

# GENERAL PRESENTATION



LEGEND

GENERAL

VALVES

PIPING

SUBSEA & SPECIAL PIECES

SERVICES

GENERAL

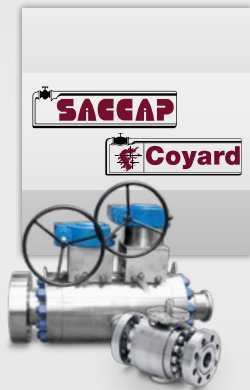
VALVES

PIPING

SUBSEA & SPECIAL PIECES

SERVICES

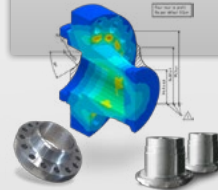
ACTIVITIES  
PRODUCT RANGE  
CERTIFICATIONS  
ORGANISATION  
...



**.ICARUS**  
PIPING



**.ICARUS**  
ENGINEERING



TEST RANGE  
QUALITY ASSURANCE  
PACKAGE  
PROJECT MANAGEMENT  
...



# 4 PARTNERS & 1 SERVICE



a European origin



### Employees

Sales:	51	
Engineers:	23	
Workshop:	151	
Quality:	25	
Logistics:	16	
Admin. & Fin.:	20	
<b>Total:</b>	<b>286</b>	

Turnover (x 1,000,000€)	2011:	72.0	
	2012:	87.7	
	2013:	81.8	
	2014:	71.8	

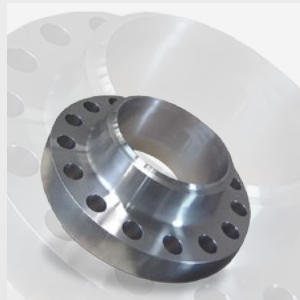
■ ICARUS ■ SACCAP □ COYARD □ SMFO

## Activities

- Production of valves, flanges, and forged parts
- Supply of **complete packages of piping and fittings**



Valves



Compact and subsea flanges



Forged parts for subsea applications



Piping and fittings

## Markets



▶ Oil & Gas



▶ Marine



▶ Petrochemical industry



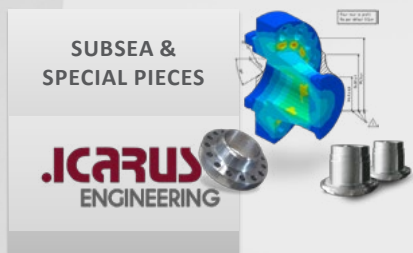
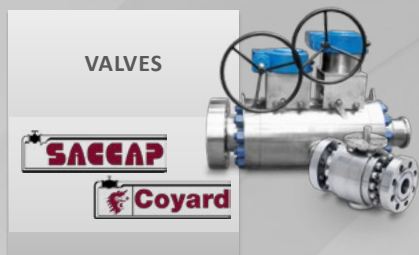
▶ Energy

▶ ...

## Clients

- ▶ End-users  
(oil & gas companies, (petro-)chemical industry, ...)
- ▶ Engineering companies
- ▶ Equipment manufacturers  
(industrial piping, boilerwork, industrial furnaces, ...)
- ▶ ...

## Commercial position



## Product range

VALVES		Ø : ¼" to 24"
Ball valves	Floating Trunion-mounted Double block & bleed Top entry	
Gate & globe valves	Gate valves, globe valves, Parallel slide gate, through conduit gate	
Double block & bleed	Ball x Ball (floating or T-M), Gate x Gate, Globe x Globe Various according to requirements	
Check valves	Wafer assembly, swing, piston, ball	
Plug valves	Plug	

PIPING & FITTINGS		Ø : ¼" to 102"
Pipes	Welded or seamless, all thicknesses	
Flanges	Compact, WN/SW/slip on & Blind standards, Long welding neck, orifice, anchor, swivel	
Forged fittings	Elbows, tees, caps, couplings, plugs, nipples, o-lets	
BW fittings	Elbows, tees, lateral & barred tees, reducers, caps	
Flexibles	Flexible or metallic, hydraulic fittings	
Bolting	Bolts, nuts, washers, screws, studs	
Gaskets	API ring joints, anti-vibration, elastomer seals, engineering plastics, expansion joints, o-rings, hydraulic seals, spiral wound gasket	
Clamps & hubs	Clamps connectors, hubs, API clamps	

SUBSEA & SPECIAL PIECES		Ø : ¼" to 36"
Offshore & subsea products	Compact flanges, buckle arrestors, anchor pipes, hanger flanges, tees et barred tees, wyes, API6A/B – ASME B16.5 flanges, ... API 5L grX60-X65 linepipe end bends (incl. clad/unclad)	

## Range of services

ENGINEERING	
Calculation	Structural resistance, sealing
Design	3D modelling & 2D drawings design

QUALITY	
Non-destructive tests	High pressure, magnetic, dye penetrant, PMI, ferrite, hardness, ultrasonic, pig test, fugitive emission, cryogenic
Destructive tests	Sub-contracted according to requirements

## Approved supplier

We are approved by our clients, such as:

- Total E&P
- Petronas
- DCNS
- Gazprom
- Alstom
- Total Raffinage
- Gaz de France
- Air Liquide
- Lukoil
- Chevron
- Exxon Mobil
- EDF
- Navantia
- KNPC
- AREVA
- Shell
- BP
- Fluxys
- Statoil
- ...

## Certifications

Details of certifications by site available on demand



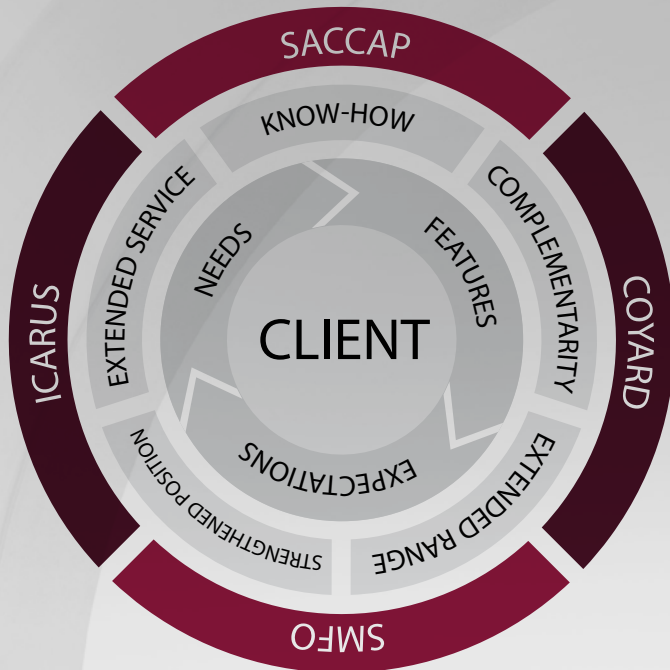
# 4 PARTNERS & 1 INTEGRATED GROUP

**.ICARUS**

**SACCAP**

**Coyard**

**SMFO**



## COLLABORATIVE PRODUCTION GROUPS EXTENDED MEANS OF PRODUCTION

IMPROVED MACHINING FACILITIES

## POOLED TECHNICAL CAPABILITIES

COLLABORATIVE DRAWING-OFFICES AND POOLED TECHNICAL SKILLS

## SYNERGY

SHARED AND GROUPED WORK

## FLEXIBILITY & RESPONSIVENESS

INFRASTRUCTURE

POOLING OF SPECIALISMS

## COMPLEMENTARY PRODUCT RANGES

JOINT-VENTURES ALREADY UNDERTAKEN ACROSS A RANGE OF MARKETS

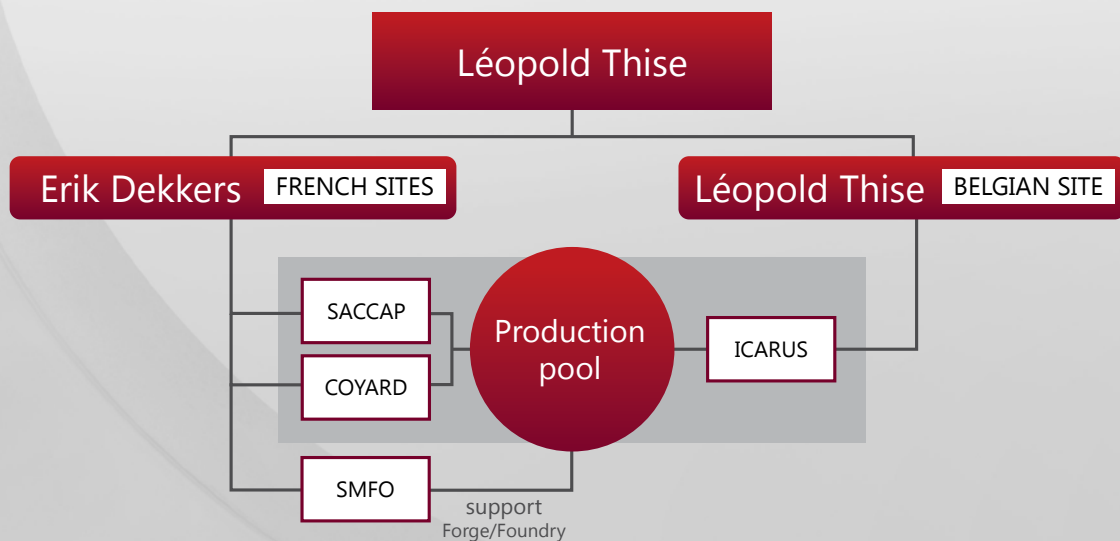
A STRONGER BRAND AWARENESS

## STRENGTHENED COMMERCIAL POSITION

IMPROVED MARKET REPRESENTATION

SUPPLY OF FULL PACKAGES

## Organization chart



**.ICARUS**

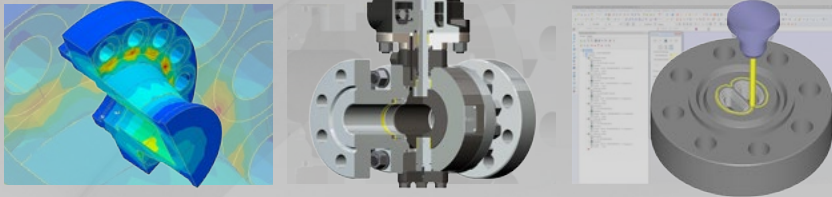
**SACCAP**

**Coyard**

**SMFO**

# Infrastructure & production

- ▶ **Extended project development capabilities**  
Engineers dedicated to your projects, custom development



ENGINEERING EMPLOYEES	
ICARUS:	8
SACCAP:	9
COYARD:	6

- ▶ **Forge and foundry integrated within the group (SMFO)**  
Forging, die-forging, or casting



SMFO EMPLOYEES	
ADMIN.:	2
PROD.:	22
QUALITY:	4

- ▶ **Three machining workshops**  
Specialised and complementary machining facilities, about 130 production technicians



PRODUCTION EMPLOYEES	
ICARUS:	19
SACCAP:	71
COYARD:	39

- ▶ **Three complete testing infrastructures**  
Non-destructive tests, metrology, mechanical testing, etc.



QUALITY EMPLOYEES	
ICARUS:	9
SACCAP:	8
COYARD:	4

- ▶ **A logistical platform**  
12,000m<sup>2</sup> for deliveries, dispatches, and storage



LOGISTICS EMPLOYEES	
ICARUS:	10
SACCAP:	2
COYARD:	4



## GROUP COMPANIES

# ICARUS

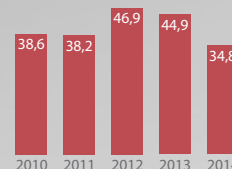
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FAX : +32 (0)4 240 06 40  
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**Turnover:**  
(x 1,000,000€)

2010: 38.6  
2011: 38.2  
2012: 46.9  
2013: 44.9  
2014: 34.8



**Activities:**

- Pipe & fitting supplier (full package)
- Valve manufacturer
- Subsea & special pieces manufacturer

**Head office:** Herstal - Belgium 

**Established in:** 1985

**Employees:**

Sales:	30
Engineers:	8
Workshop:	19
Quality:	9
Logistics:	10
Admin & Fin:	10

**Infrastructure:**

**Main building**

Offices:	1000 m <sup>2</sup>
Production site:	1200 m <sup>2</sup>
Warehousing:	1200 m <sup>2</sup>

**Depot & QC**

Offices:	960 m <sup>2</sup>
Warehouse:	4000 m <sup>2</sup>
Outdoor storage:	4000 m <sup>2</sup>

# SACCAP

112, Avenue de Vendôme  
41034 Blois  
France

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info@saccap-coyard.com  
www.saccap-coyard.com




**Turnover:**  
(x 1,000,000€)

2010: 18.1  
2011: 15.4  
2012: 19.5  
2013: 18.2  
2014: 18.5



**Activities:** Valve manufacturer dedicated mainly to the oil & gas sector

**Head office:** Blois - France 

**Established in:** 1947

**Employees:**

Sales:	12
Engineers:	9
Workshop:	71
Quality:	8
Logistics:	2
Admin & Fin:	4

**Infrastructure:**

40,000 m<sup>2</sup> site including a covered surface area of roughly 9,000 m<sup>2</sup>

Offices:	1000 m <sup>2</sup>
Warehousing:	1000 m <sup>2</sup>
Mechanical workshop:	5000 m <sup>2</sup>
Assembly / testing:	1000 m <sup>2</sup>
Marking / shipping:	1000 m <sup>2</sup>



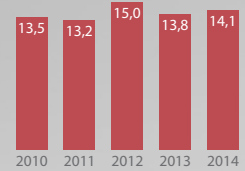
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49072 Beaucouzé Cedex  
France

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**Turnover:**  
(x 1,000,000€)

2010: 13.5  
2011: 13.2  
2012: 15.0  
2013: 13.8  
2014: 14.1



**Activities:** Valve manufacturer specialised in the marine & energy sectors

**Head office:** Angers - France

**Established in:** 1926

**Employees:**

Sales:	9
Engineers:	6
Workshop:	39
Quality:	4
Logistics:	4
Admin & Fin:	4

**Infrastructure:** 10,800 m<sup>2</sup> site including a covered surface area of roughly 5,300 m<sup>2</sup>

**Offices:** 950 m<sup>2</sup>

**Production:** 4350 m<sup>2</sup>

Machining facilities: 1200 m<sup>2</sup>

Assembly/testing: 1870 m<sup>2</sup>



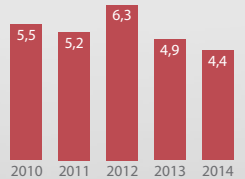
Zone d'Activités de la Ronde  
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info@smfo.fr  
www.smfo.fr



**Turnover:**  
(x 1,000,000€)

2010: 5.5  
2011: 5.2  
2012: 6.3  
2013: 4.9  
2014: 4.4



**Activities:** Forge & Foundry

**Head office:** Allonnes - France

**Established in:** 1932

**Employees:**

Workshop :	22
Quality :	4
Admin & Fin :	2

**Infrastructure:** 16,500 m<sup>2</sup> site including a covered surface area of roughly 9,000 m<sup>2</sup>

**Offices** : 200 m<sup>2</sup>

**Production** : 8800 m<sup>2</sup>

Tool shop : 1020 m<sup>2</sup>  
(tooling, dies and models)

Testing area : 80 m<sup>2</sup>

# GLOBAL LIST

# REFERENCES



## Various projects

CONTRACTOR	YEAR	DESCRIPTION	FINAL CLIENT	QTY	DESTINATION
TECHNIP	2014	HSCS API5L gr. X60 pipes and bends claddeed alloy 625 and uncladdeed	TEN (Tullow)	50T	Ghana
KT	2014	BW fittings in CS and WP11	TOTAL ANTWERP REFINERY SITE	200T	Belgium
AIR LIQUIDE	2014	GATE / GLOBE /BALL	AIR LIQUIDE BENELUX	/	Belgium
DSME	2014	fittings super duplex + duplex	Mafumeira Chevron	1T	Korea
TECNICAS REUNIDAS	2014	pipes flanges & fittings in P22, CS	ARAMCO - Jazan Project	90T	Saudi Arabia
TECHNIP SPAIN	2014	Stainless 347H and alloy 800H	SIS Cat Com	50T	Spain
TECHNIP	2014	pulling heads AISI 4130	Lianzi	0,5T	Australia
TECHNIP	2014	pulling heads A694 F52	Pazflor jumper	1T	Angola
HEURTEY PETROCHEM	2014	GATE/GLOBE / CHECK Valves	CJSC	/	Russia
TECHNIP	2014	DBB Valves	NOVATEK	/	Russia
SBM	2014	Compact flanges, pipes and fittings in duplex and super duplex and F65	Shell Stone	100T	USA
TECHNIP PARIS	2014	Complete Spools in alloy 625	DONG Project	2.5T	Denmark
TSLNG/ SENER-TECHINT	2014	Pipings & Trunnion ball valves in 304L	ZEEBRUGGE LNG PROJECT - FLUXYS	100T	Belgium
TECHNIP BULGARY	2014	Welded pipes in 347H	Lukoil Burgas	5T	Bulgary
TECHNIP BRAZIL	2014	Pipes in alloy 625, BW fitting in A420 WPL8, pipes in 316L	Petrobras P76	80T	Brazil
TECHNIP	2014	GATE/GLOBE/BALL VALVES	TOTAL E&P CONGO	/	Congo
FOSTER WHEELER	2014	Pipes flanges and fittings in CS and WP5	CORAF Congo	250T	Congo
TECHNIP QATAR	2014	Rings in 24" and 30" in ss 347H	ORYX GTL	40T	Qatar
TOTAL ANGOLA	2014	DALIA Pipes and fittings in CS, stainless steel, cupro	Total	50T	Angola

CONTRACTOR	YEAR	DESCRIPTION	FINAL CLIENT	QTY	DESTINATION
KT ROMA	2014	Pipes, flanges and fittings in CS and SS	Daura	190T	Irak
SHI KOREA	2014	Valves Gate , Globe Duplex - 6Mo - Titan	Martin Linge - Total Norway	7T	Norway
NIGERDOCK	2014	Pipes and fittings in CS	Total	50T	Nigeria
PONTICELLI	2014	GATE / GLOBE /CHECK / BALL / BUTTERFLY	TOTAL E&P NIGERIA	/	Nigeria
SUBSEA 7	2014	"GATE / GLOBE / CHECK / BALL / DBB GLOBE / BALL Cryogenic service"	EXXON	/	Nigeria
SAMSUNG ENGINEERING	2014	Seamless pipes stainless steel + duplex + alloy 825	Luberef - Aramco	20T	Saudi Arabia
SAMSUNG ENGINEERING	2014	Seamless pipes 6Mo	Shaybah	1.5T	Saudi Arabia
TECHNIP FRANCE	2014	MOHO FPU flanges - LF2 - HSCS - Duplex - SS	Total Congo	20T	Congo
YARA	2014	Steam boiler, steam collector: piping 304H, casting elbow 304H, forged components 304H	Yara France	65T	France
TECHNIP FRANCE	2013	MOHO FPU pipes CS - HSCS - SS - Duplex	Total Congo	65T	Congo
HHI	2013	Bends in duplex and CS	Clair Ridge - BP	99T	United Kingdom
TSLNG/SENER-TECHINT	2013	Pipes flanges & fittings in 304L and CS	Zeebrugge LNG Project - Fluxys	450T	Belgium
SAIPEM	2013	Anchor pieces and flanges in ASTM A694 F65	Ivar Aasen	15 T	Norway
TECHNIP	2013	GATE/ GLOBE / BALL / DBB #900 to API 10K	TOTAL E&P NORGE	/	Norway
DSME	2013	Carbon steel AIP5L gr. X65	Mafumeira Chevron	77 T	Angola
DSME	2013	Bends in HSCS API5L gr. X60	Mafumeira Chevron	58 T	Angola
TECHNIP	2013	Smls pipes in CS/HSCS/Stainless steel, duplex	Total Angola - Girri	95 T	Angola
TOTAL ANGOLA	2013	GIRASSOL Pipes and fittings in CS, stainless steel, cupro	Total	60T	Angola
SAIPEM	2013	GLOBE / CHECK / BALL	TOTAL E&P ANGOLA	/	Angola
SAIPEM ITALY	2013	Smls pipes in CS GrB / Gr 6	Chevron Mafumeira Pjt	150T	Congo/Angola
PETROINEOS	2013	Piping package in 317L	Petroineos	90T	France
EDF	2013	GLOBE valves	EDF	/	France
SBM	2013	Duplex and super duplex flanges and piping	Inpex/Total Ychtis Project	100T	Norway
KT ROMA	2013	Pipes flanges manifolds & fittings in 347H, 304H, CS and alloy steel	Aramco / Samsung	250T	Saudi Arabia
KT ROMA	2013	Pipes flanges and fittings in CS and alloy steel	Lukoil - Progetto PERM	300T	Russia
PROSERNAT	2013	GATE / GLOBE / CHECK / BALL	TOTAL E&P RUSSIA	/	Russia
HHI	2013	Bends duplex - HSCS	BP - Clair Ridge - Scotland	45T	Korea
TECNICAS REUNIDAS	2013	Flanges in F22	Lukoil	5T	Russie
MC DERMOTT	2013	stainless steel - alloy 625	Aramco - Karan	10T	Dubai
MC DERMOTT	2013	Duplex - 6mo	Aramco - KJO	16T	Dubai
NIGERDOCK	2013	Plates, piping, fittings in CS and stainless steel	Total	200T	Nigeria
MILTON ROY	2013	BALL VALVES	TOTAL E&P NIGERIA	/	Nigeria
HHI	2013	CS + HSCS bends	DSO - Chevron	12T	Korea
AIR LIQUIDE	2013	BGLA carbon steel fittings	Jabekke Aquafin	1T	Belgium
AIR LIQUIDE	2013	BGLA carbon steel pipes and fittings	Tessengerlo Antenna	5T	Belgium
OIS	2012	GATE / GLOBE / CHECK/ BALL / SBB / DBB	TOTAL E&P UK	/	United Kingdom
DSME	2012	HSCS bends and duplex bends	Wheatstone project / Chevron	95T	Korea

<b>TOTAL CONGO</b>	<b>2006-...</b>	<b>Frame agreement for supply of CS, SS, duplex pipes &amp; fittings</b>
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# VALVES

# PRODUCT SPECIFICATIONS

## Product range

	150lbs	300lbs	600lbs	900lbs	1500lbs	2500lbs
<b>ON/OFF BALL VALVES</b>						
Floating Ball	2" - 10"	½" - 8"	½" - 6"	½" - 6"	½" - 2"	½" - 1"
Trunnion Ball	½" - 24"	½" - 24"	½" - 24"	½" - 24"	½" - 16"	½" - 12"
Double block & Bleed ball						
<b>THROUGH CONDUIT GATE</b>						
Slab gate	2" - 24"	2" - 24"	2" - 24"	2" - 24"	1" - 24"	1" - 24"
<b>DUO CHECK</b>						
Dual plated Wafer Check	2" - 24"	2" - 24"	2" - 24"	2" - 20"	2" - 20"	2" - 18"
<b>CASTING</b>						
Gate	2" - 24"	2" - 18"	2" - 14"	2" - 10"	2" - 10"	2" - 8"
Globe		2" - 14"	2" - 10"	2" - 10"	2" - 10"	2" - 8"
Check (Swing, Piston and Ball)						
<b>FORGINGS</b>						
Gate						
Globe						
Check (Swing, Piston and Ball)						



## APPLICATIONS & SPECIFIC FEATURES

Navy - Military - Nuclear - Cryogenic - Oxygen Service - 3-Way Ball - Top Entry Ball - Welded Design - Wafer Swing Check - Bellow sealed - ...  
Actuated as per request

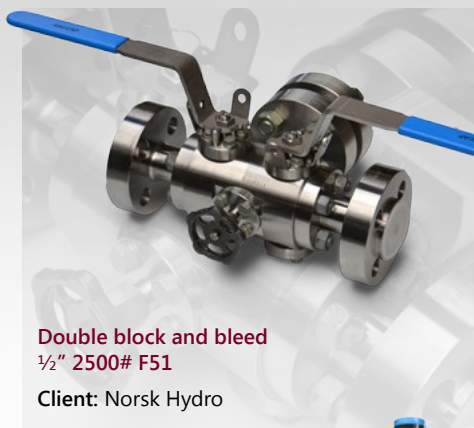
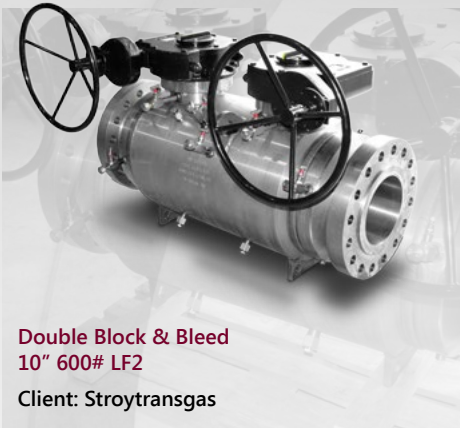
Sizes	from ½" to 24" ( > 24" upon request)
Pressure Ratings	CL-150 to 2500 – PN 16 to PN 400 – API 6a : 3,000 / 5,000 / 10,000
Material	Main: Carbon Steel ( with cladding ) / Stainless Steel / Duplex / Nickel Alloys Others: Cupro Aluminium / Titanium / ...

EUROPEAN ORIGIN  
TOP QUALITY MATERIAL SOURCING  
ASTM – PED – NORSOK M630 – CUSTOMER SPECIFICATION

## Our Strengths

- **Deadline flexibility & responsiveness**
- **Valves for use under extreme conditions:**
  - Low and high temperatures
  - Corrosive and abrasive products
  - High pressures
- **Custom solutions**

- Standards-compliant valve production
- Non-standard valve production
- Machined from bars, blocks, castings or pre-formed forged parts
- Specific and particular grades
- Engineering department allows management of specific requirements (Size constraint, pressure, corrosion, temperature, etc.)



# VALVES

# OIL & GAS

## Gate / Globe / Check

A complete range of gate valves, globe valves, parallel slide gate valves, needle valves and check valves, is available in all the normalized pressure classes and every grades of steel / alloy material from 1/2" to 24" according API, AISI, BS, DIN, NF... standards.

The available "custom-made" valves for specific applications include :

- Welded bonnet
- Extended body and/or stem
- Actuation
- Cryogeny and high temperature
- Normalized fugitive emission
- Limit switches
- Interlocks
- Tightness performed with bellows sealed

All relevant specific applications can be studied, developed and completed according to specification sheets and end-users' requirements.



Bellows sealed gate valve



Aluminum-Bronze gate valve



Cryogenic gate valve



High temperature gate valve



Flanged gate valve



Pneumatic actuated gate valve



Pressure sealed bonnet valve



Through conduit gate valve

## Ball valves & Double block & bleed

Complete range of ball valves and double block and bleed

Available diameters: ½" to 24".

Pressure classes: series 150 to 2500 lbs, API 5000 and 10000.

Floating or trunnion-mounted, in all steel grades.

All types of end connections: BW, SW, NPT, flanges ISO/ASA/PN, Hub ends,...

Specific options:

- Metal to Metal seating
- Double piston effect
- Double block and bleed
- Fully welded body
- Rising stem valves
- Cryogenic and high temperature purposes
- Specific alloys
- Tungsten carbide coating
- Overlay - Stainless steel, inconel...

Our engineering department is able to work with you on all your other specific requirements or to combine these options to meet your most demanding specifications.



Actuated cryogenic ball valve



Rising stem ball valve



API 6D trunnion mounted ball valve



Cryogenic Top Entry ball valve



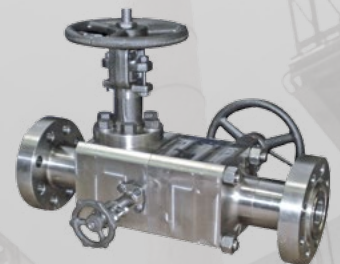
Double block and bleed ball valve



Double block & bleed globe / needle / ball valve



Trunnion mounted double block and bleed ball valve



Double block & bleed gate valve



# VALVES / SPECIAL PIECES

# MARINE

## Submarine valves

Wide range of valves and fittings specially designed for submarines and to meet the clients specifications.

- Ball valve
- Angle globe valve
- Check valve
- Gate valve
- Safety globe valve
- Self regulating valve

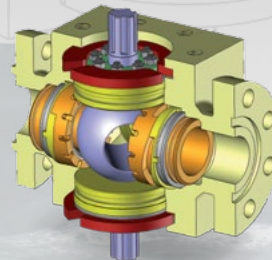
- Strainer
- Piston valve
- Air distributor
- Hydraulic actuator
- Gear box
- Switches box
- ...



Equipped ball valve



Forged angle globe valve



Top Entry ball valve



Parallel slide gate valve

## Warship valves

Wide range of moulded products for surface vessels.

- Gate valve
- Globe valve
- Ball valve
- Check valve
- Safety globe valve
- Self regulating valve
- Strainer

- High performance butterfly valve
- Fire hydrant globe valve
- Actuator
- Pressure dropping service
- Storm valve
- ...



Ball valve



Check valve



Gate valve



Safety globe valve

## Well-developed infrastructure

### Specific means

Our Marine department is equipped with integrated resources (3D design, finite element analysis, simulation, trials, mechanical workshop, clean room, test bench, three-dimensional verification equipment, ...), along with the qualifications required to meet our clients' most demanding requirements.



### Diversified materials

Our wide range of valves in corrosion-resistant alloys (copper-alloy, Monel, Hastelloy, Inconel, Titanium, Duplex and Super Duplex, ...) is intended for applications ranging from naval construction, offshore and inshore construction, energy, processing industry.



## Specific parts



Air distributor



Air pannel



Drain manifold



Hydraulic actuator



Hydraulic actuated gate valve



Electric actuator



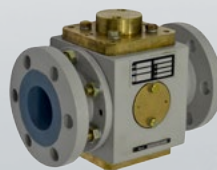
Safety globe valve



Security Valve



Discriminator



Ball valve



Self regulating valve



Y globe valve



Ball valve



Strainer



Gear box



Piston valves

# VALVES / SPECIAL PIECES

# ENERGY

## An efficient & integrated infrastructure

Machining centres, qualified welders, water and HP air test benches, clean room, cryogenic test facilities, fire test bench, x-ray examination, dye penetrant test equipment, US, PMI, etc.



Benefiting from the acquired experience and means of the group companies, and using modern production equipment in accordance with the requirements of the industrial markets, we are able to meet the high tech Energy market demand.

### SMFO: Integrated Forge-Foundry

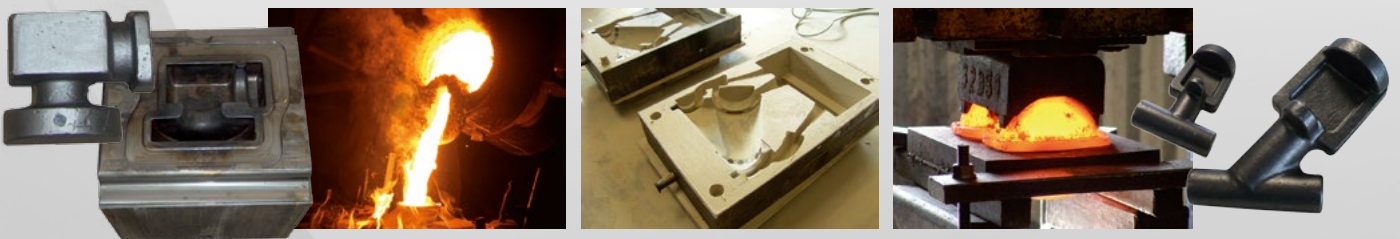
We have our own forge-foundry able to produce:

- forged or stamped pieces, of all grades of steel (carbon steels, alloy steels, stainless and duplex), copper and nickel alloys.
- cast pieces of all grades of steel, copper and nickel alloys.

This French forge-foundry fulfills all the quality requirements expected by the industrial valve market and the European Union obligations.

It has been active for over 15 years in the production of pieces for Nuclear application matching the RCC-M and the RCC-MX requirements. It produces pieces with a high-quality finishing, thanks to its sanding, blasting and spraying glass ball capacities.

Quality Control team consists of qualified COFREND Level 2 (Ultrasonic tests , Magnetic particle examination, dye penetrant tests, Radiography) with all equipment necessary to carry out those controls. It also makes its own foundry and forge tooling.



### White room

Our Energy department has also built two clean rooms in compliance with cleanliness standards required by RCC-M and RCC-MX codes. This particular environment is equipped with its own means of production in deionised water grade A. One of those rooms is dedicated to stainless steel parts and the other one to copper alloys.



## A comprehensive product range

We offer a complete range of forged and cast valves from ¼" to 24" in all pressure ratings on the following designs:

- Ball valve
- Double block and bleed
- Gate valve
- Parallel slides valve
- Globe valve
- Check Valve
- Steam piping
- Specific equipment
- ...

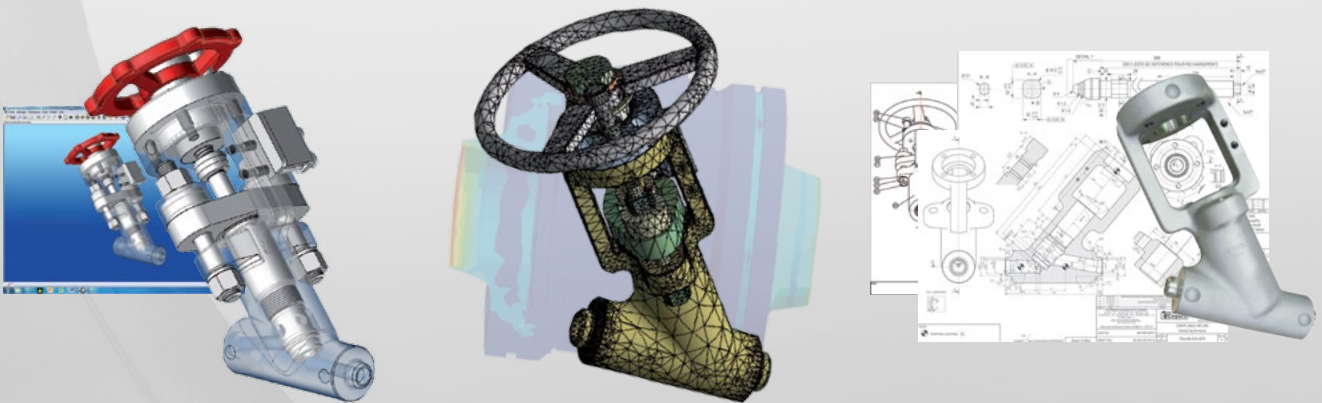
We are able to offer these designs in many grades with many variations (cryogenic design, high temperature, one-piece design, equipped with actuators, buried equipment, ...).



## A sophisticated approach

Our Energy engineering uses the 3D design software Top Solid. It is also equipped with the software ANSYS finite element calculation to match the different theoretical simulations required by its customers (fatigue, earthquake...).

Our Energy Department is expert in the development and design of valves in high level technical applications (like the Navy) wich enables it to match the requests and stipulations of its customers.



## Strong references

Our Energy department works with most major industrial actors :

- in the Energy markets (EDF, Total, Shell, ...)
- in the Nuclear markets (AREVA, EDF, ...)
- in the Defense markets (DCNS, Navantia, DSSF, ...)



# VALVES

# MACHINING WORKSHOP & ENGINEERING SKILLS

## Machining workshop

Distribution of production space at the different sites:

- **Blois** (SACCAP headquarter): 5000 m<sup>2</sup>
- **Angers** (COYARD headquarter): 4350 m<sup>2</sup>
- **Herstal** (ICARUS headquarter): 1200 m<sup>2</sup>



### Blois site

Machines	Quantity
CNC multi-tasking machines	3
CNC Lathes	22
CNC Milling machines	2
Drilling machines	5

### Production capacity:

Gate/Globe/Check ≤2" : ~ 20 000 / year  
 Ball / DBB ≤6" : ~ 10 000 / year

### Angers site

Machines	Quantity
CNC multi-tasking machines	2
Lathes (conventional   CNC)	2   8
Milling machines (conventional   CNC)	2   2
Drilling machines	2

### Production capacity:

Gate/Globe/Check ≥2" : ~ 3500 / year  
 Ball / DBB ≥1" : ~ 2500 / year

### Herstal site

Machines	Quantity
CNC Milling machines up to 2600x1200x800 / 5 axis	4
CNC Lathes up to Ø 1100mm	7
EDM (Electrical Discharge Cutting Machine)	1
Saws	2

### Production capacity:

Ball ≥6" : ~ 250 / year  
 Duo Check - all sizes : ~ 1000 / year



Mazak Integrex e-500H



DMG DMF 260 linear



Mazak VTC 300C



Mazak Variaxis 630-5X II

# Engineering skills

- Experienced engineering team
- Efficient modelling and simulation software

- FEA:
  - Samcef field
  - PTC ProMechanica
  - Ansys
- CAD:
  - PTC Pro Engineer / Creo
  - Autodesk Autocad
  - TopSolid
- CAM:
  - Mastercam
- Calculation:
  - PTC Mathcad

SAMTECH

Autodesk

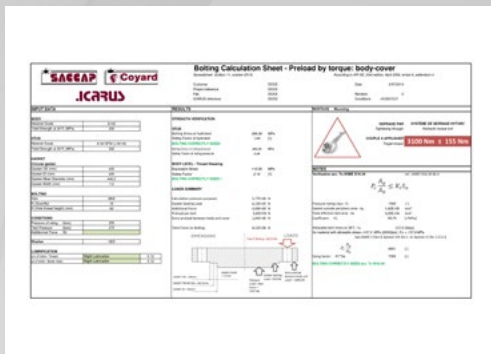
PTC

Mastercam

ANSYS

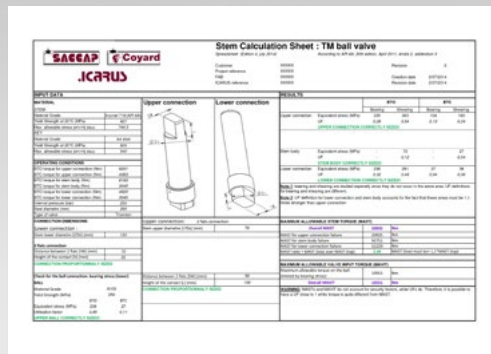
TopSolid

## Calculation notes based on standards / rules of good practice



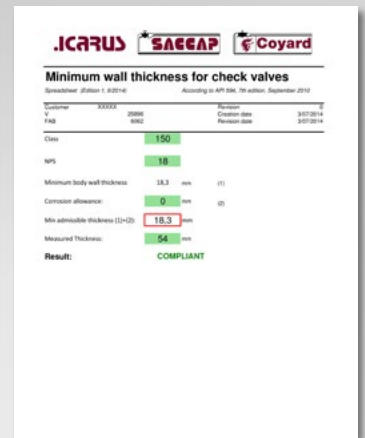
### Bolting calculation:

- Tightening torque
- Reaction forces between parts
- Working coefficient (safety)



### Stem dimensioning:

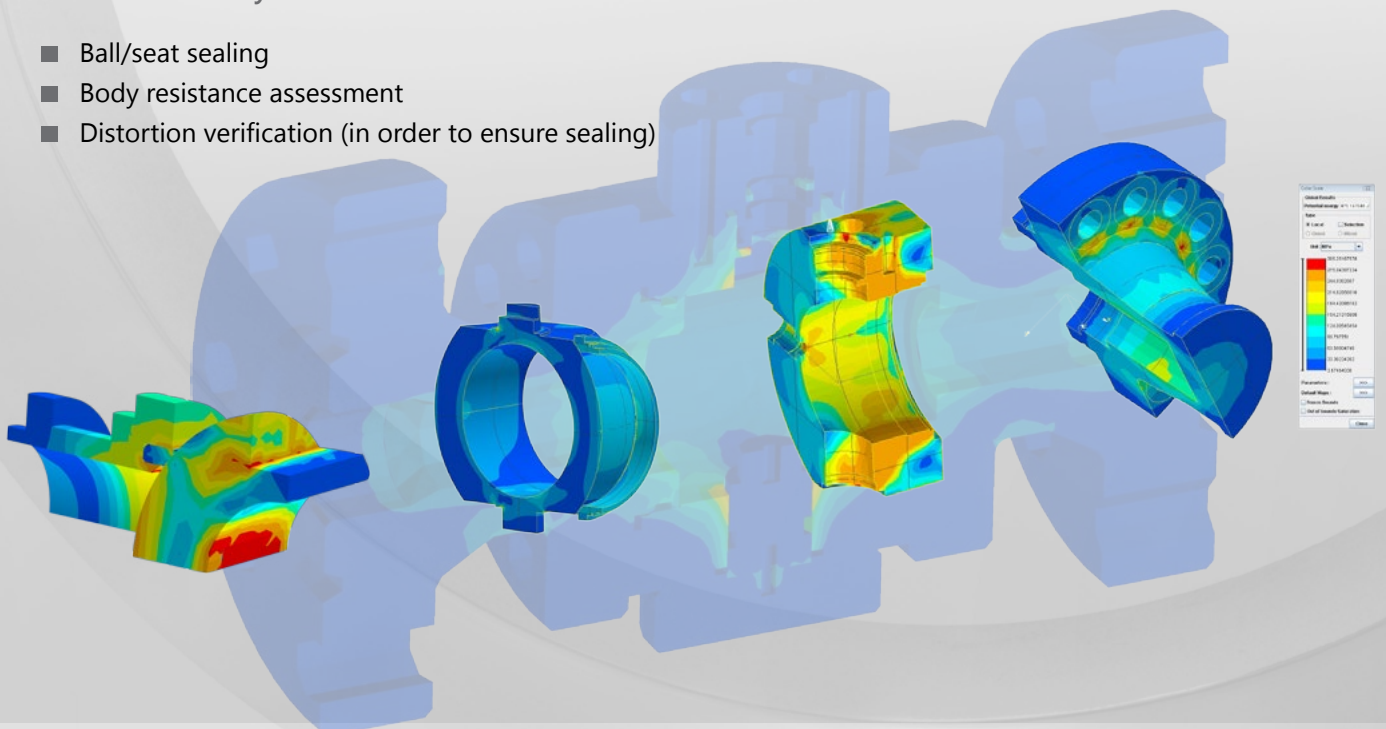
- Allowance for different shapes of stem-ends
- Working coefficient
- Maximum resistance of stem



### Wall thickness calculation for check valves

## Finite Element Analysis :

- Ball/seat sealing
- Body resistance assessment
- Distortion verification (in order to ensure sealing)



# VALVES

# SMFO : INTEGRATED FORGE & FOUNDRY

## SMFO

French Forge / Foundry, located in Allonnes

Located close to Saccap and Coyard.  
SMFO specialises in the production of:

- Forging from 0.1 kilo to 40 kilos
- Casting from 0.1 kilo to 500 kilos



## Our strength

- Single units to medium series
- Short deadlines
- Internal control of the entire process including documentary management, inspection and NDTs
- Experience in the use of a wide range of alloys:

High strength carbon steel, stainless steel including duplex and super duplex, nickel alloys, copper alloys



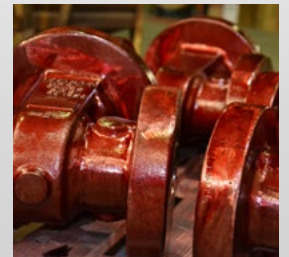
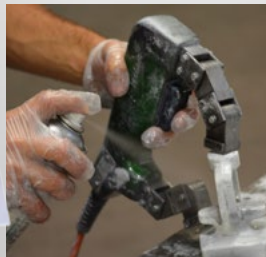
### Internal tooling production

- Die-forging
- Production of patterns



### Non-Destructive tests

- Dye Penetrant test
- Magnetic particle ex.
- X-ray
- Ultrasonic test
- Spectrometry



### Heat treatments

Electric furnace for:

- Normalisation
- Quenching
- Annealing, Tempering

### Certifications

- ISO 9001 version 2008
- DESP - 97/23/EC
- HAF604
- RCCM / RCCMX

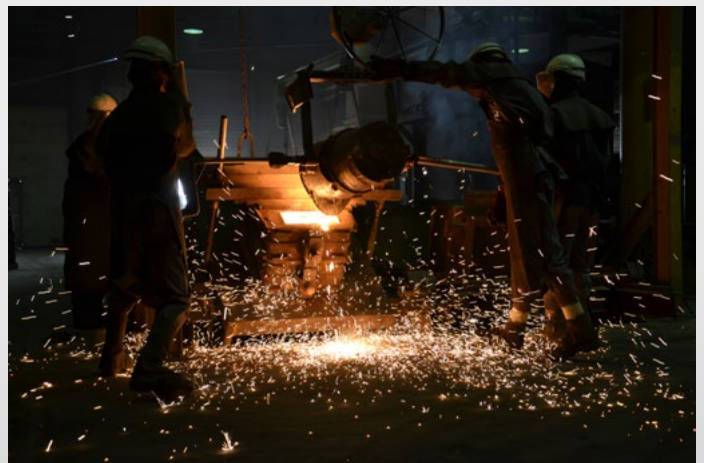


### Approved supplier

- AREVA
- EDF

### Upcoming Certifications

- NORSOK (Gr4A-Gr5A-Gr6A-CK3MCuN / F51-F53-F55-F44)
- ISO 14001 version 2004





# VALVES

# REFERENCES



## Various projects

CONTRACTOR	YEAR	END USER	PROJECT	DESTINATION	VALVE TYPE	SIZE RANGE	CLASS RANGE	BODY MATERIAL
CNIM	2013	CNIM	RIDHAM DOCK	UK	Gate (pressure seal bonnet, Slides with pneumatic actuators)	2" to 12"	1500	WC6
DSME	2013	DONG E&P	DONG HERJE	Danemark	Globe, Gate	3" to 16"	150	duplex Gr.4A / NiAlBr / CF8M
HASB	2013	EXXON MOBIL	DAMAR	Malaysia	Globe, Duo Check	2" to 4"	900 to 1500	NiAlBr / LC3
SUBSEA 7	2013	EXXON MOBIL	ERHA NORTH	Nigeria	Trunnion Mounted Ball (SDV, MOV and ROV)	2" to 12"	900 to 2500	LF2 / F65 / F53
Consistent Frontier	2013	EXXON MOBIL CO	Malaysian Project	Malasia	Wafer Duo Check	2" to 4"	300 to 1500	F51
WORLEY PARSONS	2013	EXXONMOBIL E&P (M) I	DAMAR A TOPSIDES PROJECT	Malaysia	GLOBE & CHECK	½" to 2"	900 to 2500	CS / SS / F51
WORLEY PARSONS	2013	EXXONMOBIL E&P (M) I	TAPIS Q TOPSIDES PROJECT	Malaysia	GLOBE & CHECK	½" to 2"	900 to 2500	CS / SS / F51 / Al-Bronze
C4GAS	2013	GRT GAS	GRT GAZ	France	Welded Trunnion Mounted Ball (with electrical motorisation)	14"	600	LF2
Solberg & Andersen	2013	STATOIL	Kårstø - Fractionation Depropaniser O/H condenser & reflux	Norway	Trunnion Mounted ball	14"	150	LF2
Total E&P	2013	TOTAL E&P	Kharyaga Phase 3 Project	Russia	Duo & Piston Check	¾" to 6"	150 to 2500	LF2 / SS 316
TOTAL E&P	2013	TOTAL E&P	PAZFLOR	Angola	Globe	2" to 12"	1500 to API 10 000	CS / SS / duplex Gr.4A
TOTAL E&P	2013	TOTAL E&P	SISI NUBI	Indonesia	Through Conduit Gate	2-1/16"	API 10 000	API 60K PSL 3G

CONTRACTOR	YEAR	END USER	PROJECT	DESTINATION	VALVE TYPE	SIZE RANGE	CLASS RANGE	BODY MATERIAL
TECHNIP	2013	TOTAL E&P INDONESIA	SISI NUBI 2B & PECIKO 7B	Indonesia	Gate / Globe / Check / Ball / DBB	½" to 3"	150 to API10 000	CS / SS / F51 / Al-Bronze
TECHNIP	2013	TOTAL E&P INDONESIA	SOUTH MAHAKAM PHASE 3	Indonesia	Gate / Globe / Check / Ball / DBB	½" to 3"	150 to API10 000	CS / SS / F51 / Al-Bronze
TRAPIL	2013	TRAPIL	TRAPIL (France)	France	Trunnion Mounted Ball & Gate (with electrical motorisation)	6" to 20"	150 to 900	LF2
FCC - CB&I	2013	ZADCO	CRUDE OIL STORAGE ZIRKU ISLAND	UAE	Trunnion Mounted Ball	2" to 12"	150	F53
NPCC	2012	ADCO	QUSAHWIRA FULL FIELD DEVELOPMENT 1.8 MMBOPD PROJECT	UAE	Trunnion Mounted Ball, DBB, Gate, Globe	½" to 16"	150 to 1500	WCB / CF8M / F51 / NiAlBronze
Amec	2012	BLUEWATER	Brynild	Norway	Trunnion & Floating Ball	¾" to 12"	150 to 300	LF2 / 316 / F51
SAIPEM	2012	ENI	HATCH	Mauritania	Ball / SBB / DBB	½" to 2"	150 to 1500	F53
HASB	2012	EXXON MOBIL	TELOK A / B	Malaysia	Ball, Globe, Gate, Duo Check	½" to 24"	150 to 2500	WCB / CF8M / duplex Gr.4A
PETROFAC	2012	GAZPROM NEFT	BADRA OIL FIELD DEVELOPMENT	IRAQ	Globe, Gate	½" to 24"	150 to 900	WCB / CF8M / INCO 825
ENTREPOSE Contracting	2012	LUKOIL	TUBA TANK FARM	IRAQ	Gate (with electrical motorisation)	36"	150	WCB
CBI	2012	NEXEN PETROLEUM	GOLDEN EAGLE	UK	Gate / Globe / Check	½" to 2"	150 to 2500	F53
AI GROUP	2012	NIOC	NIOC	Iran	Strainer	3", 6" & 8"	150	Ni Al Br B148 C95800
WORLEY PARSONS	2012	PETROVIETNAM	BIEN DONG PETROLEUM (PQP & WHP)	Vietnam	Gate / Globe / Check	½" to 2"	150 to 1500	CS / SS / F51
Hyundai Heavy Industries Co LTD	2012	RASGAS	Barzan	Qatar	Trunnion & Floating Ball	½" to 6" 2.1/16" to 4.1/16"	150 to 2500 & 5000psi	CS / 316 / 6Mo / Inco 825 & 625
HASB	2012	SARAWAK SHELL BERHAD	LAÏLA - D12 - F14	Malaysia	Swing Check	2" to 10"	150 to 2500	WCB / CF8M / duplex Gr.4A
TECHNIP	2012	SOBEGI	SOBEGI - LACQ - GAS TREATMENT	France	Stop Check, Swing Check, Gate	2" to 14"	150 to 600	WCB
SAMSUNG	2012	TEEKAY PETROJARL	JORDBAER FPSO (Topsides)	Norway	Gate / Globe / Check / DBB	½" to 2"	150 to 600	SS / F51
Total E&P Qatar	2012	TOTAL E&P	DP2 (Pig Launcher)	Qatar	Trunnion Mounted ball	20"	1500	A105
FABRICOM OIL & GAS B.V.	2012	TOTAL E&P NL	K6CC BOOSTER COMPRESSOR Proj.:100231	The Netherlands	DBB	½"	2500	CS / F51
TECHNIP AD	2012	ZADCO	SATAH FULL FIELD DEVELOPMENT	UAE	Globe	6"	API 10000	A494CW-6MC
Nama Mott / NPCC	2012	ZAKUM DEVELOPMENT COMPANY	Upper Zakum Facilities UZ-FFD Project-Thammama II - WAD Phase I Gas Injection Topside Facilities	Abu Dhabi	DBB	½" to 2"1/16	300 to 10000 psi	CS / Inconel 625

# PIPING

# PRODUCTS & SERVICES

## Scope of supply

### Flanges

- Compact flanges
- Standard flanges
- Long welding neck
- Orifice
- Anchor
- Swivel
- Fully designed & calculated flanges

### Pipes

Seamless & Welded

Dimensions:  
1/2" → 60"  
In all wall thicknesses

### Forged Fittings

- Elbows
- Tees
- Caps
- Couplings
- Plugs
- Nipples
- Crosses
- O-lets

### BW Fittings

- Elbows
- Tees
- Lateral & Barred Tees
- Reducers
- Caps

### Bolting

- Bolts
- Nuts
- Washers
- Screws
- Studs

### Gaskets

- API ring joints
- Anti vibration
- Elastomer seals
- Engineering plastics
- Expansion joints
- O-rings
- Hydraulic seals
- Spiral wound gaskets

### Clamps & Hubs

- Clamps connectors
- Hubs
- API Clamps

## Material grades

### Stainless steel Corrosion resistance

- 316 Mo+
- 317L
- Alloy 28
- Alloy 20
- 904L
- 19.25 HMo
- 254 SMO®

### Alloy and stainless steel

- P11
- P22
- P5
- P9, P91
- 316 L
- 304 L
- 304 H
- 321 H
- 347 H

### Austenitic-ferritic steel

Duplex : UNS S31803 / S32205  
Super Duplex :  
UNS S 32750 / S32760

### Nickel and Nickel alloy

Alloy 600, 601, 625, 825,  
400, 200/201, C276, C22,  
800, 800 H, 800 HT

### Carbon steel

- A106 Gr B
- A105
- A234WPB
- P265 GH

### Low temperature :

- LF2, A333 Gr 6
- LF3, A333 Gr 3

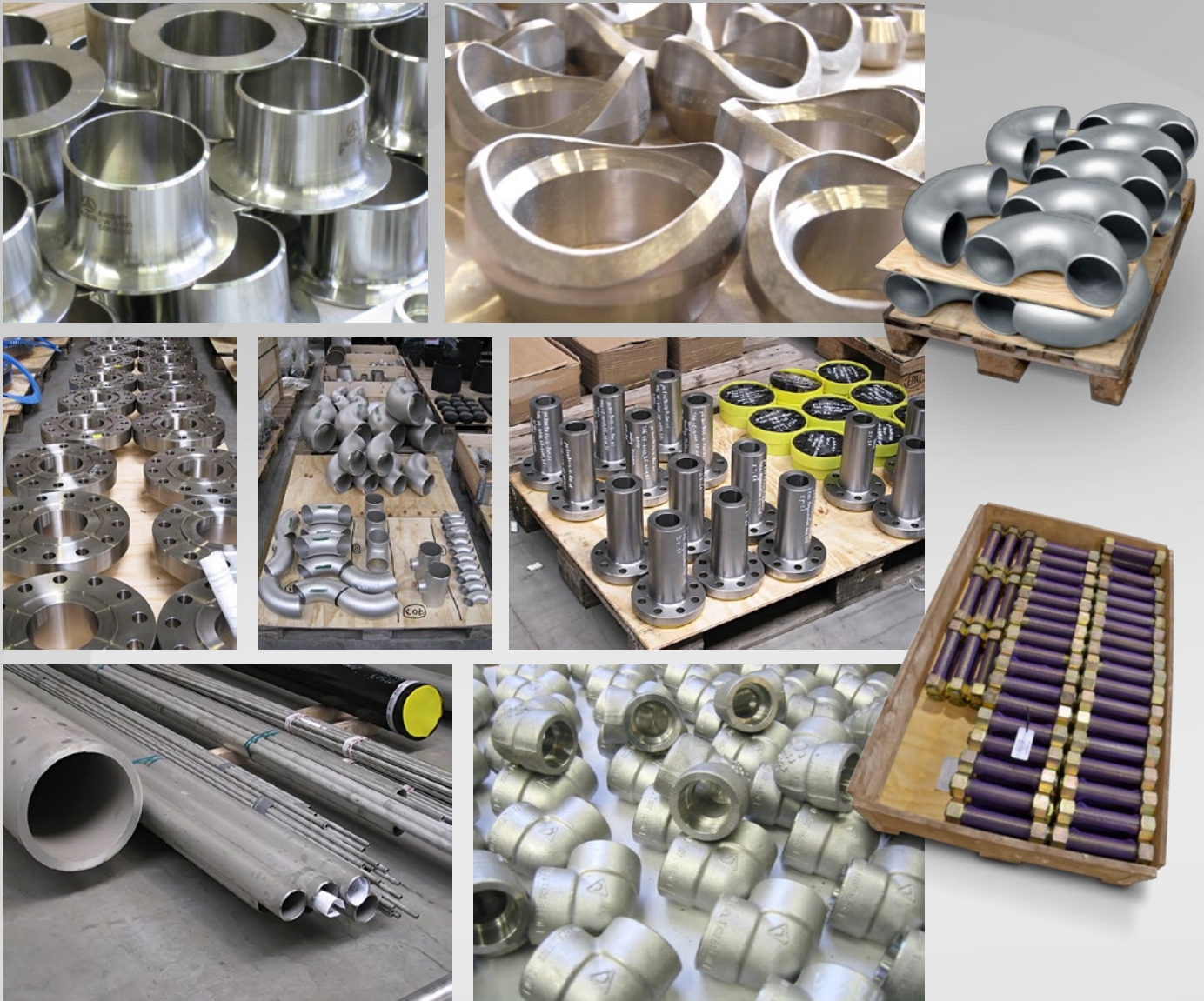
High yield strength :  
API 5L X52-60-65-80

... this is a non-exhaustive list, Do not hesitate to contact us for other needs.

ICARUS		MATERIAL COMPARISON	
Standard	ICARUS	Standard	ICARUS
ASTM A106 Gr B	A106 Gr B	ASTM A105	A105
ASTM A234 WPB	A234 WPB	ASTM A333 Gr 6	A333 Gr 6
ASTM A333 Gr 6	A333 Gr 6	ASTM A333 Gr 3	A333 Gr 3
ASTM A312	A312	ASTM A312	A312
ASTM A312	A312	ASTM A312	A312
ASTM A312	A312	ASTM A312	A312
ASTM A312	A312	ASTM A312	A312
ASTM A312	A312	ASTM A312	A312
ASTM A312	A312	ASTM A312	A312

PDF version available for download at [www.icarus-be.com](http://www.icarus-be.com)

## Piping material



### Extruded Manifolds

Material : Alloy 800 HT

Client : Total Petrochemicals Gonfreville



### Extruded Manifolds

Material : Alloy 800 HT

Client : Total Petrochemicals Gonfreville

## PIPING

## COUPLINGS & HOSES

### Our services and solutions: expertise, development, production

We supply since more than 20 years a complete range of flexible hoses assemblies and specific couplings: rubber hoses, hydraulic hoses, metallic hoses and many couplings, for using on air, water, steam, hydrocarbons, Onshore, Offshore, acids and chemicals... for low, medium, high and very high pressures.

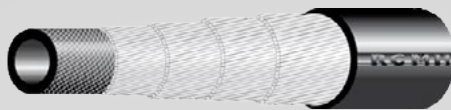
#### ■ Rubber Hoses for Air & Gas



#### ■ Rubber Hoses for Oil & Petroleum



#### ■ Rubber Hoses for Off-Shore



#### ■ Rubber Hoses for Chemical



#### ■ PTFE Hoses



#### ■ Metallic Hoses



#### ■ Half Couplings Guillemain Type



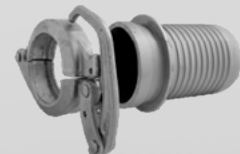
#### ■ Chicago / Express Couplings



#### ■ Quick Coupling, Camlock Type



#### ■ Victaulic type Couplings



#### ■ Dry Cam & Groove disconnect couplings



#### ■ TODO couplings

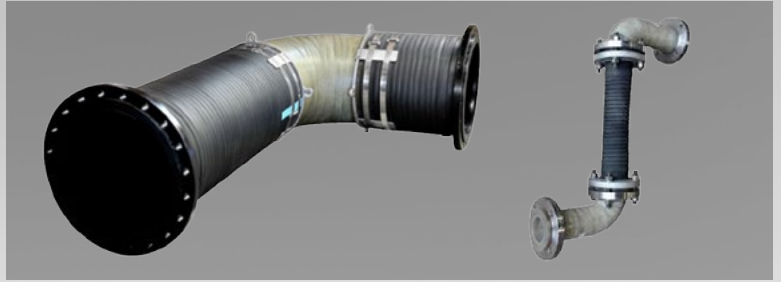


#### ■ Half flanges & joints



See our Reference List: SAIPEM O2 Pearl (TOTAL), TECHNIP TIFERT, SAIPEM SONATRACH (HASSI MESSAOUD), SNC LAVALIN : JIFCO JORDANIE, TECHNIP : PMP (QATARGAS), TECHNIP : IKRA (RUSVINYL), EIFFAGE : OFON 2 (TOTAL), SAIPEM MAFUMEIRA, TECHNIP PRELUDE FLNG (SHELL).

## Our projects



Flexibles hoses for phosphoric acids fitted 8" cam & groove couplings stainless steel 904L



# SUBSEA & SPECIAL PIECES

# PRODUCTS & SERVICES

## Our technical support at your service

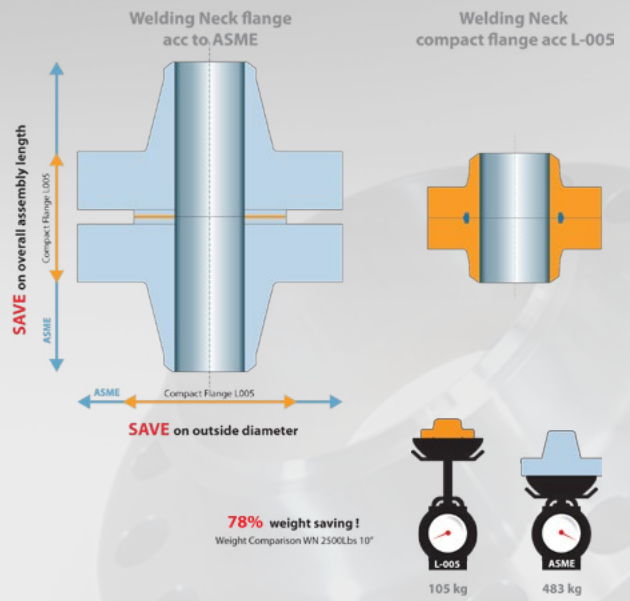
We are at your disposal for:

- Studies undertaken according to your requirements
- Flanges and forged pieces
- Special parts

## Compact flange vs. ASME flange

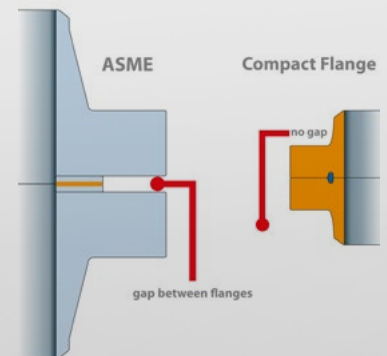
Main benefits of L-005 compact flange

- Much **lighter** (save up to 80% on weight)
- **Smaller dimensions** (in both overall length and diameter)
- **More reliable** sealing : seal ring instead of gaskets
- Multiple sealing areas
- No corrosion/erosion on flange faces (gapless)
- No need to re-tighten bolts on a regular time scale



The Raised Face (RF) on an ASME flange is a weak point

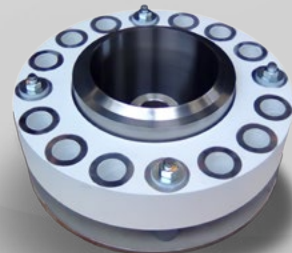
- 1) Bending forces on the piping system will relax bolting on ASME flanges after a while so that re-tightening of the bolts is required. Which is not the case for compact flanges.
- 2) Gap between 2 ASME flanges (due to RF) can cause crevice corrosion or erosion.



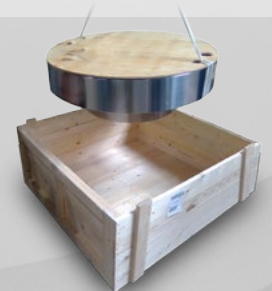
Inhouse machining of CF swivel ring  
Block 17 Phase 2 Total Angola



Hydrotest on CF assembly  
Block 17 phase 2 Total Angola



Swivel hub & ring with special coating  
and flange face protection



Welding Neck CF with proper  
protection on flange faces

## Special forgings

All sizes from ½" up to 24" (ext. Ø) and larger,  
up to 36" on request  
Maximum length up to 3500mm

High strength carbon steel, stainless steel forgings,  
including duplex and super stainless steel, nickel  
alloy, copper alloy and titanium alloy

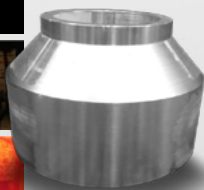
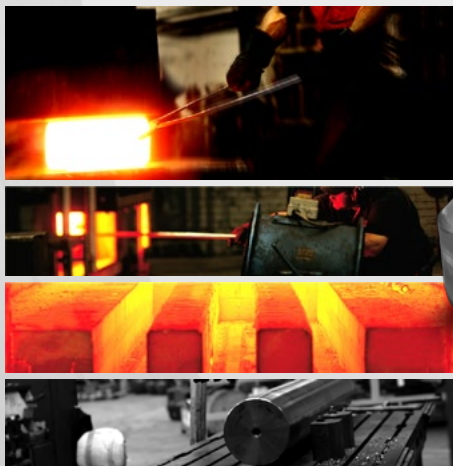
- Buckle Arrestors
- Pipe Anchors
- Hanger Flanges
- Tees and barred tees
- Wyes
- Flanges API6A/B – MSS SP44 – ASME B16.5
- Compact flanges Norsok L005

## Exemple of partnership

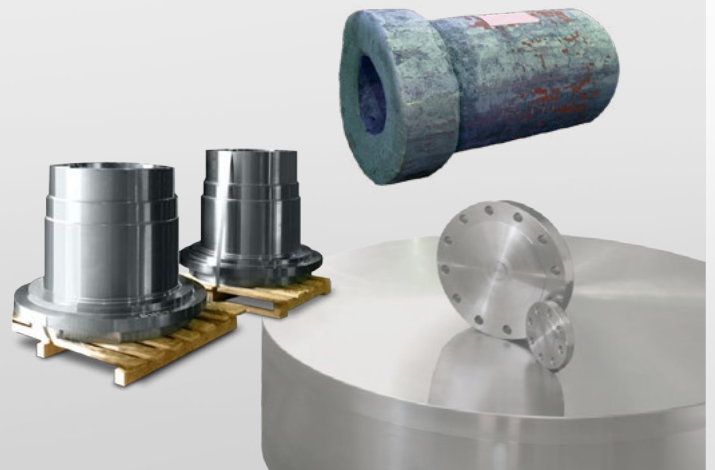
Partners forge masters working on our design and drawings :



- UK based forgemaster (Sheffield)
- Metal forgings from 1 kilo to 1200 kilos (maximum outside diameter: 1050mm)
- Ring-rolling up to 1500mm



- Spain based forgemaster (Zestoa near Bilbao)
- Three free forgings presses, with a maximum capacity of 5000 Tons
- Forgings and machining of parts up to 40 Tons
- Discs : maximum diameter is 3500 mm (40 000 kg)  
Rings : maximum diameter is 4500 mm (10 000 kg)





## SUBSEA & SPECIAL PIECES

## SPECIFIC MACHINING WORKSHOP

### Machinery list

#### Milling Machines

Brand	Model	Capacity (in mm)
<b>DMG</b>	DMF260	X 2600 / Y 1100 / Z 900 5th axis : Integrated table Ø1050 & Swivel head (axis B) - Power : 52 kW
<b>CME</b>	BF400	X 2500 / Y 1200 / Z 1500 4th axis Ø 600 Automatic head ( axis C and axis D indexable 1°) - Power : 23 KW
<b>MAZAK</b>	VTC-200B	X 900 / Y 500 / Z 500 Power : 11 KW
<b>MAXIMART</b>	Q-15	X 1520 / Y 800 / Z 700 Power : 20 KW



#### CNC Lathes

Brand	Model	Capacity (in mm)
<b>SCHIESS</b>	12 DS	Ø 1000 x 600 (Type : Vertical)
<b>DOOSAN</b>	PUMA VT900	Ø 900 x 850 (Type : Vertical)
<b>GEMINIS</b>	CNC 5 plus	Ø 800 x 3000
<b>DEAWOO</b>	PUMA 700M	Ø 800 x 2000
<b>URSUS</b>	plus 300	Ø 400 x 2000
<b>DEAWOO</b>	PUMA 400	Ø 400 x 1500
<b>DEAWOO</b>	PUMA 400L	Ø 400 x 2500



#### EDM ( Electrical Discharge Cutting Machine )

Brand	Model	Capacity (in mm)
<b>ONA</b>	RE 400	600 x 300 x 400

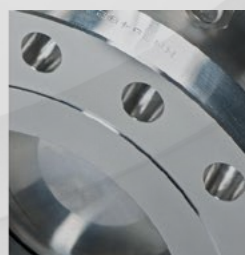
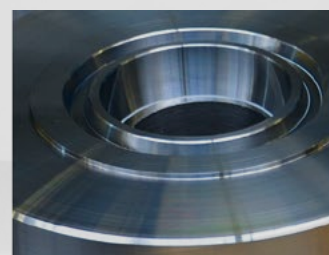
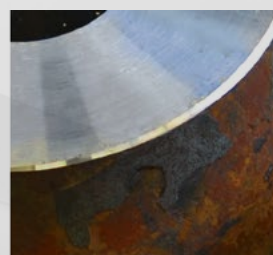
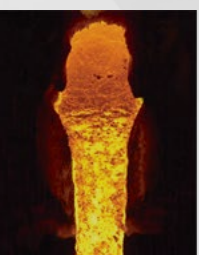
#### Saws

Brand	Model	Capacity (in mm)
<b>KASTO</b>	HBA	Horizontal Saw Max Height : 720mm
<b>PEHAKA</b>	HS 540	Horizontal Saw Max Height : 540mm



#### Welding Machines

Brand	Model	Capacity (in mm)
<b>TIG MIGATRONIC</b>	BDH 320	maximum 320 A DC



### Computer-assisted design and production

Creation of machining program for use with our CNC machines.

Our main tool for the implementation of virtual models and parameters:

**Mastercam**

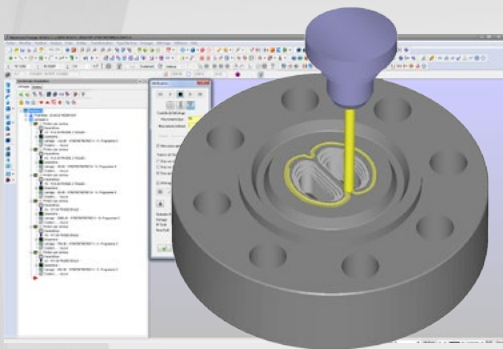


### Pass simulation

Integration of 3D model, definition of path, of cutting parameters, and of the type of tool.

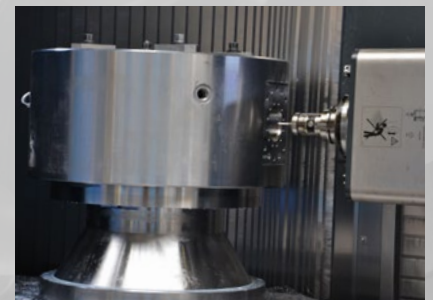
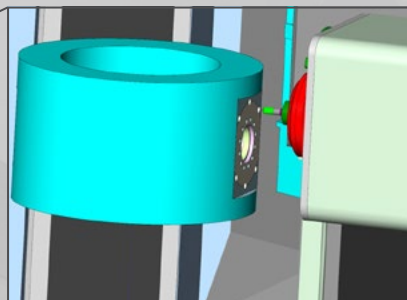
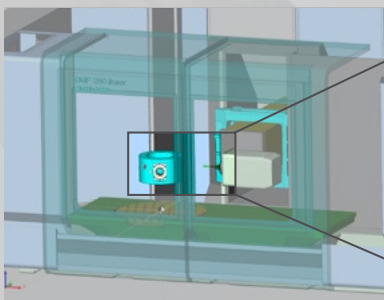
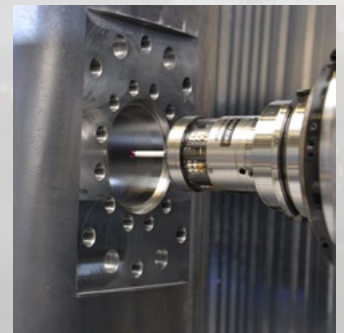
(tool path precision to 0,001mm)

Post-processing output of the NC file, tool list, machining range and transmission of the program to the machine by WiFi.



### Reproduction of machining conditions

Realistic simulation of machining with modelling of the machine, collision assessment, and precise forecasting of the machining time.



# SUBSEA & SPECIAL PIECES

# DESIGN OFFICE

## Custom products & solutions

- Experienced engineering team
- Most advanced modelling & simulation software

- FEA :
  - Samcef field
  - PTC ProMechanica
  - Ansys
- CAD :
  - PTC Pro Engineer / Creo
  - Autodesk Autocad
  - TopSolid
- CAM :
  - Mastercam
- Calculation:
  - PTC Mathcad

SAMTECH

Autodesk

PTC

Mastercam

ANSYS

TopSolid

## Our services

- Design and manufacture of custom products
- 3D modelling services
- FEA Analysis
- Calculations
- Reverse engineering services



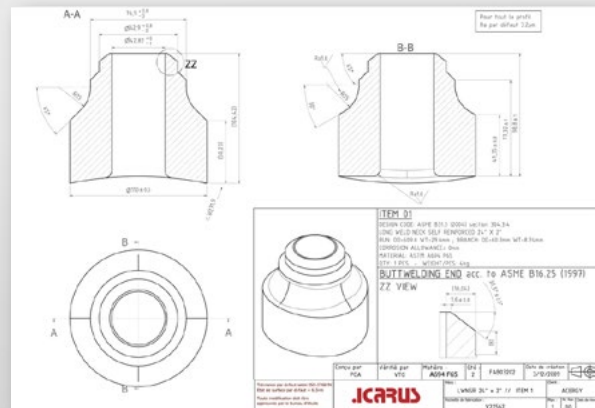
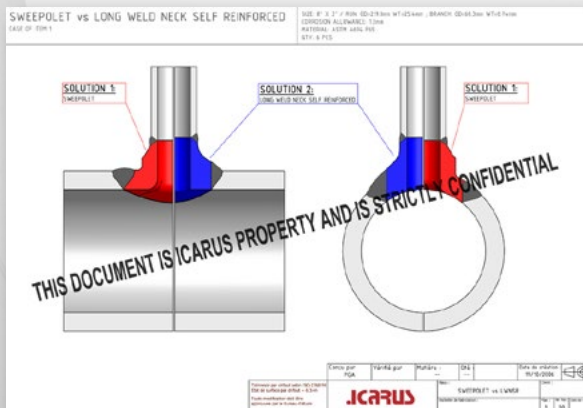
FEA ANALYSIS



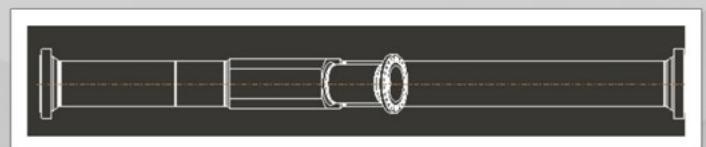
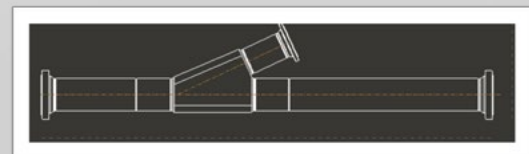
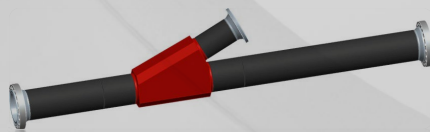
DETAILED CALCULATION NOTES

## Design

Long welding neck self reinforced



Wyes



# Calculation note

## Compact Flange



**Welding Neck CF 11"**  
Client : Saipem for Total Pazflor project

## Weldolet

**Weldolet 10" x 2"**  
Client : SBM - Cidade de Marica project

# Inhouse FEA calculation

# Examples of custom projects

- Special compact flanged joint design (based on NORSOK L-005) : including swivel ring flanges, out of standard welding neck flanges, development of special connections for cryogenic applications.
- Special flanged joint design (based on ASME B16.5 or API 6A / 17D) : swivel ring flanges.
- Calculation of branch outlet : "Common" solutions as weldolet, design of special branch outlet called the Long Weld Neck Self Reinforced.
- Development of all kind of pressure related equipment.

# SERVICES

## Supply of complete package

We are able to provide you a complete package of products for your project

- Standard or special valves
- Piping & fittings
- Special parts from Engineering (flanges, forgings, etc.)

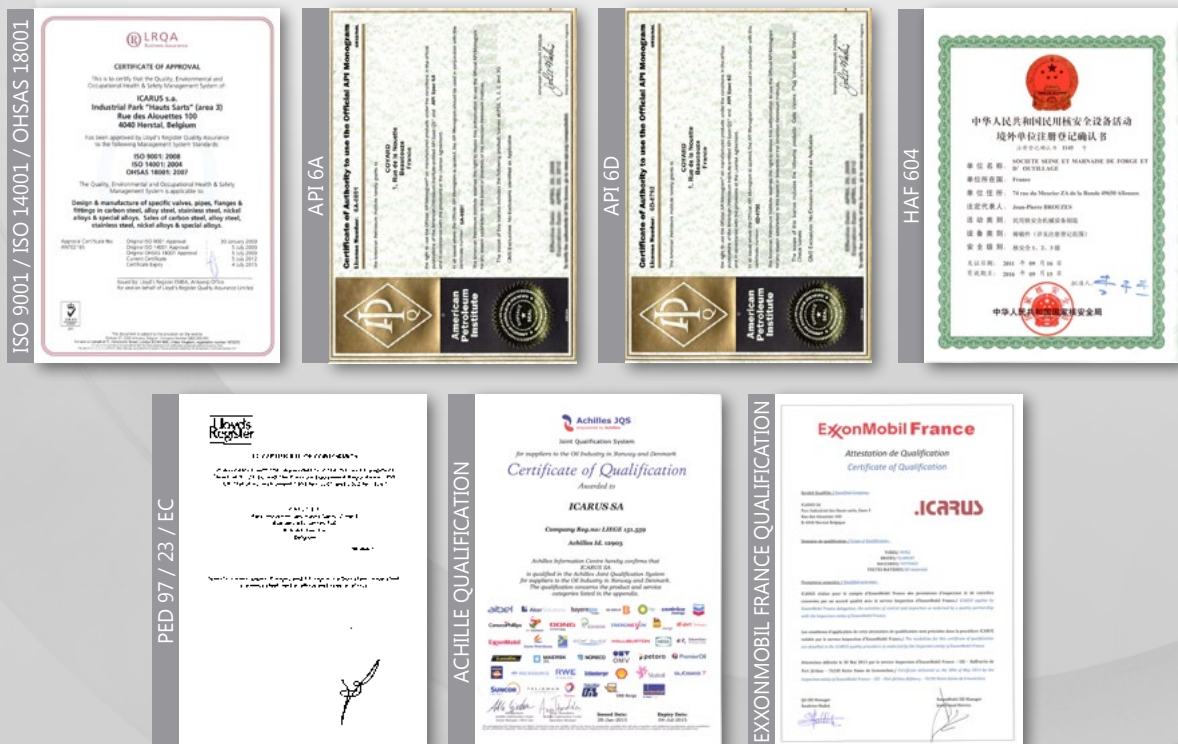
## Services provided

The entire range of supplied products is supported by an offer of complete services

- Quality assurance / Quality control
- Contract review
- Proven project management
- Following standards and specifications required by each project
- ITP management
- Third-party inspection
- Expediting
- Certificate management
- ...

## Quality assurance

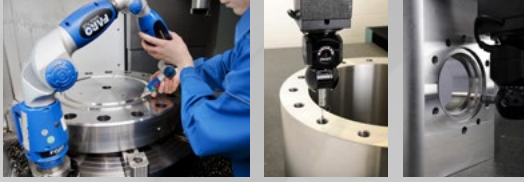
Details of certifications by site available on demand



## Dimensional analysis

### Specific measurement tools

- FARO 3D measuring arm
- Wenzel 3D measuring table
- Coating thickness measurement tool
- Ultrasonic thickness measurement



## Test range

### Non-destructive tests

- Magnetic particle examination
- Dye Penetrant test
- PMI
- Ferritoscope
- Hardness
- Ultrasonic test
- X-ray
- Pig gauge trial

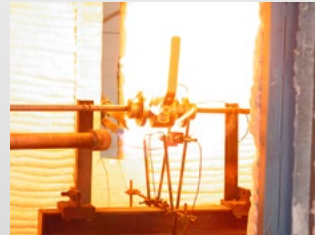
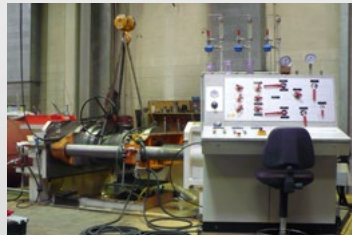


Additional tests on demand

## Simulation of extreme conditions

### Specific service or environment

- High pressure ( air / gas / water )
- Fugitive emission test (helium)
- Cryogenic test
- Fire test



## Pressure tests

### Test capacities:

- Hydraulic up to 1100 bars
- Pneumatic up to 6 bars
- High pressure gas up to 700 bars
- Cryogenic down to -196°C
- Leak detection test (with helium)

### Test equipment:

- Presses
- Safety bunkers for pressure tests
- Cryogenic tanks

