

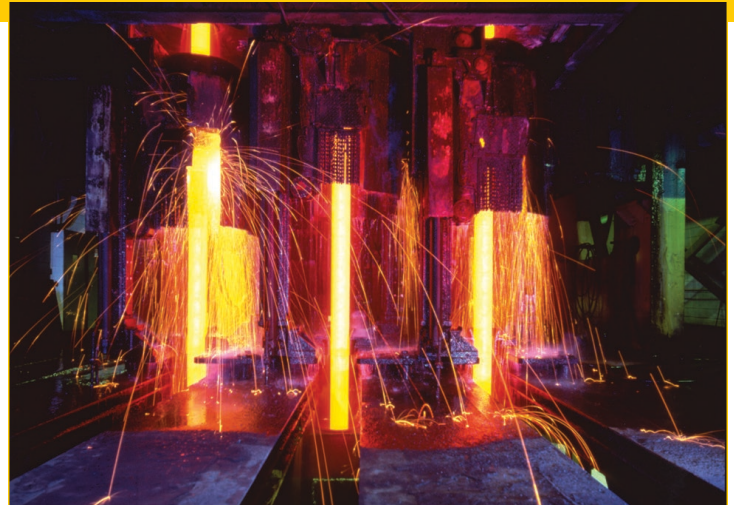
GERDAU ACCUCALIBER™ GUN BARREL QUALITY STEELS



Our AccuCaliber™ Series of premium GBQ steels provide superior performance for gun barrel drilling, reaming and machining as well as less distortion to the gun drilled surface.

AccuCaliber™ steels offer the optimum combination of strength, toughness, machinability, residual stress and dimensional control.

Gerdau's quality and consistency is the industry standard and second to none for the production of handgun, rifle and shotgun barrels, as well as other firearm components. We produce thousands of tons of AccuCaliber™ steel for gun manufacturers each year and look forward to the opportunity to meet your specific requirements. Gerdau steel is produced and tested to exacting military grade requirements.



Gerdau AccuCaliber™ GBQ carbon and alloy steels are produced with a unique rotary casting process that feeds liquid steel into a round, rotating mold where it is centrifugally forced to the mold wall for immediate surface solidification. Uniform water spray cooling systems surround the billet surface, preventing chemical segregation during solidification. The use of a round mold, as opposed to typical square or rectangular molds, allows for uniform cooling, resulting in a sound center and precise properties. The cast billet is straight, eliminating stresses created from typical curved mold casters. This means consistency in your processing operations and improved performance over the lifetime of the finished product.

GERDAU'S UNIQUE STEELMAKING PROCESS RESULTS IN PERFORMANCE SECOND TO NONE

- **Melting:** Premium scrap is melted and refined in state-of-the-art electric arc furnaces
- **Ladle Refining:** All material is ladle refined to produce consistent chemistry, remove non-metallic inclusions and homogenize the molten steel
- **Vacuum Degassing:** Vacuum degassing results in the removal of inclusive material and detrimental gases for a final "clean steel" product ready for casting
- **Rotary Vertical Continuous Casting:** Gerdau AccuCaliber™ gun barrel material is continuously cast using unique vertical rotating mold technology which **reduces segregation, minimizes residual stress, and produces superior consistent structure**
- **Rolling:** Bars are directly hot-rolled after casting using state-of-the-art finishing rolls to produce half ASTM tolerance dimensions

Several Options are available to meet specific customer requirements

IN-HOUSE HEAT TREATMENT

- **Normalizing:** Normalizing after hot rolling is recommended to refine grain size and microstructure to optimize subsequent processing. Normalizing produces a consistent and repeatable product ready for finishing operations.
- **Quenching & Tempering:** Gerdau induction hardens and tempers to customer required hardness levels for superior physical properties and residual stress conditions. The Gerdau process produces a "stress free" condition to optimize subsequent operations.
- **Final Stress Relief:** Material is stress relieved for final hardness and physical property requirements. The final stress relief is tailored to each customer's specifications. Residual stress and hardness is analyzed for each batch of material.



ACCUCALIBER™ SERIES OF GUN BARREL QUALITY STEELS

CERTIFIED TO INDUSTRY AND CUSTOMER SPECIFICATIONS

RELEVANT SPECIFICATIONS

- 100% Ultrasonic Inspected
- Mil-B-11595-General Requirments
- ASTM A255- Jominy Hardenability
- ASTM E45- Microcleanliness
- ASTM E18- Hardness
- ASTM E112- Austenitic Grain Size
- ASTM E381- Macrocleanliness
- ASTM A370- Tensile Strength, Yield Strength, and Elongation
- ASTM E23- Charpy Impact
- AMS 2301 (ASTM E1444)- Magnetic Particle Inspection
- Residual Magnetism- less than +/- 10 Gauss

Material is generally supplied in the turned and polished and the quench and tempered condition in the HRC 23-32 range with each customer requiring a specific hardness range and physical properites.



TYPICAL REQUIREMENTS

- Charpy Impact Strength
CrMoV: 40 ft-lbs. minimum at -40°F
4140: 20 ft-lbs. minimum at 70°F
- Hardness Capability
Rockwell HRC 23-32
- Macrostructure Per ASTM E381
S2 R2 C2 or Better
- Austenitic Grain Size Per ASTM E112
5 or Finer
- Hardenability Per ASTM A225
HRC 52 minimum at 8/16" Location for CrMoV
- 100% Ultrasonic & Magnetic Flux Leakage Tested
Per Industry Standard
- Non-Metallic Inclusion Ratings Per ASTM E381
Per Customer Requirements
- Decarburization and Surface Quality Per Customer
Specific Requirements
- Magnetic Particle Inspection Per AMS 2301
- Typical Physical Properties Per ASTM A370 Per Customer
Sepcifications for Ultimate Strength, Yield Strength, Elongation
- Minimum Reduction in Area from Cast to Finish Rolled Size Per
Customer Requirements met or exceeded by GerdaU

TYPICAL CHEMISTRIES

MIL-B-11595E	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Ca
Chrome-Moly-Vanadium	.41-.49	.60-.90	.040 max	.040 max	.20-.35	.35 max	.20 max	.80-1.15	.30-.40	.020-.030	.20-.30	.004 max
ORD 4150	.48-.55	.75-1.00	.040 max	.040 max	.20-.35	.35 max		.80-1.10	.15-.25	.040 max		
ORD 4150 Resulterized	.47-.55	.70-1.00	.040 max	.05-.09	.20-.35	.35 max		.80-1.15	.15-.25	.040 max		

ASTM A29 / ASTM A108	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Ca
41V45	.41-.45	.75-.90	.035 max	.025-.040	.20-.35	.35 max	.20 max	.80-1.15	.30-.40	.020-.030	.20-.30	.004 max
4140	.35-.44	.65-1.10	.030 max	.020 min	.15-.35	.45 max	.20 max	.75-1.20	.15-.25	.010 min		
1137	.32-.42	.70-1.75	.030 max	.08-.115	.02-.05	.35 max	.30 max	.30 max	.20 max	.010 min		
4130	.28-.33	.40-.60	.030 max	.012-.025	.20-.35	.30 max	.20 max	.80-1.10	.15-.25	.010 min		
1155	.50-.60	1.30-1.65	.035 max	.060-.100	.15-.35				.10-.20	.010 min		

GerdaU can meet any customer specification required

For more information about ordering AccuCaliber™ Gun Barrel Quality Steels call 1-800-876-7833