



LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®



THE PATH TO INDUSTRY LEADERSHIP

In a proud tradition of industry leadership, unmatched quality and superior technical support, Lucas-Milhaupt counts thousands of companies around the world as our very satisfied customers. As the brazing subsidiary of Handy & Harman, we provide the materials and expertise to create billions of successful brazed joints every year. Our customers rely on us for the industry's most extensive product knowledge and inventory of brazing and soldering materials – and the know-how to specifically match our capabilities and products with their needs.

Founded in 1942 as a tool manufacturer, Lucas-Milhaupt soon became a leading producer of brazing preforms for joining metals. Over the following decades, the company expanded its product offering and adapted itself in order to keep pace with the new and ever more stringent demands of our customers. Through our ability to meet and exceed these demands, we have continued to further fuel our growth and expansion.

In 1967, the company became part of Handy & Harman, enabling us to continue on a growth path toward industry leadership in brazing technology. Founded in 1867, Handy & Harman has long since been recognized as a leading company in precious metal fabrication, processing and refining. In addition, Lucas-Milhaupt became the sales and marketing arm for Handy & Harman's brand name brazing products. Together, the two companies have continually raised the bar of quality and manufacturing excellence.

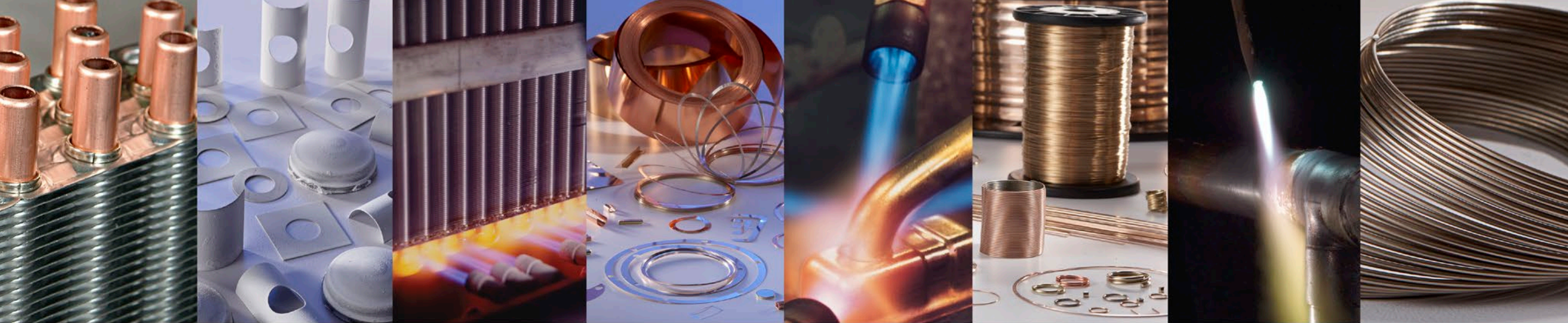
Today, our mix of products and services is extensive:

- › Brazing and Solder Filler Materials
- › High Purity Products
- › Brazing Pastes
- › Strip Rolling & Slitting
- › Specialty Alloys & Forms
- › Flux Cored Materials
- › Specialty Fluxes
- › Wire Drawing and Flattening
- › Preformed Rings & Shapes
- › Pure Metals
- › Automated Equipment
- › EDM Die Production

Of course, we back our products and services by delivering to our customers an unmatched level of technical expertise. Lucas-Milhaupt provides brazing audits and training seminars for Manufacturing & Design Engineers as well as production personnel.

We recognize that it's just as hard to remain a leader as it is to become one. Likewise, our employees know what it feels like to be associated with the industry's leader and they know what it takes to maintain that position: Think like your customer.

**AT LUCAS-MILHAUPT WE BELIEVE WE MUST EARN
OUR CUSTOMERS' BUSINESS EVERY SINGLE DAY.**



OUR PRODUCT FAMILIES

Considering the enormous variety of metals and alloys used in today's advanced manufacturing environment, your choice of brazing materials and methods is more important than ever before. Your emphasis on quality has never been higher and we know that you are increasingly pressured on manufacturing costs.

The Lucas-Milhaupt advantage begins with the industry's most comprehensive inventory of alloys, fluxes, and forms for virtually any metal joining requirement. When you combine our vast array of products with our specialized expertise in metal-joining, Lucas-Milhaupt becomes a total resource for your specific needs. Most importantly, you are assured of quality and value on every single joint you produce.

Sometimes our extensive off-the-shelf inventory will meet your needs exactly; but when it doesn't, you're able to rely on our technical support staff for a solution that will provide you with the highest quality and best value. Our technical team will identify the process advantages for your brazing and soldering application – whether paste, preforms, wire or strip would be the most appropriate. In addition, we can show you how easily adaptable to automation our engineered forms are, increasing production rates and lowering costs through material savings.

Our extensive inventory includes formulated products, such as paste and flux, as well as material forms, including Wire & Rod, Strip & Foil, and Rings & Shapes.

Our comprehensive product family includes:

EASY-FLO[®], BRAZE[™] and **SILVALOY[®]**
for general purpose brazing applications

SIL-FOS[®] and **FOS-FLO[®]** for joining copper & copper alloys

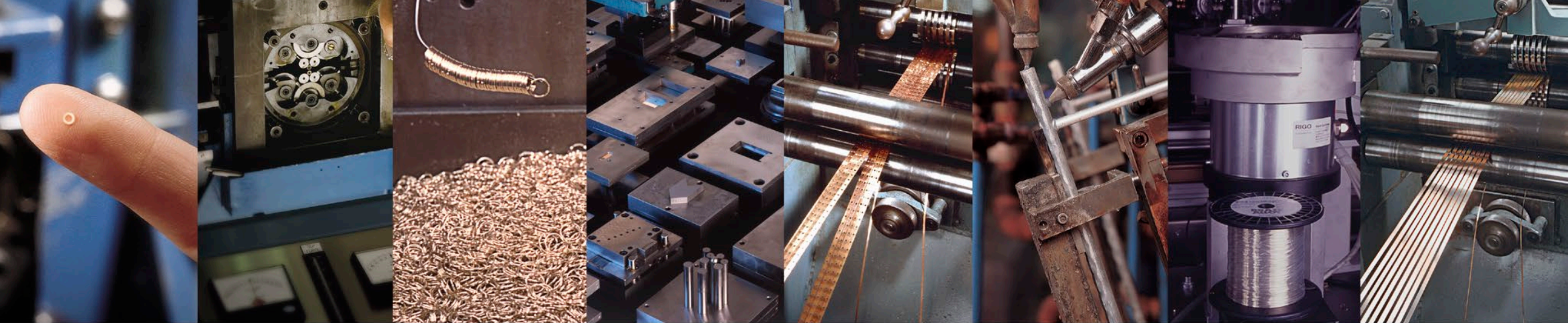
PERMABRAZE[®] alloys of Gold, Silver and Palladium for vacuum brazing

HANDY ONE[®] flux cored silver and aluminum materials

Chemical products including **HANDY FLO[®]** Paste, **HANDY[®] FLUX** and **ULTRA FLUX[®]**

HI-TEMP[®] and **TRIMET[®]** for joining mining and cutting tools

Aluminum, Copper, Nickel and **SILVABRITE[®]** Soft Solders



BEHIND THE QUALITY: OUR MANUFACTURING CAPABILITIES

In order to meet our customers' needs for the very best solutions in metal joining, Lucas-Milhaupt employs high-precision, sophisticated manufacturing methods, with tolerances and quality that exceed even the most rigorous requirements. Our employees are highly skilled, energetic and committed to their craft. Great people and the best technology: It's the perfect combination for customer satisfaction.

As one example, our flexible wire drawing and flattening process uses carbide and diamond dies to produce wire diameters from .187" to .005" (4.75mm to .127mm).

This means your assemblies are using optimally-sized filler metal, improving your manufactured quality and reducing waste. The specialized drawing process can produce a variety of shapes – round, square, rectangular or unusual cross sections, significantly expanding your joining choices.

Lucas-Milhaupt skilled machine operators also produce slit strips to widths from 6" (152.4mm) down to .062" (1.575mm), and then package the material to suit your needs on either spools or coils.

Additionally, we've developed the technology to roll your strip to thicknesses not readily available from the mills – down to .001" (.025mm).

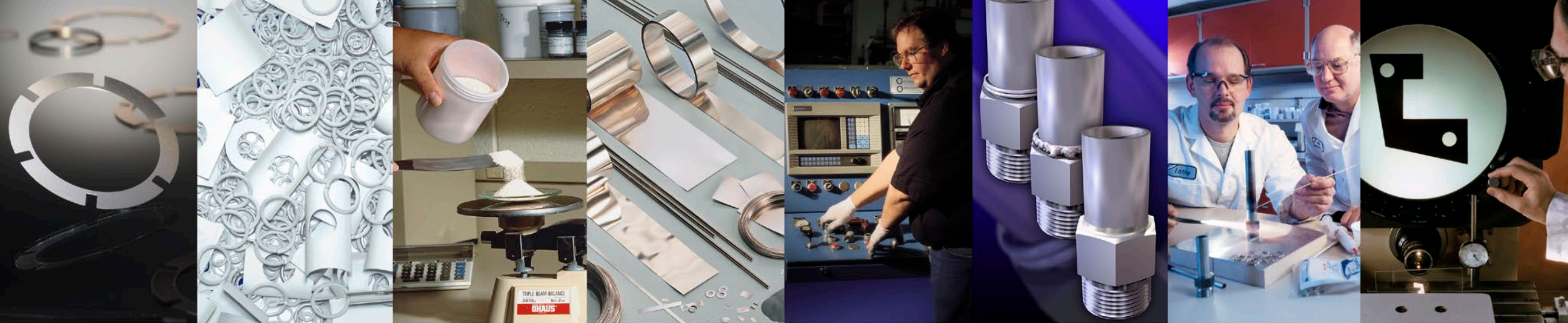
Our dies are produced in our own complete tool room

using Electric Discharge Machining (EDM) leading to lower-cost machining and the best accuracy for simple or complex shapes.

Our manufacturing capabilities are designed to provide you with an engineered solution. Our vast expertise enables us to improve quality and save you money on every joint you produce by providing the exact size, shape and volume of brazing material necessary to complete your joint. That might mean blending filler metal powders with our flux/binders for specialty paste binders to give you the exact composition you require.

In short, the final forms of our products – whether wire, rings, strip, washers, discs, paste, etc. – reflect our commitment to meeting your exact needs.

MANUFACTURING EXCELLENCE IS THE STARTING POINT FOR ALL WE DO.



THE LUCAS-MILHAUPT EDGE: TECHNICAL SUPPORT

You'd expect the leader in brazing technology to provide its customers with the best level of technical support. At Lucas-Milhaupt, our support staff is what separates us from the rest.

At the most basic, everyday level, whenever our extensive off-the-shelf inventory doesn't exactly meet your needs, we are there with the right solution. We'll identify the different process advantages (and disadvantages) for

your brazing and soldering applications to help you determine whether paste, preforms, wire or strip would be best for you. We can also help you select the most appropriate filler metal and forms.

But our technical support goes much further. Many of our chemists, metallurgists and engineers are here for the express purpose of providing technical support to you. That might mean a relatively simple test-brazing of your component with feasibility studies exploring all your options. Or it might mean an actual Brazing Audit, in which a member of our technical service team will inspect your plant's complete joining operations and provide a summary of options and recommendations to maximize quality and minimize cost.

We offer seminars for our customers on brazing – one on the fundamentals of brazing, and one aimed at designers who create products that employ metal joining. We also offer several educational courses in which we will bring the seminar right to your plant and customize the course to suit your needs. All of our seminars, of course, are taught by leading authorities in the field: Lucas-Milhaupt's own experts.

Our ability to provide superior technical support blends perfectly with our commitment to new product development. Understanding our customers' needs as well as we do drives us to develop new or enhanced products to provide you with the ultimate "engineered solution" for joining your critical components.



CUSTOMER SERVICE: THE FINAL PIECE

Our history and reputation for the best products, processes, capabilities and technical support are usually what bring first-time customers to us. Though, our existing customers know that it's our exceptional level of customer service that keeps them satisfied year after year. In the end, regardless of the product, service, or industry, it is how people do business with people, day after day, that drives business success – yours and ours.

At Lucas-Milhaupt, answering your simplest request for literature or confirmation of a delivery date is as important as following through on your most complicated inquiries, simply because we know that every inquiry you make is important to you. If it's technical support you need, our customer service associates make sure you're introduced to the right technical support staff– and then follow up with you to make certain you're satisfied.

Our employees know that at Lucas-Milhaupt, “customer service” means a lot more than cheerfully handling whatever problem you might have. They know that a promise kept matters as much to a customer as it does to them. They know that their every contact with a customer has an effect on our relationship with you. And they know that the Lucas-Milhaupt reputation for superior customer service is our most important asset. They protect that reputation as if it were their own – because it is.





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5656 South Pennsylvania Avenue

Cudahy, WI 53110 U.S.A.

Tel: +1 414.769.6000

Toll Free: +1 800.558.3856

Fax: +1 414.769.1093

www.lucasmilhaupt.com