



# STEEL BARS FOR FIREARMS

With over 70 years of experience serving the defense industry, Aubert & Duval is a leading supplier of high performance steels for defense applications, including firearms. It serves the firearm manufacturing sector for all types of small caliber barrel manufacturing, including cut rifling, button rifling, and hammer forging, as well as various grades suitable for other firearm components.

## Gun barrels

Aubert & Duval offers martensitic steel grades achieving the best high strength / toughness compromise on the market:

- GKH® and ARMAD® (CrMoV martensitic steel grades)
- APX®4 (martensitic stainless-steel grade)

For barrels that withstand a transverse load during firing, specific care has been given to bars' transversal properties. GKH®, ARMAD® and APX®4 present an isotropic structure giving the material equivalent tensile, ductility and toughness properties, resulting from Aubert & Duval's high-tech production process.

These grades can be used with cut rifling, button rifling or cold hammer forging process.



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## Customer benefits

- + High endurance, even in extreme environmental conditions
- + Long cycle life & High accuracy
- + Weight optimization
- + Resistance to intensive fire rates
- + Compatible with new high pressure ammunition
- + Customized alloys grades
- + A global supplier of the weapon systems manufacturers
- + Technical Support
- + Dedicated R&D Team

## Services

- + In-house fully integrated production process
- + Small MOQ possibility: 1500 kg
- + Distribution centers in Europe & USA.



## Firearm metallurgical expertise

### Benefits to firearm producers/designers

- Higher cold hammering rates, saving material compared with other grades
- Possibility of manufacturing the chamber during the cold hammering process
- GKH® and ARMAD®'s fatigue/strength upgrading gives opportunities to lighter barrel design with thinner wall sections
- Possibility with ARMAD® to achieve toughness and very good nitriding capability
- Ensuring stable process and limit disruptions at customer shop
- Ensuring perfect straightness and surface roughness during the cold hammering / button rifling operation

## Steels for gun barrels

### GKH®

Many years ago, Aubert & Duval developed the GKH® steel grade for gun barrels. GKH® steel (32CrMoV12) heat treated for 28-32 HRC which presents exceptional ductility and toughness including in transverse direction thanks to its homogeneous microstructure nearly free of banding.

### APX®4

When corrosion resistance is needed or in the case where no corrosion protection is present (hard chromium plating of black chromium), manufacturers often used martensitic stainless steels. The most common grade is AISI 416 martensitic stainless steel. The steel contains high amount of sulfur favorable to boring and machining. Aubert & Duval has developed for these application APX®4 martensitic stainless steel.

	APX®4	GKH®	ARMAD®
Type	Martensitic stainless	Martensitic CrMoV	Martensitic CrMoV
EN designation	X4CrNiMo16-5-1	33CrMoV12-2	32CrMoV12-10
HRC as delivered	28/34	28/34	38/40.5
UTS (MPa)	900/1050	930/1080	1200/1280
YS 0,2 (MPa)	≥ 700	≥ 750	≥ 950
EL (%)	≥ 16	≥ 15	≥ 16
KV (RT)	≥ 120	≥ 140	≥ 160
KV (-40°C)	≥ 90	≥ 130	≥ 130

## High Performance Steels for mechanism parts

For firing pins, extractors, ejectors, breeches (carburizing steels, nitriding steels and maraging steels).

FADH	14NiCrMo13-4
FDG®	20NiCrMo13-4
FND®	15NiMoSiCr10
FDMA	30NiCrMo16
819B	36NiCrMo16
NC310YW	40SiNiCrMoV10
819AW	E35NiCrMo16
MARVAL®18	X2NiCoMo18-8-5
MY19	X2NiCoMo18-9-5

### ARMAD®

The development of new ammunitions with increased pressure and temperature in the chamber and barrel has been the driving force to improve mechanical properties at elevated temperature and resistance to wear during firing. ARMAD® steel grade has been developed for these purposes aiming at higher mechanical properties up to 650°C without impairing ductility and toughness.

#### FIRING TESTS RESULTS - BORE AFTER 15K ROUNDS

