



BOTTOM POURED INGOTS

Steel the Right Choice for Bottom Poured Ingots

It all began more than 100 years ago and continues today with the dedication and skill that helps us lead the market in bottom poured ingots.

In 2008, Republic re-entered the **bottom poured ingot** market. We tapped the experience of the many employees who had expertise from our previous bottom poured production, and coupled these skills with a new, state-of-the-art bottom pour facility in our Canton, Ohio plant.

This facility enables us to marry our **long history** in making high-quality electric furnace steels with our renewed capabilities in producing high-quality bottom poured ingots. After melting, the heats are processed at our ladle metallurgy and vacuum degassing station prior to bottom pouring. During the bottom pour process, we fully protect the ladle stream from reoxidation and automatically control the rate of rise in the molds to optimize surface quality.

Republic Steel produces bottom poured ingots in three sizes – 24", 29", and 37" (610mm, 737mm, and 940mm). All are smooth-side rounds. We produce a wide variety of carbon and alloy grades. We have inventory available for immediate sale.

To find out how we can serve you, please contact Republic customer service at 1-800-433-1243, or you can complete the accompanying inquiry form and forward it to us for a quick reply.

Contact Republic Steel customer service today.

800.433.1243 www.RepublicSteel.com



BOTTOM POURED INGOTS

PRODUCT CAPABILITY

Republic Steel has certified systems for the manufacture of steel forging ingots:

– ISO/TS 16949 Quality Management

– ISO 14001 Environmental Management

All material produced is electric furnace melted, ladle refined, slag raked and vacuum degassed, followed by bottom pouring into cylindrical ingots. All ingots receive an appropriate thermal cycle following removal from ingot molds resulting in an ingot surface hardness < 285 BHN and reduced residual ingot stresses.

HEAT SIZE

200 net tons – will produce up to two ingot sizes per heat

TYPICAL GRADES/SPECIFICATIONS

<u>AISI/SAE</u>	<u>ASTM A-182</u>	<u>Other ASTM</u>	<u>JIS</u>	<u>Mil-S</u>	<u>DIN</u>	<u>MISCELLANEOUS</u>	
10xx 48xx	F1	ASTM A-105	SUJ1	Mil-S-18729	13CrMo44	300M	Nitralloy
11xx 51xx	F2	ASTM A-335 (P36)	SUJ2	Mil-S-23194	21CrMoV	D6AC	P11
12xx 52100	F3	ASTM A-336	S20C	Mil-S-23284	25CrMo4	EN355B	P22
13xx 61xx	F3V	ASTM A-350	S48C	Mil-S-46119	40CrMo4	HSLA 80	S355NL
15xx 86xx	F3VCb	ASTM A-508	S53C		42CrMo4	HSLA 100	
33xx 87xx	F11	ASTM A-514	S55C		100Cr6	HY 80	
40xx 88xx	F12	ASTM A-588 (Corten)	SCR 420		20MoCr4	HY 100	
41xx 92xx	F21	ASTM A-707	SCM 420		20MnCrS5	HY-TUFF	
43xx 93xx	F22		And Others		35Mn20Pb	L5	
46xx 94xx	F22V				17NiCrMo6	LF2	
47xx	F24				20NiCrMo2	LF6	
	F36						
	FR						

Leaded – All AISI/SAE, JIS, and DIN grades are available with lead. Modifications of these and other grades can be produced to your specifications.

CHEMISTRY

Tight chemistry control provides excellent repeatability to heat treat response, dimensional control and mechanical properties.

<u>Element</u>	<u>Aim %</u>	<u>Max Variation</u>	<u>Element</u>	<u>Aim %</u>	<u>Max Variation</u>	<u>Element</u>	<u>Aim %</u>	<u>Max Variation</u>
Carbon	<0.60	+/- 0.01	Nickel	>2.00	+/- 0.03	Niobium	≤0.50	+/- 0.02
	>0.60	+/- 0.02		>2.00 to 4.00	+/- 0.05		>0.50	+/- 0.03
Manganese	<1.50	+/- 0.03		>4.00	NA	Tungsten		NA
	>1.50	+/- 0.05	Chromium	<2.00	+/- 0.03	Vanadium	≤0.50	+/- 0.02
Phosphorous*	0.008% max			2.00-3.50	+/- 0.05		>0.50	+/- 0.03
Sulfur*	0.001% max			>3.50	NA	Lead	<0.35	+/- 0.03
Silicon	<0.50	+/- 0.03	Molybdenum	<1.00	+/- 0.01	Hydrogen*	1.5 ppm max	
	>0.50	+/- 0.05		>1.00	+/- 0.03			

*Lowest values capable (may be higher for certain grades)

CLEANLINESS

A wide variety of applications are served by Republic Steel; therefore, we review cleanliness requirements case by case. For all applications:

Magnetic Particle Capable of: AMS 2301 / AMS 2304

Ultrasonic: 0.125" Flat Bottom Hole

SIZES (CYLINDRICAL MOLDS)

<u>Mold Diameter (in.)</u>	<u>Area (sq. in.)</u>	<u>Uncropped</u>		<u>Cropped</u>	
		<u>Length (in.)</u>	<u>Weight (lbs.)</u>	<u>Length (in.)</u>	<u>Weight (lbs.)</u>
24	452.4	187	22800	171	21500
29	660.5	187	32500	171	30800
37	1075.2	187	51300	168	47500

Canton Plant

2633 Eighth Street NE
Canton, Ohio 44704-2311