

SPECIALTY ALLOYS FOR AEROSPACE

BÖHLER TM UDDEHOLM

SPECIALTY ALLOYS FOR AEROSPACE

Faster, lighter, higher — terms of our times which must be taken literally, especially in the aerospace industry. Fulfilling these requirements demands everything of materials.

Böhler-Uddeholm provides the materials that aerospace engineers need — in the grade and dimension they want.

Each and every step of production — from melting to delivery — is in our own hands and means the highest, most consistent quality for you. This is why Böhler-Uddeholm has become one of the most reliable partners of the international aircraft industry.





WING COMPONENTS

- Engine Pylons
- Engine Mounts
- Panels
- Bearing
- Flap Tracks
- Slat Tracks

LANDING GEAR COMPONENTS

- Lower Arm
- Cylinder
- Support
- Main Landing Gear Fitting
- Brakes

ENGINE COMPONENTS

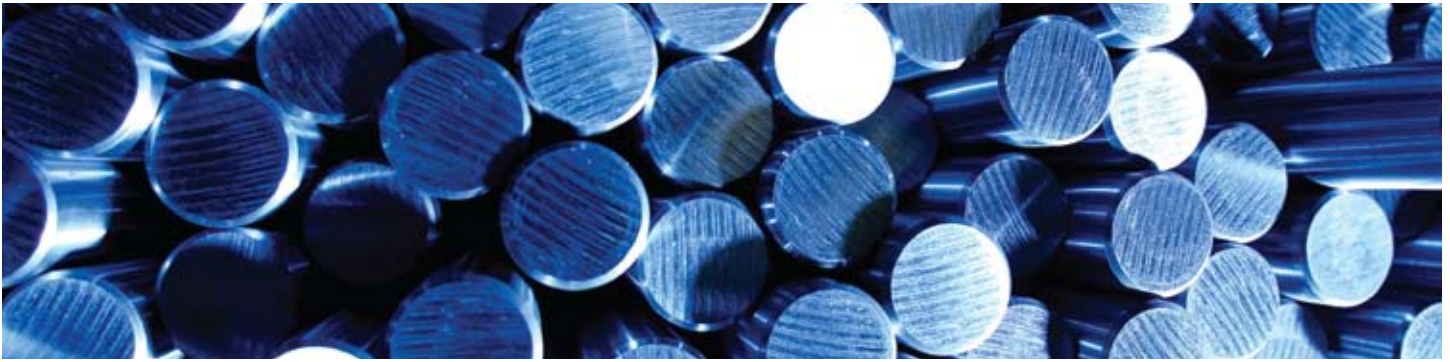
- Shaft
- Compressor Blades / Vanes
- Bearing
- Gear
- Casing / Seal

FUSELAGE COMPONENTS

- Doors
- Cargo Systems



APPROVALS



MAIN SYSTEM APPROVALS

NADCAP, AS9100:2003 (by BSI), ISO9001:2000 (by BSI)

- GE S1000
- PWA 300
- Rolls Royce SABRE
- Snecma
- MTU (MTV)
- ITP (acc. AS9100)
- Agusta (acc. AQM-002)
- Airbus Germany (acc. QVA-V06-02-00)
- Airbus UK Ltd. (acc. AUK/SA/001-3)
- BAE Systems (Operations) Ltd.
- BAE Systems Regional Aircraft (RALOA/00503/3)
- Böhler Schmiedetechnik
- Boeing (D1-4426)
- Bombardier Aerospace (Code 121017)
- Hawker Beechcraft Corp. (Code HBIFSAS/Part3/0815)
- Korean Air
- Messier Dowty (SAFRAN Group)
- NHBB
- Westland Helicopters
- SKF Aeroengines France (SNFA)

MAIN LABORATORY APPROVALS

| | |
|-----------------|---|
| NADCAP | Chemical, Mechanical, Corrosion Testing, Metallography and Hardness, Heat Treatment |
| GE Aero Engines | S400 |
| Pratt & Whitney | LCS/MCS MCL F17* |
| Snecma Moteurs | FAL n°310 acc. PRO 0430 |
| Rolls Royce | MSRR 9951 |
| Airbus France | MM 049 |
| Boeing | D1-4426 |

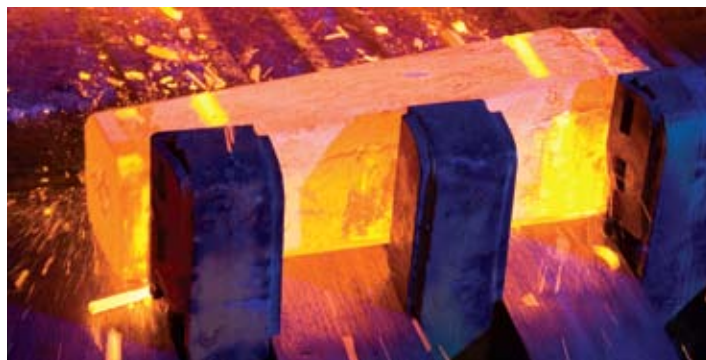
* P&W LCS requirements have to be ordered specifically.

MAIN NDT APPROVALS

| | |
|-----------------|----------------|
| NADCAP | AMS 2154 |
| GE Aero Engines | P3TF34 |
| Pratt & Whitney | SIM 14, SIS 45 |
| Snecma Moteurs | DMC 0022 |
| Rolls Royce | RPS 707 |
| Airbus UK | |
| Boeing | D1-4426 |

Being one of the largest and most renowned special steel producers in the world, Böhler-Uddeholm offers a wide range of special steels and nonferrous metal alloys.

Below is a survey of our common materials for the aircraft industry. We supply materials according to all current specifications and standards.



Premium Melted — Ni Based Alloys

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | STANDARDS | | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|--------------|--------------|---------------|---------|--------------------------------------|-------------------|------------------------|--|--|--|
| | | VIM ESR | VIM VAR | AMS | W Nr./ UNS | ASTM | OTHERS | | |
| BÖHLER L718 | Alloy 718 | | • | 5662 5663 | 2.4668/ N07718 | B637 | NiCr19NbMo | Snecma DMD 424-22 GE B50TF15 A/D/E; C50TF6; B50A809C* P&W PWA-S-5662H Cl.2, PWA-S-5663E Cl.2 Goodrich AMS5662* Boeing D1 4426 (PC694, PC696)* MTU - MTS 1424-1* | Round Bars: 14.5 – 203.2mm (0.57" – 8") Flat Bars, Ingot, Billet, Hot Rolled Coil |
| BÖHLER L303 | Waspaloy | | • | 5704 5706 5707 5708 5709 | 2.4654/ N07001 | B637 | | Snecma DMD 0426-22 | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Billet, Hot Rolled Coil |
| BÖHLER L625 | Alloy 625 | • | | 5666 | 2.4856/ N06625 | B446-03 G1 B564-06a | NiCr22Mo9Nb ASME: SB446-07 SB564-07 | Snecma DMD 0436-22 Honeywell EMS 55425P cond B | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Ingot, Billet, Hot Rolled Coil |
| BÖHLER L901 | Alloy 901 | | • | 5660 5661 | 2.4662/ N09901 | | | Snecma DMD 0212-22 GE | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Hot Rolled Coil |
| BÖHLER LHX | Alloy X | • | | 5754 | 2.4665/ N06002 | B572 | | Snecma DMD 491-23 GE B50TF31-A | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Hot Rolled Coil |
| BÖHLER L080A | Alloy 80A | • | • | | 2.4631/ N07080 | B637 | NiCr20TiAl EN 10269 | | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Hot Rolled Coil |
| BÖHLER L090 | Alloy 90 | • | • | 5829 | 2.4632/ N07090 | B637 | | MTU MTS 1042-2* | Round Bars: 12.5 – 203.2mm (0.49" – 8") Flat Bars, Hot Rolled Coil |

* Specific customer approval for a specific size or product range.

PH Grades

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | | | STANDARDS | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|-------------|--------------|---------------|---------|---------|---------|--------------|-------------------|----------------------------------|---|--|
| | | EAF | EAF ESR | EAF VAR | VIM VAR | AMS | W Nr./ UNS | OTHERS | | |
| BÖHLER N700 | 17-4 PH | • | | | | 5643 | 1.4542 | Z6CNU17.04 X5CrNiCuNb17 4 4 | Snecma DMB 229-20* P&W CPW-S-5643 | Bar-Round, Flat, Billet, Hot Rolled Coil |
| BÖHLER N700 | 17-4 PH | | | • | | 5622 5643 | 1.4548 | EZ6CNU17.04 X5CrNiCuNb17 4 4 | Airbus ZBF1109, ZBF301438 Alenia P19X316 | Bar-Round, Flat, Billet, Hot Rolled Coil |
| BÖHLER N701 | 15-5 PH | | | • | | 5659 | 1.4545/ S15500 | EZ5CNU15.05 X5CrNiCu15.05 | Airbus ASNA 3297; ASNA 6116; Eurocopter ASNA 3294* Boeing D1 4426 (PC660)* Bombardier EMCM-001-1013 Goodrich AMS5659* | Bar-Round, Flat, Ingot, Billet, Hot Rolled Coil |
| BÖHLER N709 | 13-8Mo | | | | • | 5629 | 1.4534/ S13800 | EZ3CNDA 13-8 X3CrNiMoAl13-8-2 | Airbus ZBF1109, ZBF301438 Bombardier EMCM-001-1013 | Bar-Round, Flat, Billet, Hot Rolled Coil |
| BÖHLER T670 | | • | | | | | 1.4594 | S143 | | Bar-Round, Flat, Billet, Hot Rolled Coil |

* Specific customer approval for a specific size or product range.

OUR MATERIALS

Aerospace Bearing and Gear Steels

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | | | STANDARDS | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|---------------|------------------|---------------|---------|---------|---------|--------------|-------------------|--------------------------|--|---|
| | | EAf | EAf ESR | EAf VAR | VIM VAR | AMS | W Nr. /UNS | Others | | |
| BÖHLER E105 | 9310 | | | • | • | 6265 | ~1.6657 | AISI 9310 | Agusta 199-20-005 | Round Bars: 12.7 – 400mm (0.5" – 15.75") Flats, Billets |
| BÖHLER N360 | X30 | | • | | | 5898 | 1.4108 | X30CrMoN15-1 | | Round Bars: 2.9 – 130mm (0.11" – 5.12") |
| BÖHLER N695 | 440C | • | | • | | 5618 5630 | 1.3544 | X105CrMo17 X102CrMo17 | | Round Bars |
| BÖHLER R100 | 52100 VIM/VAR | | | | • | | -- | 100Cr6 | | Round Bars |
| BÖHLER R100 | 52100 | | | • | | 6444 | -- | 100Cr6 | | Round Bars |
| BÖHLER R250 | M50 | | | | • | 6491 | ~1.3551 | | Snecma DMD 119-20* GE C50TF56* P&W PWA793*,CPW378* | Round Bars: 12.5 – 125mm (0.49" – 4.92") |
| BÖHLER R350 | M50 Nil | | | | • | 6278 | | | GE B50TF211* | Round Bars: 12.5 – 125mm (0.49" – 4.92") |
| BÖHLER V361 | E32CDV13 | | | | • | 6481 | ~1.7765 | E32CDV13 | Eurocopter ASNA 6128*, Agusta AMS6481* | Round Bars: 12.5 – 125mm (0.49" – 4.92") |
| BÖHLER V124SC | 4340 | | | • | | 6414 | 1.6944/ G43400 | S149 | Agusta 199-20-007 (ESR) Bombardier EMCM-001-1013 | Round Bars |

* Specific customer approval for a specific size or product range.

High Performance Aerospace Steels

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | | | STANDARDS | | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|------------------------------|--------------|---------------|---------|---------|---------|--------------|------------------|------|---------------|--|---|
| | | EAf | EAf ESR | EAf VAR | VIM VAR | AMS | W Nr. /UNS | BS | OTHERS | | |
| BÖHLER A750 | | • | | | | 5646 | 1.4546 | S130 | X5CrNiNb18-10 | Airbus ZBF1109, ZBF301438 | Round Bars: 0.63-220mm (0.02" – 8.66") Flat |
| BÖHLER E108SA | | • | | | | | 1.6722 | S82 | | Liebherr LAT 1.9043 | Round Bars: 12.5-127mm (0.49" – 5") Flat |
| BÖHLER N352 BÖHLER N352S1 | | • | | | | | 1.4044 | S80 | Z15CN16-02 | Airbus ZBF1109 | Round Bars: 6.34–190mm (0.25" – 7.48") Flat, Billet |
| BÖHLER T552 BÖHLER T552S1 | Jethete | • | • | | | 5719 | 1.4939 | S151 | Z12CNDV12 | Snecma DMD 235-20, DMD 237-20*, DMD 242, Turbomeca AMS 5719* | Round Bars: 12.5 – 170mm (0.49" – 6.69") Flat, Billet |
| BÖHLER T200 | A286 | | • | | | 5731 5732 | 1.4943 1.4944 | | Z6NCT25 | Snecma DMD 247-22, Turbomeca AMS 5732* | Bar — Round, Flat, Billet, Hot Rolled Coil |

* Specific customer approval for a specific size or product range.

Maraging Steels

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | | | STANDARDS | | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|-------------|--------------|---------------|---------|---------|---------|-----------|------------|------|-----------------------------|---|---|
| | | EAf | EAf ESR | EAf VAR | VIM VAR | AMS | W Nr. /UNS | BS | OTHERS | | |
| BÖHLER V720 | Maraging 300 | | | | • | 6514 | 1.6354 | | EZ2NKD18 ~X2NiCoMo18 9 5 | | Bar — Round, Flat, Billet, Hot Rolled Coil |
| BÖHLER V723 | Maraging 250 | | | | • | 6512 | 1.6359 | S162 | | Liebherr LAT 1.9018 Messier Dowty MAT102 | Bar — Round, Flat, Billet, Hot Rolled Coil |

* Specific customer approval for a specific size or product range.

High Performance Heat Treatable Steels

Standards, Customer Specifications & Approvals

| GRADE | MARKET GRADE | MELTING ROUTE | | | | STANDARDS | | | | INDUSTRY SPECIFICATIONS | PRODUCTS SIZE RANGE |
|---------------|--------------|---------------|---------|---------|---------|--------------|-------------------|---------------------|-------------------------|---|---------------------------|
| | | EAJ | EAJ ESR | EAJ VAR | VIM VAR | AMS | W Nr. /UNS | BS | OTHERS | | |
| BÖHLER V118S1 | | • | | | | | 1.6745 | S98 S99 | ~40NiMoCr10-5 | Bombardier EMCM-001-1013 | Bar — Round, Flat, Billet |
| BÖHLER V124SC | 4340 | | | • | | 6414 | 1.6944/ G43400 | S149 | SAE 4340 ~40NiCrMo6 | Agusta 199-20-007 (ESR) Bombardier EMCM-001-1013 | Bar — Round, Flat, Billet |
| BÖHLER V132 | 300M | | | • | | 6257 6419 | | S155 | SAE 4340M | Liebherr LAT 1-9042 | Bar — Round, Flat, Billet |
| BÖHLER V141 | | • | | | | | | S97 S140 S154 | | Bombardier EMCM-001-1013 | Bar — Round, Flat, Billet |
| BÖHLER V145 | 30CND8 | • | | | | | 1.6604 | | 30CND8 30CrNiMo8 | Airbus ZBF1109, ZBF301438 | Bar — Round, Flat, Billet |
| BÖHLER V354 | 15CDV6 | • | • | | | | 1.7734 1.7736* | | E 15CDV6 ~14CrMoV6 9 | Airbus ZBF1109, ZBF301438 | Bar — Round, Flat, Billet |
| BÖHLER V358 | E40CDV12 | | | • | • | | 1.8523 | S132 | E40CDV12 | Snecma DMD113-20* | Bar — Round, Flat, Billet |

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THERMAL PROCESSING

Since 1991, Böhler-Uddeholm Thermo-Tech has been providing thermal processing solutions to customers across North America. Our aim is to provide the highest level of quality and service at competitive prices.

Accreditations:

ISO 9001, AS9100, NADCAP

Capabilities:

- High Pressure Vacuum Hardening (10 Bar, 6 Bar, 5 Bar, 2 Bar)
- CryothermSM (Liquid Nitrogen Cryogenic Treatment)
- Tempering (Vacuum, Atmosphere)
- Stress Relieving (Vacuum, Atmosphere)
- Annealing (Vacuum, Atmosphere)
- Bright Annealing
- Precipitation Hardening (Solution Annealing, Ageing)
- Normalizing
- Homogenizing
- ThermoniteSM (Gaseous Ferritic Nitro-Carburizing and Nitriding)
- Specialized Racking / Fixturing
- Laboratory Services including Metallography and Microhardness

For a complete list of services, please visit our website at www.buthermotech.com or call us at 1 800 665 8335.





BÖHLER UDDEHOLM

Global Footprint — Böhler-Uddeholm markets its products and services in 100 countries on all continents, with wholly owned sales subsidiaries in over 50 markets. To find a sales office near you, please visit our corporate website at www.bohler-uddeholm.com.

DPAP - DFARS — In accordance with DFARS 252.225.7014: clause c1, DFARS 225.872, Austrian material may be used in “Buy American Act” applications where the total value of the Austrian material is less than 50% of the value of the component.

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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty of fitness for a particular purpose. Rev August 10, 2010.

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