



GERDAU

SPECIAL STEEL CATALOG



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Our objective is quite simple...



to be the best SBQ supplier in North America, delivering value to customers through competitive and innovative solutions.

We accomplish this by having consistent manufacturing processes, driven teams that provide quality and reliable products, and reinvesting in our business through technology and innovation. We've recently invested more than \$500 million to modernize our equipment so we can produce the highest quality steels for our customers' most demanding applications.

Gerdau's 120+ year history of success stems from its people. Outstanding, knowledgeable, dedicated people are at the very core of every operation, with everyone following a sincere commitment to quality and believing that our success is measured by our customers' success. We look forward to providing you with solutions for your next challenge.

Sincerely,

A handwritten signature in black ink, which reads "Rodrigo Belloc Soares". The signature is fluid and cursive, written in a professional style.

Rodrigo Belloc Soares
President, Gerdau Special Steel North America



Company Profile

Gerdau Special Steel North America produces high quality engineered carbon and alloy SBQ steel bars for safety critical applications used by the automotive, commercial vehicle, construction, agricultural, distribution and energy markets. With two special steel mills, one downstream processing facility and a heat treating facility strategically located throughout the United States, we are well-positioned to provide solutions for the most demanding applications.

Our division is part of Gerdau S.A., which is a publicly-traded corporation headquartered in São Paulo, Brazil. Gerdau is the largest Brazilian steel producer and one of the main suppliers of long steel in the Americas and of special steel worldwide. The company has industrial operations in Canada, United States, Mexico, Dominican Republic, Colombia, Venezuela, Peru, Argentina, Uruguay, and Brazil.

Empowering People Who Build the Future

Our purpose is to empower people who build the future. These people include our employees, communities, suppliers and YOU, our customers who create products for the future. We strive to make a transformative impact in our society by embracing these 10 core principles.



Safety first - No result is more important than people's lives.



Autonomy - We take responsibility for making the best decisions for the business.



Doing what's right - Ethics and respect are essential in everything we do.



We are all leaders - We are all engaged and committed to our development and the development of those around us.



Every customer is unique - We work to make each customer's business thrive, driving mutual success.



Creating value for everyone - We accomplish our purpose by sustainably creating value for all our stakeholders.



Openness - We don't know everything, and we believe that a team will always achieve better results than an individual.



Simplicity - We focus on what adds value. As a result, we become more agile and improve productivity.



Diverse and inclusive environment - We have created a diverse and inclusive environment where everyone can be heard, respected, and have opportunities.



Learning, unlearning, relearning - We believe that in order to continue evolving, it is essential to adapt to new scenarios, innovate, and find better ways of working.

Culture of Sustainability

Gerdau strives to meet the highest standards of verified social and environmental performance, public transparency and legal accountability to balance both profit and purpose. We recognize the importance of creating a positive impact for society and are committed to establishing good environmental and social sustainability practices. Therefore, we have become members of the B Movement Builders, which is a coalition of multinational, publicly traded companies committed to transforming the global economy.



One of the ways we are doing this is by focusing on environmental, social and governance factors, commonly referred to as ESG.

E

- Reducing CO2 Emissions
- Lowering Water Consumption
- Total By-Products Reuse

S

- Increasing Diversity and Inclusion
- Generating Value for Communities
- Encouraging Volunteerism

G

- Corporate Sustainability Policy
- Materiality Matrix
- ESG Scorecard

Innovation



Our goal is to be the global supplier of choice in special steels for automotive and other safety critical applications in the markets we serve. Each year we invest millions of dollars in new product development so we can provide customers with the best solutions for their needs. Gerdau is at the forefront of clean steel developments for gears, bearings and shafts that are needed to meet downsizing and electrification trends.

Gerdau recently launched a new business division, Gerdau Next, that is focused on identifying business opportunities within the existing steel value chain that provide increased value propositions for our customers. These include new models for interacting

with suppliers and clients, digital technologies, new materials such as graphene, and other disruptive innovations that will affect the future of construction, manufacturing and mobility.

Gerdau partners with universities and research centers all over the world to stay ahead of emerging trends and technologies.

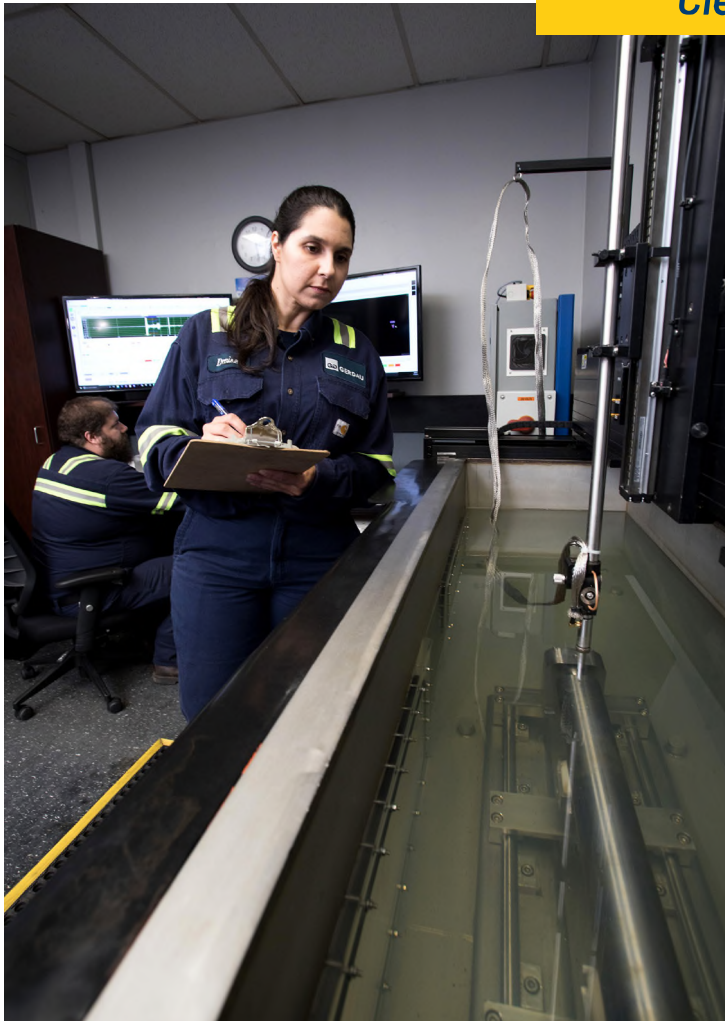
What We Make

Gerdau Special Steel is the premier producer of Engineered SBQ Steel Bars providing the highest quality, made-to-order special steel products for the most demanding applications in the automotive, commercial vehicle, agricultural, construction and energy markets.

Available Grades

- Bearing Steels to ASTM A295, A485, A534 and A866 (e.g. grades 1053, 4118, 4320, 5120, 8620, 52100)
- Aircraft Quality Steel to AMS 2301 and AMS 2304
- All ASTM A-29 and SAE Carbon, Resulfurized and Rephosphorized Steels (1008 to 1095, 11xx, 12xx, 15xx)
- All ASTM A-29 and SAE Alloy Steels (13xx, 40xx, 41xx, 43xx, 44x, 46xx, 47xx, 48xx, 50xx, 51xx, 61xx, 81xx, 86xx, 87xx, 92xx, 93xx, 94xx, and EX or PS grades)
- Boron Steels, Micro-alloyed and Calcium Treated Steels
- German (DIN), Japanese (JAS & JIS), and International Standards (ISO)
- Restrictive and special chemistries

Clean Steels



Gerdau is at the forefront of clean steel production processes and has made significant advancements in steel cleanliness through enhanced melt-practice developments, strict process controls and investments in analytical tools. Our clean steel processes can be applied to any of our core products.

Some of the tools used for clean steel development and verification include:

- Low/High Frequency Immersion Ultrasonic Testing
- Metallography including Extreme Value Analysis
- Electronic microscopy including auto image analysis Aspex®
- Mechanical testing (tensile, impact, charpy, fatigue, etc.)
- Gleeble® - digital tool for castability studies and thermodynamics simulation

Hot Rolled Bars



SBJ engineered hot rolled steel round bars are made with full ladle metallurgy and vacuum degassing processes.

Hot Rolled Bars

Diameter 7/8" - 6"
Lengths 15' - 40'

Precision Hot Rolled Bars

Diameter 1" - 5"
Lengths 15' - 40'

Semi-Finished Bars

Diameter 6" - 9 1/4"
Lengths 12' - 32'

MACPLUS® Cold Finished Bars



Macplus® bars are turned and polished to provide a uniform defect-free, decarb-free, and scale-free, bright surface with tight size tolerances and concentricity that can improve machinability up to 30%.

Macplus® bars are available in all carbon and alloy grades and can also be metallurgically tailored to suit our customer's particular requirements.

Diameter 7/8" - 5"
Lengths 15' - 32'

MACPRIME® Precision Cut Blanks



MACPRIME® is a special-bar quality steel bar precut to a customer's exact dimensional specifications. MACPRIME® precision cut blanks give forgers, machining facilities and cold formers numerous advantages, including easy unloading and storage, and improved yield. Common applications include steering racks, camshafts and machined shafts.

Diameter 7/8" - 6"
Lengths ranging from 3/8" to 60"

Quench and Tempered Bars



Gerda's quench and tempered bars are produced through an advanced induction heat treating and proprietary quench process that treats each bar individually. The process adds strength and improves resistance to impact and abrasion. Gerda's quench and tempered bars enable customers to machine distortion-free parts, eliminate production processes, such as stress relieving or straightening, and save money. Quench and tempering can be done to all heat treatable grades of carbon and alloy steels.

Diameter 7/8" - 4 1/2"
Lengths ranging from 12' to 32'

Who We Serve

Light Vehicles



A large portion of the SBQ steel we produce is used for safety-critical automotive applications, including transmission gears, wheel hub bearings, CVJs, camshafts, crankshafts, and steering racks. We have steel in all the largest OEMs including Stellantis, Ford, General Motors, Toyota, Honda, Nissan, BMW, Volkswagen, and Hyundai. We are also present in many new manufacturers of electric vehicle applications such as Tesla and Rivian.

Commercial Vehicles

Gerdau is a major supplier of SBQ steels for safety-related components present in heavy trucks that transport goods throughout North America. Some of the main applications we supply include camshafts, piston pins, crankshafts, shafts, steering systems, axles, i-beams and transmission gears for OEMs including Freightliner, MACK, International and Volvo.



Distribution



Gerdau also supplies high quality SBQ products through the Service Center markets with our flexible schedules and wide product offering including hot rolled, cold finished and quench and tempered bars.

Construction

Gerdau is a supplier of SBQ steel to the main construction equipment manufacturers in the country, including CAT. Our steel can be found in the loaders, excavators, motor graders and other types of construction equipment that are used to improve our infrastructure.



Agriculture



Gerdau supplies steels for tractor and combine applications, including shafts, gears, pinions and camshafts. We service manufacturers such as John Deere and other leaders within the farming equipment industry.

Energy

Our steel is also used in various applications within the energy sector. Some of these applications include drill collar for oil and gas exploration, and stud bolts that securely fasten large parts together for transmission towers and wind turbines.



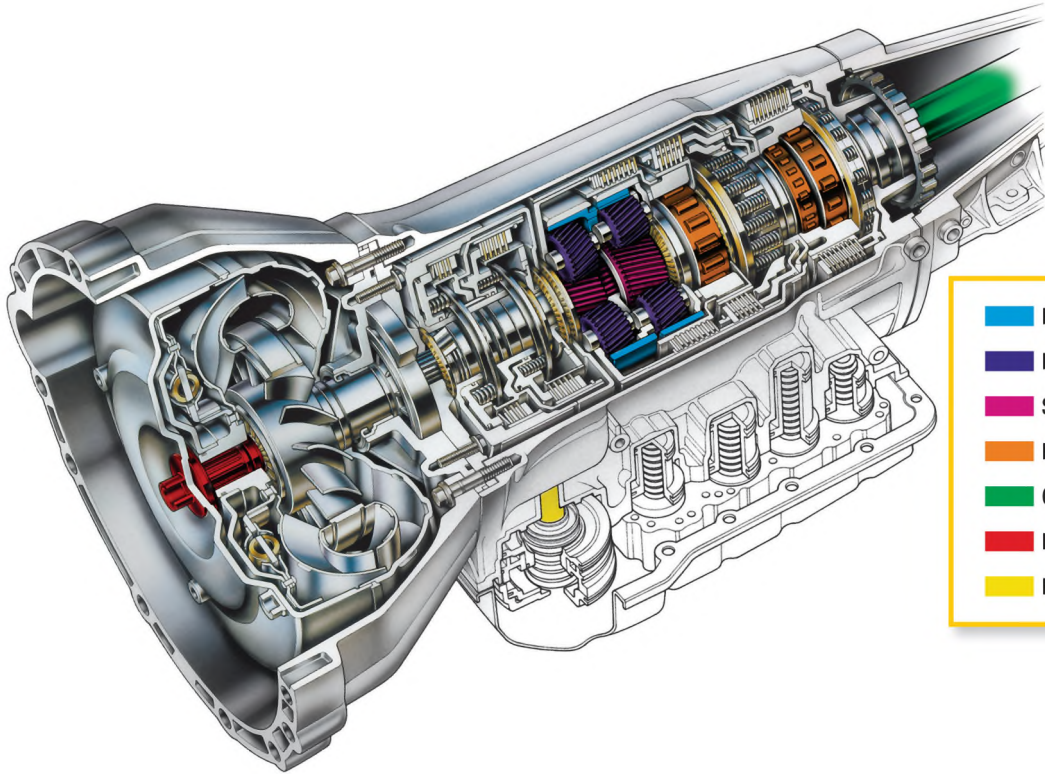
Defense



Each year we produce thousands of tons of steel that is consumed by the defense market. Some of the most common applications for our steel include the manufacturing of tank track links for military vehicles and steels for military and recreational firearms.

Who We Serve

Gerdau has served the global automotive parts industry for nearly 50 years. We are proficient in traditional critical automotive applications such as those shown in the diagrams below and welcome opportunities to support new parts creation.

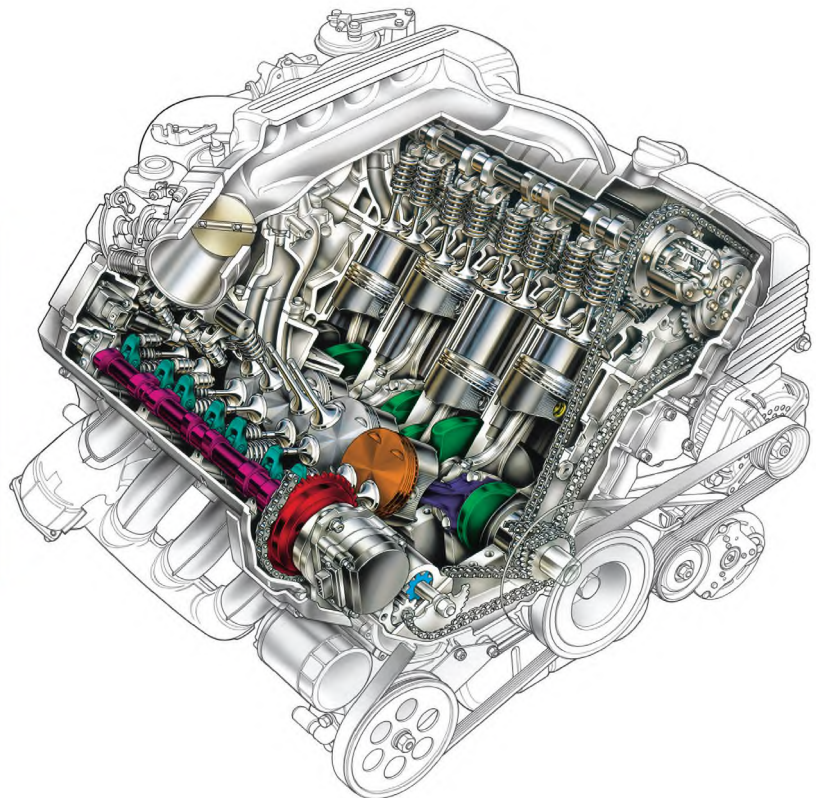


TRANSMISSIONS

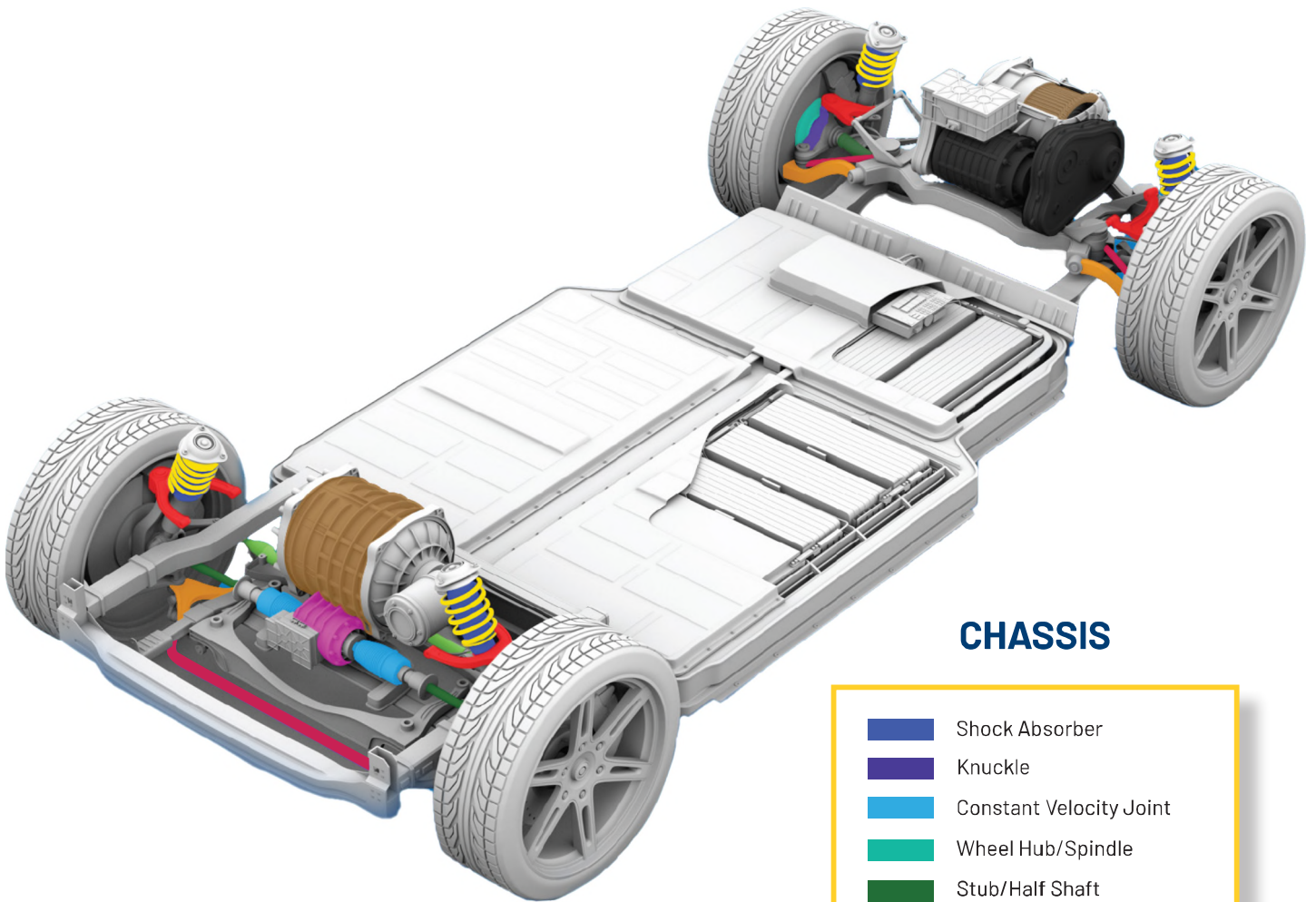
- Ring Gear
- Pinion Gear
- Sun Gear
- Rolling Bearing
- Output Shaft
- Input Shaft
- Pump Shaft

ENGINES

- Oil Pump
- Connecting Rod
- Camshaft
- Piston Crown
- Crankshaft
- Piston Pins
- Rocker Arms
- Timing Sprockets



Gerdau is also at the forefront of the electrification movement. We are a leading supplier for some of the main applications in electric vehicles, such as electric motor shafts, gears, steering racks, half shafts and stabilizing bars. We also work closely with Tier 1s and OEMs to develop innovative steels that provide the cleanliness, controlled microstructure and consistent quality needed for electric vehicles.



CHASSIS

- Shock Absorber
- Knuckle
- Constant Velocity Joint
- Wheel Hub/Spindle
- Stub/Half Shaft
- Steering Rack
- Coil Springs
- Lower Control Arm
- Electric Motor Shaft
- Upper Control Arm
- Sway Bar
- Gear Box
- Transmission Reduction/
Gear Box

How We Make It

Our mills utilize state-of-the-art equipment engineered with the capability to produce a full range of SBQ bars to the most exacting standards requested. We can customize a heat of steel directly to each customer's most demanding applications, including ASTM, SAE, German (DIN), Japanese (JAS & JIS) and International Standards (ISO) specifications.



SCAN ME

TO WATCH OUR STEELMAKING VIDEO

Scrap



Our steelmaking process begins with the highest quality blend of recycled scrap steel. The use of steel scrap as a raw material reduces energy consumption in our production process, and also minimizes emissions of CO₂.

Fun Fact: Gerdau recycles more than 14 million metric tons of steel scrap into new steel every year.

Melting

The recycled scrap is melted and refined through the melt shop, starting at high efficiency electric arc furnaces (EAF) that are strictly controlled to meet your requirements. After melting, high purity alloys are added and the heat is tapped for secondary refining.

Special fluxes that absorb non-metallic inclusions and final alloy additions are made at the ladle metallurgy furnace along with argon injection for thorough homogenization of the steel.

Additional steel cleanliness is achieved at the vacuum degassing station where the heat is subjected to very low partial pressure and held for sufficient time to diffuse gases of hydrogen, oxygen and nitrogen. This time permits detrimental inclusions to float out from the molten metal and be absorbed by the refining slag.





Casting

The liquid steel is now ready for solidification, which occurs in the casting process. The ladle is delivered to either the strand caster or rotary caster, where the steel is converted into solid blooms. Our strand caster produces 240 mm square blooms, which allows us to achieve a high reduction ratio that results in improved surface quality and cleaner steels. Our rotary caster features a rotating mold that centrifugally forces the steel to the mold wall for instant solidification of the surface. The round mold also allows for uniform cooling, resulting in a sound center and precise properties.

The solidified billet from our rotary or strand caster is now ready to be rolled.

Rolling



The blooms are brought to the proper uniform temperature through gas fired walking beam reheat furnaces, descaled and fed into the special steel rolling mills. Each mill is equipped with precision rolling stands to produce tight size tolerances, uniform weight and a concentric round surface. Bar length is controlled through the use of hot abrasive or carbide tipped saws. Automatic chamfering is available on large diameter bars. The hot rolled bars are then tightly bundled for shipment to the customer, or further on-site value-added processing.

Finishing



Gerdau offers a range of value-added finishing processes. In-line bar straightening as well as surface and ultrasonic internal inspection are available at all Gerdau SBQ mills and facilities to ensure stringent customer specifications are met. Other finishing solutions include thermal treating with a complete range of in-house normalizing, annealing, quench and tempering and customized treating processes.



When inquiring about or ordering Gerdaus bars, please have the following information in as much detail as possible. Sufficient information will better enable Gerdaus to meet your requirements to your complete satisfaction.

-
- Steel Grade Specification
 - Quality Level
 - Diameter and Length
 - Size Tolerances (other than standard)
 - Packaging Requirements
 - Delivery Requirements
 - End Use or Application
 - End User
 - Your Production Process
 - Volume Requirement

Phone: 800.876.7833
Email: info@gerdau.com
www.gerdau.com/specialsteel

Hot Rolled Bars

Total Decarburization	0.008" to 0.012" Max. 0.2mm to 0.3 mm Max.
Defect Depth	MFLT Verification
Size Tolerance	50% ASTM A-29
Macro ASTM E381	S1 - R1 - C2
Micro ASTM E45	A295, A485, A534, and A866

MACPLUS® Cold Finished Bars

Surface Finish	25 microinches Ra max
Total Decarburization	None
Defect Depth	None
Surface Appearance	Clean, Shiny
Residual Stress Warp Factor	-0.020" to -0.030"

Precision Hot Rolled Bars

As above plus...
Size Tolerance 25% ASTM A-29

Dimensional Tolerances

Size Tolerance (All Minus)

	C to 0.28	C 0.28 to 0.55	C > 0.55*
To 1.5	.002/.003	.003/.004	.005/.006
>1.5 to 2.5	.003/.004	.004/.005	.006/.007
>2.5 to 4	.004/.005	.005/.006	.007/.008
>4 to 5	.005/.006	.006/.007	.008/.009

MACPRIME® Precision Cut Blanks

Length tolerance	as low as +/- 0.005"
Gram weight tolerance	as low as +/- 2 gram
Perpendicularity tolerance	as low as 0.006"
TIR tolerance	as low as 0.003
Center Drill	available
Precision chamfer	available
Additional processes	inquire

Straightness Tolerance in 10'

Lengths <15'	0.063	0.125	0.125
Lengths >15'	0.125	0.375	0.375

Sizes in inches *Plus heat treated bars

IN-HOUSE VALUE ADDED PROCESSES

- Magnetic Flux Leakage Surface Inspection
- Automatic Ultrasonic Internal Core Inspection
- Automatic Ultrasonic Subsurface Shear-wave Inspection
- Machine Straightening
- Circograph Cold Finished Bar Surface Inspection
- Bundle Cut

IN-HOUSE HEAT TREATMENTS

- Cold Shear Anneal
- Stress Relieve
- Normalize
- Lamellar Pearlite Anneal
- Spheroidize Anneal
- Quench and Temper
- Custom Cycles



GERDAU

Shape the future

HUNTINGTON FACILITY

25 Commercial Road
Huntington, IN 46750
260.356.9520

JACKSON FACILITY

3100 Brooklyn Road
Jackson, MI 49203
517.764.0311

FORT SMITH MILL

5225 Planters Road
Fort Smith, AR 72916
479.646.0223

MONROE MILL

3000 E. Front Street
Monroe, MI 48161
734.243.2446

JACKSON OFFICE

5591 Morrill Road
Jackson, MI 49201
800.876.7833
517.782.0415