AT A GLANCE

- WIRE
- ROD
- PREFORMS
- STRIP
- PASTE
- POWDER
- FLUX
- RETURN BENDS
- TORCHES
- TIPS
- MIXERS
- REGULATORS
- MANIFOLDS
- ACCESSORIES
- BRAZING PROCEDURES

HARRIS®

A LINCOLN ELECTRIC COMPANY

Turn to the Pros

PRODUCTION BRAZING CONSUMABLES AND EQUIPMENT

THE GLOBAL LEADER IN PRODUCTION BRAZING

THE HARRIS PRODUCTS GROUP HAS BEEN MANUFACTURING QUALITY BRAZING PRODUCTS FOR OVER 100 YEARS.

EACH DAY, HARRIS SETS OUT TO MAKE THE BEST AND MOST COMPLETE LINE OF BRAZING PRODUCTS IN THE WORLD. WHY? HARRIS IS THE WORLD LEADER IN DEVELOPING BRAZING AND SOLDERING PRODUCTS TO MEET THE INDUSTRY NEEDS FOR METAL JOINING METHODS. WE HAVE DEVELOPED PROPRIETARY MANUFACTURING TECHNOLOGY TO ENSURE THE HIGHEST STANDARDS OF QUALITY AND TRACEABILITY. ALL HARRIS MANUFACTURING FACILITIES ARE CERTIFIED TO ISO 9001 AND ISO 14000 STANDARDS. **TURN TO THE PROS – TURN TO HARRIS.**

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HARRIS
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CUSTOMER SEGMENTS

HVAC/R

APPLIANCE

TUBE MANUFACTURING

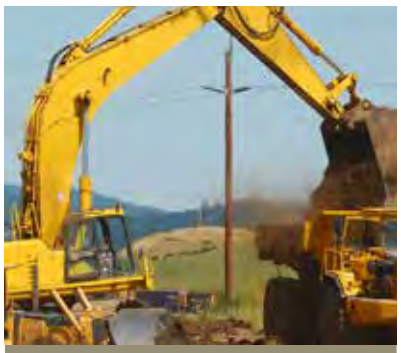
AUTOMOTIVE

PLUMBING

AEROSPACE

SHIP BUILDING

CARBIDE/MINING TOOLS



HEAVY EQUIPMENT

ABOUT THE HARRIS PRODUCTS GROUP

The Harris Products Group has been manufacturing quality braze filler metals in the United States for over 50 years. We are leaders in developing brazing and soldering products to meet the industry needs for new metal joining methods. We are certified to ISO 9001 and ISO 14000 standards. We have developed proprietary manufacturing technology to ensure the highest standards of quality and traceability.

Our experienced sales and technical personnel are trained to assist our customers in producing sound, cost effective brazed assemblies. Our international presence means we can assist our customer's operation anywhere in the world. Harris is backed by the financial strength and technical resources of The Lincoln Electric Company - **THE GLOBAL LEADER IN WELDING SYSTEMS AND FILLER METALS.**

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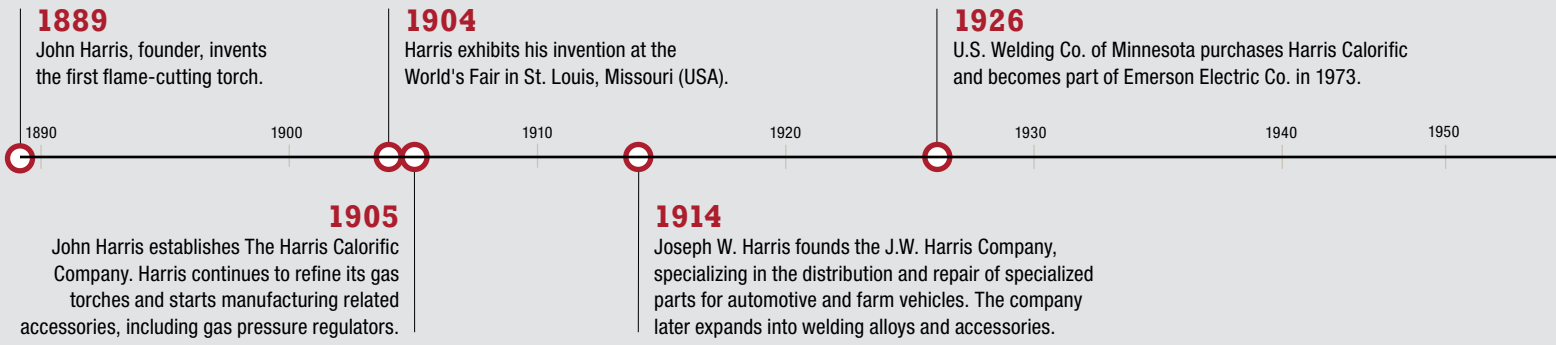
THE HARRIS PRODUCTS GROUP

The Harris Products Group was formed by combining two strong names in the brazing business—Harris Calorific and J.W. Harris. The Harris Products Group is a world leader in metalworking products used in the brazing, soldering, welding, cutting, and gas distribution industries. The combined company offers excellence in the manufacture of:

- Brazing and soldering alloys
- Preforms, rings, and return bends
- Fluxes
- Brazing and soldering torch equipment
- Welding alloys
- Industrial and specialty gas regulation equipment

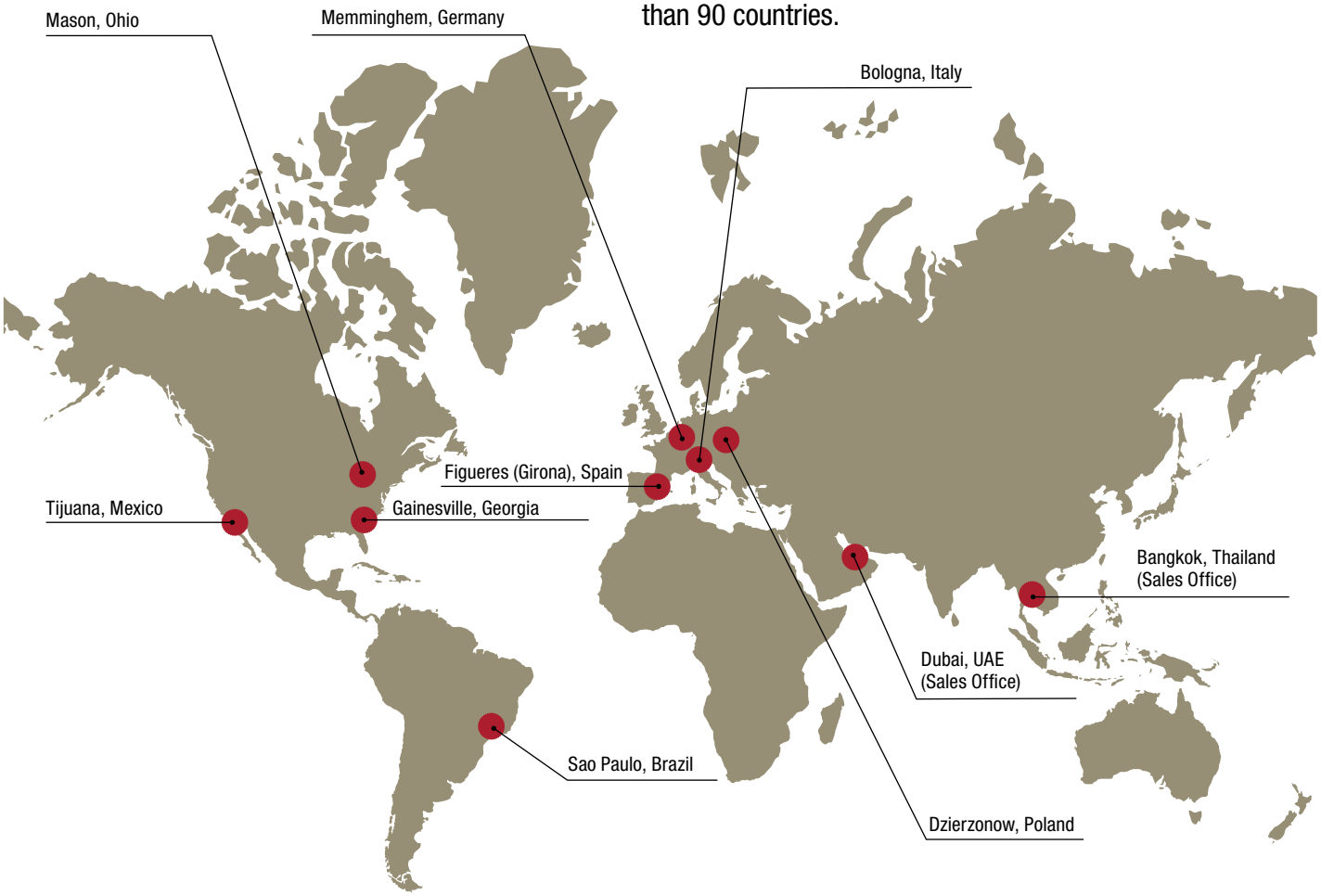
The Harris Products Group is a wholly-owned subsidiary of The Lincoln Electric Company. Lincoln has more than 49 manufacturing locations, including operations and joint ventures in 20 countries and a worldwide network of distributors and sales offices covering more than 160 countries.

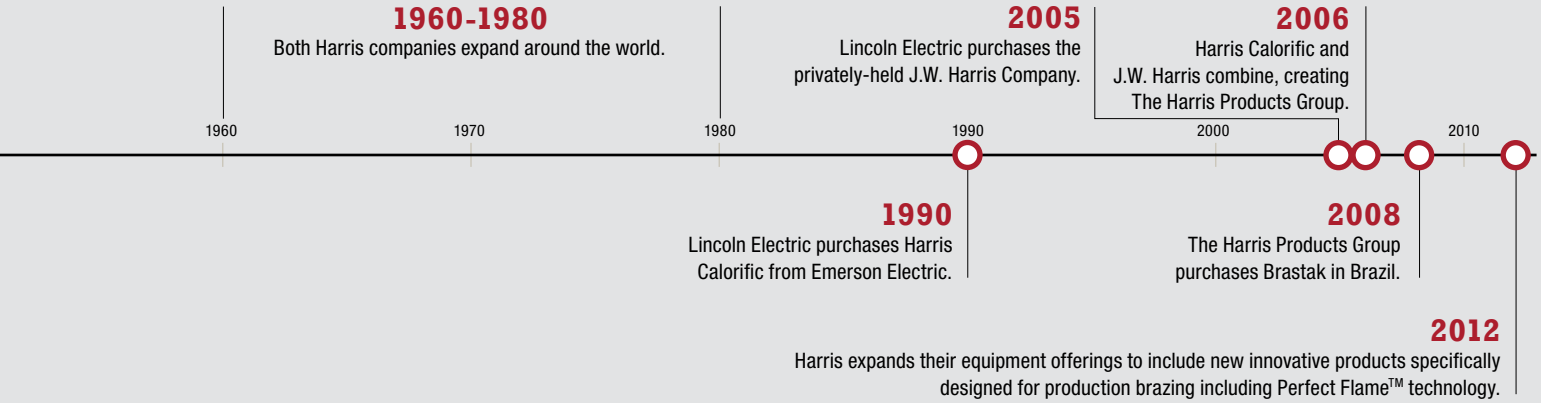
THE HARRIS PRODUCTS GROUP HISTORY

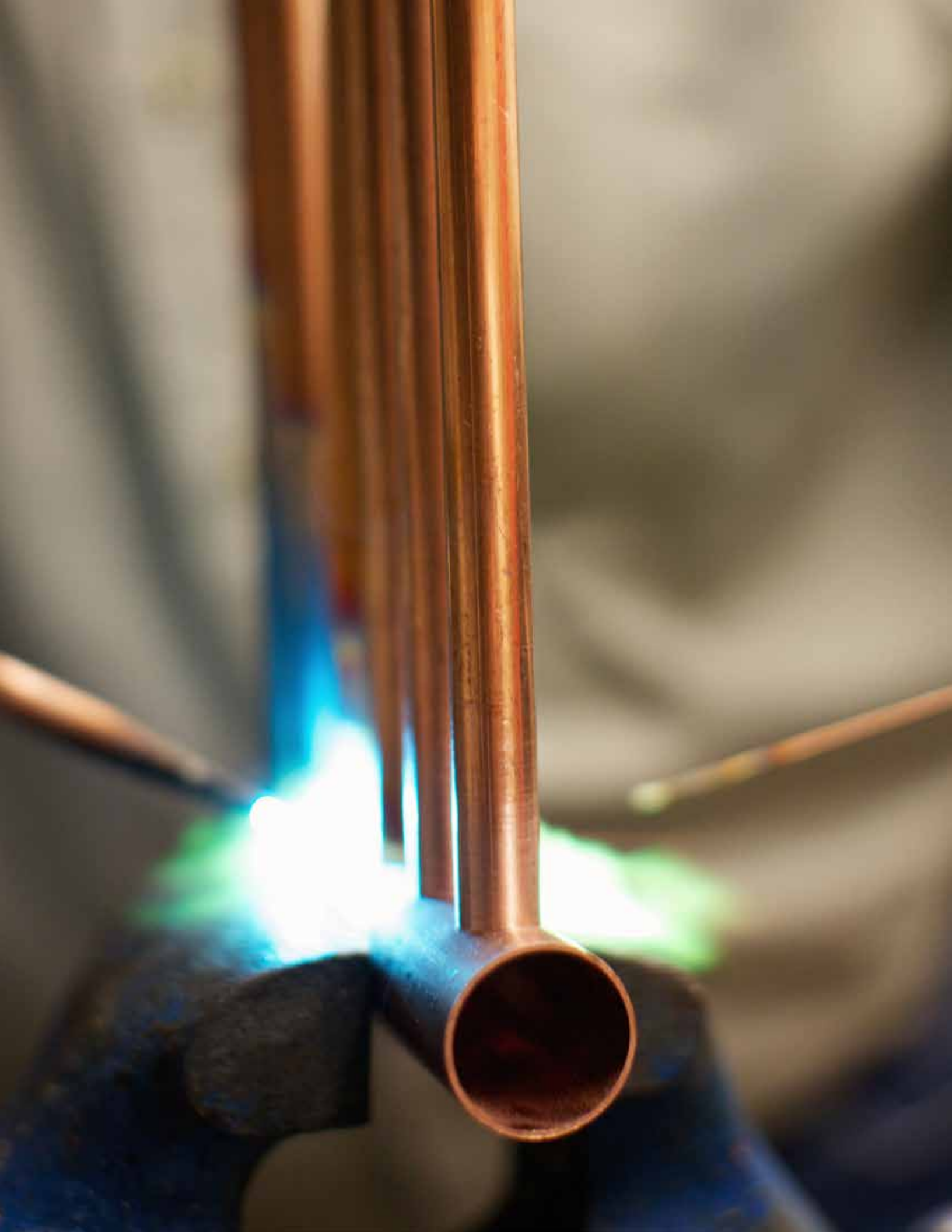


MANUFACTURING FACILITIES

Based in Mason, Ohio, The Harris Products Group has five manufacturing locations in four countries and a worldwide network of distributors and sales offices covering more than 90 countries.







THE HARRIS PRODUCTS GROUP
IS THE BRAZING INDUSTRY'S FRONT RUNNER IN DEVELOPING THE TECHNOLOGY TO CONTROL PHOSPHOROUS CONTENT.

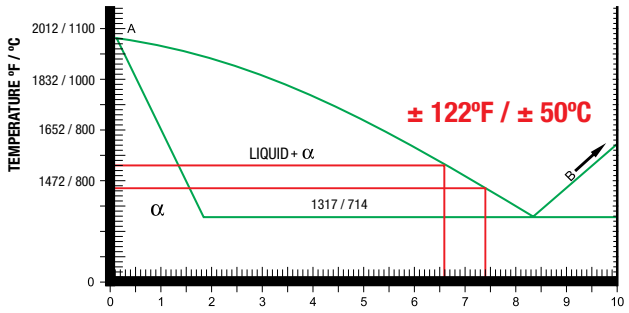
The melting range is so precise that brazing operators no longer need to make temperature adjustments from one batch of filler metals to the next. Operators know that with Harris alloys, the result will be the same with every batch, every time. Its technology is so accurate that The Harris Products Group guarantees users a liquidus temperature variation of no more than ± 6°F / ± 3.3°C - a much tighter standard than industry requires.

Over the decades many things have changed in our industry. But our dedication to making the world's purest and most consistent brazing alloys has not changed; we are committed to giving you the best tool to do your job.

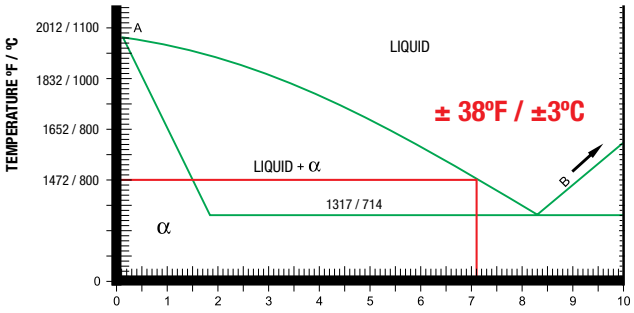
All alloys are available in rods, solid wires, and rings in both metric and imperial sizes according to European and American standards.

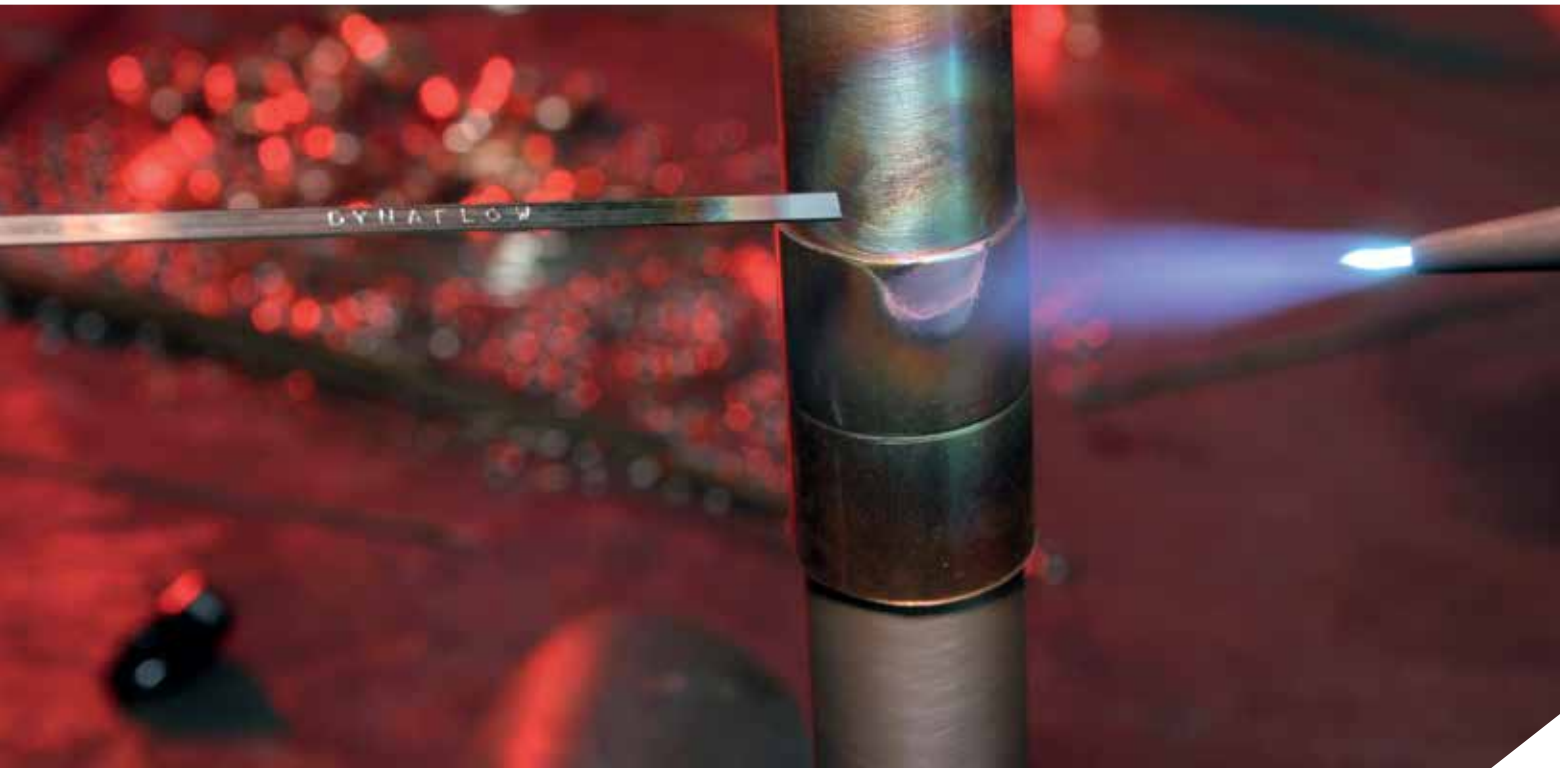
Save money using Harris phosphorous controlled products.
± 38° F / ± 3.3°C liquidus point fluctuation from batch to batch.

Standard B-CuP-2 Quality



Harris Quality





CHANGE IS GOOD

BLOCKADE®
IS ENGINEERED TO JOIN COPPER, BRASS, OR BRONZE.

Blockade®'s innovative composition provides the ability to form a large shoulder or cap at the braze connection.

Blockade® is a low melting temperature alloy which is very fluid and fast flowing. Best for tight fitting connections under two inches diameter and great for copper to brass applications like solenoid valves, ball valves, distributors, and schrader valves.

Blockade® is a copper, phosphorus, tin, and silicon alloy which is a low cost alternative to silver bearing alloys.

Available in rod, spool, and ring form.

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CHANGE IS PROFITABLE

DYNAFLOW®

IS AN EXCEPTIONALLY PURE PHOSPHORUS/COPPER/SILVER BRAZING ALLOY RECOMMENDED FOR ALL COPPER-TO-COPPER AND COPPER-TO-BRASS APPLICATIONS.

This alloy has provided decades of durability and savings to our customers.

Dynaflow® is a premium, medium range, silver alloy developed to mirror the melting range and strength performance characteristics of 15% silver brazing alloys.

Excellent for brazing both tight and loose fitted applications. It is a fantastic choice for OEM operators and service technicians.

HARRIS BRAZING ALLOYS ARE THE RESULT OF PROPRIETARY TECHNOLOGY THAT PRECISELY CONTROLS THE PHOSPHORUS CONTENT ABOVE MARKET STANDARDS.

The phosphorous content determines the precise melting temperature and performance. All Harris phosphorus/copper and silver/phosphorus/copper brazing alloys conform to +/- 6° Fahrenheit of the specified liquidus temperature. Conformity to such specification assures the operator of consistent brazing performance with every application. The advantage is apparent in automated brazing operations where control of flow temperatures can significantly reduce the incidence of rejects.

HARRIS 0

Recognized and trusted all over the world, this is our most popular copper-to-copper brazing alloy which is used for OEM production as well as aftermarket HVAC installation and repair. Harris 0 has extremely consistent flow characteristics because it is manufactured from the purest raw materials. The bright and shiny appearance of our finished material show our advanced manufacturing process capabilities and dedication to quality.

Stay-Silv® 2HP

This low silver, high phosphorus content alloy is an excellent choice for OEM customers who want to reduce silver content. The alloy flows quickly and melts at a very low temperature of 1190-1405 °F (643-763 °C) to ensure flow into the capillary.

Stay-Silv® 15

One of our most forgiving alloys with a wide melting range that helps our customers where wide gap clearance in the capillary from .002” - .006” (.051 - .015 mm) are a concern. Very common in both OEM and aftermarket business for its ability to reduce leaks.

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PHOSPHORUS / COPPER ALLOYS SELECTION CHART

ALLOY	QQ-B-654A	AWS A5.8	Ag %	Cu %	P %	OTHER	SOLIDUS °F	SOLIDUS °C	LIQUIDUS °F	LIQUIDUS °C	FLUIDITY RATING	TYPICAL APPLICATION
Blockade®		BCuP-9	0	BAL	6.5	(Sn) 6.0 - 7.0 (Si) .01 - .40	1178	637	1247	674	7	For copper or brass. Lower brazing temperature, excellent replacement for many silver bearing BCuP alloys. Can also be used to replace some BAg alloys.
Flash® (LCuP-8)			0	91.9	8.1		1310	710	1340	727	8	For copper or brass. Most popular for brazing copper return bends in automated brazing.
Harris OHHP			0	92.5	7.5		1310	710	1431	769	6.5	For copper or brass. Fluid alloy, requires good fit-up, .002 - .006" (.051 - .152 mm) clearance.
Harris OHP (LCuP-7)		BCuP-2	0	92.6	7.4		1310	710	1445	785	6	For copper or brass. Requires medium fit-up, .002-.007" (.051 - .178 mm) clearance.
Harris 0		BCuP-2	0	92.9	7.1		1310	710	1475	802	5	For copper or brass. Good alloy where joint tolerances cannot be maintained.
Harris LCuP-6			0	92.5	6.5		1310	710	1549	843	3	For copper or brass. More fluid, clearance .002 - .005" (.051 - .127 mm).
Stay-Silv® 2HP			2	90.6	7.4		1190	643	1405	763	5	For copper or brass. Broadens melting range of zero. Clearance range .002 - .005" (.051 - .127 mm).
Stay-Silv® 2		BCuP-6	2	91	7		1190	643	1450	788	4	For copper or brass. Sluggish flow, used for joints with wider clearance . 003 - .006" (.076 - .152 mm).
Stay-Silv® 2LP			2	91.4	6.6		1190	643	1500	816	3	For copper or brass. Slightly more fluid, use with clearance of .003 - .005" (.076 - .127 mm).
Stay-Silv® 5HP			5	88.6	6.4		1190	643	1445	785	4	For copper or brass. Used where fit-up cannot be controlled. Clearance of .003 - .006" (.076 - .152 mm).
Stay-Silv® 5		BCuP-3	5	89	6		1190	643	1500	816	3	For copper or brass. Used to bridge gaps where close fit-up cannot be maintained.
Stay-Silv® 5LP			5	89.3	5.7		1190	643	1535	835	2	For copper or brass. Used where fit-up cannot be controlled. Clearance of .003 - .006" (.076 - .152 mm).
Dynaflow®			6	87.9	6.1		1190	643	1465	796	3	Premium alloy for copper or brass. Excellent strength and ductility. Use as replacement for 15%.
Stay-Silv® 6HP		BCuP-4	6	86.8	7.2		1190	643	1335	724	7	For copper or brass. Fluid alloy for controlled clearance .001 - .004" (.025 - .102 mm). Good for automated brazing.
Stay-Silv® 6			6	87.5	6.5		1190	643	1425	774	5	For copper or brass. Medium range alloy. Used in applications with clearance of .002 -. 005" (.051 - . 127 mm).
Stay-Silv® 6LP			6	87.8	6.2		1190	643	1455	791	4	For copper or brass. Medium range alloy. Used in applications with clearance of .002 - .005" (.051 - .127 mm).
Stay-Silv® 15	Grade III	BCuP-5	15	80	5		1190	643	1480	804	3	For copper or brass. Useful for wide clearance .002 - .006" (.051 - .178 mm). Good ductility.
Stay-Silv® 18		BCuP-8	18	75.4	6.6		1190	643	1220	660	8	For copper or brass. Higher phosphorus/copper alloy creates a low temperature, highly fluid alloy. Suited for automated brazing operation such as those with rings.

Other alloys available upon request.

ALUXCOR™

AVAILABILITY

- Wide variety of wire diameter in spools and cut lengths in imperial and metric sizes
- Preforms
- Rings
- Return bends and Crossovers

IMPROVED DESIGN

- New round flux cored ring design
- Protects the flux inside the wire until proper pre-heat which helps prevent silicon erosion from excess flux burn off on the tube
- Seam prevents flux loss during shipping, loading onto the return bends, and in wire feed applications
- Helps with return bend ring retention to prevent rings from moving or falling off return bends and crossovers

BETTER PERFORMANCE

- Core design releases the flux only after sufficient preheating so both the flux and alloy flows at the right time into the capillary
- Proprietary custom flux blends available for customer specific applications
- Strict flux percentage tolerance ensures that the flux is consistent throughout the wire for repeatable high performance flow of the alloy
- We only use non-corrosive and non-hygroscopic flux with no flux binder

COMPETITIVE COSTING

- In house manufacturing
- Capability of manufacturing wire, flux cored rings, ring loaded return bends which helps lower costs and shorten the supply chain

MARKETS

- Residential HVAC manufactures
  - Fabricated Parts Manufacturers
  - Coil Manufacturers
- Automotive
- Appliance

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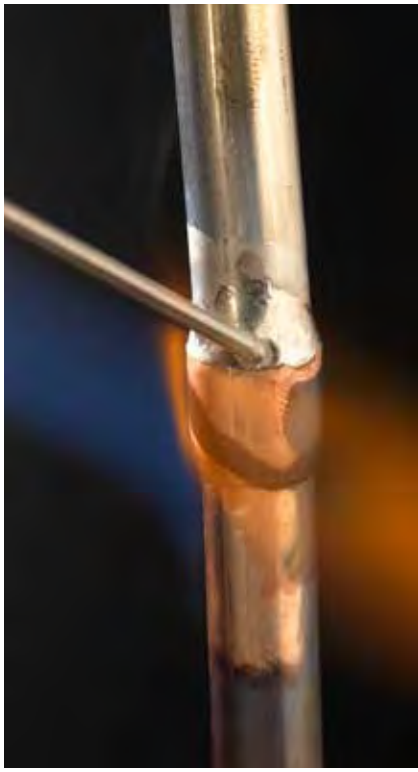
SUPERIOR BRAZING ALLOYS

With excellent strength and corrosion resistance for joining aluminum-to-aluminum or aluminum-to-copper or brass. Free flowing with unequaled capillary attraction, ductility, and penetration. Our ALUXCOR™ 4047 has four different non-corrosive and non-hygroscopic flux combinations with no binder to fit your customer specific heating applications. Our ALUXCOR™ zinc aluminum alloys also have non-corrosive and non-hygroscopic cesium flux with a lower melting temperature and wider melting range than aluminum silicon alloys.

FLUX CORED ALUMINUM AND ZINC/ALUMINUM ALLOYS

ALLOY	AWS CLASSIFICATION	Al %	Si %	Mg %	Zn %	Sn %	OTHER %	MELTING RANGE °F	MELTING RANGE °C	FLUX CORE
ALUXCOR 4047	BAlSi-4	88	12					1070-1080	577-582	Flux Formula 15.1 - Pure, premium, non-corrosive, and non-hygroscopic
ALUXCOR 4047	BAlSi-4	88	12					1070-1080	577-582	Flux Formula 15.2 - Premium, non-corrosive, and non-hygroscopic
ALUXCOR 4047	BAlSi-4	88	12					1070-1080	577-582	Flux Formula 15.3 - Premium, non-corrosive, and non-hygroscopic
ALUXCOR 4047	BAlSi-4	88	12					1070-1080	577-582	Flux Formula 15.4 - Premium, non-corrosive, and non-hygroscopic
ALUXCOR 98/2		2			98			710-725	377-385	Cesium Flux Formula - Non-corrosive and non-hygroscopic
ALUXCOR 78/22		22			78			800-900	426-492	Cesium Flux Formula - Non-corrosive and non-hygroscopic

Other alloys and flux combinations available upon request.



WE MANUFACTURE
A COMPLETE LINE OF CADMIUM-FREE, HIGH SILVER BRAZING ALLOYS.

Harris utilizes only pure base metals. Precision production procedures ensure consistency in product quality, composition, chemistry, dimension, and performance.

Our cadmium-free alloys offer excellent performance characteristics and dependable results, while eliminating hazardous cadmium fumes.

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To learn more about high silver applications and techinques

YouTube **VISIT OUR YOUTUBE CHANNEL**
Go to www.youtube.com/harrisproductsgroup

SAFETY-SILV 38T®
Low temperature, free-flowing alloy with exceptional fillet forming quality for ferrous and non-ferrous metals. Available in bare rods, flux coated, and flux cored.

SAFETY-SILV 50N®
Often used to braze stainless steel to limit interface corrosion. Also, an excellent choice for tungsten carbide brazing applications. Available in bare rods, flux coated, and flux cored.

SAFETY-SILV 56®
High silver content alloy that makes premium quality brazes. Free flowing with unsurpassed capillary attraction and deep penetration. Ductility is high and corrosion resistance is excellent. Offers highest elongation of silver brazing alloys. Can be used in the food processing industry. Silver color is an excellent match for stainless steel and silverware applications. Certified to NSF 51.

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SILVER BRAZING ALLOY SELECTION CHART

ALLOY	QQ-B-654A	AMS	AWS A5.8	Ag %	Cu %	Zn %	Ni %	Sn %	OTHER	SOLIDUS		LIQUIDUS		FLUIDITY RATING	TYPICAL APPLICATION
										°F	°C	°F	°C		
Safety-Silv® 25				25	43	30		2		1270	688	1435	779	5	Steel-to-copper alloys. Dissimilar metals joint should be in compression upon cooling.
Safety-Silv® 30	BAg-20		BAg-20	30	38	32				1250	677	1410	766	6	Use with ferrous and non-ferrous base metals. Flow suitable for bridging gaps.
Safety-Silv® 35			BAg-35	35	32	33				1250	677	1350	732	5	Ferrous and non-ferrous base metals. Moderate temperature and good ductility.
Safety-Silv® 38T		4761	BAg-34	38	32	28		2		1220	660	1325	718	7	Low-temperature, free-flowing alloy with exceptional fillet-forming quality. For ferrous and non-ferrous base metals.
Safety-Silv® 40				40	30.5	29.5				1250	660	1350	732	5	For steel, nickel, and copper alloys. Suitable for wider clearance, yet provides good ductility.
Safety-Silv® 40Ni2	BAg-4		BAg-4	40	30	28	2			1220	677	1435	779	4.5	For stainless steel, nickel alloys for corrosion resistance and strength. Good choice for tungsten carbides.
Safety-Silv® 40T			BAg-28	40	30	28		2		1220	660	1310	710	6.5	Good flow properties. Suitable for ferrous and non-ferrous base metals.
Safety-Silv® 45	BAg-5		BAg-5	45	30	25				1225	663	1370	743	6.5	General purpose filler for steel and copper alloys. Melting range useful for wide clearances.
Safety-Silv® 45T			BAg-36	45	27	25		3		1195	646	1265	685	7	Good flow properties. Suitable for ferrous and non-ferrous base metals.
Safety-Silv® 49Mn	BAg-22		BAg-22	49	16	23	4.5		(Mn) 7.5	1260	680	1290	699	8	Low-temperature alloy for joining carbides and ferrous alloys.
Safety-Silv® 50			BAg-6	50	34	16	2			1270	688	1425	774	5.5	Often used to braze galvanized steel, but suitable for bridging gaps in other ferrous and non-ferrous base metals.
Safety-Silv® 50N		4788	BAg-24	50	20	28	2			1220	660	1305	707	7	Low melting braze alloy with good flow. Primarily, used for brazing stainless steel, nickel based alloys, and tungsten carbide inserts.
Safety-Silv® 54		4772	BAg-13	54	40	5	1			1340	726	1575	857		Ideal for use on stainless steel and for wide joint clearances.
Safety-Silv® 56	BAg-7	4763	BAg-7	56	22	17		5		1145	618	1205	652	8	For ferrous and non-ferrous alloys. Often used to braze stainless steel for food service. NSF 51.
Safety-Silv® 56N	BAg-13a	4765	BAg-13a	56	40	2	2			1420	771	1640	893	5	Used in high-temperature and furnace applications where zinc fumes are objectionable.
Safety-Silv® 60T	BAg-18	4773	BAg-18	60	BAL			10		1115	602	1325	718	4.5	Used on copper, nickel, and steel. Good corrosion resistance.
Safety-Silv® 63T		4774	BAg-21	63	28.5		2.5	6		1275	691	1475	802	5	Zinc-free alloy often used for furnace brazing 300 & 400 series stainless steel. Prevents crevice corrosion on 400 series stainless.
Safety-Silv® 72			BAg-8	72	28					1435	779	1435	779	10	Used in vacuum and atmosphere brazing on ferrous and non-ferrous base metals.
Safety-Silv® 72V			BVAg-8	72	28					1435	779	1435	779	10	Used in vacuum and atmosphere brazing on ferrous and non-ferrous base metals.
Safety-Silv® 99.9			BVAg-0	99.9						1761	961	1761	961		Pure Silver.

Other alloys available upon request.

FLUX CORED HIGH SILVER

AVAILABILITY

- Wide variety of wire diameter in spools and cut lengths in imperial and metric sizes
- Preforms
- Rings

IMPROVED DESIGN

- New round flux cored ring design
- Protects the flux inside the wire until proper pre-heat
- Seam prevents flux loss during shipping and in wire feed applications

TURN TO THE PROS – TURN TO HARRIS.
Contact a Harris representative today to learn about how to improve efficiency and save money by changing from a **Solid High Silver Alloy** to a **Flux Cored High Silver Alloy**.

BETTER PERFORMANCE

- ecoSMART BORIC ACID FREE FLUX – Environmentally-friendly Boric Acid Free

(Please see the features and benefits on P. 25)

- Eliminates manual fluxing, increases throughput
- Controlled flux application for more consistent parts
- Reduces post-braze cleaning operations by controlling flux
- Less flux inclusions by reducing the chance of burnt flux in the capillary during the preheat cycle

COMPETITIVE COSTING

- In house manufacturing
- Carry less inventory with no need to stock both alloys and flux

MARKETS

- Appliance manufacturing
- Thermal expansion valve manufacturing
- Compressor manufacturing

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FLUX CORED HIGH SILVER

FLUX CORED HIGH SILVER ALLOYS

Eliminate the need for a secondary fluxing operation. Normally used in high production brazing applications for dissimilar metals. Optimal for automatic wire feed applications including use with the Harris PowerBrazer™.

Reference P. 41

FLUX CORED HIGH SILVER

Alloy	AWS Classification	ISO17672	Ag %	Cu %	Zn %	Ni %	Sn %	Other %	Melting Range °F	Melting Range °C	Flux Core
Safety-Silv® 30 CW	BAg-20	AG 230	30	38	32				1250-1410	677-766	Non-hygroscopic
Safety-Silv® 34T CW	-	AG 134	34	36	27.5		2.5		1166-1346	630-730	Non-hygroscopic
Safety-Silv® 38T CW	BAg-34	AG 138	38	32	28		2		1220-1325	660-718	Non-hygroscopic
Safety-Silv® 45 CW	BAg-5	AG 245	45	30	25				1225-1370	663-743	Non-hygroscopic
Safety-Silv® 50N CW	BAg-24	AG 450	50	20	28	2			1220-1305	660-707	Non-hygroscopic
Safety-Silv® 56 CW	BAg-7	AG 156	56	22	17		5		1145-1205	618-652	Non-hygroscopic

Other alloys and flux combinations available upon request.

RETURN BENDS

Both Aluminum or Copper, with and without rings, manufactured to meet your specifications.

SEGMENT OR ARC RINGS

Can be formed to any degree of a circle and provide a “snap” fit on a tube.

LAP RINGS

Formed with an overlap to allow a compression “cling” within the fitting.

EDGEWOUNDS

Are an economical alternative to a washer. They are made by winding flat wire on edge.

IPS BAND RINGS / GAP RINGS:

Often used for ship building applications for pipe fittings with an alloy ring insert groove / Allows a compression “cling” where wire overlap is undesirable.

STRIP

Filler metal rolled into a thin sheet. These products are frequently used in the carbide industry.

MULTI-TURN RINGS

Rings are used when a joint requires a volume of filler that cannot be provided by a single turn ring.

WASHERS, DISCS, AND SHIMS

Fabricated from Brazing Strip and used where joint clearances or join design prevents the use of wire pre-forms. These products are frequently used in the carbide industry.

BUTT END RINGS

Will not tangle and lay flat without a helix.

SLUGS

Manufactured from braze rod or wire and cut to a specific length.

Orders: 1.800.733.4043
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BRAZE AND SOLDER PASTE

IS AN ALL-IN-ONE PROCESS.

The paste contains braze alloy in a powder, a binder, and a flux. When heat is applied the binder burns off and the flux activates. At brazing temperature the powder melts and fills the capillary.

FEATURES

- Made to customer's specifications
- Can be used whenever an alloy must be pre-placed before brazing, but where a ring or preform is unsuitable
- Paste eliminates a separate flux application
- Typically used in automated brazing applications such as induction, torch, and furnace

BRAZE POWDER

IS MOST COMMONLY USED ON FLAT SURFACES AND TO FILL LARGE VOIDS.

In these applications powder is often more economical and less labor intensive than hand fed braze rod or wire.

FEATURES

- More economical and less labor intensive than hand fed operations
- Made in different mesh sizes to meet customer specifications
- Can be flux-coated or non flux-coated

HARRIS OFFERS A WIDE RANGE OF SOLDERING ALLOYS FOR MULTIPLE APPLICATIONS.

Solders are available in lead-free and tin/lead, cored wire, bar form, preform, as well as solid wire. Each solder product meets the highest standard for consistency and performance.

TURN TO THE PROS – TURN TO HARRIS.
To learn more about solder applications and techinques

VISIT OUR YOUTUBE CHANNEL
Go to www.youtube.com/harrisproductsgroup

STAY-BRITE® & STAY-BRITE® 8

Silver-bearing solders are often used throughout the air conditioning industry as an alternative to brazing alloys. Both Stay-Brite® and Stay-Brite® 8 produce an overall component with greater strength than a brazed component whose base metals are weakened by annealment from high brazing heat. Stay-Brite® solders bond with all of the ferrous and nonferrous alloys. Stay-Brite® 8 is especially effective in filling loose-fitted couplings. Use with all metals except aluminum.

BRIDGIT

Lead-free solder widely used in plumbing applications where lead-bearing solders are prohibited. Contains nickel to increase joint strength. A wide melting range makes Bridgit® an excellent alloy for large diameter fittings and non-concentric pipes. Fills gaps and caps off easily and effectively.

ALLOY	CHEMICAL COMPOSITION	SOLIDUS °F	SOLIDUS °C	LIQUIDUS °F	LIQUIDUS °C	SPECIFICATIONS
Stay-Brite®	96% Tin, 4% Silver	430	221	430	221	ASTM B32 Grade Sn96, Certified to NSF 51; J-STD-006, Sn96Ag04A
Stay-Brite® 8	94% Tin , 6% Silver	430	221	535	279	ASTM B32 Grade Sn95, Certified to NSF 51
Bridgit®	Nickel Bearing	460	238	630	332	ASTM B32 Grade HB, Certified to NSF 61
Nick®	Nickel Bearing	438	225	729	387	ASTM B32 Grade HN, Certified to NSF 61
Speedy®	97% Tin, 3% Copper	450	232	555	290	QQ-S571E, ASTM B32, CLASS Sb-5
95/5	95% Tin, 5% Antimony	452	233	464	240	ASTM B32 GRADE Sn 40A
40/60	40% Tin, 60% Lead	452	182	460	232	ASTM B32 GRADE Sn 60
60/40	60% Tin, 40% Lead	360	182	375	191	ASTM B32 GRADE Sn 50, J-STD-006
50/50	50% Tin, 50% Lead	360	182	420	216	ASTM B32 GRADE Sn 50, J-STD-006

Other alloys available upon request.
Acid, rosin, and organic flux cored solders available upon request

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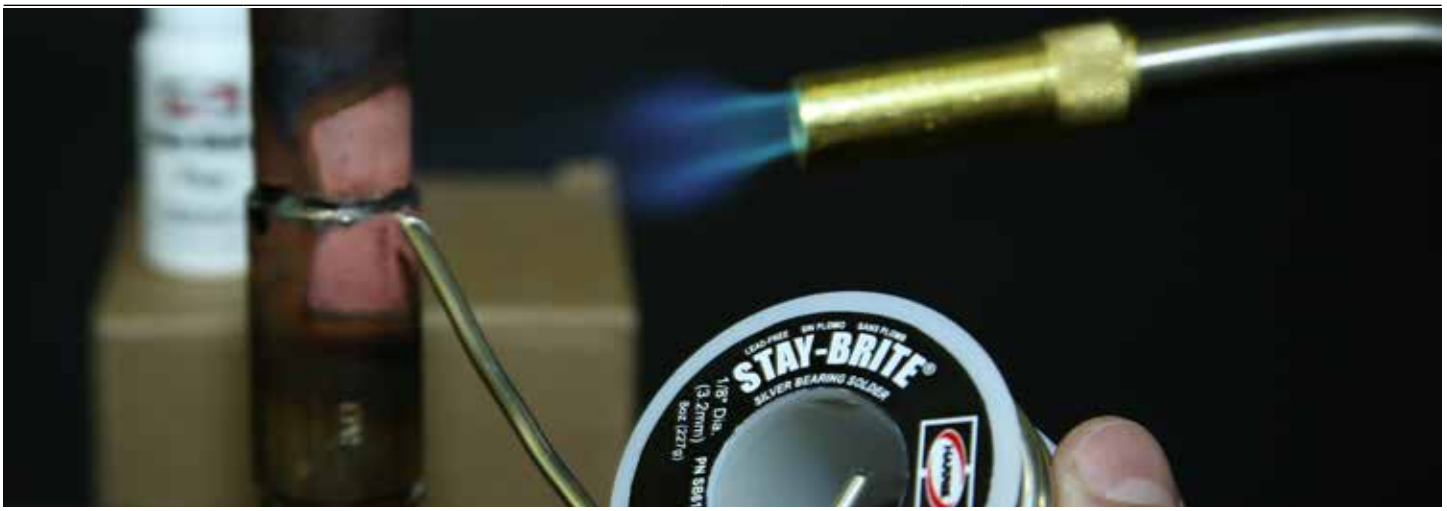
HARRIS OFFERS A WIDE RANGE OF SOLDER FLUX FOR MULTIPLE APPLICATIONS.

PART NO.	SIZE	FLUX	ACTIVE RANGE		SPECIFICATIONS
			°F	°C	
SCLF4	4 oz Bottle	Stay-Clean® Liquid Soldering Flux	Up to 700	Up to 371	A-A51145D, Type 1 Form B
SCLF16	16 oz Bottle	Stay-Clean® Liquid Soldering Flux	Up to 700	Up to 371	A-A51145D, Type 1 Form B
SCLF32	32 oz Bottle	Stay-Clean® Liquid Soldering Flux	Up to 700	Up to 371	A-A51145D, Type 1 Form B
SCLF1G	1 gl Jug	Stay-Clean® Liquid Soldering Flux	Up to 700	Up to 371	A-A51145D, Type 1 Form B
SCLF55	55 gl Drum	Stay-Clean® Liquid Soldering Flux	Up to 700	Up to 371	A-A51145D, Type 1 Form B
SCPF4	4 oz Jar	Stay-Clean® Paste Soldering Flux	Up to 600	Up to 316	A-A51145D, Type 1 Form A
SCPF1	1 lbs Jar	Stay-Clean® Paste Soldering Flux	Up to 600	Up to 316	A-A51145D, Type 1 Form A
BRPF4	4 oz Bottle	Bridgit® Burn Resistant Flux	200-800	93-427	ASTM B32 GRADE Sn 40A
BRPF1	1 lbs Bottle	Bridgit® Burn Resistant Flux	200-800	93-427	ASTM B32 GRADE Sn 40A
BRPF4WS	32 oz Bottle	Bridgit® Water Soluble Flux	250-600	121-315	ASTM B32 GRADE Sn 60
BRPF4POP	4 oz Bottle	Bridgit® Water Soluble Flux	250-600	121-315	ASTM B32 GRADE Sn 60



DYNAFLOW® FLUX

Auto dispense flux for brazing copper, brass, mild and stainless steel, and other ferrous and non-ferrous alloys. Wide active range, long shelf life, uniform, and excellent joint penetration.

STAY-SILV® WHITE FLUX

An all purpose, low temperature flux for use in silver brazing. Use with most ferrous and non-ferrous base metals, not recommended on aluminum, magnesium, and titanium.

STAY-SILV® BLACK FLUX

An all purpose, high-temperature flux for use in silver brazing. Formulated for applications where the work is subjected to rapid, localized heating. Particularly useful in applications where large amounts of refractory oxides may form, such as with stainless steel alloys. Use with stainless steel, carbide, heavy parts, and prolonged heating cycles.

PART NO.	SIZE	FLUX	ACTIVE RANGE °F	ACTIVE RANGE °C	SPECIFICATIONS
DWNAW5	5 lbs Pail	Dynaflow® Brazing Flux	1050-1600	566-871	AWS A5.31, CLASS FB3-A
DYNAW50	50 lbs Pail	Dynaflow® Brazing Flux	1050-1600	566-871	AWS A5.31, CLASS FB3-A
SSWF1/4	1/4 lbs Jar	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF1/2	1/2 lbs Jar	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF7	6.5 oz Bottle	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF1	1 lbs Jar	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF5	5 lbs Jar	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF25	25 lbs Pail	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSWF60	60 lbs Pail	Stay-Silv® White Brazing Flux	1050-1600	566-871	0F499, Type B, AWS A5.31, CLASS FB3-A, AMS 3410
SSBF1/2	1/2 lbs Jar	Stay-Silv® Black Brazing Flux	1050-1600	566-982	0F499, Type B, AWS A5.31, CLASS FB3-C, AMS 3411
SSBF1	1 lbs Jar	Stay-Silv® Black Brazing Flux	1050-1600	566-982	0F499, Type B, AWS A5.31, CLASS FB3-C, AMS 3411
SSBF5	5 lbs Jar	Stay-Silv® Black Brazing Flux	1050-1600	566-982	0F499, Type B, AWS A5.31, CLASS FB3-C, AMS 3411
SSBF30	30 lbs Pail	Stay-Silv® Black Brazing Flux	1050-1600	566-982	0F499, Type B, AWS A5.31, CLASS FB3-C, AMS 3411
SSBF60	60 lbs Pail	Stay-Silv® Black Brazing Flux	1050-1600	566-982	0F499, Type B, AWS A5.31, CLASS FB3-C, AMS 3411

Other packaging sizes including metric sizes available upon request

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ECO SMART™
BORIC ACID FREE FLUX

ECO SMART® IS THE UNIQUE, BORIC ACID AND BORAX FREE, PATENT - PENDING NEW RANGE OF ENVIRONMENTALLY - FRIENDLY FLUXES.

Quality brazed joints require flux to protect the joint during heating and promote complete braze alloy flow. To ensure the best connections Harris designed, developed, and produced a variety of fluxes for specific applications to meet our customer's needs.

FEATURES

- Environmentally-friendly boric acid and borax free
- Smooth consistency for easy application
- Powder flux has excellent adherence when heated rod is dipped into flux
- Dissolves surface oxides and protects against oxidation during heating
- Wide activation range
- Excellent flux coverage during heating
- Easy flux residue removal

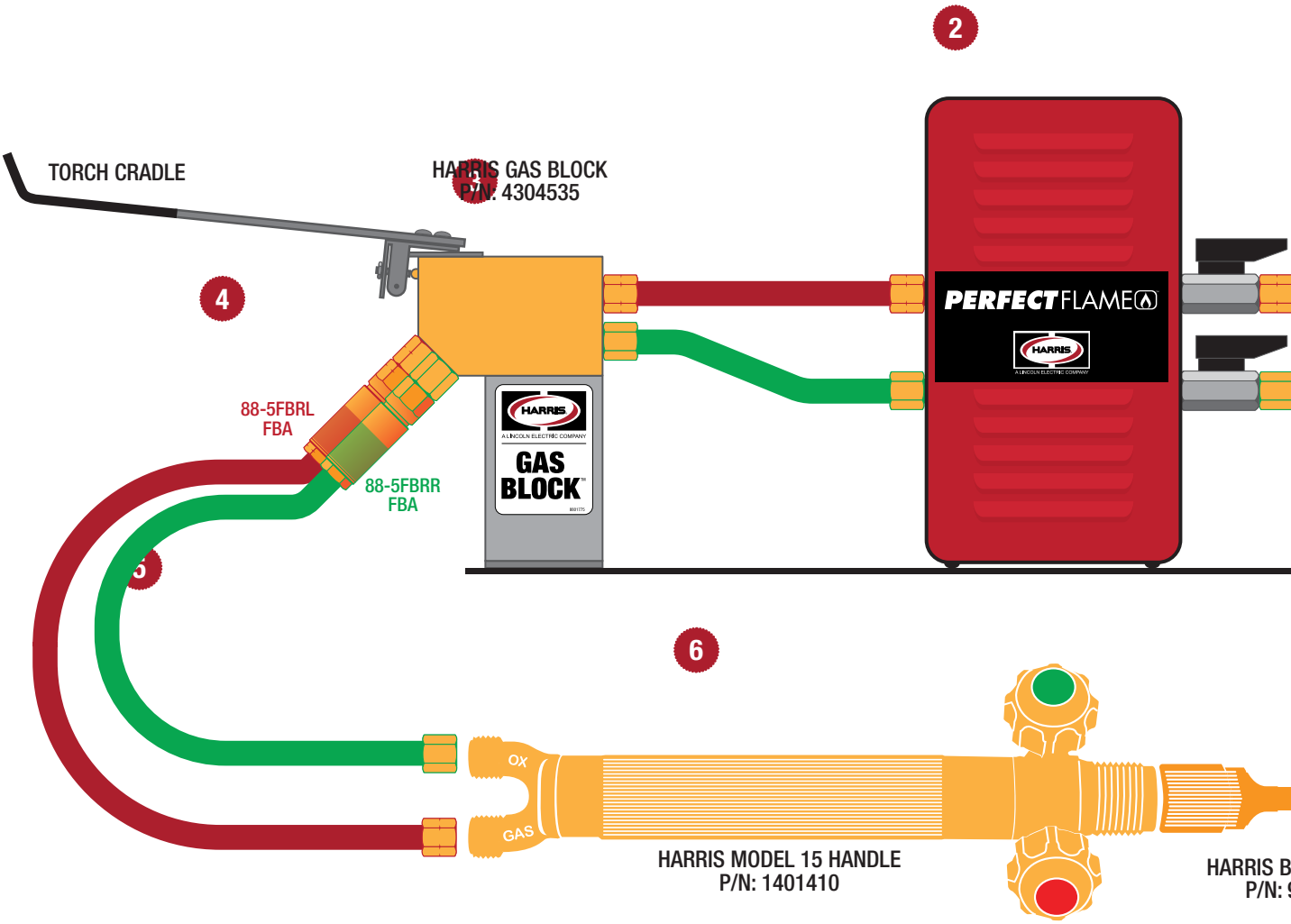
PART NO.	SIZE	FLUX	ACTIVE RANGE		SPECIFICATIONS
			°F	°C	
ESF7OZPG	6.5 oz Jar	Flux - Green Paste	800-1600	427-871	AWS A5.31M/A5.31: FB3-A
ESF1/2PG	1/2 lb Jar	Flux - Green Paste	800-1600	427-871	AWS A5.31M/A5.31: FB3-A
ESF1PG	1 lb Jar	Flux - Green Paste	800-1600	427-871	AWS A5.31M/A5.31: FB3-A
ESF5PG	5 lb Jar	Flux - Green Paste	800-1600	427-871	AWS A5.31M/A5.31: FB3-A
ESF25PG	25 lb Pail	Flux - Green Paste	800-1600	427-871	AWS A5.31M/A5.31: FB3-A
ESF1/2PB	1/2 lb Jar	Flux - Black Paste	700-1800	371-982	AWS A5.31M/A5.31: FB3-C
ESF1PB	1 lb Jar	Flux - Black Paste	700-1800	371-982	AWS A5.31M/A5.31: FB3-C
ESF5PB	5 lb Jar	Flux - Black Paste	700-1800	371-982	AWS A5.31M/A5.31: FB3-C
ESF1/2DG	1/2 lb Jar	Flux - Green Powder	800-1600	427-871	AWS A5.31M/A5.31: FB3-F
ESF25DG	25 lb Pail	Flux - Green Powder	800-1600	427-871	AWS A5.31M/A5.31: FB3-F
ESF40DG	40 lb Pail	Flux - Green Powder	800-1600	427-871	AWS A5.31M/A5.31: FB3-F
ESF1/2DB	1/2 lb Jar	Flux - Black Powder	700-1800	371-982	AWS A5.31M/A5.31: FB3-J
ESF25DB	25 lb Pail	Flux - Black Powder	700-1800	371-982	AWS A5.31M/A5.31: FB3-J
ESF40DB	40 lb Pail	Flux - Black Powder	700-1800	371-982	AWS A5.31M/A5.31: FB3-J

Other packaging sizes including metric sizes available upon request

BRAZING EQUIPMENT

PROVIDING WORLD-CLASS BRAZING ALLOYS IS ONLY PART OF WHAT HARRIS OFFERS OUR PRODUCTION BRAZING CUSTOMERS. ACCURATE, RELIABLE, AND SAFE EQUIPMENT IS AS CRITICAL IN THE BRAZING PROCESS AS THE BRAZING ALLOYS USED.

THE DIAGRAM BELOW SHOWS A COMPLETE HARRIS BRAZING STATION. PLEASE USE THE CHART ON PAGE 27 AND 59 TO ADD THE SPECIFIC PART NUMBERS THAT YOUR BRAZING APPLICATION REQUIRES.



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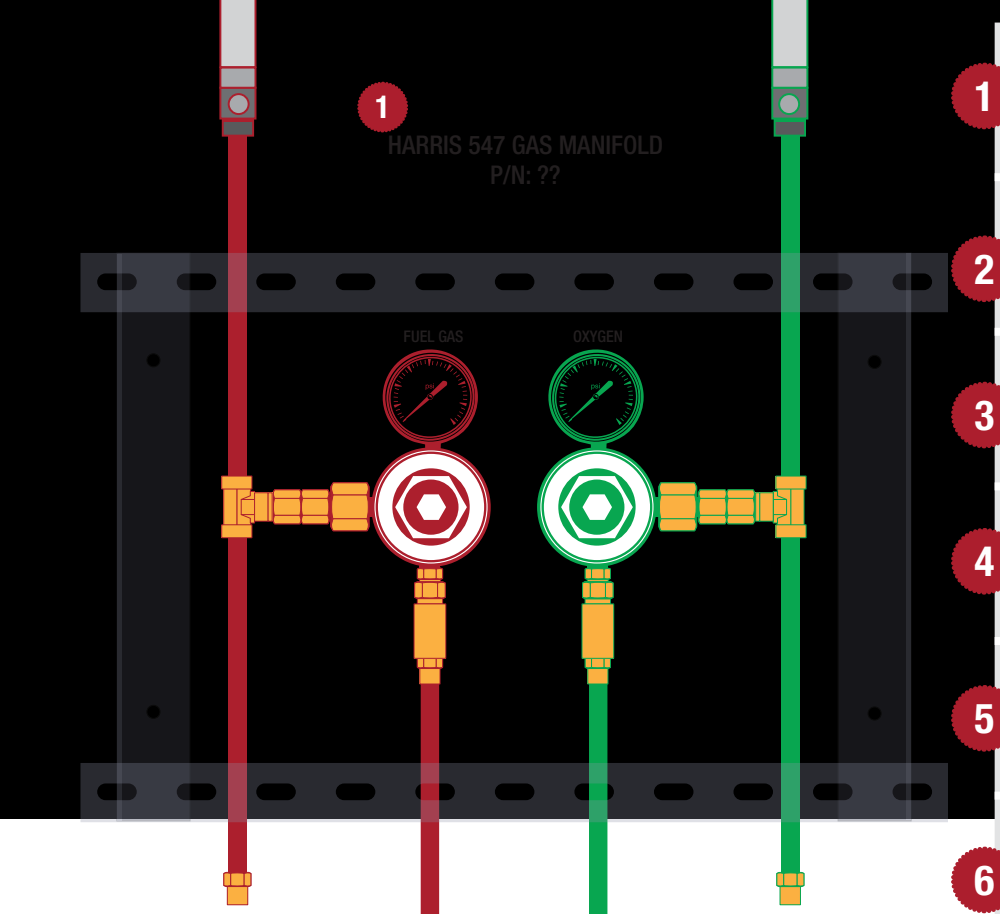

1 **HARRIS GAS REGULATION**
P/N:
DESCRIPTION:

2 **HARRIS PERFECT FLAME**
P/N:
DESCRIPTION:

3 **HARRIS GAS BLOCK**
P/N:
DESCRIPTION:

4 **HARRIS FLASHBACK ARRESTOR**
P/N:
DESCRIPTION:

5 **HARRIS HOSE**
P/N:
DESCRIPTION:

6 **HARRIS TORCH HANDLE**
P/N:
DESCRIPTION:

7 **HARRIS MIXER**
P/N:
DESCRIPTION:

8 **HARRIS TIP TUBE**
P/N:
DESCRIPTION:

9 **HARRIS TIPS**
P/N:
DESCRIPTION:

10 **HARRIS LIGHTPRO SPARK**
P/N:
DESCRIPTION:

7

HARRIS
CUSTOM
TWIN TIP

-15-3 MIXER
9100072

8

10

HARRIS LIGHT PRO SPARK
P/N: 4304535

SELECT THE HANDLE

50-10 MODEL

STRAIGHT TORCH HANDLE

MODEL SHOWN:
50-10

DESCRIPTION

The Model 50's are automatic brazing torch handles. The handle features a unique on/off gas control system to reduce operating cost and improve safety and convenience as well as an adjustable pilot light feature that can be used with all fuel gases. The thumb operated on/off gas control eliminates flame readjustment each time the torch is used.

DETAILS

Length: 8" / 203.2 mm

Weight: 0.8 lbs / 0.36 kg

Features:

- Automatic on/off gas control
- Adjustable pilot light

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
1401590	50-10	RH - 9/16" - 18 "B"	LH - 9/16" - 18 "B"
QC5010A	50-10A	RH - 3/8" - 24 "A"	LH - 3/8" - 24 "A"

50-10P MODEL

PISTOL GRIP TORCH HANDLE

MODEL SHOWN:
50-10AP

DESCRIPTION

The Model 50-P's are an ergonomically designed automatic brazing torch with a pistol grip. The new design retains all the features of the original Model 50 but with a pistol grip design for greater operator comfort in specific applications. The handle features a unique on/off gas control system to reduce operating cost and improve safety and convenience as well as an adjustable pilot light feature and can be used with all fuel gases. The thumb operated on/off gas control eliminates flame readjustment each time the torch is used.

DETAILS

Length: 5.5" x 3"

Weight: 0.8 lbs / 0.36 kg

Features:

- Pistol grip
- Automatic on/off gas control
- Adjustable pilot light

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
QC5010P	50-10P	RH - 9/16" - 18 "B"	LH - 9/16" - 18 "B"
QC5010AP	50-10AP	RH - 3/8" - 24 "A"	LH - 3/8" - 24 "A"

SELECT THE MIXER

MODEL SHOWN:
H-16-E

MODEL SHOWN:
H-16-S

PART NO.	MODEL NO.	GAS MIXER STYLE	FITS HANDLE
9100096	H-16-E	Equal Pressure	All model 50, 50-P, 19, 19-P style torches
9100100	H-16-S	Low Pressure Injector	All model 50, 50-P, 19, 19-P style torches

For more information on equal pressure and low pressure injector mixer styles please see the bottom of page 30.

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SELECT THE HANDLE

19-6
MODEL

STRAIGHT TORCH HANDLE

MODEL SHOWN:
19-6

DESCRIPTION

The Model 19's are a standard brazing handle that can be used with all fuel gases and has front valves for easy adjustment.

DETAILS

Lengths: 7 ½" / 190.5 mm
Weight: 0.7 lbs / 0.32 kg
Features:
- Easily adjustable valves
- Rugged construction

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
1401156	19-6	RH - 9/16" - 18 "B"	LH - 9/16" - 18 "B"
1401143	19-6A	RH - 3/8" - 24 "A"	LH - 3/8" - 24 "A"

19-6P
MODEL

PISTOL GRIP TORCH HANDLE

MODEL SHOWN:
19-6AP

DESCRIPTION

The Model 19-P's are an ergonomically designed brazing torch with a pistol grip. The new design retains all the features of the original Model 19 but with a pistol grip design for greater operator comfort in specific applications. This standard brazing handle can be used with all fuel gases and has front valves for easy adjustment.

DETAILS

Length: 5.5" x 3"
Weight: 0.7 lbs / 0.32 kg
Features:
- Pistol grip
- Easily adjustable valves
- Rugged construction

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
QC1906P	19-6P	RH - 9/16" - 18 "B"	LH - 9/16" - 18 "B"
QC1906AP	19-6AP	RH - 3/8" - 24 "A"	LH - 3/8" - 24 "A"

SELECT THE MIXER

MODEL SHOWN:
H-16-E

MODEL SHOWN:
H-16-S

PART NO.	MODEL NO.	GAS MIXER STYLE	FITS HANDLE
9100096	H-16-E	Equal Pressure	All Model 50, 50-P, 19, 19-P Style Torches
9100100	H-16-S	Low Pressure Injector	All Model 50, 50-P, 19, 19-P Style Torches

For more information on equal pressure and low pressure injector mixer styles please see the bottom of P. 30.

SELECT THE HANDLE

15-4
MODEL

LIGHTWEIGHT TORCH HANDLE

MODEL SHOWN:
15-4

DESCRIPTION
The Model 15-4 is a lightweight brazing handle with “A” (3/8-24) hose connections, is popular for aluminum brazing, can be used with all fuel gases, and has large front valves for easy adjustment.

DETAILS
Length: 5 ¾" / 146.0 mm
Weight: 0.5 lbs / 0.23 kg
Features:
- Lightweight

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
1401410	15-4	RH - 3⁄8” - 24 “A”	LH - 3⁄8” - 24 “A”

SELECT THE MIXER

MODEL SHOWN:
B-15-3

MODEL SHOWN:
B-15-3F

PART NO.	MODEL NO.	OXYGEN HOSE CONNECTION	FUEL HOSE CONNECTION
9100070	B-15-3	Equal Pressure	Model 15-4
9105207	B-15-3F	Low Pressure Injector	Model 15-4

“EQUAL PRESSURE” MIXER VS. “ LOW PRESSURE INJECTOR” MIXER
Harris offers two types of oxy/fuel mixers. Equal pressure or positive pressure mixers are referred to as “E” type mixers while, low pressure injector mixers are referred to as “S” or “F” mixers. The type of mixer that best suits the need depends on the application and the available fuel gas supply. The following explains some of the features and benefits of each mixer design.

TYPICAL “EQUAL PRESSURE” MIXER DESIGN
This is the preferred mixer if the fuel gas pressure available is **above** 5 PSI. To thoroughly mix the oxygen and fuel gas, an equal pressure mixer design relies on the positive pressure control of both oxygen and fuel gas. Both gases enter the mixing chamber at controlled pressures. “E” mixers allow the end-user greater control of the oxy/fuel ratio. This feature has an advantage in applications where a slightly carburizing or oxidizing flame is required. Also because of their higher potential flow rates, “E” mixers are required for high flow heating applications. This design should be used with both acetylene and alternate fuels when positive pressure control of the fuel gas is available.

TYPICAL “LOW PRESSURE INJECTOR” MIXER DESIGN
This is the preferred mixer if the fuel gas pressure available is **below** 5 PSI. Low pressure injector mixers require that only the oxygen has a positive pressure control. The oxygen exits a specially designed chamber at a very high velocity creating a venturi effect allowing the fuel gas to be aspirated into the mixing chamber. Because of the aspirating effect on the fuel gas, positive control of the fuel gas is not required. In fact, the mixers in the Harris line are designed to operate at fuel gas pressures as low as 0.25 PSI. Low pressure mixers tend to have a narrower operating range than equal pressure mixer so low pressure injector mixers are used primarily with low pressure natural gas/methane.

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5090 MODEL

SINGLE PIECE BRAZING TIPS

MODEL SHOWN:
5090

DESCRIPTION

Model 5090 tips are manufactured using environmentally-friendly tellurium copper that has excellent machining properties resulting in a higher quality tip. They are swaged for more precise and consistent flames. They use a universal mixer for all sizes eliminating the expense of using a different mixer for every tip size. All 5090 tips have a metal-to-metal mixer seat virtually eliminating the possibility of leaks and the need for thread sealants.

DETAILS

Material: Copper

ACETYLENE FUEL SINGLE TIP

PART NO.	TIP SIZE	DESCRIPTION	ACETYLENE PRESSURE (PSI) RANGE	ACETYLENE FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1601730	3	5090-3	3	3 - 8	3	3 - 8
1601760	5	5090-5	5	8 -18	5	8 - 18
1601810	8	5090-8	8	16 - 32	8	16 - 32

ALTERNATE FUEL SINGLE TIP

PART NO.	TIP SIZE	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1600134	3N	5090-3N	5 - 15	5	5 - 15	19
1600135	5N	5090-5N	5 - 15	8	5 - 15	32
1600136	8N	5090-8N	5 - 15	13	5 - 15	53

9505 MODEL

REPAIR TIP

MODELS SHOWN:
9505

DESCRIPTION

Model 9505 is commonly used for maintenance, general brazing, and repair stations. The curved end design allow this tip to get into tight spaces and direct the short flame only where needed.

DETAILS

Length: 8.5”

Weight: 0.09 lbs

Material: Stainless steel with brass base

PART NO.	TIP SIZE	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9505	-	Alternate Fuel Repair Tip	5 - 15	3.0 - 5.5	10 - 25	7.0 - 13.0

D-50-C MODEL

SINGLE TIP TUBE

MODEL SHOWN: **D-50-C**

DESCRIPTION

This gooseneck tip tube is most commonly used with 1390 separable tips which give you a wide variety of flame sizes to choose from. Using the separable tip tube design reduces the extra cost associated with additional tip sizes and/or replacement tips. You can also use the 8490 or 9690 tips with this tip tube using the correct adaptor on the following page.

DETAILS

Material: Brass

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
9100379	D-50-C	Gooseneck Tip Tube	1390, 1390-N	4”	0.1 lbs	NONE	Gooseneck

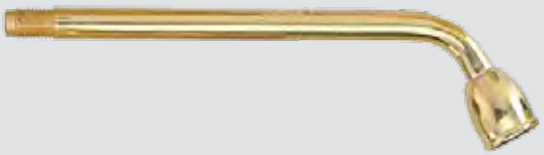
D-50-CXL MODEL

SINGLE TIP TUBE

MODEL SHOWN: **D-50-CXL**

DESCRIPTION

This gooseneck tip tube is most commonly used with 1390 separable tips which give you a wide variety of flame sizes to choose from. Using the separable tip tube design reduces the extra cost associated with additional tip sizes and/or replacement tips. You can also use the 8490 or 9690 tips with this tip tube using the correct adaptor on the following page.



DETAILS

Material: Brass

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
9100872	D-50-CXL	Gooseneck Tip Tube	1390, 1390-N	7”	0.15 lbs	NONE	Gooseneck

D-50-CS MODEL

SINGLE STRAIGHT TIP TUBE

MODEL SHOWN: **D-50-CS**

DESCRIPTION

This straight tip tube is most commonly used with pistol grip torches and 1390 separable tips which give you a wide variety of flame sizes to choose from. Using the separable tip tube design reduces the extra cost associated with additional tip sizes and/or replacement tips. You can also use the 8490 or 9690 tips with this tip tube using the correct adaptor on the following page.

DETAILS

Material: Brass

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
QCDC2ST	D-50-CS	Straight Tip Tube	1390, 1390-N	2”	0.04 lbs	NONE	Straight

Orders: 1.800.733.4043
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1390 MODEL

SEPARABLE AND BRAZING TIPS

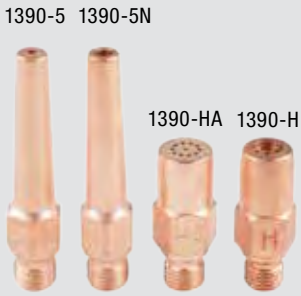
MODELS SHOWN:
1390, 1390-HA, 1390-H

DESCRIPTION

Model 1390 tips are manufactured using environmentally-friendly tellurium copper that has excellent machining properties resulting in a higher quality tip. They are precision drilled for more precise and consistent flames. They use a universal separable tip tube and mixer system for tip sizes 0-10 eliminating the expense when replacing tips or changing to a different size. All 1390 tips have a metal to metal tip contact seat virtually eliminating the possibility of leaks and the need for thread sealants.

DETAILS

Length: 1" - 2"
Weight: 0.04 - 0.06 lbs.
Material: Copper



ACETYLENE

PART NO.	TIP SIZE	DESCRIPTION	ACETYLENE PRESSURE (PSI) RANGE	ACETYLENE FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1600020	0	1390-0	1	1-3	1	1 - 3
1600030	1	1390-1	1	2-5	1	2 - 6
1600040	2	1390-2	2	3-8	2	3 - 9
1600050	3	1390-3	3	5 - 11	3	6 -12
1600060	4	1390-4	4	6 - 14	4	7 -15
1600070	5	1390-5	5	8 - 18	5	9 - 20
1600080	6	1390-6	6	10 - 20	6	11- 22
1600090	7	1390-7	7	13 - 25	7	14 -28
1600100	8	1390-8	8	16 - 32	8	18 - 35
1600140	9	1390-9	9	20 - 37	9	22 - 41
1600150	10	1390-10	10	24 - 42	10	26 - 46
1800025	HA	1390-HA	5-10	35 - 52	5 -10	39 - 57

ALTERNATE FUEL

PART NO.	TIP SIZE	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1600180	2N	1390-2N	1	5	2	20
1600190	3N	1390-3N	1	5	2	20
1600200	4N	1390-4N	1	5	2	20
1600210	5N	1390-5N	1	5.5	2	22
1600220	6N	1390-6N	2	6.3	2	25
1600230	7N	1390-7N	2	7.5	3	30
1600240	8N	1390-8N	3	7.8	3	35
1600250	9N	1390-9N	3	10	4	40
1600260	10N	1390-10N	3	11.2	4	45
1800020	H	1390-H	2 - 12	12 - 40	5 - 25	48 - 160
1800015	B	1390-B	2 - 12	12 - 40	5 - 25	48 - 160

USE ADAPTORS BELOW WITH YOUR SELECTED D-50 TIP TUBES FOR MODELS 8490 AND 9690

MODEL SHOWN:
D-50 Tip tubes to 8490 tips P. 35
P/N: QC9679

MODEL SHOWN:
D-50 Tip tubes to 9690 tips P. 37
P/N: QC9681

8493B MODEL

MEDIUM DUTY SINGLE TIP TUBE

MODEL SHOWN: QC8493B

DESCRIPTION

This gooseneck tip tube is most commonly used with 8490 separable tips which give you a wide variety of flame sizes to choose from. Using the separable tip tube design reduces the extra cost associated with additional tip sizes and/or replacement tips.

DETAILS

Material: Brass

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
QC8493B	8493-B	Gooseneck Tip Tube	8490 and 8490N	4”	0.1 lbs	NONE	Gooseneck

TH-50 MODEL

MEDIUM DUTY TWIN TIP TUBE

MODEL SHOWN: TH-50-2

DESCRIPTION

This adjustable twin tip is used with 8490 tips which give you a variety of flame sizes to choose from. The TH-50 tubes come straight and are annealed so they can be reformed and / or adjusted to your specific application needs.

DETAILS

Material: Copper

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
1601590	TH-50-2	Adjustable Twin Tip Tube	8490 and 8490N	5.5”	0.16 lbs	Adjustable	Adjustable
1601596	TH-50-2XL	Adjustable Twin Tip Tube	8490 and 8490N	7.25”	0.20 lbs	Adjustable	Adjustable

TH-50-P MODEL

MEDIUM DUTY TWIN TIP TUBE

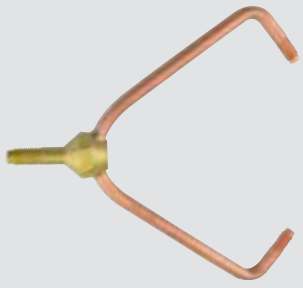
MODEL SHOWN: QC-50-2P

DESCRIPTION

This preformed twin tip is used with 8490 tips which give you a variety of flame sizes to choose from. This tip is preformed at the factory to cover a wide variety of applications, but can still be adjusted to fit specific needs of your application.

DETAILS

Material: Copper



PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
1601714	TH-50-2P	Preformed Twin Tip Tube	8490 and 8490N	5”	0.14 lbs	3”	Pre-bent

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8490 MODEL

MEDIUM DUTY ACETYLENE BRAZING TIPS

MODELS SHOWN:
8490-6, 8490-6-65

DESCRIPTION

The Model 8490 series separable brazing tips are made of high-quality brass bar stock. The 8490 series tips also include a special multi-flame heating tip, 8490-6-65.

DETAILS

Material: Brass

ACETYLENE

PART NO.	TIP SIZE	DESCRIPTION	ACETYLENE PRESSURE (PSI) RANGE	ACETYLENE FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1601990	2	8490-2	2	3 - 8	2	3 - 9
1602010	4	8490-4	4	6 - 14	4	7- 15
1602030	6	8490-6	6	10 - 20	6	11 - 22
1602060	8	8490-8	8	16 - 32	8	18 - 35
1602040	6-65	8490-6-65	8	45 - 56	8	50 - 62

8490N MODEL

MEDIUM DUTY ALTERNATE FUEL BRAZING TIPS

MODEL SHOWN:
8490-6N, 8490-6-65

DESCRIPTION

The Model 8490-N series separable brazing tips are made of high-quality brass bar stock. The 8490-N series tips are designed with a counter bored tip end for maximum performance with alternate fuels. They are stable over a broad BTU range, consequently, one tip size can be used over a wide range of joint sizes. The 8490-N series also includes a special multi-flame heating tip, 8490-6-65.

DETAILS

Material: Brass

ALTERNATE FUELS

PART NO.	TIP SIZE	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
1602090	4N	8490-4N	1	2	2	8
1602100	5N	8490-5N	1	2.5	2	10
1602110	6N	8490-6N	1	3	3	12
1602120	7N	8490-7N	1	4	4	20
1602130	8N	8490-8N	2	6	5	24
1602040	6-65	8490-6-65	8	8	8	30

TH-96

MODEL

HEAVY DUTY TWIN TIP TUBES

DESCRIPTION

This heavy duty tip tube series is used with the 9690 series tips and can be used for brazing large diameter tubing or other applications requiring a lot of heat. Options include pre-bent tip tubes for convenience or straight tip tubes which can be easily bent to fit your specific application.

DETAILS

Material: Annealed copper

PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
1601716	QC-96-2P	Preformed Twin Tip Tube	9690 Style Tips	7”	0.26 lbs	2.25” (57.2 mm)	Pre-bent
QC9685	QC-96-2	Adjustable Twin Tip Tube	9690 Style Tips	8”	0.26 lbs	Adjustable	Adjustable
QC9687	QC-96-1	Single Adjustable Tip Tube	9690 Style Tips	8”	0.15 lbs	None	Adjustable

TH-96-XL

MODEL

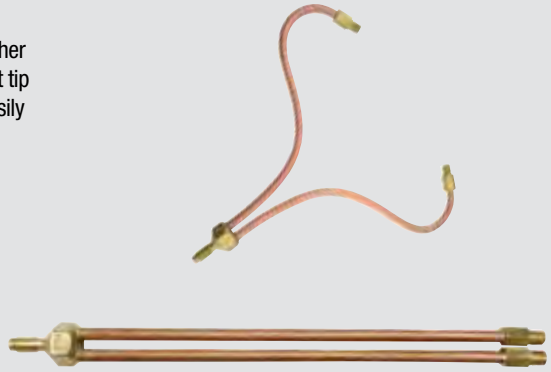
HEAVY DUTY TWIN TIP TUBES

DESCRIPTION

This heavy duty tip tube series is used with the 9690 series tips and can be used for brazing large diameter tubing or other applications requiring a lot of heat. Options include pre-bent tip tubes for convenience or straight tip tubes which can be easily bent to fit your specific application.

DETAILS

Material: Annealed Copper



PART NO.	MODEL NO.	DESCRIPTION	TIP MODELS USED	LENGTH	WEIGHT	GAP	SHAPE
QC96832	QC-96-2PXL	Preformed Twin Tip Tube	9690 Style Tips	7.5”	0.31 lbs	4.5” (114.3 mm)	Pre-bent
QC9683	QC-96-2XL	Adjustable Twin Tip Tube	9690 Style Tips	10”	0.31 lbs	Adjustable	Adjustable

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9690 MODEL

HEAVY DUTY TIPS

DESCRIPTION

The Model 9690 series separable multi-flame brazing tips are made for brazing large diameter tubing or other applications requiring a lot of heat. They can be used with all fuel gases and are chrome plated to resist contamination.

DETAILS

Length: 0.75" - 1.125"
Weight: 0.02 - 0.03 lbs
Material: Chrome Plated Brass

QC9682

QC9783

QC9688

QC9412

PART NO.	TIP SIZE	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9682	5	9690-5	5 - 15	14 - 48	10 - 40	58 - 192
QC9783	7	9690-7	5 - 15	14 - 48	10 - 40	58 - 192
QC9688	10	9690-10	5 - 15	14 - 48	10 - 40	58 - 192
QC9412	10C	9690-10C	5 - 15	14 - 48	10 - 40	58 - 192

TWIN TIPS

ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9501

DESCRIPTION

Preformed twin tip design for return bend brazing where the tip can rest on the coil base plate protecting the plate and directing the flame on the joint. Also used for other applications where space is limited and heat needs to be precisely directed.

DETAILS

Weight: 0.07 - 0.08 lbs
Material: Stainless steel tip and brass base
Gap: 0.62”
Flame Angle: Up

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9501	7”	Preformed Twin Tip	5 - 15	2.5 - 4.0	10 - 20	6.0 - 10.0
QC9500	9”	Preformed Twin Tip	5 - 15	2.5 - 4.0	10 - 20	6.0 - 10.0

TWIN TIPS

ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9508

DESCRIPTION

Preformed twin tip designed for smaller diameter tubing usually less than 1”

DETAILS

Weight: 0.15 lbs
Material: Stainless steel tip and brass base
Gap: 0.35”
Flame Angle: Flat

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9508	7.25”	Preformed Twin Tip	5 - 15	2.5 - 4.0	10 - 20	6.0 - 10.0
QC9509	9.25”	Preformed Twin Tip	5 - 15	2.5 - 4.0	10 - 20	6.0 - 10.0

TWIN TIPS

ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9697

DESCRIPTION

Preformed twin tip designed for medium diameter tubing usually 0.5” to 2”.

DETAILS

Weight: 0.15 lbs
Material: Stainless steel tip and brass base
Gap: 0.925”
Flame Angle: Flat

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9697	7.25”	Preformed Twin Tip	10 - 20	3.5 - 6.5	15 - 25	9.0 - 19.5

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TWIN TIPS

ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9866

DESCRIPTION

Preformed twin tip designed for medium diameter tubing usually 0.5” to 2”.

DETAILS

Weight: 0.15 lbs
Material: Stainless steel tip and brass base
Gap: 0.80”
Flame Angle: Up

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9866	7.25”	Preformed Twin Tip	10 - 20	3.5 - 6.5	15 - 25	9.0 - 19.5
QC9866S	5.25”	Preformed Twin Tip	10 - 20	3.5 - 6.5	15 - 25	9.0 - 19.5

TWIN TIPS

ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

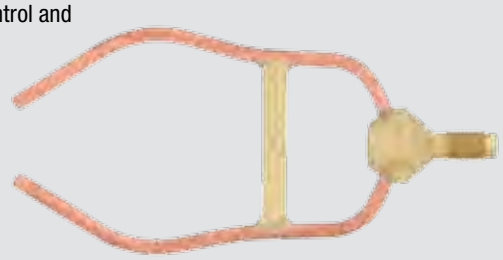
MODEL SHOWN:
QC9659

DESCRIPTION

Preformed twin tip designed for medium diameter tube brazing for standard HVAC applications. Includes cross bar for distance control and easy hang up.

DETAILS

Weight: 0.125 lbs
Material: Copper tip and brass base
Gap: 1”
Flame Angle: Flat



PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9859	5.75”	Preformed Twin Tip	5 - 15	3.0 - 8.5	10 - 20	6.0 - 20.5

TWIN TIPS

CHROME ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9680

DESCRIPTION

Preformed twin tip designed for medium diameter tube brazing for standard HVAC applications. Includes cross bar for distance control and easy hang up.

DETAILS

Weight: 0.125 lbs
Material: Chrome plated copper and brass
Gap: 1”
Flame Angle: Flat

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9680	5.25”	Chrome Preformed Twin Tip	5 - 15	3.0 - 8.5	10 - 20	6.0 - 20.5

TWIN TIPS

CHROME ALTERNATE FUEL PREFORMED TWIN BRAZING TIPS

MODEL SHOWN:
QC9975

DESCRIPTION

Chrome plated design is sometimes preferred for aluminum brazing applications.

DETAILS

Weight: 0.125 lbs
Material: Chrome plated copper and brass
Gap: 0.75”
Flame Angle: Flat

PART NO.	LENGTH	DESCRIPTION	ALTERNATE FUEL PRESSURE (PSI) RANGE	ALTERNATE FUEL FLOW (SCFH) RANGE	OXYGEN PRESSURE (PSI) RANGE	OXYGEN FLOW (SCFH) RANGE
QC9975	6.25”	Chrome Preformed Twin Tip	5 - 15	5.0 - 7.5	10 - 20	9.0 - 18.0

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POWERBRAZER™

POWERBRAZER™

MODEL SHOWN:
POWERBRAZER™

DESCRIPTION

Using the operational effectiveness of current technology, The Harris Products Group has developed a streamlined unit to improve your operator's brazing efficiency. The PowerBrazer™ is a semi-automatic adjustable speed braze wire feeder that can be used in a variety of applications.

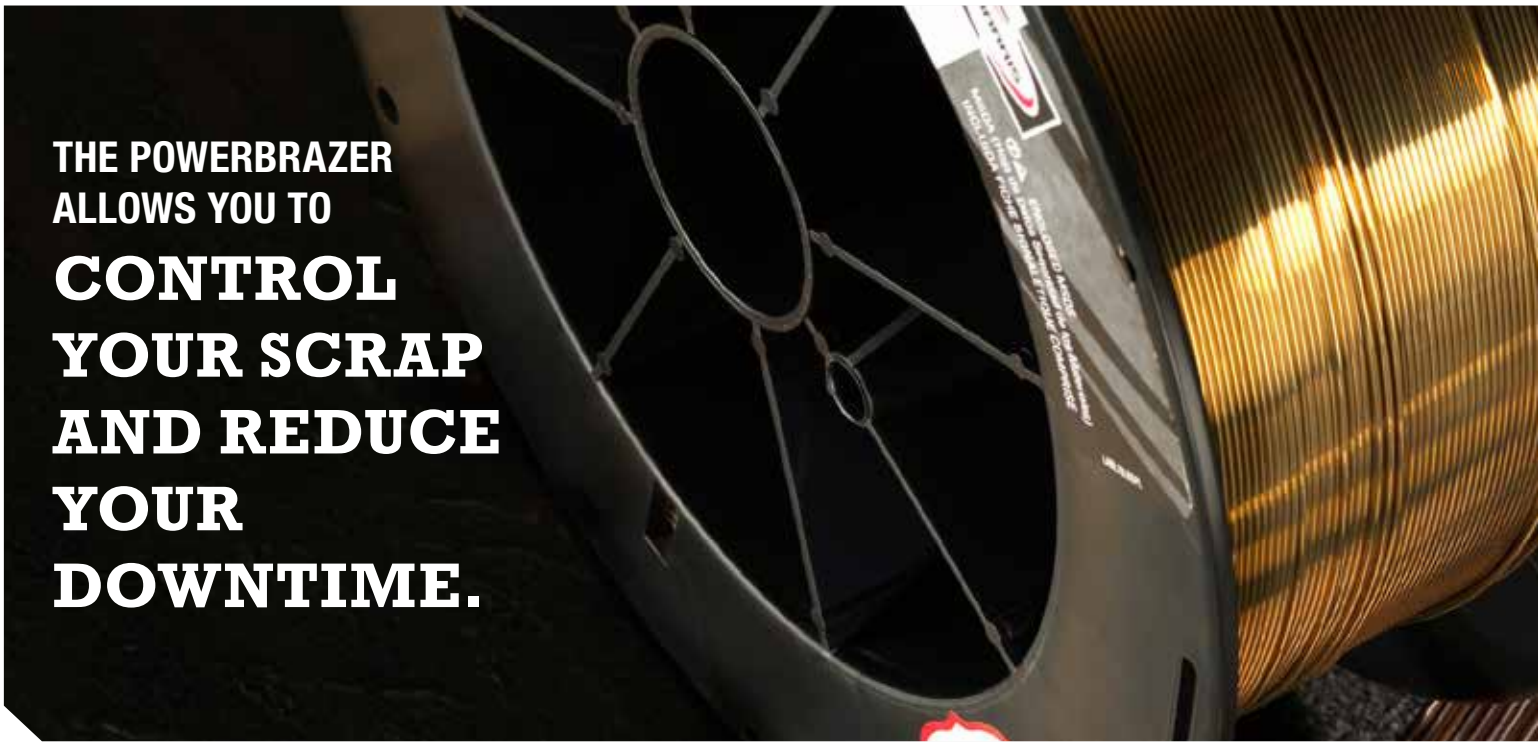
EQUIPMENT FEATURES

- Better control of your entire brazing process
- Reduces scrap brazing alloys up to 10%
- Increased manufacturing throughput in all brazing applications
- Can improve joints to aid in leak elimination
- Apply better brazing techniques to your products
- Applications in a number of different industries

OTHER ADVANTAGES:

- Unique drive roll design provides feeding and quick reloading by simply starting wire into guide tube
- The drive rolls and guide tubes are designed for long life, quick reloading, and precise wire feeding
- Completely enclosed case protects heavy duty wire drive mechanism from damage, but allows easy access to drive rolls
- Spool protection cover protects brazing wire against shop dirt and other contaminates
- (24 volt) trigger with momentary or continuous wire feed control
- Dynamic braking system stops wire feed motor quickly to control
- Two speed settings (high & low) with full 0-100% adjustment within each range

INPUT POWER	WIRE SIZE	H x W x D	WEIGHT
120V / 1.5 Amp	1/16" and 3/32"	10.9" x 9.8" x 9.6"	24 lbs / 10.9 kg



GAS BLOCK™

1YR WARRANTY

DESCRIPTION

The lever on the Gas Block™ acts as an on/off control which eliminates the need to reset the torch each time it is used and offers quick ignition. The Gas Block™ comes equipped with a set screw and lock nut which allows the user to easily adjust the shut off lever. The Gas Block™ is a safer option than other competitive models that pose a safety risk with open flames. It is a available in two and three gas version. The three gas version offers control of the nitrogen purge line for brazing applications. Ask the Pros at Harris to help document a nitrogen gas cost savings today.

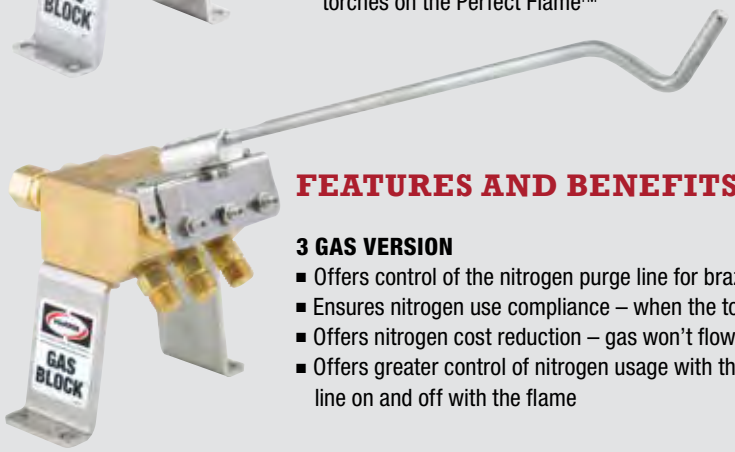
DETAILS

Capacity: Heavy Duty
Where Used: Brazing stations, gas welding stations, test labs, schools, and training centers
Weight: 2 Gas - 3.5 lbs / 1.59 kg 3 Gas - 4.9 lbs / 2.22 kg
Related Items: LightPro Spark P/N: 4304535

FEATURES AND BENEFITS

2 GAS VERSION & 3 GAS VERSION

- Heavy-duty rigid design with a laser cut and formed 10 gauge stainless steel base
- Welded stainless steel swivel bracket and stainless steel plunger
- Can be used with the LightPro Spark, Harris' electric ignitor, and the valveless torches on the Perfect Flame™



FEATURES AND BENEFITS

3 GAS VERSION

- Offers control of the nitrogen purge line for brazing applications
- Ensures nitrogen use compliance – when the torch is lit, the nitrogen is on
- Offers nitrogen cost reduction – gas won't flow when the operator is away
- Offers greater control of nitrogen usage with the ability to turn the purge line on and off with the flame

PART NO.	DESCRIPTION	GAS	INLET CONNECTION	OUTLET CONNECTION
4300943	Gas Block, 2 Gas Assembly	Propane, Natural Gas, Hydrogen, Propylene, Acetylene	Fuel 9/16" - 18 (LH) Oxy 9/16" - 18 (RH)	Fuel 9/16" - 18 (LH) Oxy 9/16" - 18 (RH)
4300944	Gas Block, 3 Gas Assembly	Propane, Natural Gas, Hydrogen, Propylene, Acetylene	Fuel 9/16" - 18 (LH) Oxy 9/16" - 18 (RH)	Fuel 9/16" - 18 (LH) Oxy 9/16" - 18 (RH)
		Nitrogen	Inert 5/8" - 18 (F)	Inert 1/4" NPT (M)

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LIGHTPRO SPARK IGNITOR

DESCRIPTION

The LightPro Spark is a portable, hands-free piezoelectric ignitor for use in repetitive brazing operations. When the lever is depressed the piezoelectric ignitor is engaged and a spark is created. It offers a quicker and more reliable ignition compared to typical hand held strikers and offers greater safety than open pilot lights used in some production areas. The unit is battery powered and eliminates the need for an external power source.

DETAILS

Capacity: Medium duty

Housing: Zinc die cast

Where used: Brazing and welding operations

Weight: 0.43 lbs / 0.20 kg

FEATURES AND BENEFITS

- Safer and less expensive than an open pilot light*
- Replaces manual hand-held strikers
- Shock proof, metal housing
- Powered by two standard AA batteries (sold separately)
- Compact design – 2” x 3” x 4”
- No need to replace striker flint
- Not recommended for use with large multi-flame heating tips

PART NO.	DESCRIPTION	OUTPUT	IGNITION CYCLES
4304535	Ignitor, LightPro Spark	14K	100,000

Estimated savings of $5.00/mo. For more information about gas cost savings please contact your Harris representative.

LIGHTING PROCEDURE

The LightPro Spark™ includes plastic components under the trigger mechanism that can melt and cause failures if lit improperly.

✓ To ensure maximum life out of each unit make sure to light the torch properly as shown in the figures to the right.

✗ Improper lighting will cause failures.

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AS MANUFACTURERS STRIVE TO REDUCE OVERALL COSTS, HARRIS CAN ASSIST IN THOSE EFFORTS.

OUR TECHNICAL TEAM IS FOCUSED ON COST REDUCTION SOLUTIONS FOR SPECIFIC APPLICATIONS IN YOUR PLANT.

PERFECT FLAME

EMPOWERING PRODUCTION BRAZING MANUFACTURERS

TO IMPROVE THEIR HAND BRAZING APPLICATIONS THROUGH THE SIX SIGMA DMAIC PROCESS:

DEFINE

You can define exactly what type of brazing flame you are currently using in production with our software. (Carburizing, Oxidizing, Neutral)

MEASURE

Using the software program, you can now measure the exact energy (BTU or KCAL) and temperature of your flame.

ANALYZE

Depending on your specific application you can analyze your brazing flame to find the PERFECT FLAME.

IMPROVE

Making slight adjustment to the micrometer valves and pressure regulators to get your PERFECT FLAME for your specific application to help ensure a perfect braze joint.

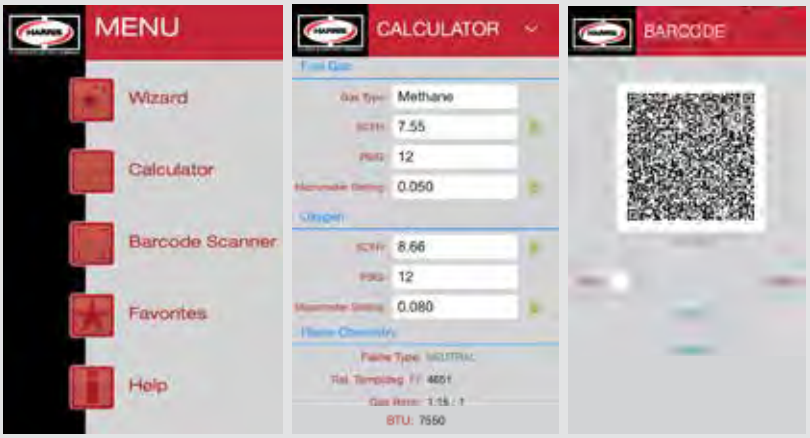
CONTROL

Now you can lock the setting in the PERFECT FLAME so operators cannot make any adjustments to the flame. This gives you a consistent flame from operator to operator, shift to shift, and location to location.

PART NO.	DESCRIPTION
4300945	Perfect Flame
4404945	Perfect Flame w/Valveless Model 50-10 B Fitting
4404947	Perfect Flame w/Valveless Model 50-10 A Fitting
4404946	Perfect Flame w/Valveless Model 15-4 A Fitting
9105440	Kit, Perfect Flame Wall Mount
9105450	Kit, Perfect Flame Bottom Mount

PERFECT FLAME hardware purchases and the continuous use of our free software is only available to customers who also purchase a mutually agreed amount of Harris brazing alloys annually.

HARDWARE
PERFECT FLAME box and torch equipment



SOFTWARE
Gas calculator

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PERFECT FLAME™ CREATE YOUR PERFECT BRAZING FLAME:

THIS SYSTEM OF FLAME CONTROL HELPS CREATE THE PERFECT OXY-FUEL FLAME.

Our unique gas control system acquires data for the correct settings and allows the user to analyze and adjust the flame for maximum performance. It was developed as a practical, efficient, safe, and sure method of controlling the oxy-fuel flame in production brazing for the HVAC industry. The end result is better process control with fewer braze joint failures.

QUANTIFY THE VARIABLES THAT MAKE UP A PERFECT BRAZING FLAME:

Current efforts to train operators, set standards, and measure efficiency are not successful because the variables are not measured or controlled. Even with the best efforts, the individual operator's sense of sight and sound are relied upon to set the proper flame. With the Perfect Flame™, the optimum flame for each process can be quantified, recorded, and reproduced with little operator input or training.

REDUCE THE OPERATOR TRAINING NEEDED TO SET A PERFECT BRAZING FLAME:

Prior to the Perfect Flame™, no amount of training could guarantee the same flame setting each time the torch was lit. Even with extensive operator training and re-qualification there is no real assurance. The Perfect Flame™ dramatically reduces the time spent training operators on flame settings. In addition, the ideal brazing flame can be established, set, and secured so there is no need for time spent on continual operator readjustment.

MAKE IT POSSIBLE TO RECORD AND/OR SHARE A PERFECT FLAME WITH OTHER LOCATIONS:

The Perfect Flame™ creates and uses the data to produce the same results each time the flame is ignited. This data can also be recorded for future use and to reproduce the Perfect Flame™ even at other remote locations.

GAS CONTROL SYSTEMS

LET THE EXPERTS AT HARRIS SHOW YOU HOW YOU CAN RAISE PRODUCTIVITY, LOWER OPERATIONAL COST, AND IMPROVE THE QUALITY OF YOUR PRODUCTS BY CHOOSING THE RIGHT GASES AND EQUIPMENT FOR YOUR SPECIFIC APPLICATION. WHETHER YOU ARE WORKING WITH OXYGEN, HYDROGEN, NITROGEN, OR ANY OF THE FUEL GASES, HARRIS OFFERS A COMPLETE LINE OF GAS CONTROL SYSTEMS COUPLED WITH EXPERIENCED ENGINEERS AND TECHNICAL SPECIALIST THAT ARE READY TO ASSIST YOU FROM THE GAS SUPPLY TO THE FLAME.

Orders: 1.800.733.4043
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BRAZING STATION PANEL

BRAZING STATION PANEL

MODEL SHOWN:
THREE GAS

DESCRIPTION

Gas panels are designed to be a turn key solution with only two or three pipeline connections to complete the entire installation. They are installed directly off the pipeline, and includes shut off valves, drip lines for any pipeline debris or moisture, check valves, preset regulators, and flashback arrestors. Regulators come preset but are adjustable with an allen wrench by removing the cap.

DETAILS

- Max Inlet 200 PSIG
- Oxygen regulator - Preset with check valve inlet
- Fuel gas regulator - Preset with check valve inlet
- Inlet - 1/2" FNPT
- Outlet - 9/16 -18 "B" fittings with flash arrestor (RH and LH)
- Conforms to NFPA 51 and CGA G-4.4

PART NO.	DESCRIPTION	GAS SERVICE
QCMFD4500	Two Gas Station	Oxy-Fuel
QC2MFD4507	Three Gas Station	Oxy-Fuel and Nitrogen

425 MODEL

CYLINDER REGULATORS

MODEL SHOWN:
425-50-540

DESCRIPTION

Model 425 is a premium, single-stage, industrial regulator that is an ideal choice for most industrial applications. This regulator incorporates a number of Harris features designed to make it a rugged, long-lasting performer, including an exclusive tamper-proof, self-reseating internal HP safety valve. The 425 is also available in a multitude of pressure ranges and for all standard industry gases.

DETAILS

Capacity: Heavy duty

C_v: 0.17

Gauges: 2.5" brass

Pressure Regulation:
0.2 PSIG/100 PSIG

Seat: One-piece encapsulated seat design with internal filter and PTFE Teflon® seat

Certifications: UL® listed/CGA E-4

Featured In:
Pipeliner® Classic kits

Weight: 3.7 lbs / 1.67 kg

Related Equipment: Gauge Guards
Green (Oxygen) P/N: 4300239
Red (Fuel) P/N: 4300238
See P. 160

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG	INLET CONNECTION	OUTLET CONNECTION
3000815	425-15-510	Fuel Gas	500	0 - 15	30RZ	400	CGA 510	9/16" - 18 LH
3000713	425-50-510P	LPG*	3000	0 - 50	60	400	CGA 510P	9/16" - 18 LH
3000795	425-50-540	Oxygen	3000	0 - 50	60	4000	CGA 540	9/16" - 18 RH

*Regulators designed specifically for LPG service can be used with any of the other welding grade liquid petroleum gases. NOT FOR USE WITH ACETYLENE.

447 MODEL

STATION BACK ENTRY C Inlet (⅞" - 14")

MODEL SHOWN:
447-50-CR

DESCRIPTION

The Model 447 regulators are designed to deliver high gas flows from piping systems that are equipped with standard pipe connection outlets or with station regulator connections. The 447 also has a brass bonnet and gauge.

DETAILS

Capacity: Heavy duty, high flow

C_v: 0.53

Gauge: 2.5" Brass

Pressure Regulation:
1.6 PSIG/100 PSIG

Seat: One-piece encapsulated seat design with internal filter and PTFE Teflon® seat, low pressure versions feature neoprene seats (NC)

Certifications: CGA E-4

Weight: 3.6 lbs / 1.63 kg

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	INLET CONNECTION	OUTLET CONNECTION
4000549	447NC-15-CL	Fuel	200	0 - 15	30	⅞" - 14 LH (F)	9/16" - 18 LH
4000553	447-50-CR	Oxygen	200	0 - 50	100	⅞" - 14 RH (F)	9/16" - 18 RH

Preset/lockable hardware available on P. 49

547 MODEL

HEAVY DUTY STATION - SIDE ENTRY

MODEL SHOWN:
547-50-CR

DESCRIPTION

The Model 547 high flow station regulator is designed to deliver high gas flows from piping systems that are equipped with station regulator connections.

DETAILS

Capacity: Heavy duty, high flow

C_v: 0.53

Gauge: 2.5" brass

Pressure Regulation:
1.6 PSIG/100 PSIG

Seat: One-piece encapsulated seat design with internal filter and PTFE Teflon® seat, low pressure versions feature neoprene seats (NC)

Certifications: CGA E-4

Weight: 3.6 lbs / 1.63 kg

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG	INLET CONNECTION	OUTLET CONNECTION
4000601	547NC-15-CL	Fuel Gas	200	0 - 15	30	-	⅞"-14-LH-025	9/16" - 18 LH
4000605	547-50-CR	Oxygen	200	0 - 50	100	-	⅞"-14-RH-024	9/16" - 18 RH

Preset/lockable hardware available on P. 49

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HOSES

PART NO.	DESCRIPTION
4300725	3/16" X 12.5' Twin Hose, B & B Fittings, "T" Grade
4300771	3/16" X 12.5' Twin Hose, A & B Fittings, "T" Grade
4300532	3/16" X 20' Twin Hose, B & B Fittings, "T" Grade
4300772	3/16" X 20' Twin Hose, A & B Fittings, "T" Grade
4300583	1/4" X 12.5' Twin Hose, B & B Fittings, "T" Grade
4300533	1/4" X 20' Twin Hose, B & B Fittings, "T" Grade

WHAT IS THE DIFFERENCE BETWEEN "A" AND "B" HOSE CONNECTIONS

"A" Hose Fittings

3/4" - 24 R+L

"B" Hose Fittings

9/16" - 18 R+L

MODEL SHOWN:
P/N: 4300725

TORCH TYPE CHECK VALVES & REGULATOR TYPE FLASHBACK ARRESTORS

PART NO.	DESCRIPTION	TYPE	MODEL NO.	PACK	FUEL/OXYGEN	HOSE CONNECTION
4300390	Check Valve	Torch	88-6CVT (R&L)	Pair	Fuel and Oxygen	B
4300835	Check Valve	Torch	88-6CVTA (R&L)	Pair	Fuel and Oxygen	A
4301651	Flashback Arrestor	Regulator	88-5FBR (R&L)	Pair	Fuel and Oxygen	B

FLASHBACK ARRESTOR FEATURES

- Prevents reverse flow of gases with built-in check valves
- Extinguishes flashback fire with stainless steel sintered element
- 9/16" - 18 connections CGA "B" size
- 100 micron inlet filter helps keep dust and dirt out
- Flow capacities high enough for all brazing applications

MODEL SHOWN:
88-6CVTA (R&L)
P/N: 4300835

MODEL SHOWN:
88-5FBR (R&L)
P/N: 4301651

HOSE ADAPTORS

PART NO.	DESCRIPTION
9004418	Hose Adaptor - B x A (R)
9004419	Hose Adaptor - B x A (L)
9004426	Hose Adaptor - B x A (R)
9004427	Hose Adaptor - B x A (L)

P/N: 9004418

P/N: 9004419

P/N: 9004426

P/N: 9004427

OTHER ACCESSORIES

PART NO.	DESCRIPTION
4300679	Flame Barrier 12" X 12"
4300833	Tip Cleaner
4300418	Flint, 26-L
4300834	Single Flint Striker with Replaceable Flint
LEAK8	Leak Detector
9005591	Preset Regulator Screw
9001436	Preset Regulator Cap Nut
BERNITE45	Post Braze Cleaning Solution

P/N: 4300679

P/N: 4300833

P/N: 4300418

P/N: 4300834

P/N: LEAK8

P/N: 9005591

P/N: 9001436

P/N: BERNITE45

BRAZING PROCEDURES

CUT TUBE SQUARE

Cut to the exact length required using a tube cutter or hacksaw. If a hacksaw is used, a sawing fixture should also be used to ensure square cuts. Remove all inside and outside burrs with a reamer, file, or other sharp edge scraping tool. If tube is out of round, it should be brought to true dimension and roundness with a sizing tool.

CLEAN TUBE END AND INSIDE SURFACE OF FITTING

The joint surface areas should be clean and free from oil, grease, or oxide contamination. Surfaces may be properly cleaned for brazing by brushing with a stainless steel wire brush or by a stiff rubbing with emery cloth or Scotch-Brite®*. If oil or grease is present, clean with a commercial solvent. Remember to remove small foreign particles such as emery dust, by wiping with a clean dry cloth. The joint surface MUST be clean.

*Scotch-Brite is a trademark of 3M

SELECT BRAZING ALLOY

Refer to the catalog section of alloys for recommended brazing filler metal selection. When brazing copper to copper, alloys such as Dynaflow®, Stay-Silv® 5, or Stay-Silv® 15 are recommended. These alloys contain phosphorus and are self-fluxing on copper. When brazing brass or bronze fittings, Stay-Silv® or EcoSmart® flux is required with these alloys. When brazing iron, steel, or other ferrous metals, select one of the Safety-Silv® brazing alloys such as Safety-Silv® 45 or Safety-Silv® 56 with Stay-Silv® white or ECO SMART® flux. Phosphorus bearing alloys should only be used for copper and brass.

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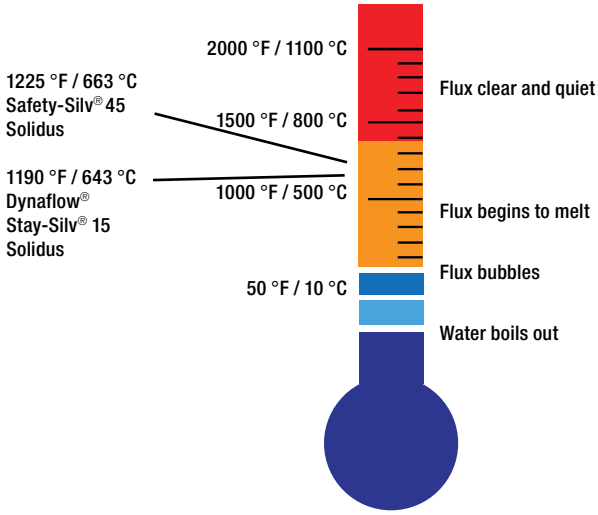
PERFORM PROPER FLUXING

Proper fluxing is important because the flux absorbs oxides formed during heating and promotes the flow of the filler metal. When using Stay-Silv® white flux, apply it only with a brush. To prevent excess flux residue inside refrigeration lines, apply a thin layer of flux to only the male tubing. Insert the tube into the fitting and, if possible, rotate the fitting once or twice on the tube to ensure uniform coverage.



Flux at brazing temperature

FLUX APPLICATION

White flux is used for most applications. Black flux is helpful for long heating cycles or localized heating with induction.
It is also used when brazing stainless steel.

Flux goes through physical changes during heating and turns clear at about 1100°F (593°C). This is an indication that parts are close to brazing temperature. Stir flux before use. If flux is dried out add a small amount of water until flux reaches a paste consistency.

TORCH FLAME
ADJUSTMENT

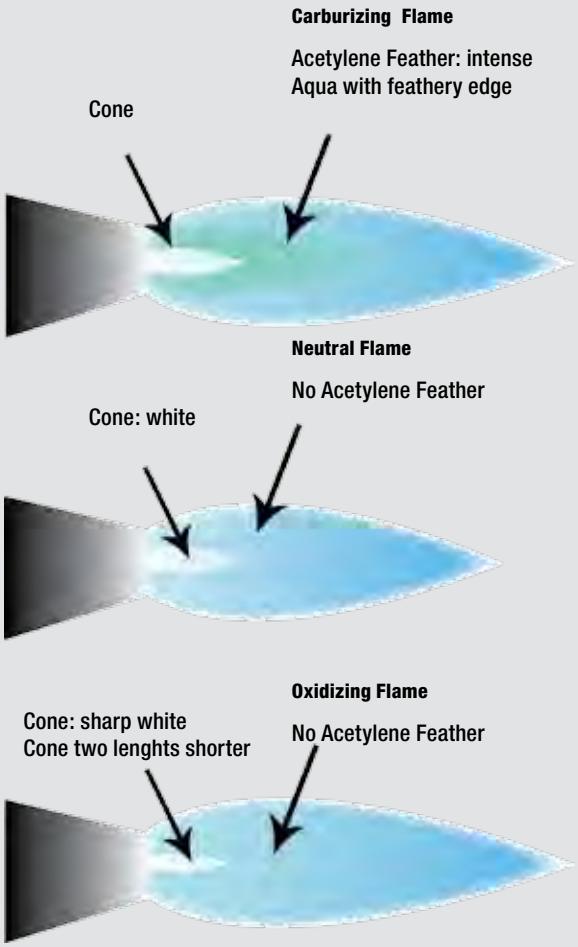
OXYGEN / FUEL
Alternate fuel gases such as propane, propylene, butane, and natural gas / methane mixed with oxygen is the most common method used for production brazing globally. This is due to these gases higher BTU content, increased safety, and reduced cost when compared to acetylene. Refer to the Harris equipment section of this catalog or website for equipment and setting information.

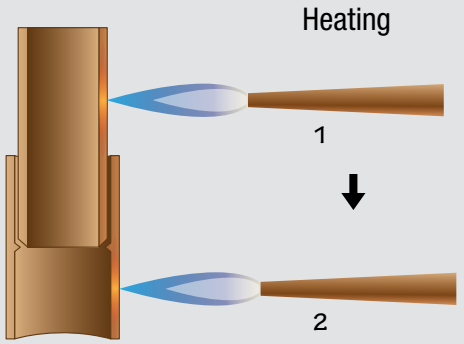
For most brazing jobs using oxy-acetylene gases, a slightly carburizing or neutral flame should be used. The neutral flame has a well defined inner cone. Avoid an oxidizing flame.

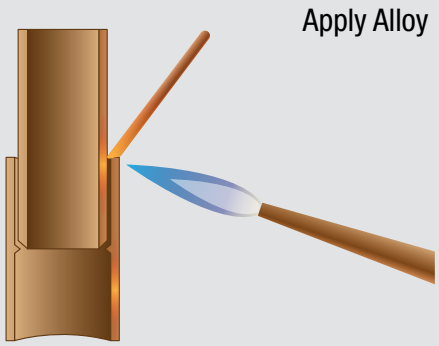
AIR / ACETYLENE TORCHES
Brazing with air/acetylene torches is a popular alternative to oxygen mixed fuel gas. The fuel gas flow aspirates air into a mixer that contains an internal vane that spins the gas to improve combustion and increase flame temperature.

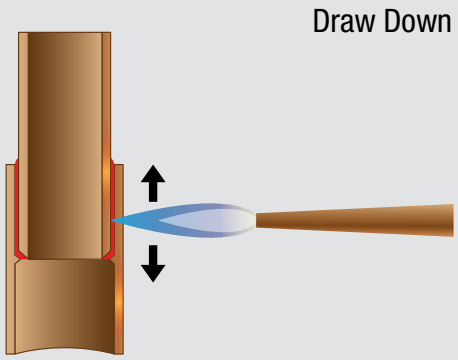
If the tank has a delivery pressure gauge, set the delivery pressure at 14 - 15 PSI. If the tank has only a contents gauge delivery pressure is preset at the factory. Open the regulator adjusting screw all the way by turning it clockwise until it bottoms.

OPEN THE TORCH VALVE
Opening the torch valve about 3/4 of a turn will provide sufficient fuel gas delivery. Do not try to meter pressure (reducing the flame) by using the torch handle valve. If a higher or lower flame is required, change to a different tip size.









HEATING TUBE

Start heating the tube, by first applying the flame to a point just adjacent to the fitting. Work the flame alternately around the tube and fitting until both reach brazing temperature, before applying the brazing filler metal.

ENSURE HEATING

When a flux is used, it will be a good temperature guide. Continue heating the tube until the flux passes the “bubbling” temperature range and becomes quiet, completely fluid, and transparent. Watch for this on both sides of the joint to ensure even heating.

APPLY THE ALLOY

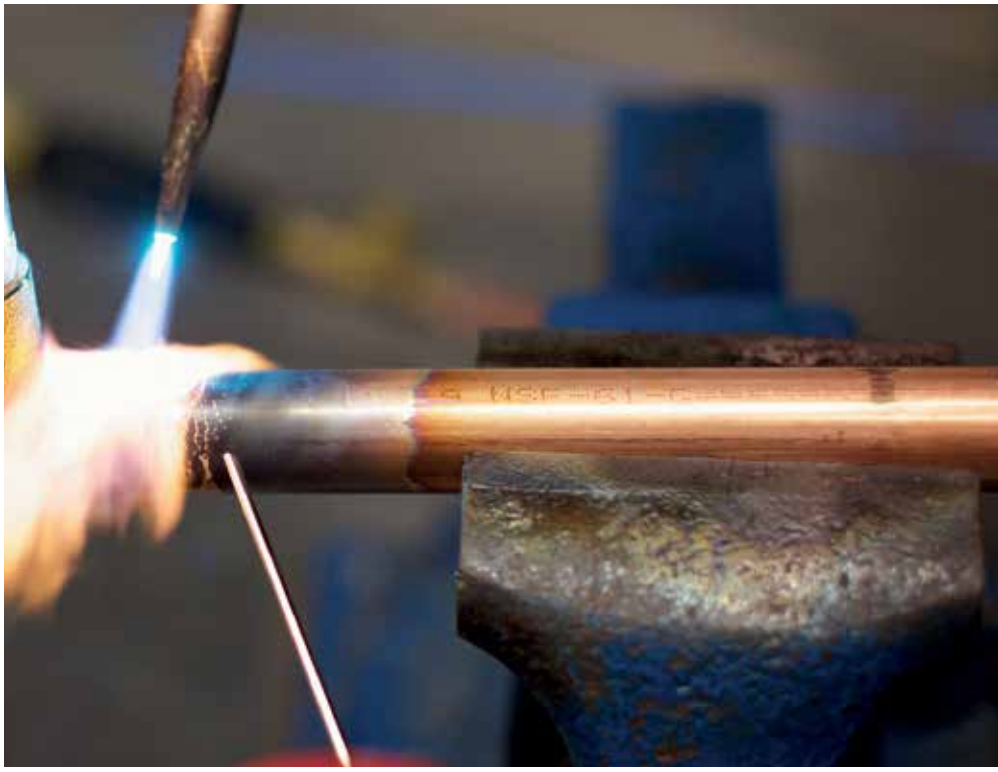
Direct the flame from the tube to the fitting. When alloy is applied it should quickly melt and flow into the joint.

UNIFORM HEAT

Sweep the flame back and forth along the axis of the assembled joint, tube, and fitting to reach and then maintain uniform heat in both parts.

APPLY THE BRAZING ALLOY

Feed the alloy into the joint between the tube and the fitting. Only after the base metals have been heated to brazing temperatures should the filler metal be added. At that time, the flame may be deflected momentarily to the tip of the filler metal to begin the melting process. Always keep both the fitting and the tube heated by playing the flame over the tube and the fitting as the brazing alloy is drawn into the joint. The brazing alloy will diffuse into and completely fill all joint areas. Do not continue feeding brazing alloy after the joint area is filled. Excess fillets do not improve the quality or the dependability of the braze and are a waste of material.



CLEAN AFTER BRAZING

All flux residue must be removed for inspection and pressure testing. Immediately after the brazing alloy has set, quench or apply a wet brush or swab to crack and remove the flux residue. Use emery cloth or a wire brush, if necessary.

NITROGEN PURGE

During braze heating, oxide scale forms on the inside of the copper tube.
These dark scales flake off and are carried by refrigerant and can potentially clog small orifices.

For HVAC/R and medical gas installations it is common to flow nitrogen through the tube during brazing to prevent internal scale formation. Use a low flow rate to avoid excess pressure inside the tube. A small hole at the line end will allow the nitrogen to escape.

Without nitrogen purge **With nitrogen purge**

DEVICES FOR NITROGEN FLOW CONTROL

Please refer to the Harris Industrial Equipment Catalog (P/N:9505629)
for complete nitrogen gas flow solutions.

FLOWMETER

FLOWMETER REGULATOR

"ZERO" COMPENSATED FLOWMETER REGULATOR

Other gas flow options available in the Harris Industrial Equipment Catalog (P/N:9505629)

VALUE ADDED SERVICES

Production Brazing manufacturers are constantly seeking ways to improve production while lowering their overall costs. Harris is dedicated to helping our customers achieve their operational goals. We offer a full suite of value-added, cost reduction services that maximize a facilities brazing operation while minimizing cost. ASK US HOW.

HARRIS DOCUMENTED COST REDUCTION (DCR) PROGRAM

The Harris Products Group is committed to going above and beyond the expectations of a normal supplier by helping our customers improve their brazing operations. We strive to help you lower costs, decrease leaks, increase production, and improve quality. To do this, we have created the DCR or Documented Cost Reduction Program to help you identify potential areas for improvements.

This program begins with a Facility Brazing Audit so we can better understand your specific operations. Our full brazing audit is a detailed audit aimed at either validating your current process or identifying deficiencies for future improvement. We spend additional time on the floor thoroughly auditing six steps in the brazing process: Clearance, Filler Metal, Cleaning, Heat Input, Flux, and Post Braze Processes. After completing the full audit and gathering the required technical information, we will provide you with a DCR Report. This report will outline projects for potential improvement and the savings associated with these projects. Examples include: leak reductions programs, material cost reductions, operator training programs, and optimal brazing equipment selection.

Finally, if you decide to move forward with some or all of these identified projects, we will then help you design and implement a program to achieve results.

BRAZE ALLOY MATERIAL COST REDUCTIONS AND SILVER RECLAMATION PROGRAMS

The Harris Products Group has a variety of new flux cored aluminum braze ring, rod, and spool products available as well as Phos Copper & High Silver alloys available in a variety of forms including wire, rod, preforms, strip, paste, powder, and flux cored options. We constantly work with customers on Silver Content Reduction Programs to help you lower material costs of silver bearing alloys. We also offer ECO SMART™ flux which is a new high performance, environmentally-friendly brazing flux.

Harris offers a silver reclamation program tailored to each customer's needs. We help our customers reclaim the dollars trapped inside their silver alloy scrap. Some facilities pay to have scrap removed, but our program credits our customers for returned scrap. This environmentally-friendly reclamation program is a great cost savings strategy in large brazing operations.

BRAZING EQUIPMENT PROCESS IMPROVEMENT SOLUTIONS

The Harris Products Group offers the best variety of hand brazing equipment options of any manufacturer globally. We have tools like the Perfect Flame™ which gives your engineering team, for the first time, the ability to use the Six Sigma DMAIC methodology (Define, Measure, Analyze, Improve, Control) for your manual hand brazing operations so we can help you find the perfect brazing flames for your specific applications. We have a variety of custom designed brazing tips stocked and can even manufacture custom tips for your specific application to help speed up production, evenly distribute the heat on your parts, and lower leak rates.

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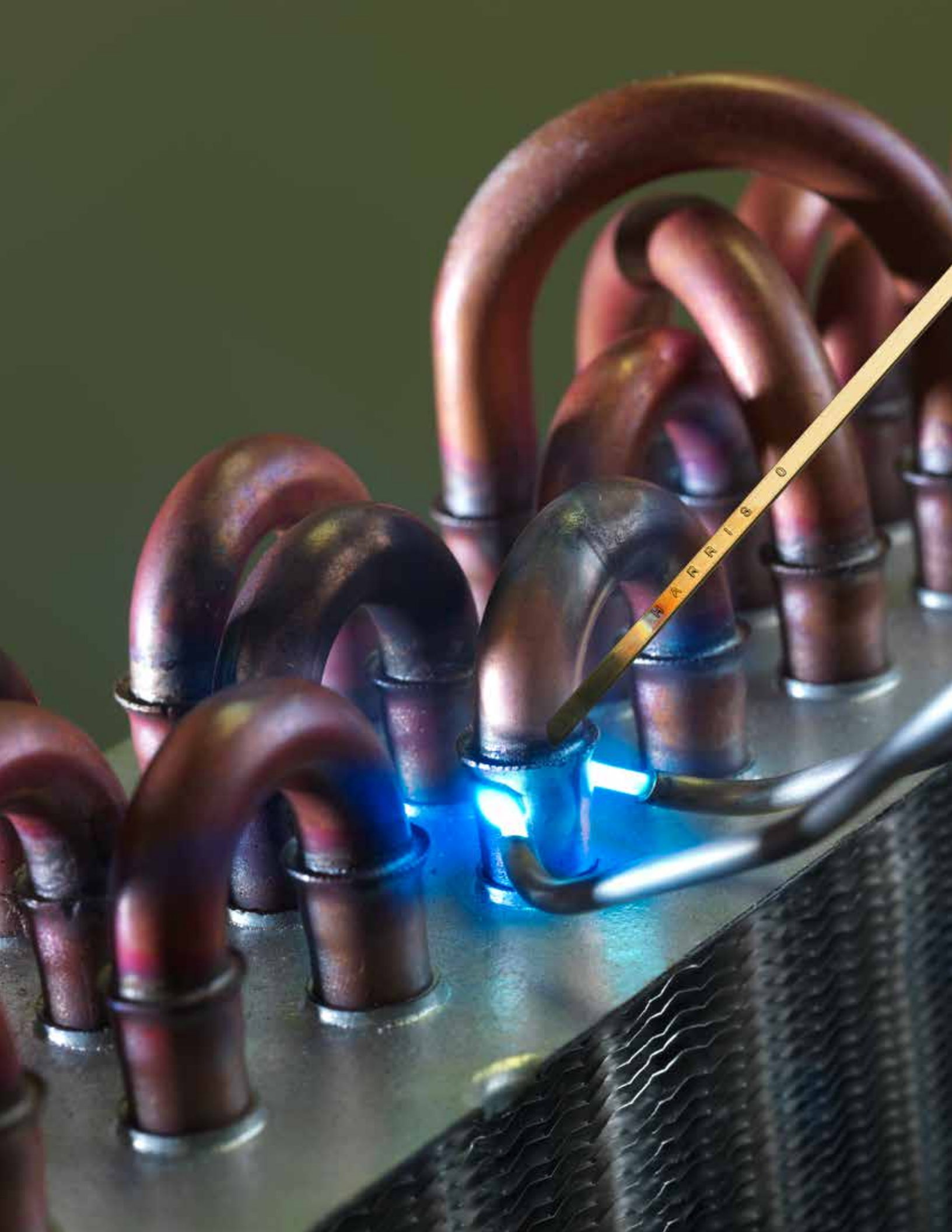
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MY WORK STATION

Quick Reference Guide

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2 **HARRIS PERFECT FLAME**
P/N:
DESCRIPTION:

3 **HARRIS GAS BLOCK**
P/N:
DESCRIPTION:

4 **HARRIS FLASHBACK ARRESTOR**
P/N:
DESCRIPTION:

5 **HARRIS HOSE**
P/N:
DESCRIPTION:

6 **HARRIS TORCH HANDLE**
P/N:
DESCRIPTION:

7 **HARRIS MIXER**
P/N:
DESCRIPTION:

8 **HARRIS TIP TUBE**
P/N:
DESCRIPTION:

9 **HARRIS TIPS**
P/N:
DESCRIPTION:

10 **HARRIS LIGHTPRO SPARK**
P/N:
DESCRIPTION:

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