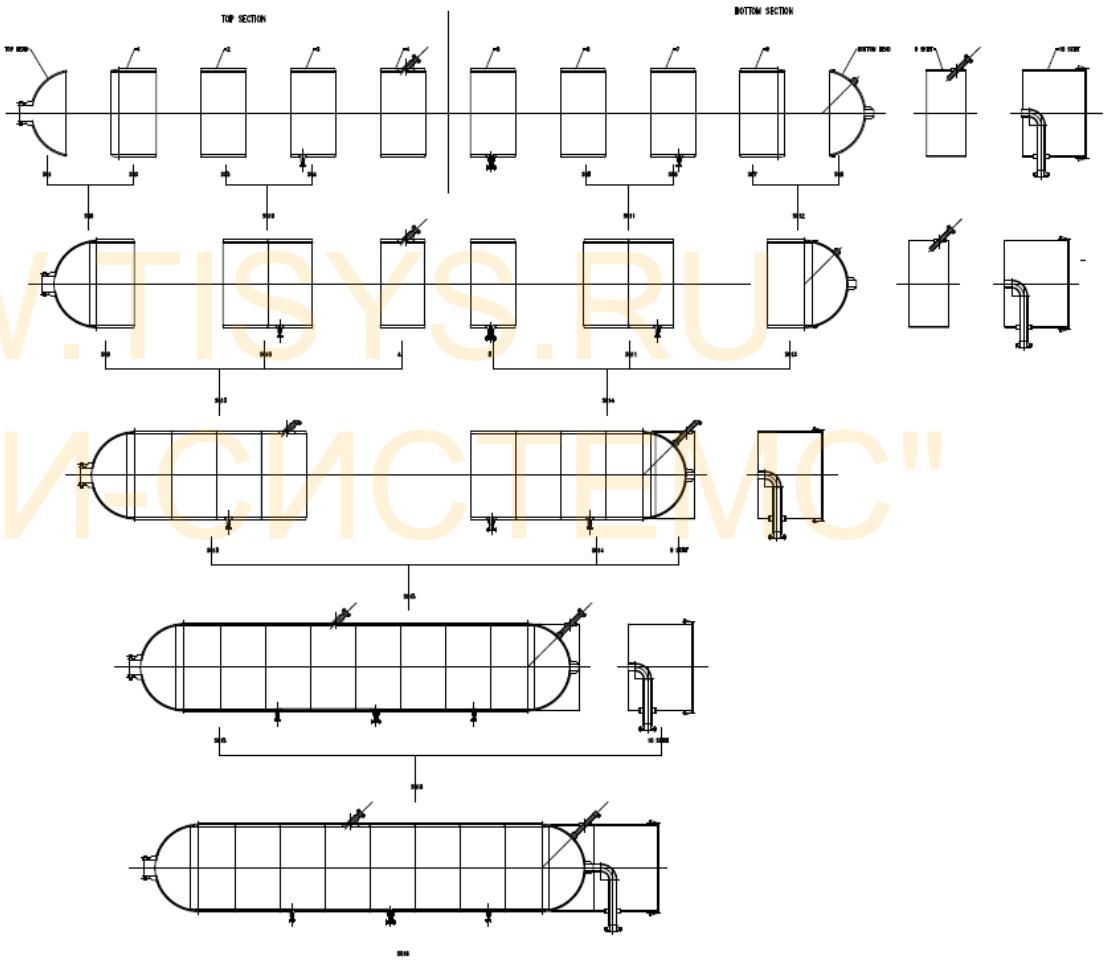
ООО "ТИ-СИСТЕМС"

Typical Manufacturing sequence for reactors





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Body Shells Manufacturing
Bending

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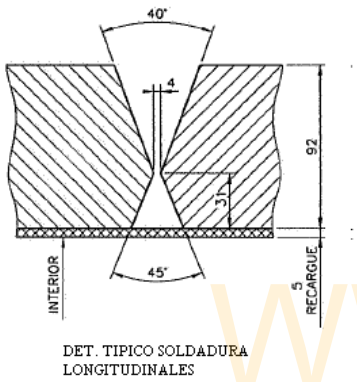
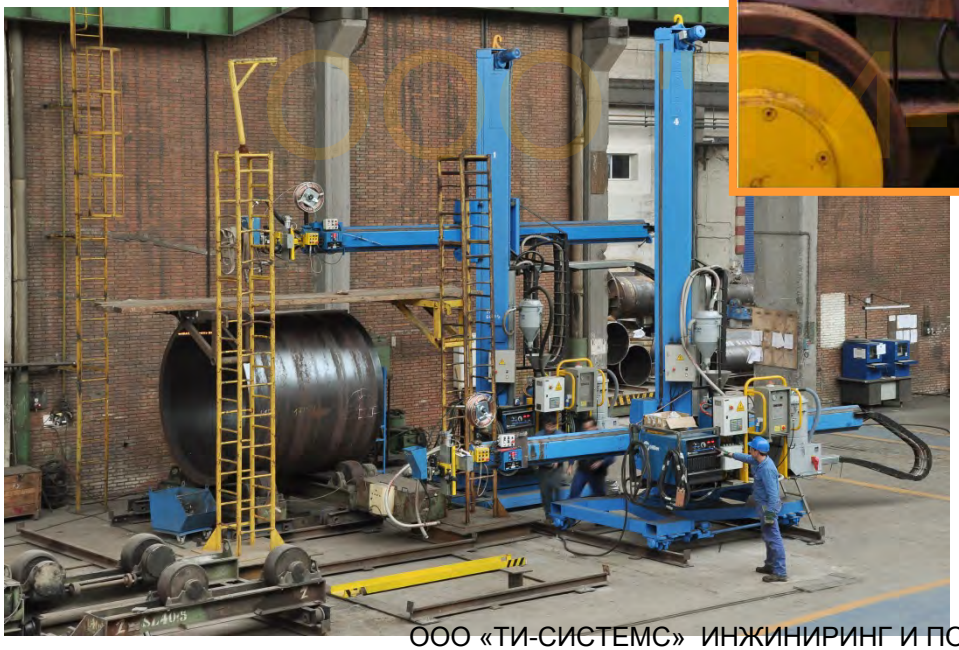
Body Sheets Manufacturing
Longitudinal Welding



DET. TIPICO SOLDADURA
LONGITUDINALES



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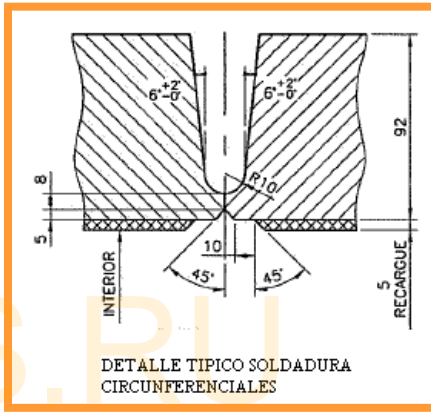
Equipment Assembling
Welding



DETALLE TIPICO SOLDADURA
CIRCUNFERENCIALES

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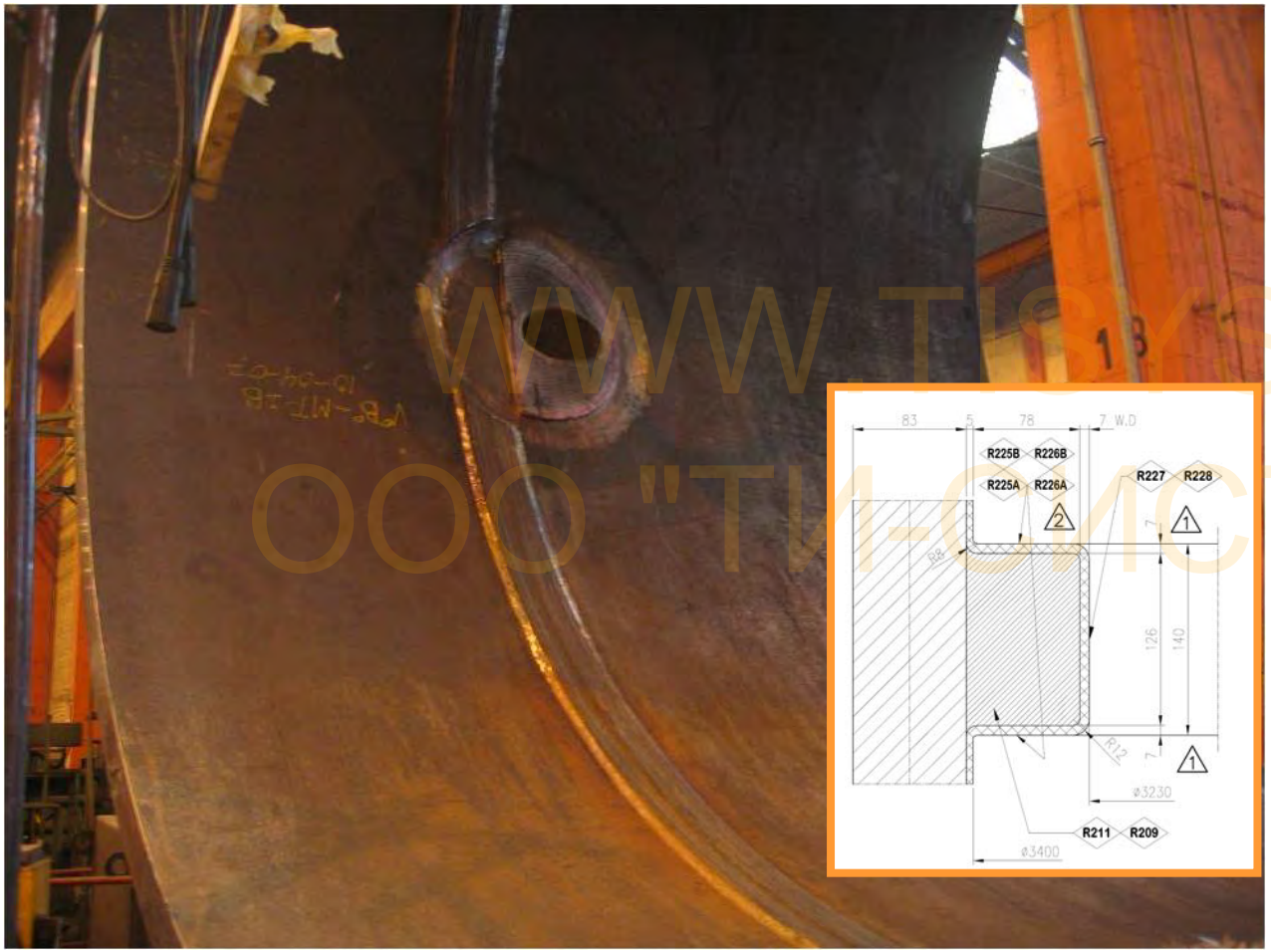
Body Sheets Manufacturing
Connections and supports



- **WELD BUILD UP RINGS**

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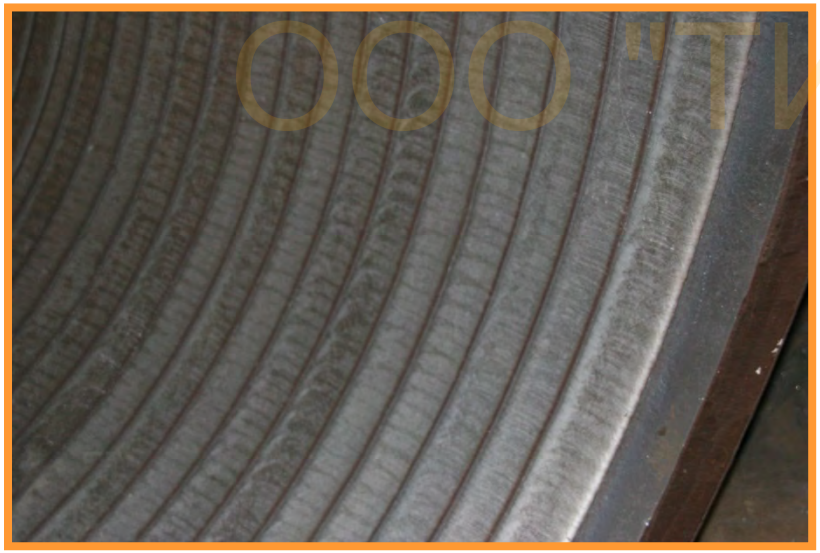
Body Shells Manufacturing
Weld Overlay

STRIP ELECTROSLAG OVERLAY

SAW AND SMAW OVERLAYS STRIP FOR REACTORS



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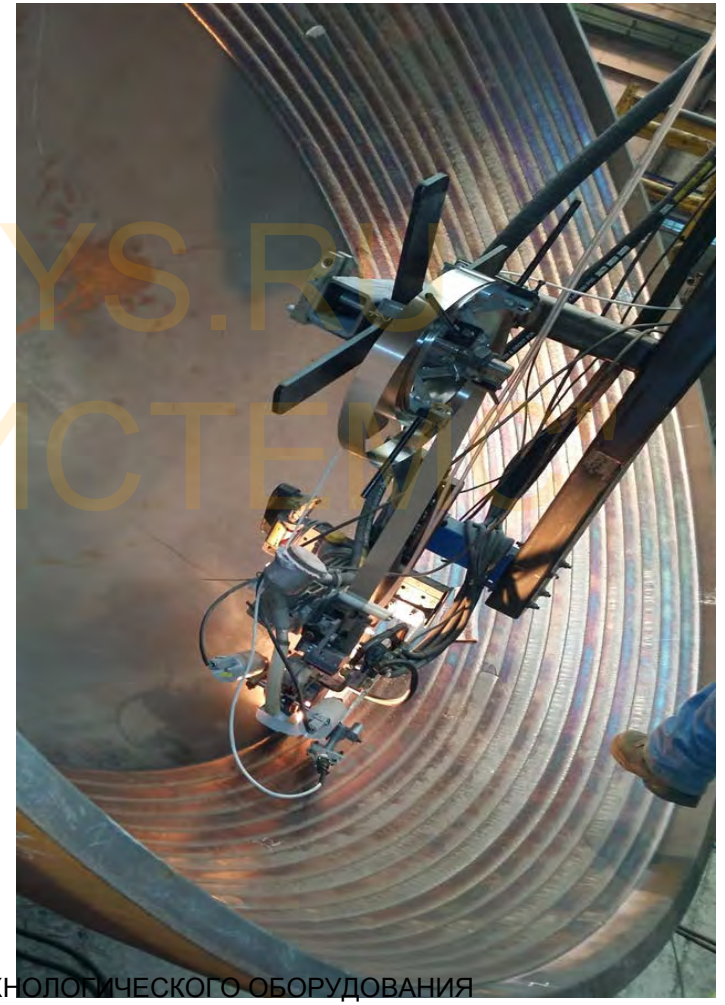
Heads Manufacturing Assembly and Overlay



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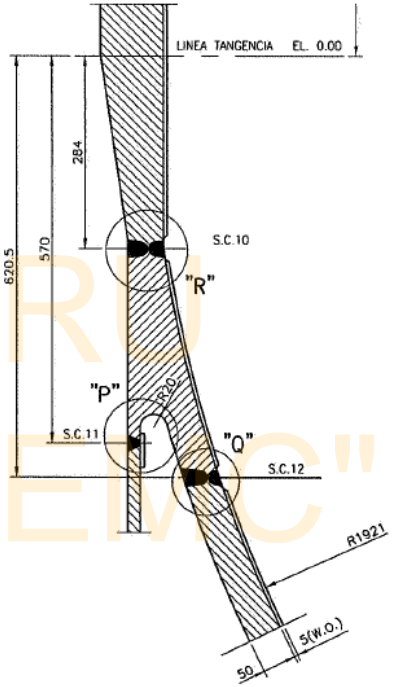
Heads Manufacturing
Skirt-head joint



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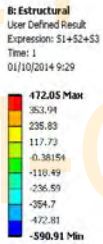
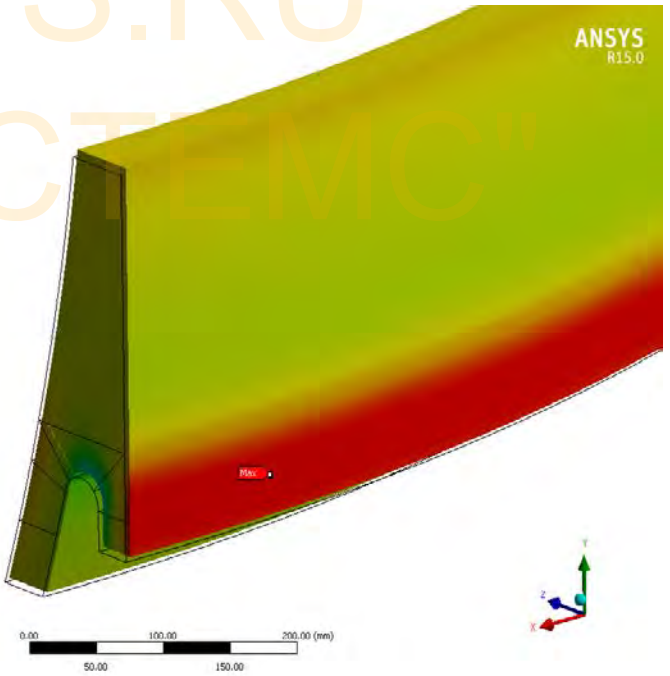
Heads Manufacturing
Skirt-head joint

Thermal gradient and mechanical stresses analysis at skirt to vessel joint





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Vessel Assembly Preparation

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Equipment Assembling
Closure welding

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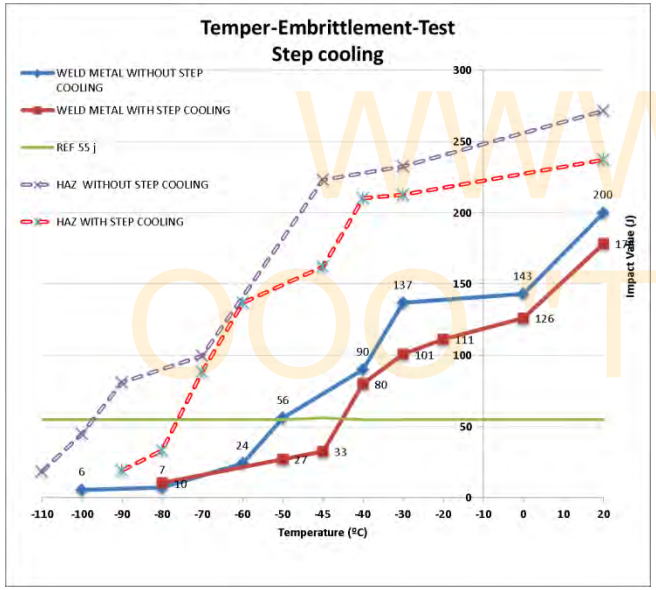
HeatTreatment (ISR + PWHT)



DHT (Dehydrogenation Heat Treatment)

Temperatura : 350ºC

Duración: 6 Horas

ISR (Intermediate Stress Relief)

Temperatura : 650ºC

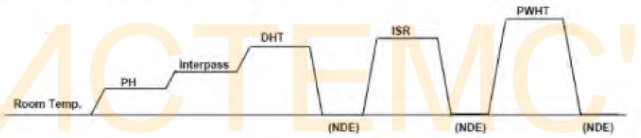
Duración: 6 Horas

PWHT (Post Weld Heat Treatment)

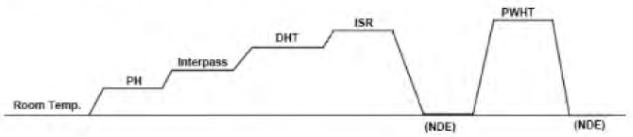
Temperatura : 710ºC

Duración: 6

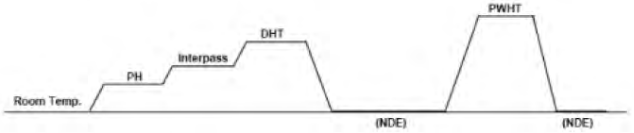
Tratamientos Térmicos en Soldaduras Longitudinales



Tratamientos Térmicos en Conexiones y Fondos



Tratamientos Térmicos en Costuras Circunferenciales



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Quality
NDT

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Quality
NDT

Welding types	Before PWHT	After PHWT	After Hydraulic Test
Longitudinal	MT-TOFD-MANUAL UT	MT-TOFD-MANUAL UT	MT-TOFD-MANUAL UT
Circumferential	MT-TOFD-MANUAL UT	MT-TOFD-MANUAL UT	MT-TOFD-MANUAL UT
Nozzle	MT-TOFD-PHASED ARRAY	MT-TOFD-PHASED ARRAY	MT-TOFD-PHASED ARRAY
Overlay	PT-UT-FERRITE	PT-UT	

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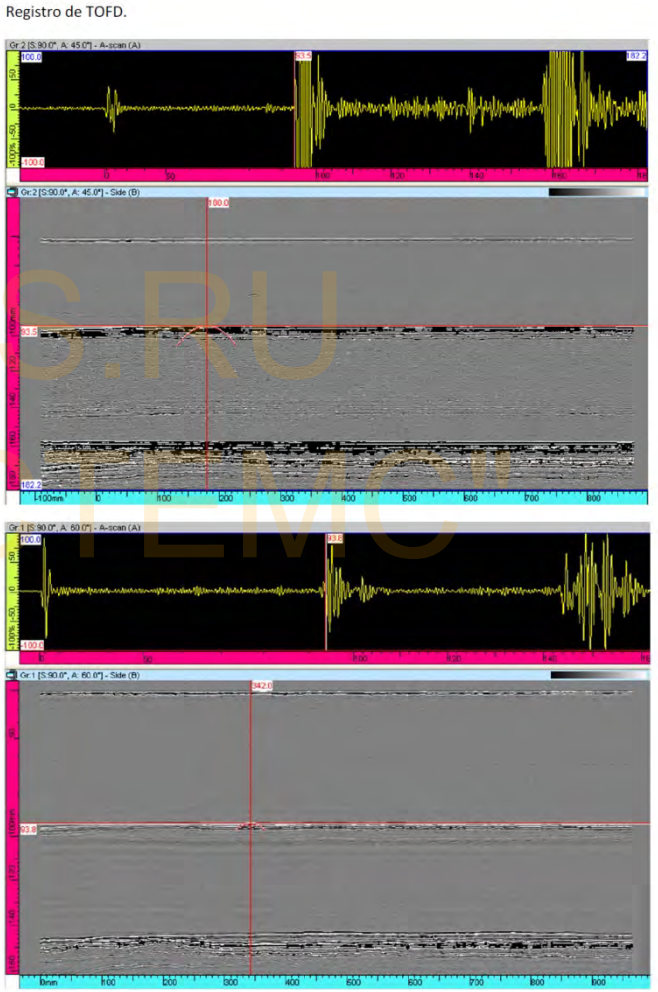
Quality
NDT



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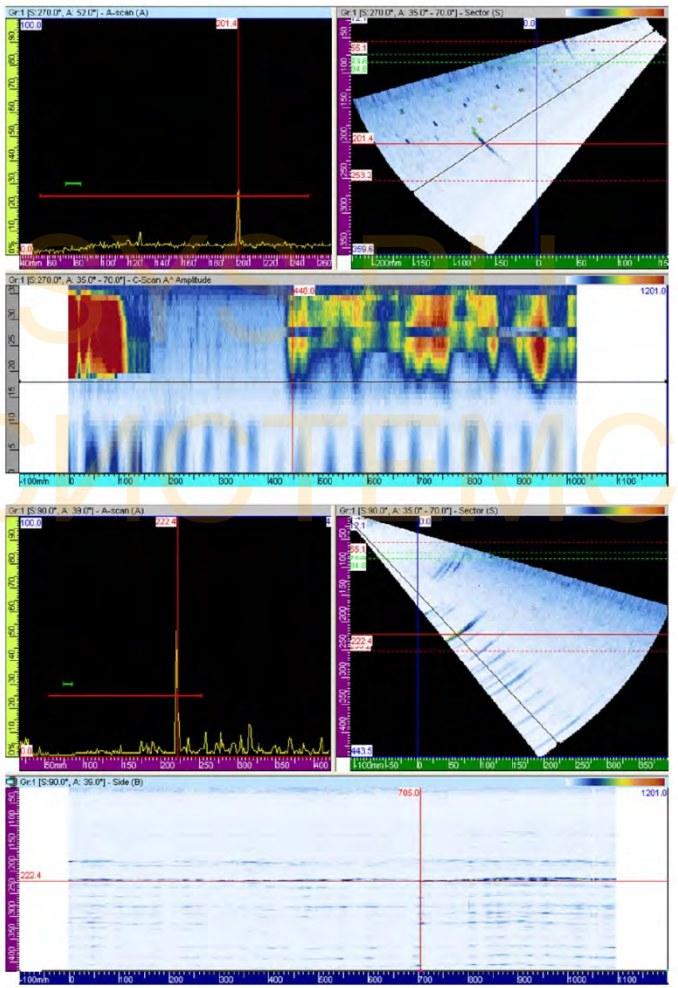
Quality
NDT



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BOILERS

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Lointek Boilers

WATER TUBE	FIRE TUBE BOILER
HRSG – Recovery < 60 Mw	Fire Tubes < 40 tn/h steam
Industrial Package < 200 tn/h steam	Recovery Boilers
	HTF Boilers
	Waste Heat Boilers
Biomass Boilers < 40 tn/h steam	Superheated Steam

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HRSG Boilers

ZABALGARBI (CNIM – SENER)

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ООО "ТИ-СИСТЕМС"

Industrial Boilers

60 т/ч а 45 bar Abengoa PS-20

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ООО "ТИ-СИСТЕМС"

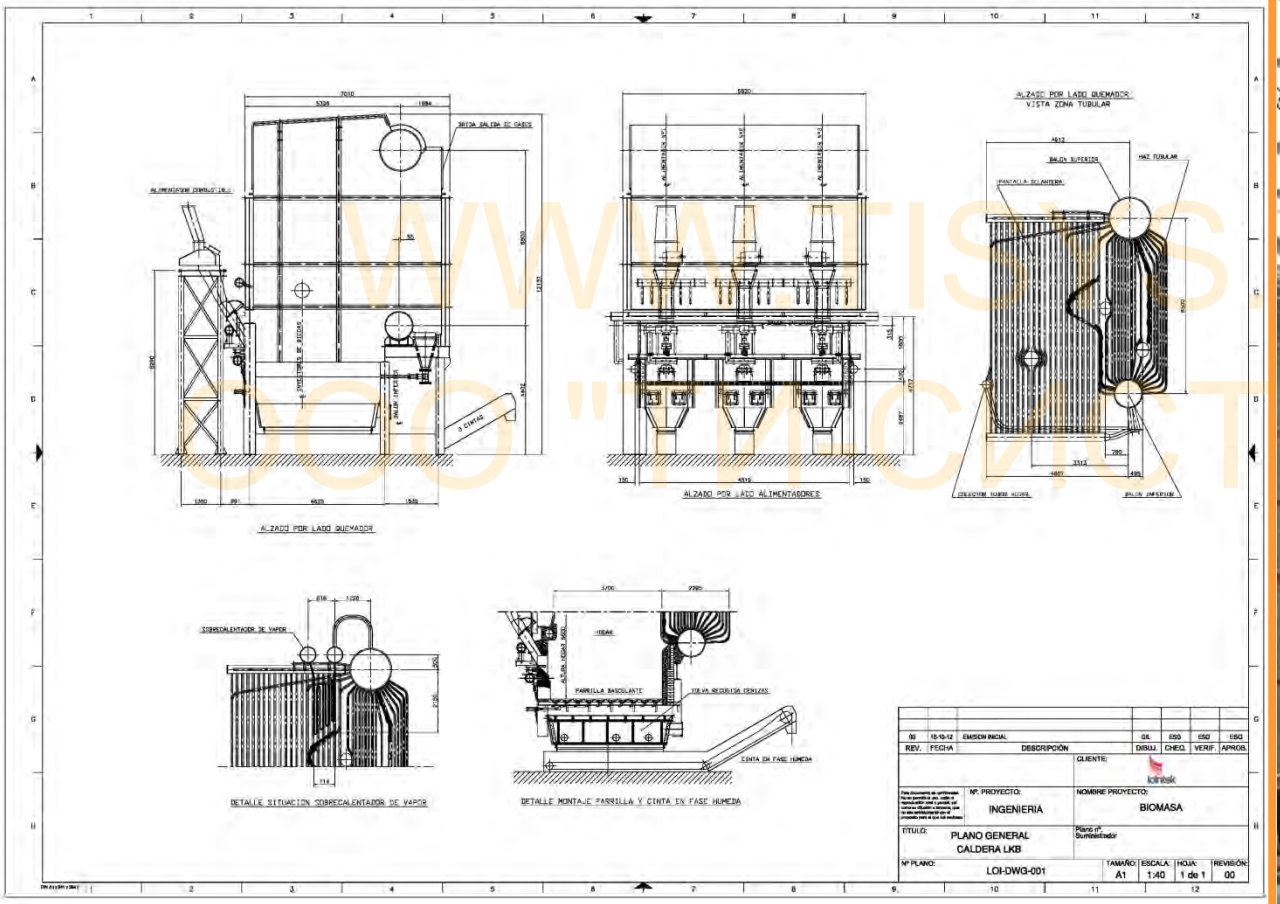
Industrial Boilers

150 T/H WITH FUEL OIL PETROGAL

ООО «ТИ-СИСТЕМС»

Biomass Boilers

BAGASSE



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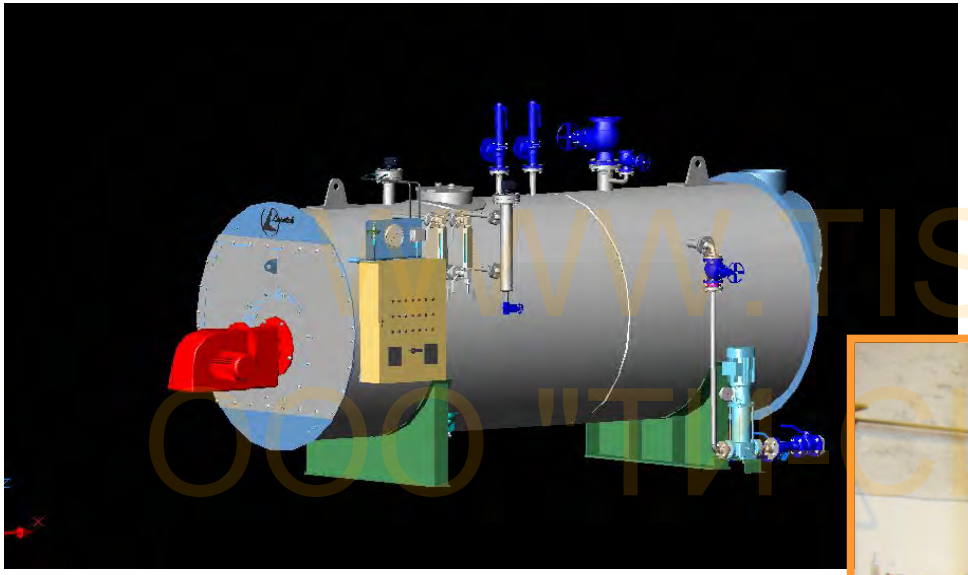
Fire Tube Boilers

4 т/ч Oleanostra



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Fire Tube Boilers

LKM-30 (30 т/н 12 bar SH 225°C - Lituania)

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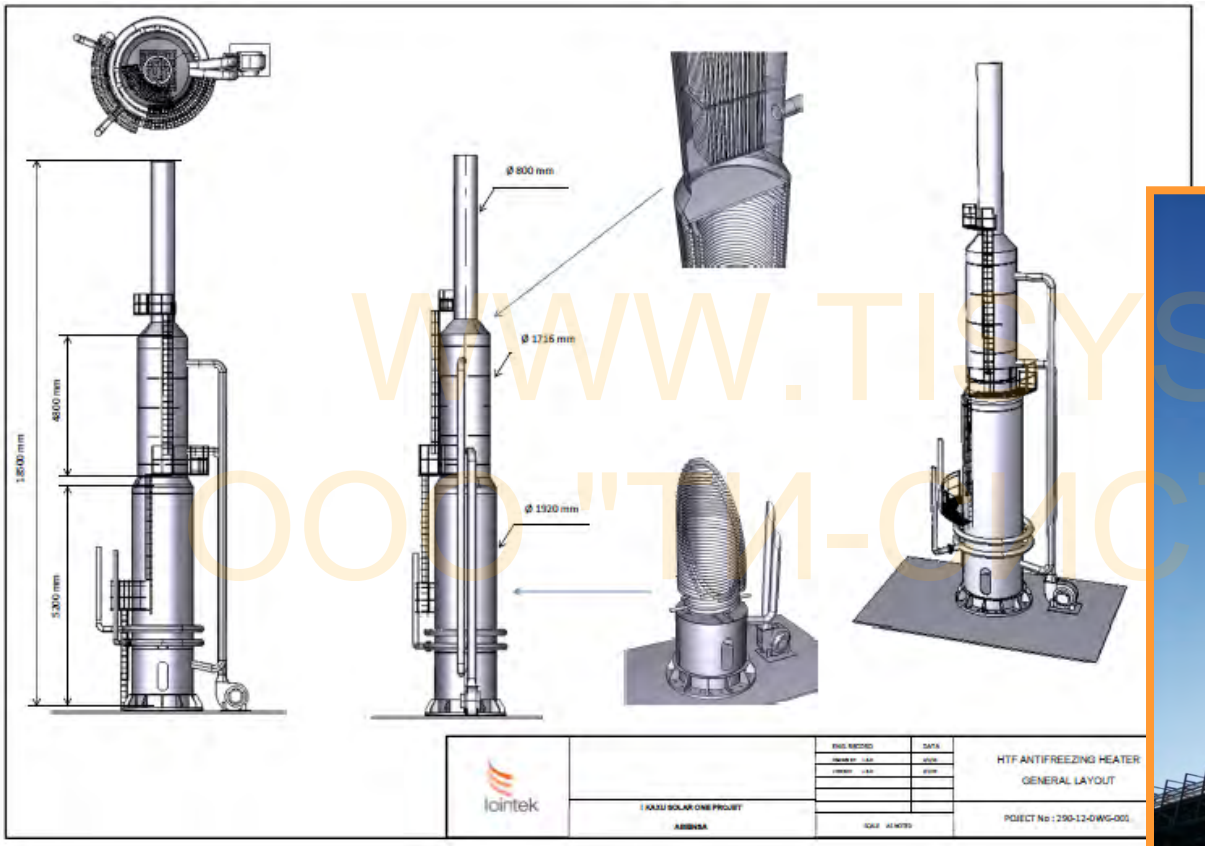
HTF Fired Heaters



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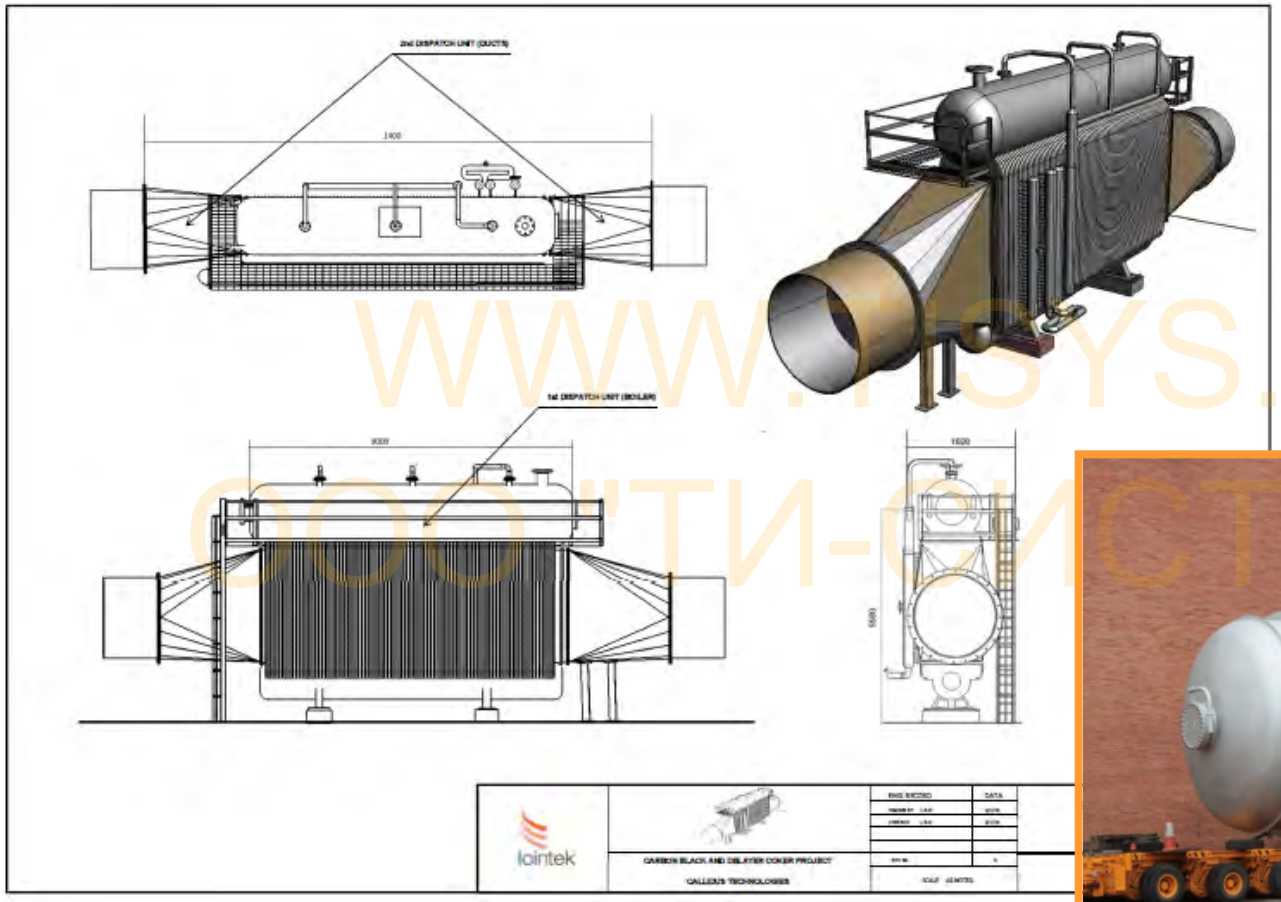
Waste Heat Boilers



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Waste Heat Boilers

Critical Temperatures
(up to 1200ºC)
&
Corrosive gases

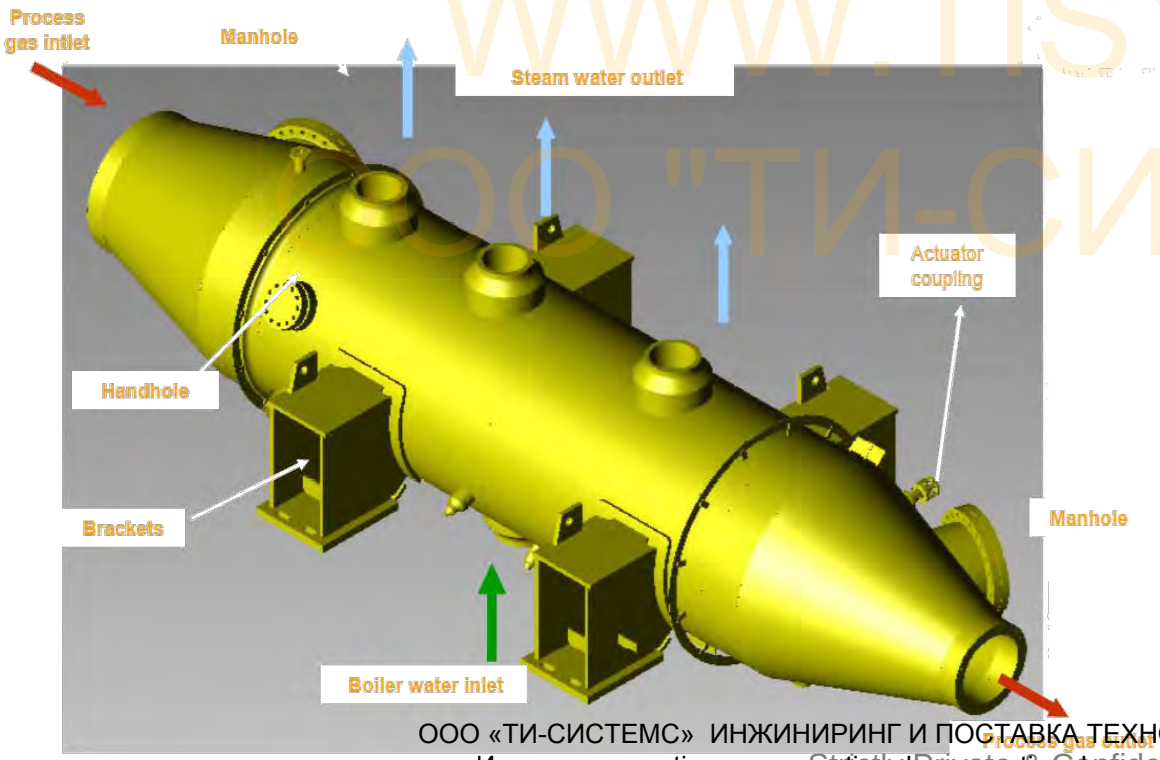
DETAIL ENGINEERING

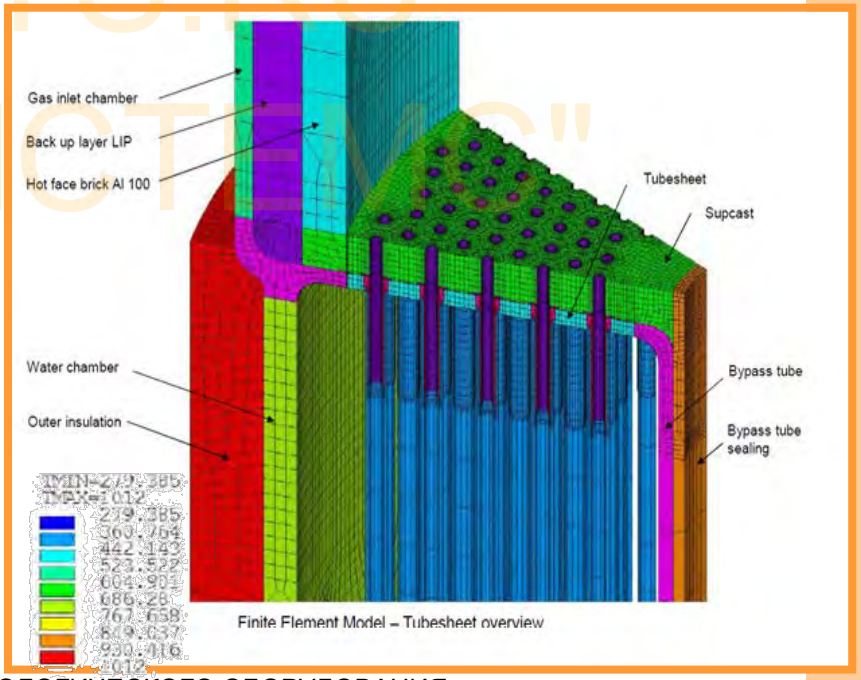
Alloyed Materials

Specialized Design

Manufacture with advanced procedures:

- Inner bore welding
- Recessed welding





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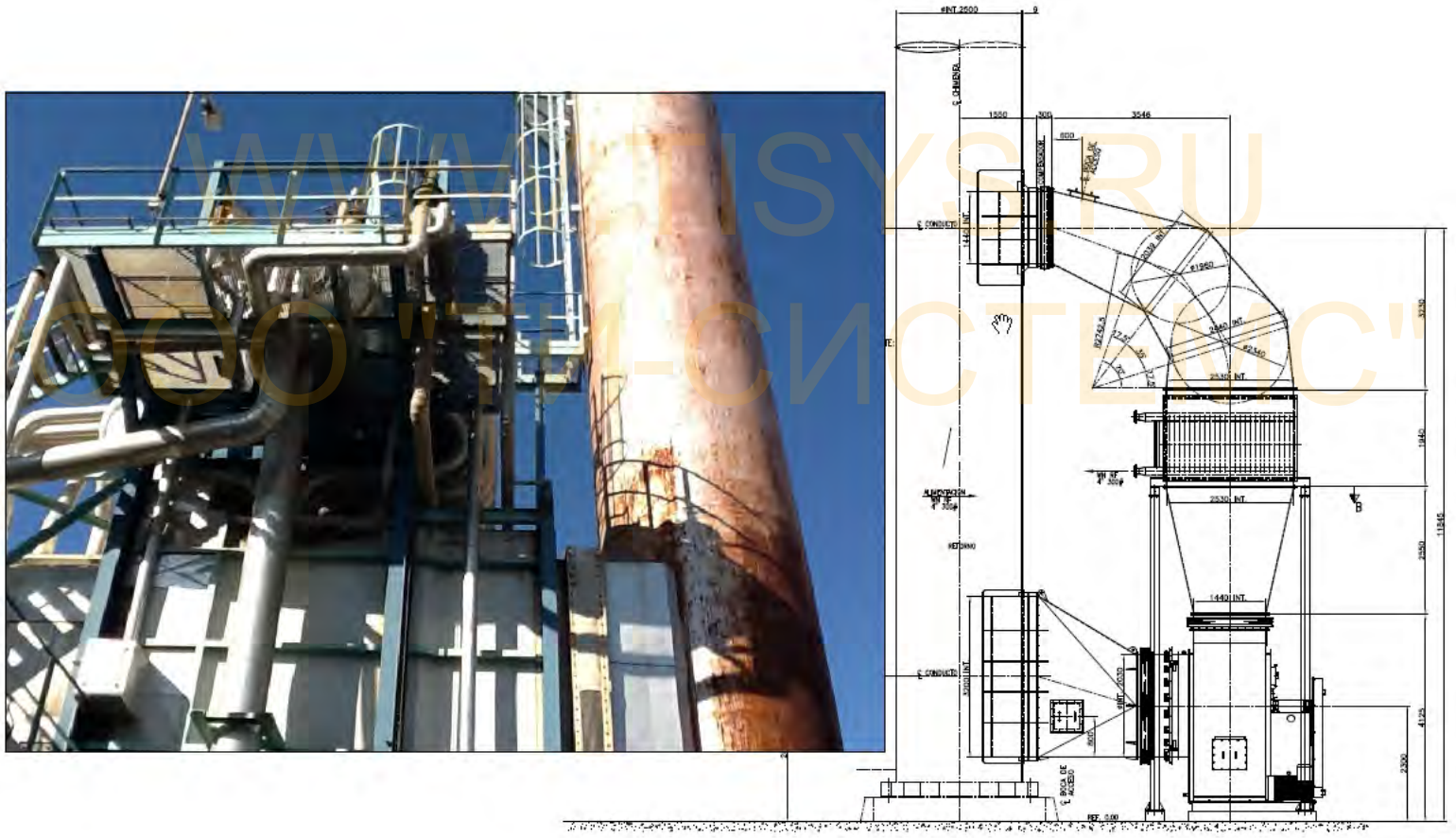
Energy Optimization Studies

BOILER GAS HEAT RECOVERY SYSTEM

OPEL FACTORY (ZARAGOZA)



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SURFACE CONDENSERS

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Products

Cylindrical Surface Condensers

- Tubesheet diameter < 4500 mm
- Duty: Up to 150 ~ 200 MWth

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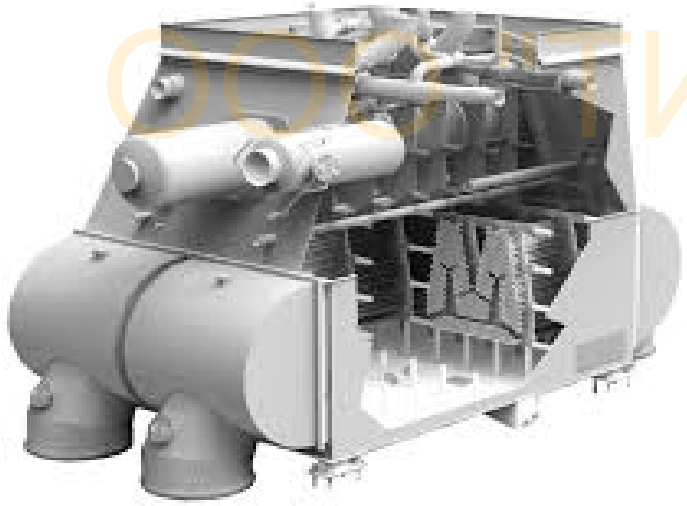

Rectangular Surface Condensers

- Nº of tubes > 8500 ~ 9000 ud
- Duty range: 150 ~ 1000 MWth

Products

Auxliary components (Optional)

- Air removal system (Steam jet ejector or liquid ring pumps)
- Tube ball cleaning system (Package unit)
- Cathodic protection system (induced currents or sacrificial anodes)

Configurations

- Axial or radial steam inlet
- Simple or double pass

Main design codes

- HEI
- ASME VIII Div.1
- AWWA

Applications

- Steam/Condensate recovery systems for industrial processes (energy production plants, petrochemical industry, food industry…)

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Surface Condensers

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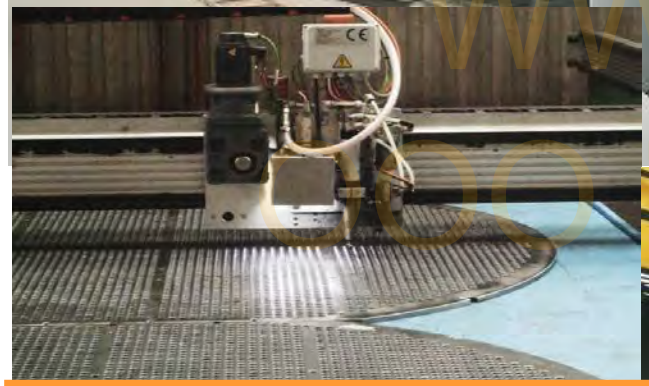
Condenser components





ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ
Интернет: www.tisys.ru www.tisys.kz www.tisys.by www.tesec.ru www.ти-системс.рф
Телефоны: +7 (495) 7774788, 7489626, 5007155, 54 Эл. почта: info@tisys.ru info@tisys.kz info@tisys.by

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PIPING

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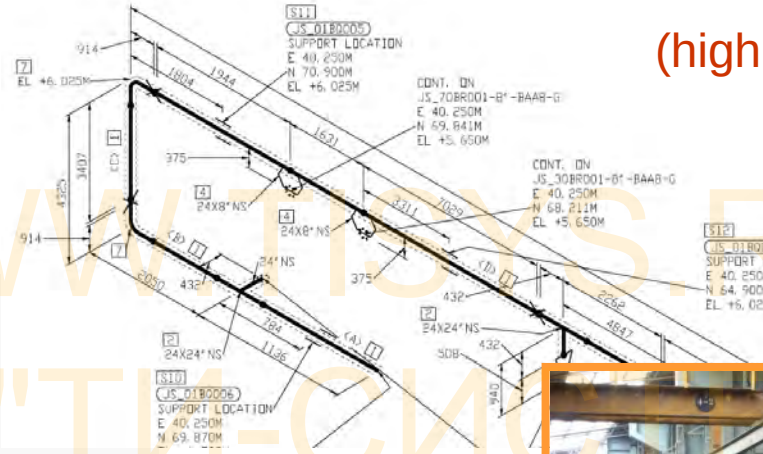
Piping

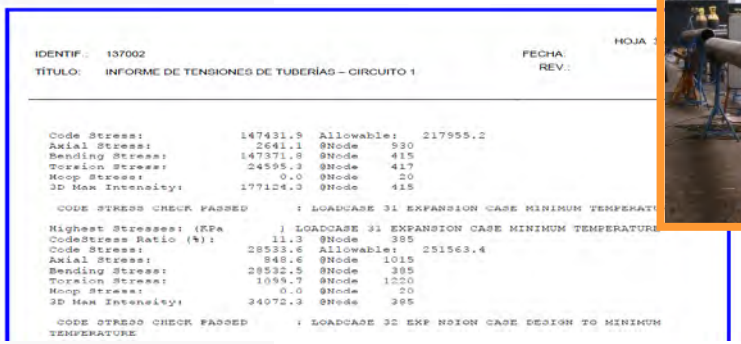
- Thermal design & Mechanical calculation
- 3D modeling
- Flexibility Analysis
- Structural Support Analysis



Special materials

(high pressure&temperature):

- ✓ A355 P91
- ✓ A355 P22
- ✓ A355 P11


IDENTIF.: 137002
TÍTULO: INFORME DE TENSIONES DE TUBERÍAS – CIRCUITO 1
FECHA:
REV.:

Code Stress:	147431.9	Allowable:	217955.2	
Axial Stress:	2641.1	@Node	930	
Bending Stress:	147371.8	@Node	415	
Torsion Stress:	24595.3	@Node	417	
Hoop Stress:	0.0	@Node	20	
3D Max Intensity:	177124.3	@Node	415	

CODE STRESS CHECK PASSED : LOADCASE 31 EXPANSION CASE MINIMUM TEMPERAT

Highest Stresses: (KPa		LOADCASE 31 EXPANSION CASE MINIMUM TEMPERATURE		
CodeStress Ratio (%):	11.3	@Node	385	
Code Stress:	28533.6	Allowable:	251563.4	
Axial Stress:	848.6	@Node	1015	
Bending Stress:	28532.5	@Node	385	
Torsion Stress:	1099.7	@Node	1020	
Hoop Stress:	0.0	@Node	20	
3D Max Intensity:	34072.3	@Node	385	

CODE STRESS CHECK PASSED : LOADCASE 32 EXPANSION CASE DESIGN TO MINIMUM TEMPERATURE

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PROCESS SYSTEMS
MODULAR PLANTS

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Activity Sectors

Refineries

Upstream

LNG

Petrochemicals

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Services

- Project Management
- Basic engineering
- Detail engineering
- Equipment design: thermal, mechanical, fatigue,…
- Fabrication, Procurement, Erection
- Commissioning, Start up & Training
- Technical Assistance

- Customized Systems

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Typical Process Systems

- **Acid Gas Cleaning Units**

  Contaminants (H2S, CO2, HCN, COS, CS2, mercaptans,…) removal by absorption.

  Selection of most adequate solvent /amine (MEA, DGA, DEA, DIPA, MDEA) for each project conditions.

- **Gas Dehydration Units**

  Water removal by absorption with glycol (DEG, TEG, TREG).

- **Crude Oil pre-treatment units**

  Bring oil to meet certain export specifications (BS&W, TVP/RVP,…)

  Units based on Multistage separation or Reboiled Stabilizer column processes

- **Process Packages**

  Customized fully functional systems designed to client needs including:

  heat exchangers / columns / separators / pressure vessels / piping

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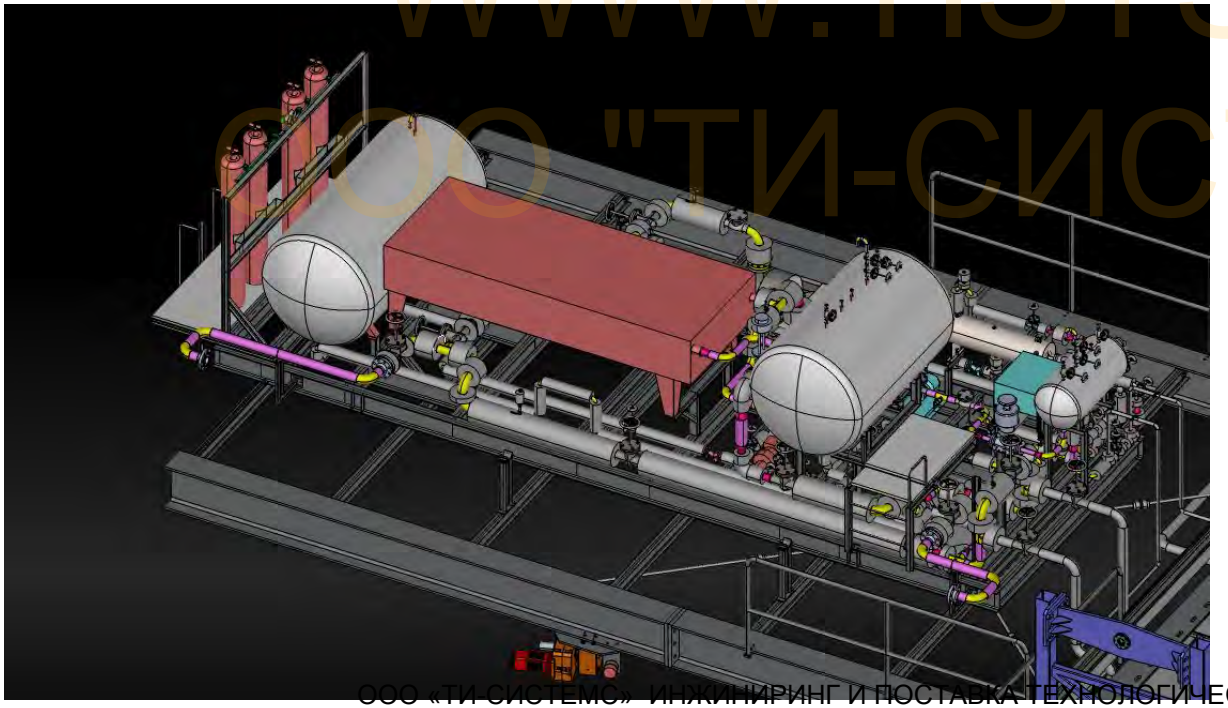
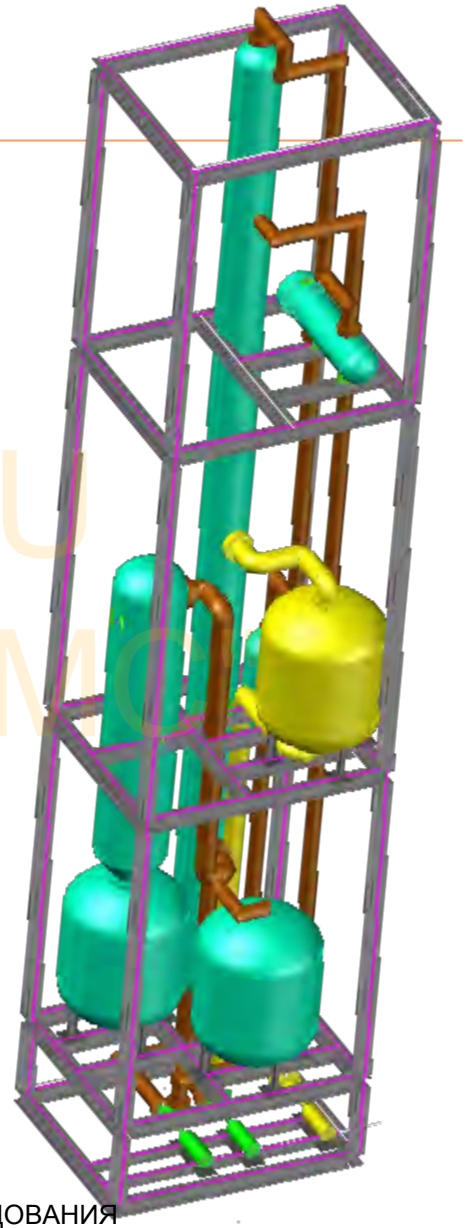
Modular Plants & Skids

When?

- Hard environments
- Scarcity or high cost of local skilled labor
- Transportable complete functional systems





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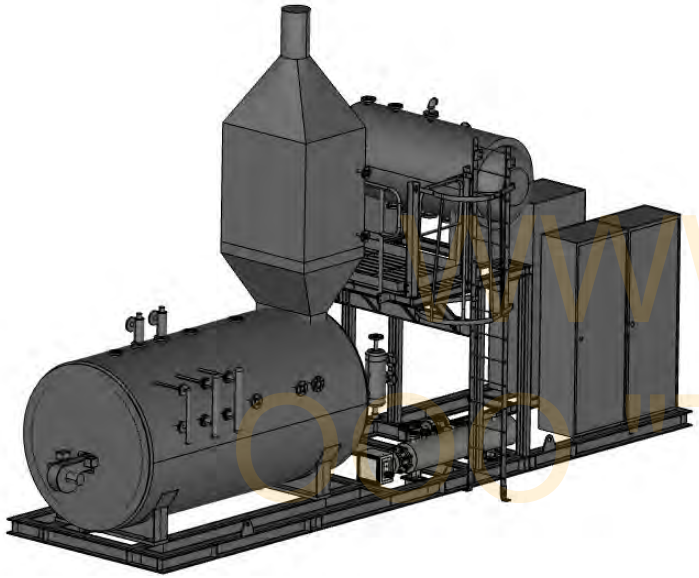
Modular Plants & Skids



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OFFSHORE

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OFFSHORE

- Piles and transition pieces for Offshore Wind Energy sector
- Able to manufacture any product of Steel in our facilities at the Port of Bilbao
- Our extensive experience in manufacturing steel products, allows us to compete in this sector with total guarantee.

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SOLAR THERMAL ENERGY

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Lointek´s Scope in Solar Thermal Parabolic Trough & Tower Plants

Steam Generation System

HTF heaters

HP & LP Feed Water Heaters

Oil to Salt Heat Exchangers

Boilers

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Lointek´s Scope in Solar Thermal Parabolic Trough & Tower Plants

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Lointek Markets

OWNER	PROJECT	LOCATION	SUPPLIER
COBRA	Andasol-1	Granada	LOINTEK
COBRA	Andasol-2	Granada	LOINTEK
Iberdrola Energía Solar de Puertollano	Ibersol	Ciudad Real	LOINTEK
Acciona/ Mitsubishi Corp	La Risca	Badajoz	LOINTEK
COBRA	Extresol-1	Badajoz	LOINTEK
COBRA	Extresol-2	Badajoz	LOINTEK
Abengoa Solar	Solnova 1	Sevilla	OTROS
Abengoa Solar	Solnova 3	Sevilla	OTROS
Renovables SAMCA, S.A.	La Florida	Badajoz	LOINTEK
Abengoa Solar	Solnova	Sevilla	OTROS
Acciona/ Mitsubishi Corp		Cáceres	OTROS
Renovables SAMCA, S.A.			LOINTEK
Acciona/ Mitsubishi			LOINTEK
COBRA		Real	LOINTEK
COBRA		Real	LOINTEK
Acciona/ Mitsubishi			LOINTEK
Abengoa			OTROS
Valoriza/Sacyr			LOINTEK
Solar Millennium/ Energy,SWM			OTROS
Elecnor/Eiser			LOINTEK
Torresol			OTROS
Torresol			OTROS
Elecnor/Eiser			LOINTEK
Elecnor/Eiser			LOINTEK
Abengoa S			OTROS
Abengoa			LOINTEK
Abengoa			LOINTEK
Abengoa Solar		Real	LOINTEK
Ibereólica			LOINTEK
Abengoa Solar/IT			LOINTEK
Grupo Ortiz-Gru	R-Mag	Cor	OTROS
FCC/Mitsui		Córdoba	LOINTEK
Ibereolica		Badajoz	OTROS
Acciona	Orellana	Badajoz	LOINTEK
COBRA	Extresol-3	Badajoz	LOINTEK
Abengoa Solar	Helios 2	Ciudad Real	LOINTEK
Abengoa Solar/ITOCHU	Solaben 2	Cáceres	LOINTEK
Abantia /Comsa EMTE	Termosolar Borg	Lleida	LOINTEK
COBRA	Casablanca	Cáceres	LOINTEK
FCC/Otros	Enerstar	Alicante	OTROS
Solar Millennium/Ferrostaal	Extremasol 1	Badajoz	PENDIENTE
Solar Millennium/OHL	Arenales	Sevilla	LOINTEK
Nextera-FPL	Termosol 1	Badajoz	OTROS
Abengoa Solar/ITOCHU	Solaben 1	Cáceres	LOINTEK
Renovables SAMCA, S.A.	Cáceres	Cáceres	LOINTEK
Abengoa Solar/ITOCHU	Solaben 6	Cáceres	LOINTEK
Nextera-FPL	Termosol 2	Badajoz	OTROS

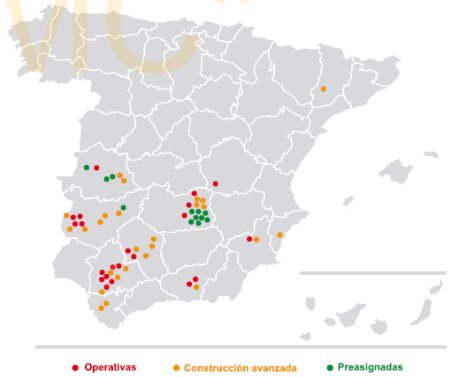
70% Spanish Market Share

Presence in more than 40 Thermosolar Power Plants

More than 500 Heat Exchangers Supplied

More than 350,000 Engineering Hours

More than 1,500,000 Manufacturing Hours



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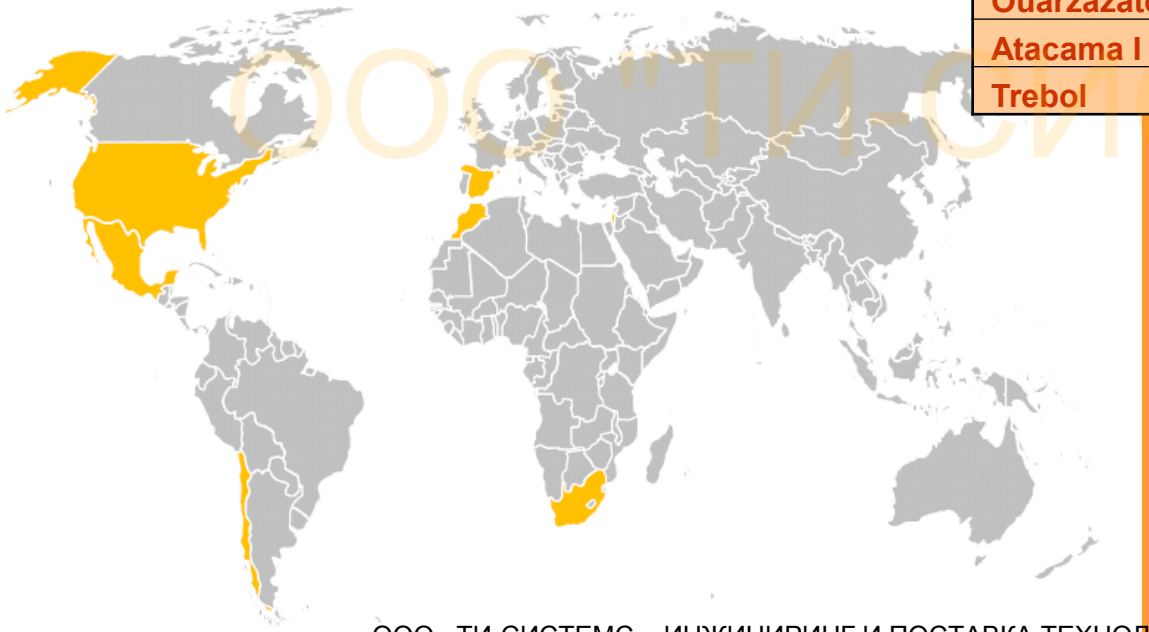
Lointek Markets

PROJECT	COUNTRY	TYPE
Crescent Dunes	U.S.A.	Tower
Solana	U.S.A.	Parabolic Trough
SEGS Harper 8	U.S.A.	Parabolic Trough
Agua Prieta	Mexico	Parabolic Trough
Ashalim	Israel	Parabolic Trough
Kaxu solar one	South Africa	Parabolic Trough
Xina solar one	South Africa	Parabolic Trough
Ouarzazate	Morocco	Parabolic Trough
Atacama I	Chile	Tower
Trebol	Chile	Tower



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Clients

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