

HIGH PERFORMANCE PRODUCTS, INC.

MILD STEELS

HPP 160 Mild Steel	1
HPP164 High Strength Mild Steel	2
HPP165 Maintenance All-Position	3
HPP 168 High Tensile Mild Steel	3
HPP 166 Lo-Hydro	4

DISSIMILAR STEELS

HPP 150 Ultimate Dissimilar Steel	5
HPP 151 Dissimilar Steel	6

STAINLESS STEELS

HPP 101 Ultimate Stainless Steel Vertical Down	7
HPP 102 Stainless Steel Vertical Down	7
HPP 103 Stainless Steel	8

CAST IRON

HPP 310 Premium Cast Iron	9
HPP 312 Machinable Cast Iron	10

CUTTING

HPP 401 Green Machine Cutting Rod	11
-----------------------------------	----

HARD-FACING

HPP 220 Premium Tool Steel	12
HPP 221 Severe Impact Hard-Facing	13
HPP 222 High Impact Hard-Facing Build-up	14
HPP 224 All Position Hard-Facing	15
HPP 225M Premium Hard-Facing Build-up	16
HPP 226M Severe Abrasion & Impact	16

HARD-FACING TUBULARS

HPP 251 Impact & Abrasion Hard-Facing	17
HPP 252 High Chrome Carbide Hard-Facing	17
HPP 253 High Temp Abrasion Hard-Facing	18
HPP 254 Vanrode	18

ALUMINUM / BRONZE/ BRASS/ COPPER

HPP 673 High Performance Aluminum	19
HPP 561 Silicon Bronze	20
HPP 562 Copper	20
HPP 563 Aluminum Bronze	21

BRAZING – COPPER / BRASS

HPP 564 High Performance Braze	21
HPP 565F Super Red Braze	22

SILVER BRAZING / SOLDER

HPP 524F Orange Silver Braze	23
HPP 525F Pink Silver Braze	23
HPP 526 Ultimate Silver Braze	24
HPP 521AC Low Temp Silver	24

MISC

HPP 500 General Purpose Silver Braze Flux	25
HPP 89 Heat Sink	25
Chrome Carbide Wear Plate	26
Pyrofacers Torch	27
Hot Spray Powders	28
Cold Spray Powders	29
Advantage Cutoff Wheels / Grinding Wheels	30
Drill Bits	30

NOTES:

Value, selection, and service is HPP.

We shall exceed our customer expectations for quality service, delivery and product value.

Hpp is your one stop for hardfacing and overlay products, joining consumables for all ferrous and nonferrous metals, mig and tig wires, metal working products and accessories.

With over 45 years experience in the maintenance welding industry, High Performance Products offers the maintenance welder and mechanic the highest quality product line available anywhere in the world. Whether you're a one man shop or a Fortune 500 company HPP products save you money and time with products designed to help you achieve your uptime goals.

Our sales and technical staff is available to discuss your particular welding and wear applications and design a custom solution. In addition we can provide onsite technical and safety seminars.

HPP 160

MILD STEEL

GENERAL PURPOSE ELECTRODE FOR WELDING LOW CARBON STEELS IN ANY POSITION

GENERAL CHARACTERISTICS

This electrode has been designed to operate on almost any AC or DC welding machine even when the open circuit voltage is very low. The special coating protects the weld deposit from adverse conditions normally encountered in maintenance repair welding. Low amperage requirement controls distortion when welding thin sheet metal; spatter is kept to a minimum. Ideal for field work and out-of-position welding.

TYPICAL APPLICATIONS: Fabrication of thin, medium, heavy, and dissimilar gauge mild steel.

Sheets, plates, angle iron, beams, pipes and machine parts can be welded in all positions. Also used for filling holes and build-up of over-machined and worn surfaces. Commonly used on applications requiring short, intermittent and spot welds because of the outstanding restarting characteristics.

- **Welding Parameters**

Diameter	1/16"	5/64"	3/32"	1/8"	5/32"	3/16"
Amperage	20-50	25-60	35-80	65-125	90-160	120-210
Current.....	AC or DC either polarity (electrode+ or -)					

- **Technical Data:**

Tensile Strength as welded.....	up to 80,000 PSI
Yield Strength.....	up to 68,000 PSI
Elongation.....	approx 24%

Procedure:

Remove as much foreign material as practical from the weld area. DC reverse polarity (electrode +) produces deep penetration; DC straight polarity (electrode -) will have shallow penetration and a flatter bead. AC prevents arc blow. A medium arc length should be maintained with either stringer or weave beads. Slag is easily removed with a light chipping hammer.

HPP 160 ALSO AVAILABLE IN:

Mild Steel Mig	.030, .035, .045,
Mild Steel Tig	1/16", 3/32"

HPP 164

HIGH STRENGTH MILD STEEL

**VERY HIGH STRENGTH LOW ALLOY
ELECTRODE FOR WELDING OF LOW
TO MEDIUM CARBON ALLOYED
STEELS**

GENERAL CHARACTERISTICS

All position, low hydrogen iron powder type electrode with a fast and efficient metal transfer. Deposits have outstanding elongation and ductility and provide crack free welds under highly stressed conditions. The slag is easily removed from the smooth welds, which are easily machined.

TYPICAL APPLICATIONS: HPP 164 is designed to weld low alloy high strength steels such as T-1, Hy-80, Hy-90, Hy-100, SSS 100 and Jalloxy 90 and 100. Commonly used to fabricate tanks, containers, covers and high strength pipe. Also recommended for welding low alloy steels containing nickel, manganese, molybdenum, and chromium such as I-beams, angle iron, scaffolding, and super-structures. Weldments can be used "as welded" or "stress relieved".

• Welding Parameters

Diameter	3/32"	1/8"	5/32"	3/16"
Amperage	70-120	100-150	120-210	200-275
Current.....	AC or DC reverse polarity (electrode+)			

• Technical Data:

Tensile Strength as welded.....	up to 113,000 PSI
Yield Strength.....	up to 104,000 PSI
Elongation.....	approx 23%

Procedure: No preheat is necessary when welding low carbon steels. When joining heavy sections to thin sections and when low alloy or higher carbon steels are welded, a preheat of 400°F to 600°F (200°-300°C) is recommended. Maintain a short arc with either stringer or weave beads. Allow deposit to cool normally before chipping off slag. To stress relieve, heat to 1025°F (550°C) and maintain for 1 hour.

HPP 164 ALSO AVAILABLE IN:

High Strength Flux Cored Mig .045, 1/16, 5/64

HPP 165

MAINTENANCE ALL-POSITION SUPERIOR ALL-POSITION CONTROLLED- HYDROGEN ELECTRODE FOR PROBLEM STEELS

GENERAL CHARACTERISTICS

HPP165 is a high tensile strength ferritic electrode. This high quality, all position low amperage electrode features rapid deposition. Deposits have good ductility, are dense, crack-free and of x-ray quality. HPP165 is excellent for steels sensitive to cracking when welded with conventional mild steel electrodes.

TYPICAL APPLICATIONS: For "tramp" and "problem" steels high in sulphur, phosphorus or other elements added to improve the machinability of steel. For fabrication of "H" and "I" beams, angle and channel iron, pipelines and all other steel structures. For circular tube to plate welds and other type joints subject to stress and strain.

- **Welding Parameters**

Diameter	3/32"	1/8"	5/32"	3/16"	1/4"
Amperage	60-100	110-150	140-200	220-280	300-375
Current.....	AC or DC Reverse Polarity (electrode+)				
Tensile strength.....	up to 80,000 PSI				

- **Procedure:**

Area to be welded should be cleaned thoroughly. Surface contamination must be removed and beveled or chamfer where required. Maintain close arc length. Vertical joints should be welded from bottom up, using rapid weave technique. Do not whip. Use drag technique to make horizontal fillet welds. Slag is easily removed.

HPP 168

MILD STEEL "HIGH TENSILE" ELECTRODE THAT EXCELS AT VERTICAL WELDING

GENERAL CHARACTERISTICS

Easy to use in all positions. Exceptional where vertical welds have to be made. An electrode that can actually be dragged. HPP168 has a special violet colored flux that establishes immediate recognition.

TYPICAL APPLICATIONS: For joining common steels where extra strength is required in the weld.

- **Welding Parameters**

Diameter	3/32"	1/8"	5/32"
Amperage	60-80	70-110	120-150
Current.....	AC or DC Reverse Polarity (electrode+)		
Welding Positions:.....	Flat, Vertical up, Vertical down, Horizontal, Overhead		

- **Technical Data**

Tensile strength.....	97,000 PSI
Yield strength.....	78,000 PSI
Elongation.....	approx. 17%



LO-HYDRO
PREMIUM QUALITY, LOW-HYDROGEN
ELECTRODE WITH MOISTURE GUARD
COATING. FOR X-RAY QUALITY
WELDS ON CONSTRUCTION STEELS

GENERAL CHARACTERISTICS

HPP 166 is a premium quality, iron powder low-hydrogen electrode designed for joining construction grade and problem steels. Product features a moisture guard coating to minimize hydrogen embrittlement and underbead cracking. Weldability is excellent on both AC or DC reverse polarity. The first choice for x-ray quality welds featuring high impact resistance.

TYPICAL APPLICATIONS: Used primarily on carbon and medium tensile steels, especially under conditions of restraint. Excellent for high sulphur and “tramp” steels. Used extensively on construction grades, for shipbuilding, pipelines, boiler plate, cast steel and cryogenic grades.

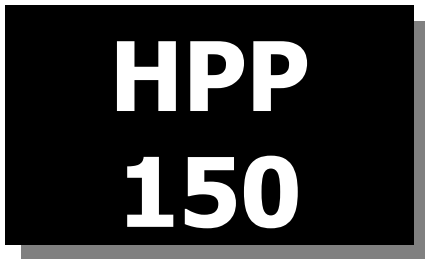
• **Welding Parameters**

Diameter	3/32"	1/8"	5/32"	3/16"
Amperage	60-100	110-150	140-200	220-280
Current.....	AC or DC reverse polarity (electrode+)			

• **Technical Data:**

Tensile Strength as welded.....	up to 76,000 PSI
Yield Strength.....	up to 69,000 PSI
Elongation	approx. 31-33%
Reduction in Area.....	75-80%

Procedure: Area to be welded should be clean and free of surface contamination such as rust, scale, grease, etc. On DC, use reverse polarity (electrode +). Preheat of 300⁰ – 450⁰F should be employed with heavy sections and hardenable grades of base metal. For x-ray quality, maintain a short arc gap. On vertical welds, start at bottom and weave slightly while pausing at the edges. For root passes, set a minimum gap (3/32" for 1/8" electrodes) and run stringer beads. For fill and cover passes, a weaving technique is best employed.



ULTIMATE DISSIMILAR STEEL

**THE ULTIMATE ELECTRODE FOR
WELDING ALL TYPES OF STEELS,
WITHOUT FEAR OF
CRACKING OR BREAKAGE**

GENERAL CHARACTERISTICS

Because maintenance shops often have old or inexpensive welding equipment, HPP150 has been formulated to provide the best possible arc stability, even under adverse conditions. It is amazingly stable on low, open circuit voltages, AC buzz box welding machines. The weld metal transfer is especially smooth and there is almost no spatter. Arc restrike is instantaneous. We have even managed to make the slag virtually self-releasing. It is without a doubt the best possible product to use on unknown steels and dissimilar metal combinations.

TYPICAL APPLICATIONS: Due to its exceptional strength and crack resistance, it is ideal for repairing tools, dies, spring steel, and any dissimilar metal combinations, with the exception of the aluminum and copper alloys. Because the weld metal is so tough, it is recommended for repairing worn parts, and also as an underlayment for hardfacing. Because of its low amperage requirements and exceptional ease of its use, it is the first choice for both home hobbyists and maintenance welders.

- **Welding Parameters**

Diameter	1/16"	3/32"	1/8"	5/32"	3/16"
Amperage	25-35	35-70	60-110	75-140	130-200
Current.....	DC Reverse Polarity (electrode+)				

- **Technical Data:**

Tensile Strength as welded.....	up to 128,000 PSI
work hardened.....	up to 186,000 PSI
Yield Strength.....	up to 90,000 PSI
Elongation.....	approx 32%
Hardness.....	320 (BHN)

Procedure: The area in which the weld is to be made should be free of rust, grease, paint and other materials which cause weld contamination. A 90° vee should be used when joining heavy sections. High carbon steels should be preheated to 350°F(177°C). The interpass temperature should be kept below 500°F (260°C). Alignment should be maintained by the use of fixtures, tack welds, or other types of mechanical support. Maintain a short arc length and use stringer beads. Avoid weaving whenever possible.

HPP 151

DISSIMILAR STEEL

THE STRONGEST PROBLEM SOLVING, UNIVERSAL ELECTRODE FOR ALL STEELS

GENERAL CHARACTERISTICS

A low heat input electrode designed to produce the highest tensile welds. It can be used in all positions to produce smooth, porosity free welds without undercut or spatter.

TYPICAL APPLICATIONS: Welding of low, medium, and high alloy steels requiring the highest strength and quality. Ideal for repair of tools, dies, springs, carbon steels, stainless steels, pressure vessels, aircraft steels, vanadium-moly spring steels and as an underlayment or pad prior to applying hard-facing alloys. Commonly used for joining stainless steels of unknown analysis and these steels to carbon steels. Also used for rebuilding shafts and blades used in the chemical, construction and mining industries, and for broken stud removal.

- **Welding Parameters**

Diameter	1/16"	3/32"	1/8"	5/32"	3/16"
Amperage	30-40	40-80	65-120	90-150	140-220
Current.....	AC or DC Reverse Polarity (electrode+)				

- **Technical Data:**

Tensile Strength as welded.....	up to 120,000 PSI
work hardened.....	up to 180,000 PSI
Yield Strength.....	up to 90,000 PSI
Elongation.....	approx 28%
Hardness.....	300 (BHN)

Procedure: Prepare joint area by removing foreign material. Bevel heavy sections to form a 90° vee. Preheat high carbon steels to 400°F (204°C). Use jigs, fixtures and tack welds to maintain alignment. Hold a short arc. Stringer beads are preferred to prevent overheating. Allow to cool before removing slag. Deposits will take a high polish when subjected to wear.

HPP 151 ALSO AVAILABLE IN:

Dissimilar Steel Mig	.035, .045,
Dissimilar Steel Tig	1/16, 1/8, 3/32

HPP 101

ULTIMATE STAINLESS STEEL VERTICAL DOWN

GENERAL CHARACTERISTICS

Finest Out of Position Welding Alloy. HPP 101 has superior restrike that reduces electrode stub loss. No special welding techniques are required. X-ray quality weld deposits. HPP101 has a high Molybdenum content for corrosion resistance.

TYPICAL APPLICATIONS: Ideal for welding 204,304,304L ,316,316L and other common grades of austenitic stainless steel. Perfect for extra low carbon versions. Other applications include: Food processing equipment, stainless piping, thin installations and corrosive chemical handling.

- **Welding Parameters**

Diameter	3/32"	1/8"
Amperage	50-75	70-90
Current.....	DC Reverse Polarity (electrode+)	

- **Technical Data:**

Tensile Strength.....	84,000 PSI
Elongation.....	40%

Procedure: Welding in vertical down position, maintain a tight arc and tip the electrode 10 degrees in the direction of travel. Straight stringer beads will yield the best results.

HPP 102

STAINLESS STEEL VERTICAL DOWN

GENERAL CHARACTERISTICS

Stainless steel electrode for vertical down welding of austenitic stainless steel. Resistant to intergranular corrosion.

TYPICAL APPLICATIONS: Vertical down welding for pipe lines, sheet metal and other applications where excellent weldability is needed.

- **Welding Parameters**

Diameter	3/32"	1/8"
Amperage	50-75	85-105
Current.....	AC OR DC Reverse Polarity (electrode+)	

- **Technical Data:**

Tensile Strength.....	up to 73,000 PSI
Elongation.....	40%

Procedure: Remove foreign material and unsound metal from surface to be welded. Deposit must be applied as stringer beads. Prevent excessive heat build-up and allow part to cool slowly.

HPP 103

STAINLESS STEEL

SPECIAL LOW CARBON ELECTRODE FOR MOLYBDENUM-BEARING STAINLESS STEELS

GENERAL CHARACTERISTICS

All position electrode that deposits a fast, smooth, corrosion resistant weld without spatter. The special coating produces a slag, which provides excellent protection to the weld deposit, yet is very easy to remove after slight cooling. The low carbon content prevents carbides from being formed at the grain boundaries and resultant intergranular corrosion.

TYPICAL APPLICATIONS: Welding 302, 304, 308, 316L Stainless steels. Fabricating and repair of standard and low carbon, molybdenum-bearing, austenitic stainless steels. Commonly used to weld tanks, pipes, fittings, etc. in chemical plants and paper mills. Also used by the food, dairy and distillery industries. Ideal as a protective overlay, for steel that must resist corrosion.

• **Welding Parameters**

Diameter	3/32"	1/8"
Amperage	40-90	75-120
Current.....	AC or DC Reverse Polarity (electrode+)	

• **Technical Data:**

Tensile Strength	up to 100,000 PSI
Yield Strength.....	up to 65,000 PSI
Elongation.....	approx 40%
Corrosion Resistance.....	very good

Procedure: Thoroughly clean weld area of all foreign material. A 60° bevel should be used when butt welding parts 3/16" (5.0mm) and heavier. Do not preheat. Tack parts to maintain alignment. Hold a medium short arc with electrode tilted 15° in the direction of travel. Prevent excessive heat build-up during welding operations. Remove slag between passes. Allow to cool slowly.

HPP 103 ALSO AVAILABLE IN:

Stainless Steel Mig	.035
Stainless Steel Tig	1/16, 1/8, 3/32



PREMIUM CAST IRON

***SPECIALLY DESIGNED FOR
DIRTY CAST IRON.
THE PROBLEM SOLVER TO USE
WHEN ALL OTHERS FAIL***

GENERAL CHARACTERISTICS

Unique flux coating on alloyed core wire produces dense, strong, crack-resistant welds on all types of cast iron. Especially good for contaminated, old, oil-soaked, dirty base metal. Also recommended for joining cast iron to steel. Use on gray, ductile, Meehanite and nodular cast iron. Deposits are machinable.

TYPICAL APPLICATIONS: Use on sewer pipe, machine bases, transmission or gear housings, sprockets, repair of or build-up on gears and any repair of cast iron to steel.

- **Welding Parameters**

Diameter	3/32"	1/8"	5/32"	3/16"
Amperage	40-70	70-110	90-130	110-170
Current.....	AC or DC reverse polarity (electrode+)			

- **Technical Data:**

Tensile Strength.....	up to 75,000 PSI
Hardness	210 (BHN)

Procedure: On heavy sections, remove worn, cracked metal and bevel joint using a grinding wheel. When repairing cracks, drill "stop" holes at either end to prevent spreading while welding. On very heavy sections, preheat to approximately 400°F. Use short stringer beads for root pass and peen lightly after removing slag. Use a short to medium arc and the lowest amperage possible to minimize base metal over-heating. When breaking arc, always back whip into weld crater. Weaving two times rod diameter is acceptable for cover beads on multi-pass work. Weld joints should be allowed to cool slowly for maximum strength and machinability.

HPP 310 ALSO AVAILABLE IN:

Premium Cast Iron Mig .035, .045

HPP 312

MACHINABLE CAST IRON

***PREMIUM NICKEL ELECTRODE FOR
WELDING CAST IRON WITH MAXIMUM
MACHINABILITY***

GENERAL CHARACTERISTICS

Specially formulated coating gives a pulsed arc for low temperature welding of cast irons. When properly applied the arc will penetrate surface skin and contaminants to produce a porosity free weld. The heat affected zone is not hardened and stress cracks are almost always avoided.

TYPICAL APPLICATIONS: Low temperature welding of cast iron in all positions. Repair breaks and cracks in engine blocks, gear housings and machine bases. Ideal for filling holes and building up worn or missing sections which must be machined to final dimension after welding. Also for joining cast iron to steel, iron, stainless steel, etc.

- **Welding Parameters**

Diameter	3/32"	1/8"	5/32"	3/16"
Amperage	30-70	55-110	75-135	100-175
Current.....	AC or DC straight polarity (electrode-)			

- **Technical Data:**

Tensile Strength.....up to 50,000 PSI
Hardness160 (BHN)
Color Match.....similar to cast iron

Procedure: Clean weld area if possible. Bevel joint to form a "U" Groove. A hole should be drilled at each end of all cracks to prevent spreading during welding. Select lowest possible amperage. Maintain a medium long arc with electrode tilted slightly in the direction of travel. Short stringer beads or narrow weave beads should be used to prevent excessive heat build-up. When breaking the arc always fill the crater and drag rod back over the weld deposit. Peening while still hot will help reduce stresses. When restriking the arc start on previously deposited weld metal, not the base material. Allow part to cool slowly.

HPP 312 ALSO AVAILABLE IN:

Machineable Cast Iron Tig 1/16, 3/32, 1/8



GREEN MACHINE CUTTING ROD

GENERAL CHARACTERISTICS

- Reduce repair and down time. Easiest method of removing failed welds and metal removal.
- Extremely controllable arc. Simple technique to learn. Use on standard arc welder – doesn't require air.
- Noise and smoke reduction compared to arc air system.

TYPICAL APPLICATIONS:

Removes all types of metal. Easily removes hardsurfacing. Quickly gouges cracks to be welded. Pierce holes quickly. Absolutely essential for cast iron repair preparation, it leaves a u-shaped groove to avoid notch sensitivity, seals the porous cast iron surface for optimum adhesion and aids in pre-heating the base metal in the weld area.

• Welding Parameters

	Diameter	1/8	5/32	3/32	3/16
450	Amperage	200 – 250	220 – 330	100 – 170	300 –

Recommended Current: AC or DC Straight Polarity (electrode -)

WELD POSITIONS: Flat, Vertical up, Vertical down, Horizontal, Overhead

- **Procedures:** Hold electrode nearly flat to metal surface. Initiate arc and use a quick push motion to blast the molten metal away from your line of travel. Limit depth on any one pass to one half the diameter of the electrode.

HPP 220

PREMIUM TOOL STEEL

ELECTRODE FOR REPAIR AND HARD-FACING OF “HIGH SPEED” AND “HOT WORKING” STEELS

GENERAL CHARACTERISTICS

This electrode is specially formulated for use on high speed and hot working steels. Tungsten, molybdenum and vanadium have been alloyed with other elements to produce a deposit that will maintain a sharp edge on high speed tools yet can withstand elevated temperatures that are normally encountered with these tools. When applied to hot working tools, the deposit will retain its hardness and resistance to wear at high operating temperatures.

TYPICAL APPLICATIONS: Build-up and hard-facing of molding plates, mandrels, hot shears, reamers, turning and planning tools, drawing mandrels and dies, circle cutting tools, trimming plates, stencils, punches, cams, lathe tools, mill cutters and sliding surfaces.

• **Welding Parameters**

Diameter	3/32"	1/8"
Amperage	45-90	80-120
Current.....	AC or DC either polarity (electrode+ or -)	

• **Technical Data:**

Hardness as welded.....	58-62 RC
Hardness heat treated.....	63-65 RC
Hot Hardness.....	approx. 56 RC at 1100°F (600°C)

Procedure: Remove all foreign material from weld area. When the base metal is tool steel, preheat part to 800-1100°F (425-600°C); maintain this temperature during the entire welding operation. No preheat is required when making deposits on low carbon steel but a minimum of 3 layers is necessary to overcome dilution. Do not quench after welding, remove slag and reheat to 1000°F (540°C), allow to cool slowly. The deposit can then be ground to final dimension.

HPP 220 ALSO AVAILABLE IN:

Premium Tool Steel Mig -- Flux Core	.045, 1/16, 7/64
Premium Tool Steel Mig -- Metal Core	.045, 1/16



SEVERE IMPACT HARD-FACING JOINING AND BUILD-UP ALLOY FOR SEVERE IMPACT AND COMPRESSION RESISTANCE

GENERAL CHARACTERISTICS

HPP 221 is a tough, high-strength electrode for use where high impact and high compression strength is needed. Weldable in all positions. HPP 221 applies easily with minimum spatter loss. The non-popping slag is easily removed. Deposits are nonmagnetic and can be flame-cut or forged.

TYPICAL APPLICATIONS:

Excellent for manganese or manganese-to-steel applications. Specially formulated for use on railroad industry. Additionally, it's good compressive strength makes it ideal as build-up prior to hard-facing. Also excellent for high impact situations like crusher roll build-up, crusher jaws, hammer mill hammers, bucket teeth, etc. No limit to deposit thickness

• Welding Parameters

Diameter	5/32"	3/16"	1 /4"
Amperage	125-170	160-225	225-390
Current.....	AC or DC either polarity (electrode+ or -)		

• Technical Data:

Tensile Strength.....	up to 116,000 PSI
Hardness (as welded).....	83-91 RB
Hardness (as work hardened).....	42-47 RC
Elongation.....	38%
Machinability.....	with carbide tools
Forgeability.....	Yes

Procedure: Remove all dirt, grease and surface scale. Use suggested amperage to get proper weld shape. Keep weld interpass temperature as low as possible; do not exceed 500°F (260°C).

HPP 222

HIGH IMPACT HARD-FACING BUILD-UP HIGH ALLOY ELECTRODE FOR JOINING AND BUILD-UP OF AUSTENITIC MANGANESE STEELS FOR EXTREME IMPACT RESISTANCE

GENERAL CHARACTERISTICS

This high chromium, high manganese alloy is for joining and rebuilding manganese and carbon steel parts. The high alloy deposits are very tough and will take extreme impact and abrasion conditions. Has excellent weldability with very low spatter. Operates easily in all positions.

TYPICAL APPLICATIONS: For rebuilding and joining austenitic manganese steels and manganese steels to other steel combinations. Especially designed for high impact applications such as rail frogs and switch points, roller crushers, hammers, shovel tracks. HPP 222 is also excellent for use as a base for harder overlays.

• **Welding Parameters**

Diameter	1/8"	5/32"	3/16"
Amperage	110-135	125-190	150-250
Current.....	AC or DC reverse polarity (electrode+)		

• **Technical Data:**

Hardness (as deposited).....	16-19 RC
Hardness (as work hardened).....	48 RC

Procedure: Deposits may be placed with either the stringer bead or weaving technique. This electrode deposits easily in all positions with excellent build-up quality. Avoid over-heating on manganese steel base metals. Deposits work harden rapidly.

HPP 222 ALSO AVAILABLE IN:

High Impact Build-up Mig .045, 1/16, 7/64



ALL POSITION HARD-FACING ULTIMATE HARD-FACING ELECTRODE FOR MEDIUM IMPACT AND HIGH ABRASION

GENERAL CHARACTERISTICS

High deposition rate electrode that produces smooth beads and in most cases the slag comes off by itself. The arc is easily controlled and prevents excessive dilution with the base metal. The high chromium content of these electrodes makes the weld deposits maintain their resistance even at elevated temperatures.

TYPICAL APPLICATIONS:

Parts subjected to severe abrasion as well as light impact such as equipment for processing soil, rock, coal, cement, grinding plates, dredger teeth, conveyor screws, coal augers, agitators, earth augers and scrapers. Also, for surfaces that must resist abrasion combined with scaling such as open-hearth tools, grates, conveying chains in annealing furnaces and manipulators.

- **Welding Parameters**

Diameter	1/8"	5/32"	3/16"
Amperage	80-125	100-160	125-190
Current.....	AC or DC reverse polarity (electrode+)		

- **Technical Data:**

Hardness (as welded).....56-60 RC

Procedure:

Remove foreign material and unsound metal from surface to be welded. For best results and long service life an elastic cushion layer of HPP 222 should be applied to the part before surfacing with this electrode. When making the final surface with HPP 224 keep electrode vertical to the work piece and maintain a short arc. Deposits must be kept thin, never more than two layers thick. To prevent excessive local heat build up in the part, alternate welding area. Allow part to cool slowly.

HPP 225M

PREMIUM HARD-FACING BUILDUP

GENERAL CHARACTERISTICS

HPP225M is an outstanding **OPEN ARC WIRE**. HPP225M deposits are excellent work hardening high chromium austenitic manganese steel alloys. It can be used for build-up or overlay on manganese steel, carbon and low alloy steels. It can also join austenitic manganese steel to carbon steel and low alloy steel. Deposits are very tough and work harden rapidly under high impact.

TYPICAL APPLICATIONS: Crusher rolls & cones, hammer mill hammers, impactor bars, railroad frogs & crossings.

• **Welding Parameters**

Diameter.....	.045"	1/16"	7/64"
Amperage.....	145-195	150-275	175-500
Voltage.....	18 – 24	25 – 28	28-32
Shielding Gas.....	None	None	None
Wire Extension.....	1/2" – 3/4"	3/4" – 1 1/4"	1" – 1 1/2"
Current.....	DC Reverse Polarity (electrode+)		

• **Technical Data**

Deposit Layers.....	Multiple	Hardness as Deposit.....	RC 18-23
Work Hardened.....	HRC 50-55	Impact Resistance.....	High
Abrasive Resistance...	Fair	Surface Cross Check.....	None
Flame Cut.....	No	Machinability.....	Poor

HPP 226M

SEVERE ABRASION & IMPACT

GENERAL CHARACTERISTICS

Deposit of HPP226M is a medium chromium carbide surfacing alloy. It has excellent combination of abrasion resistance and impact resistance properties. The weld metal has high toughness and less stress relief check cracks.

TYPICAL APPLICATIONS: Cone crusher bowls & mantles, hammer mill hammers, grader blades & roll crushers

• **Welding Parameters**

Diameter.....	.045"	1/16"	7/64"
Amperage.....	150 - 200	175 – 350	300-700
Voltage.....	22 - 26	24 – 28	30-36
Shielding Gas.....	Open arc wire or CO ₂	Open arc wire or CO ₂	Open arc wire or CO ₂
Wire Extension.....	1/2" – 3/4"	1/2" – 1"	1" – 1 1/2"
Current.....	DC Reverse Polarity (electrode+)		

• **Technical Data**

Hardness (two layers).....	RC 40 – 45	Abrasion Resistance.....	Outstanding
Impact Strength.....	Good	Deposit cross check.....	yes
Machinability.....	Grinding only		
Thickness.....	2 – 3 layers recommended		
	(Multiple layers with proper procedures)		

HPP 251

IMPACT & ABRASION HARD-FACING

SEVERE ABRASION RESISTANCE
MEDIUM IMPACT RESISTANCE
GOOD OXIDATION RESISTANCE

SPECIAL CHARACTERISTICS

- * All position
- * AC/DC Operation
- * Low Dilution
- * Moisture resistant Coating
- * High Deposition
- * Low Heat Input
- * High Efficiency
- * Requires Low Amperage

GENERAL CHARACTERISTICS

HPP251 tubular hardfacing electrode is designed for use on cast irons, manganese steels, low alloy and carbon steels. Resistant to high abrasive wear and small particle abrasion. Use for applications where impact as well as abrasion are encountered.

TYPICAL APPLICATIONS: Use for severe abrasion and medium impact. This alloy has good hot harness up to 1000° F. Designed for crusher tools, jaw crushers, crusher mantles and liners, hammer mill hammers, bucket teeth and edges. Low amperage requirements result in low dilution and higher hardness.

• **Technical Data:**

Diameter.....	1 /4"	3/8"	1 /2"
Amperage.....	85-135	130-190	200-430
Current.....	AC or DC either polarity (electrode + or -)		
Hardness as welded.....	RC 55-60		

Procedure: Remove fatigued or unsound metal. No preheat is necessary on carbon steels or cast irons.

HPP 252

HIGH CHROME CARBIDE HARD-FACING

**HIGH RESISTANCE TO SEVERE
ABRASION FROM FINE PARTICLES,
CONTAINS CARBIDES IN AUSTENITIC MATRIX**

SPECIAL CHARACTERISTICS

- * All position
- * AC/DC Operation
- * Low Dilution
- * Moisture resistant Coating
- * High Deposition
- * Low Heat Input
- * High Efficiency
- * Requires Low Amperage

GENERAL CHARACTERISTICS

HPP252 Tubular hardfacing electrode is designed to hardsurface all steels and iron subjected to severe abrasion. Excellent for fine particle abrasion. Deposits take on a high polish in service.

TYPICAL APPLICATIONS: Use for parts subjected to severe abrasion such as brick extrusion augers, muller plows, pan scraper blades, bulldozer end bits, conveyor chains in annealing furnaces and other equipment used in rock, coal, cement and ceramic industry where small particle abrasion is a problem.

• **Technical Data:**

Diameter.....	1 /4"	3/8"	1 /2"
Amperage.....	85-135	130-190	200-430
Current.....	AC or DC either polarity (electrode + or -)		
Hardness as welded.....	RC 55-60		

Procedure: Remove fatigued or unsound metal. A padding may be used when a thick build up is needed. No preheat is necessary on carbon steels or cast irons.

HPP 252 ALSO AVAILABLE IN:

High Chrome Carbide H.F. Mig .045, 1/16

HPP 253

HIGH TEMP ABRASION HARD-FACING ULTIMATE ELECTRODE FOR ABRASION, IMPACT AND HEAT RESISTANCE IN SEVERE ENVIROMENTS

SPECIAL CHARACTERISTICS

- * All position
- * AC/DC Operation
- * Low Dilution
- * Moisture resistant Coating
- * High Deposition
- * Low Heat Input
- * High Efficiency
- * Requires Low Amperage

GENERAL CHARACTERISTICS

HPP253 weld metal is composed of complex carbides of chromium, tungsten, molybdenum, columbium and vanadium. This results in a deposit highly resistant to fine particle abrasion and erosion at temperatures up to 1500° F.

TYPICAL APPLICATIONS: Conveyors for hot coke, slag and cement. Kiln grates, crushers and other equipment subjected to abrasion and erosion at elevated temperatures. Very good for extreme abrasion with impact such as crusher cones and mantles in taconite crushing operations. Excellent for feed chutes handling hot abrasive materials.

• **Technical Data:**

Diameter	1 /4"	3/8"	1 /2"
Amperage	85-135	130-190	180-390
Current.....	AC or DC either polarity (electrode + or -)		
Matrix Hardness.....	RC 62-64		
Carbide Hardness.....	Vickers 1950		

Procedure: Remove all foreign material, fatigued and unsound material. Do not deposit more than two layers of HPP253.

HPP 254

VANRODE

GENERAL CHARACTERISTICS

A coated tubular electrode with vanadium carbides in a tough matrix. The unique feature of vanadium carbide is that it will dissolve during welding and will reform upon solidification. Deposit contains vanadium carbide, which is close to the wear resistance of tungsten carbide. Ideal for components subject to extreme earth abrasion.

TYPICAL APPLICATIONS:

Scrapping, cutting, digging and handling of highly abrasive earth-like materials. Examples are: dredge cutter blades, augers, conveyor flights, scraper blades and tool joints.

Welding Parameters:

Diameter	5/32"	3/16"	1/4"
Amperage	80-130	130-165	150-180
Current.....	AC or DC either polarity (electrode + or -)		

Technical Data:

Abrasion Resistance.....	Outstanding
Impact Strength.....	Moderate
Machinability.....	Not applicable
Thickness.....	2 layers maximum
Deposit cross check.....	yes

HPP 254 also available in:

Vanrode Mig 1/16, 3/32, 7/64

**HPP
673**

HIGH PERFORMANCE ALUMINUM

**PREMIUM FLUX COATED ALUMINUM
ELECTRODE FOR ARC WELDING OR
TORCH JOINING AND BUILD-UP**

GENERAL CHARACTERISTICS

HPP 673 is an unique electrode for arc welding or brazing aluminum and aluminum alloys. Welds are strong, dense and free of porosity on both production and maintenance applications. Arc is exceptionally stable, operates at low amps with a minimum of spatter and fuming. Weld deposits have good color match and corrosion resistance. Ideal for welding heat-treated aluminum parts. Ideal for outdoor use when Mig and Tig is often not suitable. Slag is virtually self-releasing. May be also used as a brazing rod with oxy-acetylene torch.

TYPICAL APPLICATIONS:

Repairing of automotive, truck and bus parts. Also for tanks, pipes, ladders, shelves, refrigeration equipment, foundry patterns and many other aluminum parts. Suitable for 1100, 3003, 6061, 6062, 6063, 5052 types of aluminum and many other types.

• Welding Parameters

Diameter	3/32"	1/8"	5/32"
Amperage	50-80	80-130	100-160
Current.....	DC Reverse Polarity (electrode+)		

• Technical Data:

Tensile Strength	up to 34,000 PSI
Elongation.....	approx 20%
Hardness.....	40-55 (BHN)

Procedure:

Thoroughly clean weld area of all foreign material, including oil, lubricants and grease. A 70° – 90° bevel should be used when butt welding base materials 1/8" or thicker. No preheat is necessary on thin gauge material. However, flatter, smoother welds are produced on heavier sections if they are preheated to approximately 400°F. Hold electrode vertical to the work piece and maintain short arc length. Stringer beads should be used. Remove slag between passes. Restart arc on existing weld deposits. Allow part to cool slowly. Chip off all slag before quenching. For complete slag removal use a wire brush with a 10% sulfuric acid and hot water solution. Rinse with clean hot water.

HPP 673 ALSO AVAILABLE IN:

High Performance Mig	.030, .035, .045, 3/64
High Performance Tig	1/16, 1/8, 3/32

HPP 561

SILICON BRONZE

ELECTRODE FOR COPPER BASE ALLOYS, STEELS, CAST IRONS OR COMBINATIONS

GENERAL CHARACTERISTICS

Smooth, stable arc on both AC or DC machines. Minimum spatter and good slag removal.

TYPICAL APPLICATIONS: Use for welding silicon bronze, copper, malleable iron. A good choice for welding steel to cast iron, dirty or burned cast iron and malleable iron. Has many uses for repair of gears and sprockets on farm implements.

- **Welding Parameters**

Diameter..... 1/8"
Amperage..... 75-115
Current..... AC or DC Reverse polarity (electrode +)
Tensile strength..... up to 65,000 PSI
Hardness..... 80-100 (BHN)

- **Procedure:**

Weld area should be clean as possible. Heavy sections should be beveled using HPP 401 or grinder. Preheat to 400° for best results. Each pass should be thoroughly cleaned. Slag entrapment should be avoided. Peening of the deposit will increase its strength and reduce internal stress.

HPP 562

COPPER

ELECTRODE FOR WELDING COPPER

GENERAL CHARACTERISTICS

Smooth running high purity copper electrode designed for both overlay and fabrication of conventional grades of copper and copper alloys.

TYPICAL APPLICATIONS: For surfacing, build-up and fabricate electrolytic and deoxidized copper parts. Ideal for applications requiring high corrosion resistance, thermal and electrical conductivity. Also commonly used to copper clad steel and cast iron, especially heavy sections.

- **Welding Parameters**

Diameter	1/8"	5/32"	3/16"
Amperage	100-130	140-170	170-200
Current.....	AC or DC Reverse Polarity (electrode +)		

- **Technical Data**

Tensile strength..... up to 31,000 PSI
Elongation..... approx 35%
Hardness..... 50-60 (BHN)
Corrosion Resistance..... excellent
Electrical Conductivity..... very good

- **Procedure:** Clean joint area of all oxides and other foreign material. Bevel sections which are more than 3/16" thick. Thin gauge sections do not require preheat but heavier sections require preheating to 750 –1100 degrees F. Use the largest diameter electrode possible and maintain a short arc. Allow to cool before removing slag.



ALUMINUM BRONZE

UNIVERSAL BRONZE ELECTRODE FOR JOINING AND SURFACING

GENERAL CHARACTERISTICS

High-alloyed bronze electrode contains aluminum, nickel, and manganese. The unique formula with flux coating makes this electrode outstanding for a wide range of applications.

TYPICAL APPLICATIONS: Structural joining, repair and surfacing of high manganese steel, nickel and iron-containing aluminum bronzes, steel, tin bronzes (phosphor bronze), brass and copper. Also for cast iron surfacing. Commonly used on ship propellers, turbines, valves, thrust bearings, stirrer blades, guides, suction rolls and parts of hydraulic equipment. Construction of machines, fittings, instruments and pumps for the chemical and paper industries. Dissimilar metals are also joined with this electrode.

- **Welding Parameters**

Diameter	1/8"	5/32"
Amperage	90-125	120-150
Current.....	DC Reverse Polarity Only (electrode +)	
Tensile strength.....	up to 100,000 PSI	
Yield strength.....	up to 63,000 PSI	
Hardness.....	200 (BHN)	
Elongation.....	approx 20%	
Corrosion Resistance.....	very good	

- **Procedure:**

Preheat copper base metals to 570° F; do not heat other materials. Maintain a short arc. Apply thin layers using either stringer beads or weave beads. Remove slag between passes. Allow part to cool slowly. In most applications it will not be necessary to machine the surface after welding.



HIGH PERFORMANCE BRAZE

ULTIMATE SILVER ALLOY FOR A WIDE RANGE OF COPPER AND COPPER ALLOY BRAZING

GENERAL CHARACTERISTICS

This alloy is self-fluxing on copper to copper joints. It can be applied with the oxy/fuel torch, induction, furnace or any other suitable means of heat.

TYPICAL APPLICATIONS: Loose fitting joints (.003" to .006).

- **Technical Data:**

Diameter.....	1/8"
Liquidus	1465° F
Solidus.....	1190° F
Brazing Range.....	1300 – 1500° F

- **Procedure:** The joint should be clean and free of foreign matter. Use a slightly carburizing flame keeping the torch in motion. When the flux liquefies, add filler metal and allow it to flow throughout the joint. Remove flux residue with a wire brush and hot water.

**HPP
565F**

SUPER RED BRAZE
SPECIAL MULTI-TEMP NICKEL SILVER
ALLOY FOR HIGH STRENGTH JOINING
AND WEAR RESISTANT BUILDUP
TORCH OR INDUCTION

GENERAL CHARACTERISTICS

For general maintenance repair with the torch. At 1400° – 1600°F the deposit has controlled fluidity which makes it ideal for surfacing and buildup of parts subjected to frictional wear. When the temperature is increased to 1650° – 1750°F the alloy becomes very thin flowing and will product high strength joints with only .001" to .003" clearance.

TYPICAL APPLICATIONS:

1. **Low temperature** – overlaying and buildup of gear teeth, bearings, shafts, valve seats, wedge bars and steering knuckles.
2. **High temperature** – for close fitting joints on broken drills, mill cutters, furniture and bicycle assemblies, attaching carbide cutting tips and many other applications requiring high strengths.

This alloy is designed to buildup and join carbon steels, alloy steels, cast iron and many non-ferrous materials to themselves or multiple combinations.

• **Welding Parameters**

Diameter	1/16"	3/32"	1/8"	3/16"
----------	-------	-------	------	-------

• **Technical Data:**

Tensile Strength	up to 70,000 PSI
Hardness.....	140-200 (BHN)
Working Temperature.....	1400°-1750°F(760°-955°C)
Remelt temperature.....	approx. 1800°F (980°C)

Procedure: Rough grind surfaces to be joined or built up. Always use a neutral flame concentrated on the base metal, not on the molten alloy. Keep torch in constant motion to prevent overheating of the local areas. When used as a joining alloy, small rods are recommended. For surfacing and build up the larger diameter rods should be used. Additional passes can be applied without the need of removing flux residue from previous passes. Allow part to cool slowly. Remove flux by chipping and wire brushing.

HPP 524F

ORANGE SILVER BRAZE

**CADMIUM FREE, PREMIUM HIGH
STRENGTH, SUPER ACTIVE, FLUX
COATED SILVER BRAZING ALLOY**

GENERAL CHARACTERISTICS **TORCH, FURNACE, INDUCTION**

HPP524F has excellent wetting action on a wide range of metals, especially stainless steels and carbides. This alloy is cadmium free, non-toxic and easier to use due to the elimination of the glare in the flame. HPP524F is the most economical substitute for the higher silver alloys.

TYPICAL APPLICATIONS: with the absence of cadmium, HPP524F is perfect for the food and drug industries. Use it to join similar and dissimilar metals such as copper, nickel, stainless steel, brass, bronze, Inconel** and Monel**. Excellent for carbides, light gauge metals, heat treated parts and tight fitting joints. Color is silver to light yellow, similar to polished brass.

• **Technical Data:**

Diameter..... 1/16"
Tensile strength..... up to 73,000 PSI
Working temperature..... approx. 1275° F

Elongation..... approx. 24%
Corrosion resistance..... good

• **Procedure:**

Prepare surfaces to be joined by mechanical or chemical cleaning. Fixture parts to maintain alignment. Joint clearance should not exceed .003". Heat parts uniformly with a slightly carburizing flame, place the flux directly on the heated joint. When the flux becomes clear and fluid, melt a small amount of alloy onto the joint and continue heating to uniformly spread the alloy through the entire joint area. DO NOT OVERHEAT THE BASE METAL. Allow the part to cool slowly, then remove flux residue with warm water.

** Inconel and Monel are registered trademarks of Inco Alloys International.

HPP 525F

PINK SILVER BRAZE

**THE ULTIMATE HIGH SILVER BRAZING
ALLOY, CADMIUM FREE, FOR JOINING
FERROUS AND NON-FERROUS METALS**

GENERAL CHARACTERISTICS

The cadmium free, high silver content makes HPP525F the ultimate choice for joining ferrous and non-ferrous metals. Ideal for food and pharmaceutical as well as general industrial use.

TYPICAL APPLICATIONS: Use for joining and repairing stainless steel components, especially when color match is critical. Ideal for tubing, instruments, switches, ornamental trim and laboratory equipment. Universal alloy for general maintenance and repair.

• **Technical Data**

Diameter..... 1/8" 3/32"
Tensile strength..... up to 76,000 PSI
Elongation..... approx 22%
Working temperature..... approx 1220° F

Corrosion Resistance..... good
Color match..... good on stainless steel
Electrical Conductivity..... good

• **Procedure**

Prepare surfaces to be joined by mechanical or chemical cleaning. Fixture parts to maintain alignment. Joint clearance should not exceed .003". Heat parts uniformly with a slightly carburizing flame, place the flux directly on the heated joint. When the flux becomes clear and fluid, melt a small amount of alloy onto the joint and continue heating to uniformly spread the alloy through the entire joint area. DO NOT OVERHEAT THE BASE METAL. Allow the part to cool slowly, then remove flux residue with warm water.

HPP 526

ULTIMATE SILVER BRAZE

GENERAL CHARACTERISTICS

HPP 526 possesses a low brazing temperature allowing it to flow freely into narrow clearance capillary joints. Suitable for work in tight spaces. Its narrow melting range is appropriate for rapid or slow methods of heating. *This filler metal contains cadmium.*

TYPICAL APPLICATIONS:

It is used for joining most ferrous and non-ferrous metals except aluminum and magnesium. HPP526 has good brazing properties and is suitable either for pre-placement in the joint or for manual feeding into the joint. Joint clearances of 0.001 to 0.005" (0.0225 to 0.13mm) are recommended for proper capillary action.

- **Technical Data:**

Diameter:.....1/16"
Melting Range:..... 1125° F
Density:..... 4.96 TO/Cu.In.
Identification:..... Blue
Color as brazed:..... Light Yellow
Tensile Strength:.....88,000 PSI

HPP 521AC

LOW TEMP SILVER ACID CORE COIL LOW TEMP SILVER BEARING SOLDER FOR FERROUS AND NON-FERROUS METALS

GENERAL CHARACTERISTICS

CADIUM FREE, USES ALL HEAT SOURCES, EASY TO USE

High strength silver solder, free of cadmium, lead, zinc, and other impurities. It has a close color match to stainless steel. Solder joints can be readily plated and have good corrosion resistance.

TYPICAL APPLICATIONS: Ideal for use on stainless steel, carbon steels, nickel, nickel alloys, copper, bronze and brass, when higher strengths are required than normally found with conventional solders. Widely used in food and dairy industries and general maintenance and repair. Great for applications in the jewelry industry. Not suitable for electrical applications.

- **Technical Data:**

Diameter:.....1/16" x 9' coil
Tensile strength.....up to 15,000PSI
Working temperature.....430° F
Hardness..... 15 (BHN)
Color match..... excellent on stainless steel
Corrosion resistance.....good
Electrical conductivity...very good

- **Procedure:** Joint area must be clean of all foreign material. Apply solder with any heat source until flow-out is complete. After part has cooled slowly, wash flux residue off with warm water.

HPP 500

GENERAL PURPOSE SILVER BRAZING FLUX

USES:

Use for all silver brazing alloys.

TYPICAL DATA: Active range is 1000 degrees to 1700 degrees F.

PROCEDURE:

Prepare surfaces to be joined by mechanical or chemical cleaning. Fixture parts to maintain alignment. Joint clearance should not exceed .003". Heat parts uniformly with a slightly carburizing flame. Place HPP500 directly on the heated joint. When the flux becomes clear and fluid, melt a small amount of alloy onto the joint and continue heating to uniformly spread the alloy through the entire joint area. DO NOT OVERHEAT THE BASE METAL. Allow the part to cool slowly, then remove flux residue with warm water.

HPP 89

HEAT SINK MATERIAL FOR INSULATING AND POSITIONING PARTS FOR BRAZING

GENERAL CHARACTERISTICS

An easy to mold compound that is used as a heat dam and insulator to protect metal and other materials from the effects of heat. The dough-like consistency of HPP89 makes it easy to mold around intricate parts. It will adhere to most surfaces making it ideal for use as a jiggling fixture or insulator for parts to be welded. HPP89 will not distort or shrink when heated.

TYPICAL APPLICATIONS: Can be used as a heat sink to absorb heat and avoid surface discoloration on heat sensitive parts. It can be used as a heat dam to prevent heat from traveling to areas that can be damaged by heat, such as valves, other fittings, O-rings, packing glands, glass, and paint. HPP89 is ideal to hold or position difficult to align parts. HPP89 will keep distortion down when welding on light gauge metals such as stainless steel.

• **Technical Data:**

- Asbestos free – Does not contain any toxic elements.
- Maintains shape when heated.
- Withstand temperature to 3000 degrees F.

- Can be reused.
- Can be reconstituted using water.

• **Procedure:**

Position each of the parts to be joined in a mound of HPP89 large enough to support its weight. Adjust the alignment as necessary before welding. For parts that need to be protected from heat, cover the area with a layer of HPP89. For high temperature applications or where heat is applied for a prolonged time, use a thicker coating. HPP89 can also be used to protect non-metallic parts along side the welding area. If moisture would be harmful to the protected area, a piece of plastic wrap should be applied first.

CHROME CARBIDE OVERLAY WEAR PLATE

GENERAL CHARACTERISTICS:

Standard mild steel base plate with chrome carbide overlay for longer life in applications requiring high resistance against wear by abrasion along with moderate impact, providing you with extended equipment service life and less down time. Large areas can be easily hardsurfaced with the overlay wearplate with minimum labor and time.

- Single and double pass overlay is available
- Various sizes available
- Detailed information with composition and hardness is available upon request

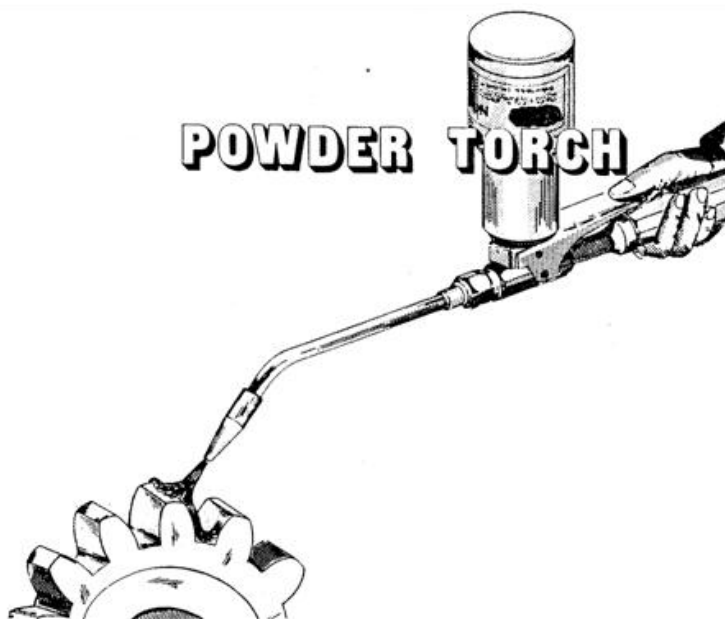
TYPICAL APPLICATIONS:

Chrome Carbide Overlay Plates are used in many industries:

- | | |
|---------------|---------------|
| ▪ Logging | ▪ Steelworks |
| ▪ Quarries | ▪ Refineries |
| ▪ Agriculture | ▪ Cement |
| ▪ Mining | ▪ Powerplants |
| ▪ Dredging | ▪ Sawmills |
| ▪ Papermills | |

Contact your Sales Rep for quotes pertaining to specific to your application

POWDER TORCH



HPP MODEL 10 PYROFACERS TORCH

Torch designed specifically to be used with the HPP hot spray powder alloys to perform buildup and hardsurfacing on maintenance and repair applications efficiently & economically.

*Torch includes :
#20 single orifice powder injector tip*

Single Orifice Powder Injector Tip Assembly

Tip Number	Orifice
#6	.042"
#9	.052"
#15	.059"
#20	.073"
#40	.098"
#55	.113"

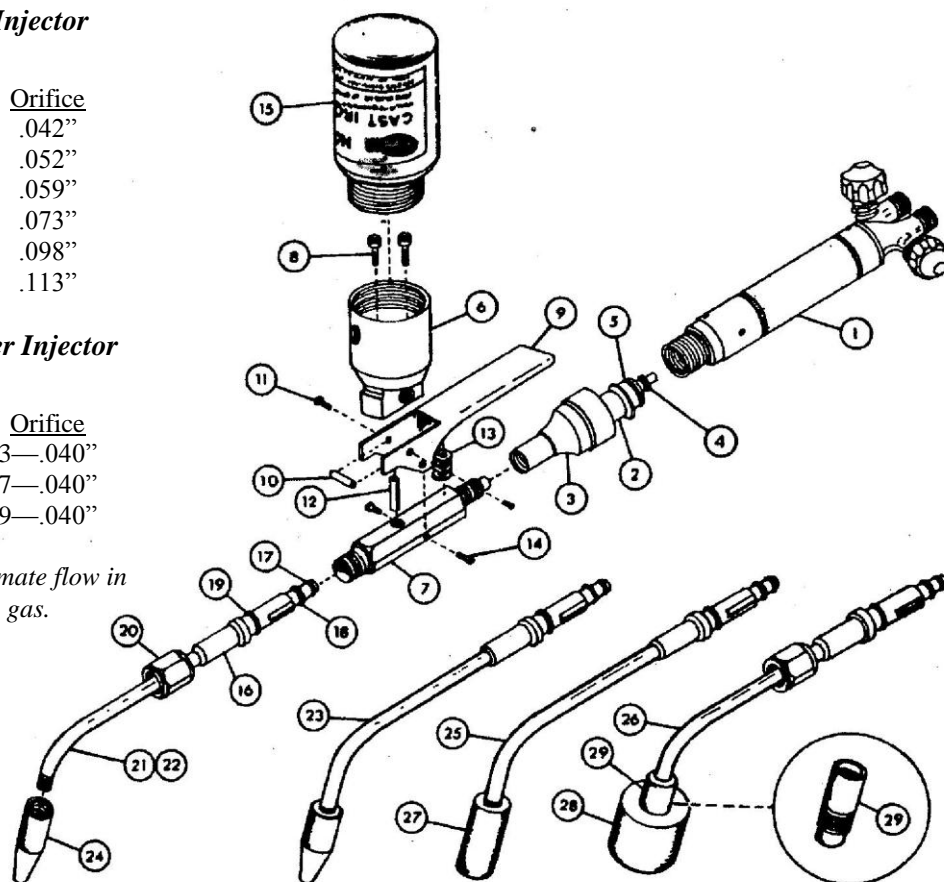
Multiflame Orifice Powder Injector Tip Assembly

Tip Number	Orifice
#20	3—.040"
#40	7—.040"
#55	9—.040"

Tip numbers indicate approximate flow in cu. ft. per hour of each gas.

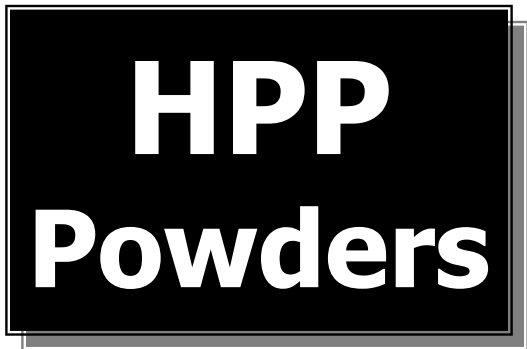
Part # Description

- 1 Torch Handle w/mixer
- 2 Torch Handle w/o mixer
- 3 Mixer only
- 4 Small "O" ring—mixer
- 5 Large "O" ring—mixer
- 6 Powder Hopper Assembly
- 7 Model 10 Hex body
- 8 Hopper Cap Screw
- 9 Powder Feed Lever
- 10 Valve Bar
- 11 Valve Bar Screw
- 12 Powder Feed Valve (rubber)
- 13 Spring
- 14 Pivot Pin
- 15 Powder Bottle
- 16 Injector Sub Assembly (specify size)
- 17 "O" ring—powder injector
- 18 "O" ring—powder injector
- 19 "O" ring—powder injector
- 20 Tip Coupling Nut



Part # Description

- 21 6" Tip Barrel (for #6, #9, #15, #20 Tips)
- 22 8" Tip Barrel (for #40 & #55 Tips)
- 23 Complete Tip Assembly (specify size) (for single orifice tips)
- 24 Tip end (copper) only (specify size) (for single orifice tips)
- 25 Complete Tip Assembly #20 multiflame (3—.040 orifices)
- 26 Complete Tip Assembly #40 multiflame (7—.040 orifices)
- 26a Complete Tip Assembly #40 multiflame (7—.040 orifices)
- 27 #20 Multiflame Tip End only
- 28 #40 Multiflame Tip End only
- 28a #55 Multiflame Tip End only
- 29 Adapter for #40 or #55 Multiflame Tip Ends



***Hot Spray
POWDERS***
620.630.680.688

GENERAL CHARACTERISTICS

A self fluxing alloy powder to be used with the Model 10 Powder Torch. When sprayed with torch it makes a metallurgical bond to all steels, cast iron, nickel, iron and cobalt base alloys. The deposit can be as thin or thick as needed. It has excellent bonding characteristics to base metal without dilution, and produces machinable deposits. Provides an excellent cushion layer for thick build up followed by hardfacing spray deposits.

Powder spraying would be used to fill casting defects, repair gouged or damaged surfaces, cracks, broken edges, etc. Excellent results for cast iron applications. Deposits can be fully machinable, filed, ground or polished to a shine. Provides excellent ductility and has a high wear resistance deposit for longer service life.

TYPICAL APPLICATIONS:

Hydraulic Rams
Cylinders
Crank Cases
Cams
Keyways
Motor Housings
Gears & Sprockets

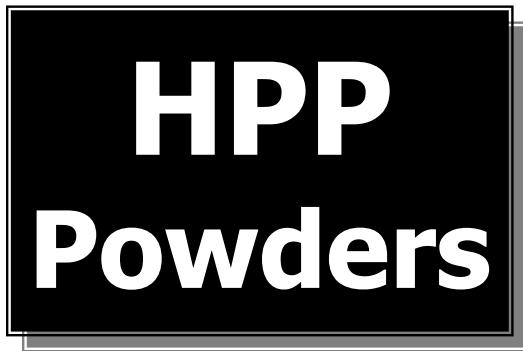
Cast iron molds
Feed Rolls
Shafts
Tools
Auto Parts

Screw Conveyors
Blades
Dies
Augers
Agricultural Parts

• Technical Data:

Deposit Hardness:

RB 90-95	HPP #620
Rc 38-42	HPP #630
Rc 58-62	HPP #680
Rc 68-72	HPP #688



Cold Spray POWDERS 635,665,685 606 Bond Coat

Specially formulated powders for all low temperature powder spray torches.

635 – Aluminum Bronze –

A copper based alloy powder for build-up on metal surfaces.
Excellent for coating soft bearing surfaces & provides excellent hard surface wear and friction properties.
Can be built up to thicknesses in excess of 0.250"

Technical:	Deposit Hardness – RB 65 to 75
	Melting Temperature 1900 °F (1040°C)
	Bonding Temperature min 200 °F over bond coat

Applications:	Soft bearing surfaces, Worn-out or mis-machined parts Pistons & housings, hydraulic press sleeves
---------------	---

665 – Nickel base inconel –

A nickel base alloy powder for build up that is machinable
Provides excellent corrosion, oxidation & friction wear.
Can be built up to thicknesses in excess of 0.125"

Technical:	Deposit Hardness – RB 75 to 83
	Melting Temperature 1900 °F (1040°C)
	Bonding Temperature min 200 °F over bond coat

Applications:	General purpose build-up Crank shafts, journals, impeller shafts
---------------	---

685 – Chrome Nickel –

A chrome nickel base alloy powder for hard wear & cavitation resistance.
Excellent for abrasion and metal to metal wear. Deposits are grindable
Can be built up to thicknesses in excess of 0.080"

Technical:	Deposit Hardness – RC 32 to 39
	Melting Temperature 1850°F (1010°C)
	Bonding Temperature min 200 °F over bond coat

Applications:	Hard surface shafts Wear plates, spindles,
---------------	---

606 Bond Coat – Underlayment Bonding Compound

Nickel based self bonding powder used as initial thin layer on oxide-free clean surfaces (except copper).
Provides excellent surface adhesion and bonding to the overlay cold spray powder. alloys.
Excellent for copper base alloys, low alloy steels & heat treatable alloys
Bond coat layer .004" to .010"

Technical:	Bond Strength on smooth surface 3500 psi
------------	--

Note: FOR ALL COLD SPRAY PROCEDURES

MAX BASE METAL TEMPERATURE – 500°

A CUT ABOVE THE REST

ADVANTAGE WHEELS Type 27 Hard Steel

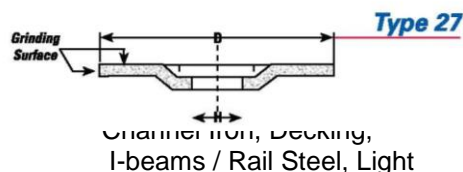
Depressed Center Wheels

Type 27 - Depressed Center Wheels are available with either 7/8" conventional arbor holes or 5/8"-11 threaded arbor Quick-Spin type as an integral part of the wheel. The wide flat area of contact serves as a guide to prevent digging into flat surfaces.

HPP 7-224 — 4 1/2 x 1/4 x 7/8

HPP 7-324 — 4 1/2 x 1/4 x 7/8 with hub

Applications: Angle Iron, Bar Stock, Carbon Steel, Heavy Rebar, High Tensile Steel, Iron Pipe, Stainless Steel, Gauge Metals, Metal Tubing, Steel, Thin Rebar



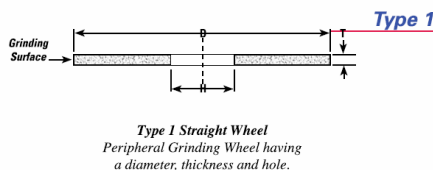
Small Diameter Cut-Off Wheels

Small Diameter Cut-Off Wheels are reinforced with multiple layers of fiberglass. They are able to withstand severe peripheral, side, and wedge stresses. This assures maximum safety even where joining, slotting, notching, or cutoff work would normally create a hazard.

HPP 7-102 — 3 x .035 x 3/8 Type 1 Cutoff Wheel

HPP 7-413 — 3 x 1/16 x 3/8 Type 1 Cutoff Wheel

Applications: Decking, Light Gauge Metals, Metal Studding, Metal Tubing



HPP 3044

**1/16"-1/2" by 64ths 29Pc 135sp
Heavy Duty Job Lgth Drill Set**

Heavy Duty sets are gold surface treated for lubricity. Made of M2 tool steel and cobalt. Cut Flute design for all sets. Packaged in a durable case with a locking cover.

Individual Bits and Silver & Deming Style available also.

