

AUBERT&DUVAL



## Special Steels and Superalloys for the Oil and Gas Industry

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**Realisation:** Makheia Affinity, Aubert & Duval 04-2009  
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Spar Plateform: Courtesy of Technip



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## Our pledge: your satisfaction

### When new metallurgical challenges must be met, we stand by you !

With the rapid exhaustion of existing fields, the Oil & Gas industry faces new industrial challenges to meet the requirements of more demanding environments: ultra-deep offshore, arctic well-below-zero conditions, more aggressive gas, etc. This results in the need for products withstanding higher pressure, very high (or very low) temperatures, and fierce corrosion, which Aubert & Duval is able to provide.

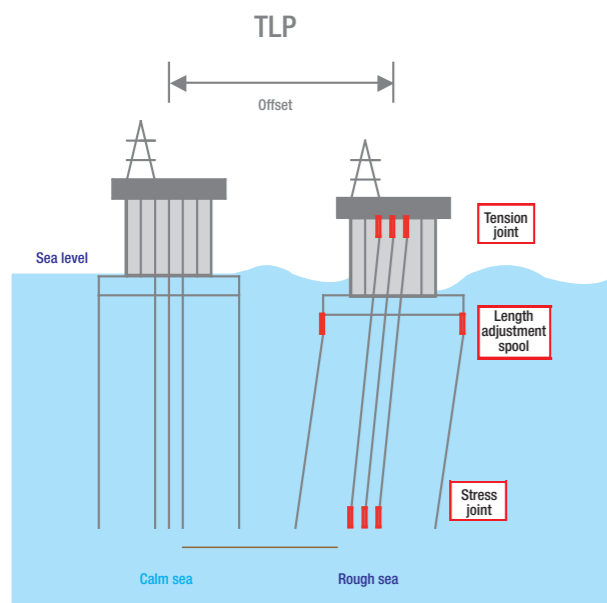
### A long history

Due to its dedicated forging and heat-treatment equipment for extra-long steel parts, Aubert & Duval has been a leading supplier in the market of specialty joints for TLP, Spar and FPSO. Some of our products have already been operational under extremely severe condition for 20 years. We have participated in projects such as: Girasol, Brutus, Bonga, Matterhorn, Constitution and many others.

We are proud to have the following companies as regular customers: Shell, FMC, RTI, SRP ( Subsea Risers Products), Technip, Mountwest, SBM Offshore, Sultzer pumps...

### Qualified Products and Process

Aubert & Duval follows the most stringent requirements in terms of grade composition, microstructural material integrity, dimensional tolerances and quality control. All of our products comply with ASTM and NACE standards.



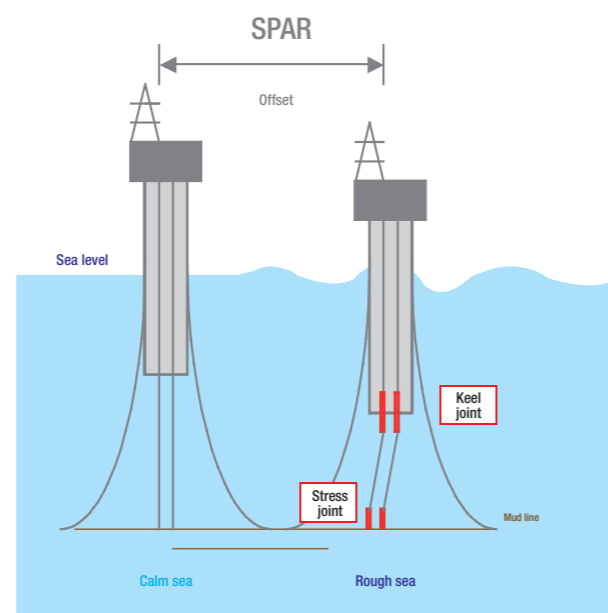
### Development

With R&D - 2% of turnover spent every year - and with dedicated investments, such as milling machines, lathes, heat treatment furnaces and control equipment, Aubert & Duval makes sure that it remains competitive in terms of performance, quality and cost.

New grades: Aubert & Duval is constantly seeking to meet customers' requirements created by new challenges of the oil & gas industry, such as those corresponding to ultra-deep offshore drilling, or extremely harsh corrosion/pressure/temperature environments. The NYB66® superaustenitic is a result of this endeavour.

Titanium parts: Aubert & Duval has recently announced its decision to further invest in titanium forging, together with UKTMP, a leading supplier in Ti raw material.

Powder Metallurgy: in cooperation with its sister-company Erasteel - a leading manufacturer of high cleanliness gas atomized metal powders - Aubert & Duval can also design customized solutions for small and medium sized highly stressed near-net-shape or bimetal HIP components.



## Top-tensioned risers Tendon systems Other critical steel parts

### Dedicated capabilities

To meet the specific requests for critical parts in the oil & gas industries, Aubert & Duval has built an extensive product offering. It provides the optimum combination of expected functionalities: corrosion and extra-low or high-temperature resistance, shock and pressure-resistance, durability and performance.

### Stainless Steels

Grade	UNS Ref.	Application(s)
<b>F51</b>	S31803	HP Pumps
<b>F53</b>	S32750	HP Pumps
<b>NYB 66*</b>	S31266	New grade for highly-demanding applications
<b>F44</b>	S S31254	Highly-demanding applications
<b>Drilloy 262</b>	N/A	Non magnetic Drilling Stabilizers
<b>F6 NM</b>	S41500/42400	Swivels and Specialty Joints, HP Pumps
<b>800/810/811</b>	N08811	Heat exchangers and Coolers

\* Grade co-patented by Aubert & Duval and Industeel.

### Specialty Alloyed Steels

Grade	Application(s)
<b>F22 and F22V</b>	Specialty Joints for TTRs
<b>A707 Gr. 1, 3 and 3W</b> <b>SAE 8630</b> <b>HY80/HY100 (A508 Gr 4N)</b>	Risers stress joints, hang-off spools, length-adjustment spools
<b>ASTM A508 Gr 3</b>	Pressure vessels
<b>PM (powder metallurgy)</b>	Swivel joints

### Superalloys

Grade	UNS Ref.	Application(s)
<b>625</b>	N 06625	Seabed equipments, valves, fittings
<b>718</b>	N 07718	Seabed equipments, valves, fittings

### Semi-Finished or Finished Extra-long Forged Parts for TTR and LAS

Aubert & Duval facilities display a range of high-tech equipment dedicated to the manufacture of finished forged parts, up to 20 m (66 ft) long:

- Steel Melting: 47 t Electric Arc Furnace able to provide parts up to 30 Tons for massive forgings and 12 Tons for tubes
- Forging: 4,500 t opened-die forging press
- Heat Treatment: 14 horizontal or vertical furnaces up to 21m, quenching, cold or warm straightening
- Machining: turning, milling, drilling, sawing, etc.

This equipment is typically optimized for long specialty riser joints.

### Other Applications

The breadth of our product portfolio allows us to participate in many other on-shore and off-shore projects, such as drilling stabilizers, hydraulic jacks, SCR stress joints, and some critical parts of seabed equipment.

