

## JUST ONE STOCK

Republic 100 bars are suitable for a wide range of production or maintenance jobs. Thus only one stock is necessary, in many cases, by virtue of the material's mechanical properties. They can be used for parts requiring either strength or just easy machining qualities. They work equally well on simple or more complex parts and exhibit excellent wear qualities.

## HIGH QUALITY STANDARDS

Removal of scale from incoming hot-rolled bars, by shot blasting, is one of the first operations when these bars arrive in our Hamilton facility.

The cleaned bars, of carbon or alloyed steels, are then cold-drawn through dies to the desired final size and shape, straightened and stress relieved. Centerless grinding, sometimes combined with modern polishing methods, achieves the superior finishes and close tolerances so often specified by today's customers.

## ONE-SOURCE RESPONSIBILITY

Because Republic has full control over steel production, from raw material to cold-finished bars, customers receive the benefits of guaranteed size, concentricity, and straightness. In addition to improved mechanical properties, better machinability and excellent surface quality are attained. Each heat of steel is numbered, with the corresponding certified chemical analysis becoming a permanent record that accompanies customer orders.

### SUMMARY OF ADVANTAGES OF WORKING WITH REPUBLIC 100 COLD-DRAWN BARS:

#### To:

- longer tool life
- faster feeds and speeds
- elimination of heat-treatment

#### Add:

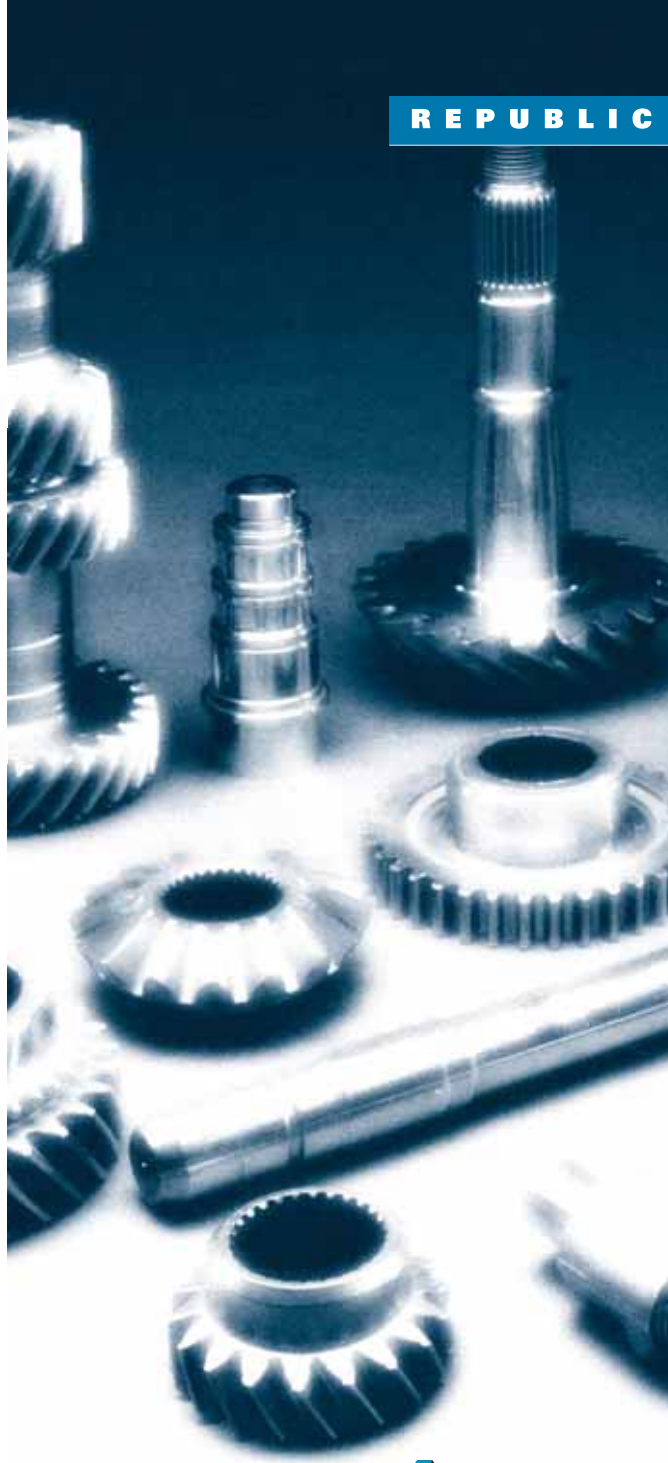
- excellent machinability
- less machine downtime
- fewer rejects
- better quality parts and products
- increased production rate
- consistent uniformity



401 ROSE AVENUE, S.E.  
MASSILLON, OH 44646-6870

800.433.3281 | republicengineered.com

PRECISELY RIGHT.™



REPUBLIC

100 STEEL BARS

## SPECIFICATIONS

### FINISH

Republic 100 is supplied in a cold-drawn "furnaced" finish or in a ground and polished finish. "Furnaced" describes the typical dark finish of Republic 100 in the drawn and stress-relieved condition: a light, thin oxide which inhibits rusting and does not interfere with machining. Republic 100 is also electromagnetically tested using eddy currents.

### TYPICAL USE

Republic 100 often replaces parts now heat-treated from RC23 to RC30. This is an extremely uniform material which provides exceptional quality for production, maintenance, or special machine parts. It is widely used for keyed shafts, gears, pinions, pins, lead screws, or wherever the above properties are appropriate.

### CHEMISTRY

Carbon .....	0.40/0.48
Manganese .....	1.35/1.65
Phosphorus .....	0.040 Max.
Sulphur .....	0.24/0.33
Silicon .....	0.15/0.30
Copper .....	0.15/0.25
Nitrogen .....	0.008 (Aim)

### MECHANICAL PROPERTIES

Tensile Strength .....	115,000 psi
Yield Strength .....	100,000 psi Min.
Machining Characteristics .....	83% of 1212 (Typical)
Elongation .....	8% Min. to 3"
	7% Min. >3 to 4-1/2"
Reduction of Area .....	25% Min. to 2" Rd
	20% Min. >2 to 4-1/2"
Wearability .....	Good
Warpage .....	Minimum

### TOLERANCES

#### ROUNDS (INCHES)

1/4 to 1-1/2 Incl .....	0.003
Over 1-1/2 to 2-1/2 Incl .....	0.004
Over 2-1/2 to 4-1/2 .....	0.005

#### HEXAGONS (INCHES)

1/4 to 3/4 Incl .....	0.003
Over 3/4 to 1-1/2 Incl .....	0.004
Over 1-1/2 to 2 Incl .....	0.005

Tolerances, in decimals of an inch, provide for undersize variation only.



© 2009 Republic Engineered Products, Inc.

PRECISELY RIGHT.™



#### TYPICAL MICROSTRUCTURE

Lamellar pearlite and ferrite.

#### SIZE RANGE

Rounds 1/4 through 4-1/2 in. in standard 20/22 ft. and 10/12 ft. lengths.

Hexagons 1/4 through 2 in. in standard 12/14 ft. lengths.

Non-standard lengths available upon request.

#### EXCELLENT MACHINABILITY

There is no single set of rules that will prove best for all machining jobs.

The material is rated at 83 percent of 1212. It will machine much faster than comparable heat-treated steels of equivalent hardness. With Republic 100 bars, faster speeds, heavier feeds, and better tool life are possible, compared with materials heat-treated to the same strength level. Republic 100 turns, forms, broaches, drills, reams, splines, and threads with minimum warpage. Resulting finish is also excellent.

Normally, these bars should be machined with feeds as heavy as possible. However, light feeds may be used providing the tool does not burnish the work. Republic 100 steel bars tend to glaze and work-harden if the tool is not cutting. Lubrication with any good cutting oil is recommended.

#### GRINDING & POLISHING

Republic offers a precision-ground and mirror-like polished surface on Republic 100 bars. These operations are performed when customers require better finish and accuracy than obtainable with standard cold-drawing. It is important to note that grinding and polishing do not affect the mechanical properties of the Republic 100 steel.

Table 1 shows the comparison figures for Degree of Surface Smoothness available with Republic 100 products. Prolifometer measurements are taken as part of the regular inspection procedures. The values given in Table 1 represent the microinch RMS of all the readings taken.

TABLE 1

#### DEGREE OF SURFACE SMOOTHNESS - REPUBLIC 100 PRODUCTS

Type	Microinch RMS
Standard cold-drawn bars	50
Turned and polished bars	35
Ground and polished bars	25 max.

Shafts, pins, gear spindles, piston rods, and many other parts are manufactured from Republic 100 steel that is ground and polished before shipment. It provides the clean, bright, and smooth surfaces needed for these applications. Seams and other surface blemishes sometimes present on standard bars are eliminated. If subsequent plating of the parts is contemplated, Republic 100 in this form performs as an excellent plating base.

In special instances, surface stresses must be avoided on certain parts. Because such stresses are higher after polishing, bars should be ordered ground only in these cases.

#### IDEAL MAINTENANCE STOCK

Republic 100 steel bars replace most maintenance steels used around plants, mills, or mines. These include: 1018, 1212, 4140, 8620, and many other more expensive steels in both hot-rolled and cold-drawn form. The Republic 100 bars cost less than heat-treated in-the-bar materials.

#### TYPICAL REPAIR AND MAINTENANCE PARTS INCLUDE:

arbors	drive shafts	piston rods	spline shafts
armature shafts	feed screws	pump shafts	steering rods
axles	generator shafts	reducer gears	take-off shafts
beveled gears	impeller shafts	rotors	tie rods
boring bars	knock-out bars	set-screws	tool holders
bushings	lead screws	sleeve shafts	turbine shafts
cross-feed screws	magneto shafts	sleeves	valve stems
cylinders	mandrels	speed gears	worm shafts
drive gears	motor shafts	spindles	wrist pins

