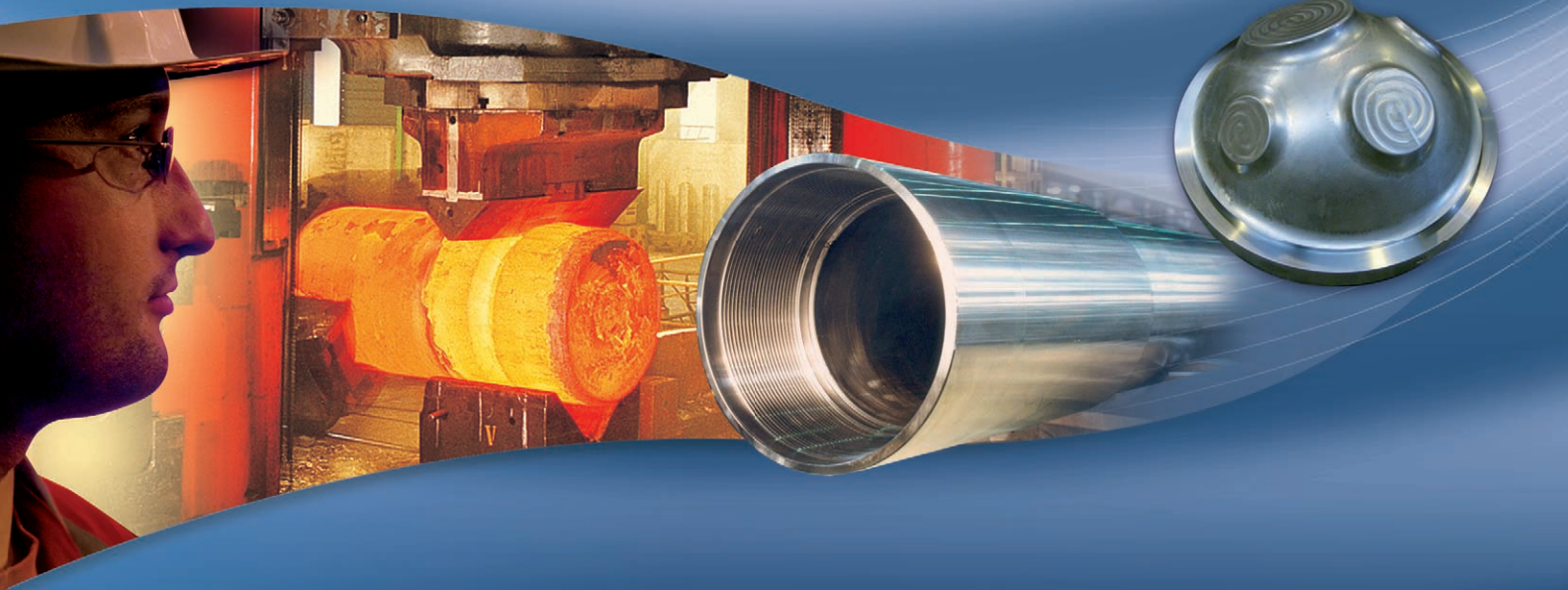


AUBERT&DUVAL



Special Steels, Superalloys, Aluminum and Titanium for the Naval and Marine Industries



Enhancing your performance

A Proven Record in Marine Industry

With a proven record in the marine industry, Aubert & Duval offers metallic solutions for every situation.

Our pledge:
your satisfaction

A wide array of solutions for small and mid-size critical components

Merchant vessels, warships, submarines and offshore vessels: this market represents approximately \$300 billion in the next 20 years. When it comes to small and mid-size components able to guarantee safety, increase performance and withstand sea-water corrosion, think of Aubert & Duval. We are proud to participate in the development of cooling circuits for submarines, precision shafts for water-jet-turbines, landing grids for helicopters and UAV (Unmanned Aerial Vehicle), as well as in numerous other marine projects.

A proven history in marine industry

For more than 30 years, Aubert & Duval has been a leader in the most demanding marine applications. Our reputation has gained partnerships such as with DCNS, Areva/Technatome, Rolls-Royce Marine, BAE Systems and Navantia.

Qualified Products and Process

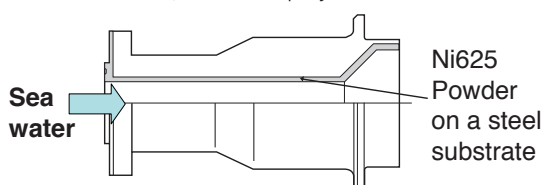
Aubert & Duval follows the most stringent requirements in terms of grade composition, microstructural integrity, dimensional tolerances and quality control. Our products comply with multiple military standards.

Development

With R&D equal to 2% of turnover spent every year, and with dedicated investments in melting, remelting, machining, and testing equipment, Aubert & Duval makes sure that it remains competitive in terms of performance, quality and cost.

Because we believe in the future of titanium, Aubert & Duval is investing in a dedicated forging workshop, together with UKTMP, a leading supplier in Ti raw material.

In order to save on raw materials and costly operations for its customers, Aubert & Duval is constantly promoting innovative near net shape (NNS) solutions. This includes Powder Metallurgy hiped products, developed in cooperation with Erasteel, a sister-company of Aubert & Duval.



Bimetalllic Submarine parts, produced through powder metallurgy, followed by hot isostatic pressing.

Dedicated capabilities

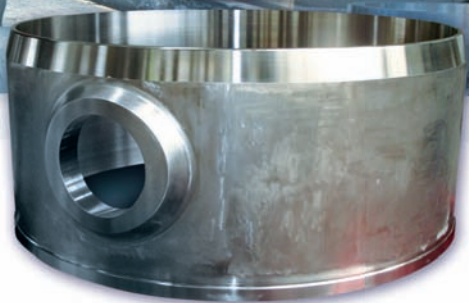
To meet specific requests for critical parts in the Marine industry, Aubert & Duval offers an extensive product range. It provides the optimum compromise between mechanical properties (yield strength, fatigue) and resistance to localized corrosion (pitting and crevice).

The following processes are available within Aubert & Duval, or qualified subcontractors:

- Steel making for any special, stainless steel or superalloy : EAF + AOD/VOD, VIM, gas-atomization powder.
- Remelting ESR or VAR
- Open-die forging (parts up to 30 tons)
- Closed-die forging parts up to 8 Tons (with presses from 4800 to 65000 tons)
- Rolling of bars, sheets and plates
- Heat treatment for up to 21-meter long forged parts (eg shafts and tubes)
- Machining up to 20 meters

Aubert & Duval is also a leader in steel and superalloy parts for Aerospace, Oil & Gas, Land and Sea Transportation and the Defense markets. Please ask for the corresponding brochures.





Aubert & Duval Proprietary Steels

Grade	Type	Applications
Super-Austenitic Stainless Steel		
NYB66*	S31266	Sea water circuit, cups, piston, bell for flexible
Martensitic Stainless Steel		
APX4	X4CrNiMo16-5-1	Periscope masts
Precipitation Hardening Steels		
MARVALX12 MLX17 MLX19	X1CrNiMoAlTi12-9-2 X1CrNiMoAlTi12-11-2 X1CrNiMoAlTi12-12-2	Helicopter / UAV landing grids
Maraging Steels		
MARVAL18 MY19	Maraging 250 Maraging 300	Motor case for submarine vehicles, cups, sheets

*Copatented by Aubert & Duval and Industeel, the NY B66 is particularly suited for crevice-corrosion resistance in sea-water environment.

Standard Steels

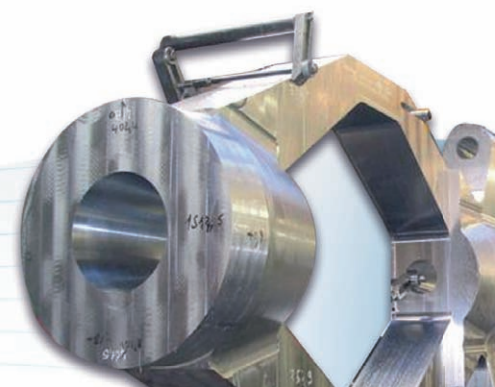
Grade	Type	Grade	Type	Applications
Alloyed Steels		Duplex Stainless Steel		Launch Torpedo Tubes, Spindles, Rods, Shafts, Sleeves, Manholes, Pump elbows, Blocks, Rings, Flanges, Nozzles, Filters, Caps, Covers, Grids, Shells, Bells for Flexible, Stearing Gears, Press Main shafts...
80HLES 100HLES	12NiCrMoV18 X10NiMoCrV6	URANUS 47N	Type 24.07	
ASTM A508 Gr3	16MnD5	Superduplex Stainless Steels		
HY80 HY100	K31820 K32045	URANUS 47N+ URANUS 52N URANUS 52N+	S32750 S32550 S32520	
Austenitic Stainless Steels		Non magnetic Stainless Steels		
AISI 304L AISI 316L AISI 347 AISI 316LN AISI 316Nb	S30403 S31603 S34700 S31653 S31640	URANUS C1 URANUS C2 (XM19)	W1.3964 S20910	

Superalloys and Titanium

Grade	Applications
Titanium Alloys	Closed-die forged cups
Inconel 625 gr 1&2 PYRAD53NW	Flanges, fittings, valves

Aluminum

Grade	Applications
AI 2214 T654 AI 7010 T74 AI 6082 T6 AI 6082 T652	Torpedos



The information and the data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically suggested for material described herein are made solely for the purpose of illustration to enable the reader to make his own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. Aubert & Duval's liability shall not extend, under any circumstances, to the choice of the Product and its consequences.

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