



ST. LAWRENCE

Alloys for Industry Since 1955

MAN-CRO® 400F

MAN-CRO® 500F

- Wear Resistant Materials
- Over 50 Years Experience
- Custom Fabrications
- Extended Service Life





MAN-CRO® 400F AND 500F AR STEELS

MAN-CRO AR grades are quenched and tempered alloy steels designed to provide an excellent combination of high strength (100,000 psi minimum yield), toughness, abrasion resistance, and weldability in plate thicknesses through 3 inches. By desulphurizing and degassing during manufacture, we are able to offer a “clean” alloy while providing good cold forming characteristics and impact properties to temperatures as low as -40° C and still eliminate welding problems.

High pressure water spray-quench insures maximum scale removal. This feature improves surface condition and enhances welding processes.



ADVANTAGES

- Maximum Resistance to Both Impact and Abrasion
- Excellent Weldability
- Cold Formability
- Excellent Charpy Impact Properties
- Flat Surfaces
- Fine Grain Structure
- “Clean” Steel

CHEMISTRY (%)

Manufactured in Compliance with ISO 9002 ABS-QE

Grade	C	Si	Mn	P	S	Cr	Ni	Mo	B
MAN-CRO 400F	.12/.16	.35/.55	1.55 max	.025 max	.005 max	.55 max	1.00 max	.55 max	.0005/.005
MAN-CRO 500F	.25/.31	.35/.55	.95 max	.025 max	.005 max	.75 max	1.00 max	.65 max	.0005/.005

MECHANICAL PROPERTIES

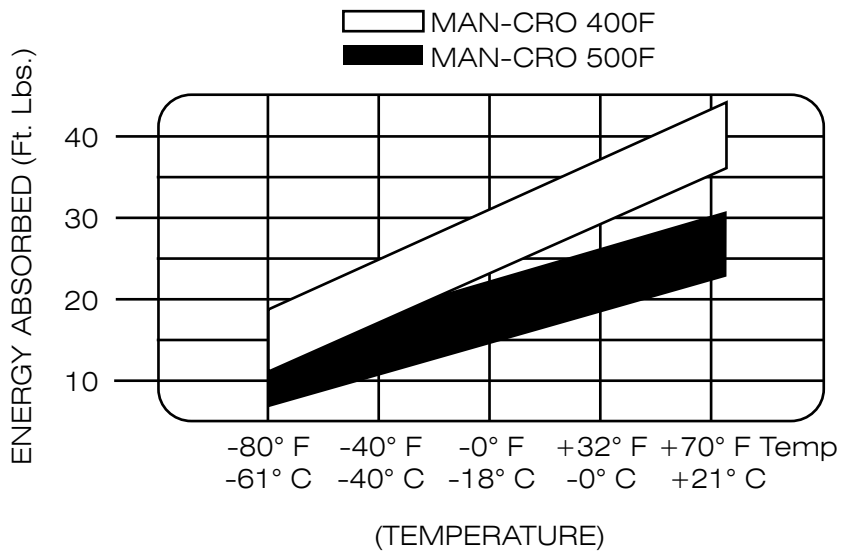
Grade	Yield PSI	Tensile PSI	Elong 2"	Reduction of Area%	Hardness HB Type
MAN-CRO 400F	140,000	180,000	15%	65	400
MAN-CRO 500F	187,000	248,000	11%	44	495



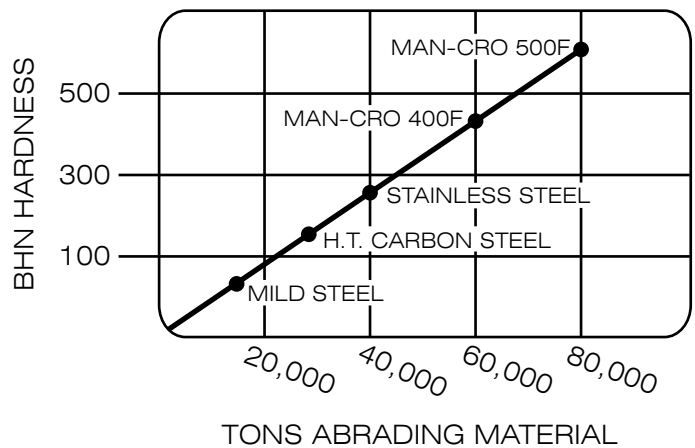
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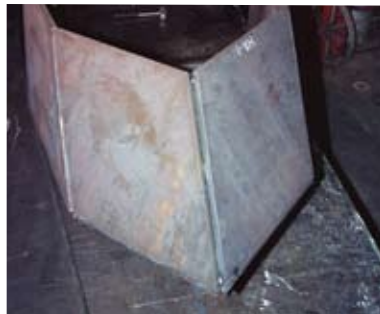
CHARPY IMPACT PROPERTIES

TEST SECTION .5" - 2.5" THK



SERVICE LIFE COMPARISONS - ABRASION TESTS





WELDING

1. General Instructions

Both **MAN-CRO** 400F and 500F grades can be welded with standard low hydrogen electrodes or wire. Low heat input methods such as submerged-arc, metal-arc and gas-shielded metal-arc (TIG) are recommended.

Original mechanical properties can be maintained by using these types of low heat input methods.

2. Preheating

PREHEATING

Grade	Plate Thickness Range					
	.5"	1"	1.5"	2"	2.5"	3"
MAN-CRO 400F	NONE			300°F		
MAN-CRO 500F	300°F			375-425°F		

To insure good welding results, be sure joint is clean and use only dry consumables. The pre-heat and interpass temperature should be maintained throughout welding procedure. Temperature crayons are helpful in maintaining reasonably constant temperature during welding. Under severe restraint conditions, tack welds or in damp weather; increase pre-heat temperatures by 25%.

3. Consumables

Filler metal with lower tensile and yield strength are recommended in welding **MAN-CRO** 400F and 500F. This type material provides more ductility while the weld is cooling, thus reducing stress on the joint. AWS E70XX, E80XX and E90XX shielded metal-arc electrodes have been successful for submerged-arc and gas metal arc wire. Low hydrogen flux is also recommended. For butt weld, when the joint strength must be equal to that of the parent plate, electrodes equivalent to AWS E 11018 are recommended.

FABRICATION

Oxy-Acetylene Gas Cutting

MAN-CRO grades may be gas cut with conventional fuels and procedures. **MAN-CRO** 500F should be cut at minimum room temperature or preferable in a preheat range of 200°-400° F to prevent surface or edge cracking. If machining is required near torch cut edges, allow sufficient stock removal to get below hardened edge or preheat to 400° F prior to flame cutting.

Forming

The low level of oxides and sulfides present in **MAN-CRO** grades provides superior bending properties. Bending force required is approximately 4X carbon steel grades. Plates should be rolled or bent with the grain (rolling direction) which is clearly marked on each plate. 3t is usually minimum radius for **MAN-CRO** 400F up to 3/4" thick plate, 6t for **MAN-CRO** 500F up to 1/2" thick plate.

Machining

High speed steels, cobalt or cemented carbide can be used for planing, cutting, drilling and countersinking. Reducing speeds depending on plate hardness are recommended. Use a top angle (included) of 150° and edge clearance of 5°-7°.

For cutting speeds and feeds contact your St. Lawrence representative.





MAN-CRO® SUGGESTED APPLICATIONS

- Agricultural Tyres
- Agitator Paddles
- Arms for Lift Trucks
- Back-up Plates
- Baffle Plates
- Bucket Lips
- Bucket Liners
 - Drag Line Shovel
 - Conveyor Loader
- Bulldozer Blades
- Car Plates
- Chain Links
- Chain Side Runners
- Chutes
 - Coal Coke
 - Glass Gravel
 - Limestone Ore
 - Refuse Rock
 - Sand Slag
 - Slate
- Classifier Screens
- Coke Bins
- Conveyor Buckets
- Crusher Hammers
- Crusher Liners
- Clam Shell Bucket Liners
- Concrete Mixer Liners
- Concrete Pipe Liners
- Deck Plates
- Doors
- Dredge Pump Liners
- Dragline Buckets
- Dipper Sticks
- Dump Truck Beds
- Eye Bars
- Fan Blades and Housings
- Flotation Plates
- Flue Liners
- Funnels
- Furnace Liners
- Grader Blades
- Hoppers
- Launder Plates
- Loaders
- Log-Washer Paddles
- Muller Bottoms
- Mixers
- Oscillator Liners
- Ore Car Bodies and Liners
- Ore Pocket Liners
- Pressure Plates
- Scrap Baler Liners
- Screen Decks
- Shakeout Liners
- Shot-Blast Liners
- Skip Cars and Liners
- Sluice Plates
- Spiral Castings
- Transfer Car Liners
- Truck Box Liners
- Vibrators
- Wear Bars
- Wear Plates
- Wearing Strips

MAN-CRO® STANDARD STOCK SIZES

PLATES

Grade	Thickness	Plate	
		Width	Lengths
MAN-CRO 400F	3/16"-3"	48"-96"	up to 288"
MAN-CRO 500F	1/4"-3"	48"-96"	up to 288"

BARS

Grade	Thickness	Bars	
		Width	Lengths
MAN-CRO 400F	1/4"-2"	1"-12"	up to 288"
MAN-CRO 500F	CUSTOM CUT		

MAN-CRO® COLOR CODES

MAN-CRO 400F Blue
 MAN-CRO 500F Green

NOTE: Special shapes cut to size: circles, rings, sprockets, blades, etc. all cut to specification on our oxy-acetylene or plasma-arc systems. Contact your St. Lawrence Representative for more detail.





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