

METAL IDENTIFICATION CHART

We have made Maintenance Welding easier than ever...

"What is the base metal?" is often the toughest challenge a maintenance welder has to face. Using this chart along with a file, magnet, and chisel will help answer this question and lead to the proper electrode selection.

STEELS

TEST/METAL	LOW CARBON	HI-STRENGTH STEEL	HIGH CARBON STEEL
Uses	Angle, Channels, Beams, Sheet, Plates E.G. Storage Tanks (May Also Be Cast)	Wear Plates, Bars, Truck Frames, Excavator Parts, Some Tanks	Tools, Axles, Springs, Spindles
Fractures	Bright Grey	Very Light Grey	Very Light Grey
Surface Unfinished	Dark Grey	Dark Grey	Dark Grey
Surfaced Machined	Very Smooth Bright Grey	Very Smooth Bright Grey	Very Smooth Bright Grey
Magnetic	Yes	Yes	Yes
File Test	Files Easily	Files	Maybe Too Hard To File Depending On Carbon Content And Heat Treatment
Chisel Test	Continuous Chip, Smooth Edges, Chips Easily	Continuous Chip	Hard To Chip, Can Be Continuous
R&M Alloy	RM 480, XR 1000, RM421 UNA-WELD 1235	XR 1020, UNA-WELD 1235	UNA-WELD 1235

STAINLESS STEELS

TEST/METAL	CHROME NICKEL 300 SERIES	PLAIN CHROME 400 SERIES
Uses	Piping and Fittings, Duct Work, Corrosion Resistant Fabrications, Chemical And Food Processing, Paper And Pulp Industries	Cutlery & Knives, Surgical Steel, Excellent Sharp Edge Capabilities, High Stress Fasteners, Steam And Mild Chemicals
Appearance	Bright Silvery Smooth (May Be Cast)	Bright Silvery Smooth (May Be Cast)
Magnetic	No	Yes
File	File But Harder Than Steel	May Be Too Hard
Chisel	Continuous Smooth Bright Color	
R&M Alloy	300S STAINMASTER	UNA-WELD 1235

HINT: Chrome Nickel 300 Series Stainless is used in 90% of all welded stainless applications due to its ease of weldability.

HIGH NICKEL ALLOYS

TEST/METAL	NICKEL CHROME MOLY	NICKEL CHROME IRON
Description	High Strength At Room And Elevated Temperatures, Exceptional Corrosion Resistance Against Pitting And Crevice Corrosion	Excellent Strength And Oxidation Resistance At High Temperatures And Retains Impact Resistance To -140° F
Uses	Valves, Pumps, Piping, Marine Fixtures, Petroleum Refining, Fasteners, Pulp And Paper, Liquor Tanks And Pickling Plants	Heat Treating Equipment, Heat Treat Baskets, Furnace And Boiler Components, Scrubbers, Food Processing, Pollution Control, Petro Chemical
Magnetic	No	No
Appearance	Looks Like Stainless	Looks Like Stainless
Use On	All Wet Corrosion Applications	All Dry Corrosion Applications
Alloy	RM 3000	RM 3000

NOTE: Pure nickel alloys are magnetic.

COPPER BASE ALLOYS

TEST/METAL	PURE COPPER	YELLOW BRASS	RED BRASS
Uses	Tubing, Buss Bars, Wiring	Decorative Items, Plumbing Faucets, Drain Covers And Traps	Plumbing, Elbows, Small Valves, Screws, Valve Stems
Appearance	Red	Yellow	Rosie
R&M Alloy	RM 340	RM 320	RM 320
TEST/METAL	PHOSPHOR BRONZE	SILICON BRONZE	ALUMINUM BRONZE
Uses	High Quality Steam Valves, Gears, Some Marine Hardware	Pumps, High Strength Castings, Impellers	High Strength Gears, Gears, Wear Plates, Worn Wheels, Bearings
Appearance	More Red Than Yellow	Red	Fairly Yellow
R&M Alloy	RM 320	RM 320	RM 320

- Aluminum Bronze will chip instead of curl when machined and is slightly magnetic.
- Red brass will curl when machined.
- Brass will put off white smoke under flame due to zinc content.
- Copper alloys listed will be nonmagnetic except for aluminum bronze.
- When possible silver braze copper alloys.
- Copper melts much slower than brass and bronze.

ALUMINUM AND WHITE METALS

TEST/METAL	ALUMINUM	MAGNESIUM	ZINC DIE CASTING
Uses	Angles, Beams Motor Housings, Boat Hulls, Marine Hardware Castings, Window Frames	Aircraft Parts (High Strengths/Light Weight) Ladders, Mortar Shells, Raised Printer Plates	Carburetor Bowls, Trophies, Ornaments, Kirksite Dies, Housings
Weight	About 1/3 Weight Of Iron	1/5 Weight Of Iron	About Same As Iron
Acid Test	Nitric Acid Won't React	White Vinegar Foams White	Nitric Acid Turns Black
Flame Test	Melts Faster Than Steel	Slivers Will Flare Up White And Green	Melts At 800° F, Aluminum And Magnesium 1200° F
Magnetic	Non-Magnetic	Non-Magnetic	Non-Magnetic
R&M Alloy	RM 3060	RM 3018	RM 3016

CAST IRONS AND MANGANESE

TEST/METAL	GREY CAST	MALLEABLE & DUCTILE CAST	MANGANESE STEEL 12%
Uses	Motors, Engine Blocks And Heads, Gearbox Housings, Machine Frames	Pipe Fittings, Yokes, Shifting Forks	Hammermill & Crusher Parts, Track Parts Subject To Impact Wear
Fractures	Dark Grey	Dark Grey	Coarse Grained
Surface Unfinished	Dull Grey - Evidence Of Sand Mold	Dull Grey	Coarse Grained - Evidence Of Sand Mold
Surfaced Machined	Fairly Smooth Light Grey	Smooth Light Grey	Not Machined Typically
Magnetic	Yes	Yes	Not Unless Work Hardened
File Test	Files Easily	Files Easily	Maybe To Hard To File
Chisel Test	Small Powdery Chip	Small Chips	Very Hard To Chisel
R&M Alloy	SURE CAST 935-2	SURE CAST 935-2	HF 540