

WORLD CLASS PERFORMANCES

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Ferritic Nitrocarburizing: A Superior Metal Surface Treatment

The Challenge: Lengthen The Life of Wear Surfaces While Reducing Costs

Dynamic Metal Treating, Inc. has put a new surface treating process on the front burner to meet a growing need for improved metal treating techniques. Using a process called ferritic nitrocarburizing, Dynamic provides its customers with higher quality products at lower costs than those achieved using more traditional metal treating processes.

What Is Ferritic Nitrocarburizing?

Ferritic nitrocarburizing is a case hardening process which uses temperatures as low as 600°F to produce an extremely hard wear and corrosion resistant surface. This process causes virtually no distortion or size change.

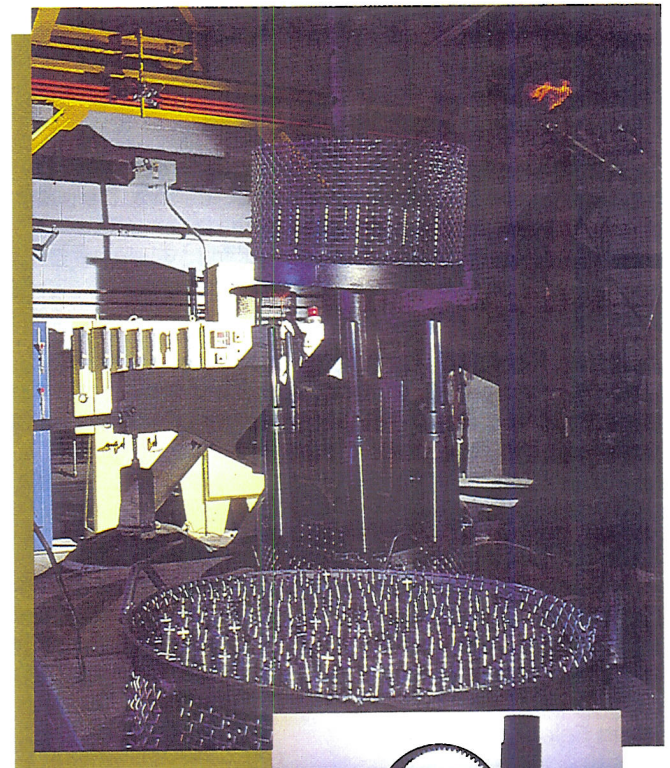
Fluidized Bed Furnaces: A Technological Advance

Dynamic performs ferritic nitrocarburizing using fluidized bed furnaces. The furnaces house containers holding very dry, uniformly sized particles of inert aluminum oxide. A blend of fluidized gases (nitrogen, ammonia, and natural gas) is introduced into the container, separating and mobilizing the minute particles to give them fluid-like characteristics. Silicon carbide elements between the container wall and the furnace's outer insulated wall heat the flowing particles.

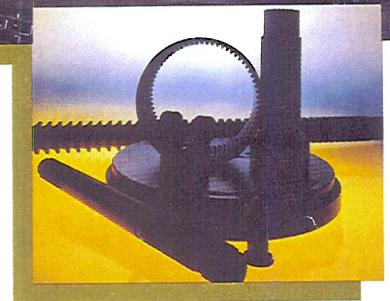
Parts requiring heat treatment are lowered into this fluidized bed. The mobilized particles engulf the object and begin radiating a uniform heat ($\pm 3^\circ\text{F}$). By varying the cycle times, temperatures, and the proportions of the gases, the surface hardness requirements for cast iron and a wide variety of steels (carbon, alloy, tool, high speed, and stainless) can be met.

The Results

High Quality: Ferritic nitrocarburizing's low processing temperatures minimize distortion during heat treating. The treatment produces high hardness (as high as 60 to 80



A load of nitrogen dip cylinders and pistons and silicon chip mold and machine guides is pulled out of the furnace.



Some Dyna-Blue treated items: automotive and aircraft gears, U-joints, transmission components, high-speed steel broach, and H-13 aluminum extrusion die.

Rockwell "C" equivalent) and reduces friction and galling. And because hardening agents are actually diffused into the metal's surface, flaking and adherence concerns and critical dimensional problems are eliminated.

Longer Life: Increased wear and corrosion resistance...reduced friction, galling, and edge buildup...greater fatigue and yield strength...additional lubricity...all of these factors add up to a longer life for items heat-treated using ferritic nitrocarburizing. The life span of items treated can be increased up to 600%!

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Energy Savings: Because of the physical contact of the heat source and the atmosphere to the part, fluidized bed ferritic nitrocarburizing is extremely efficient. The fluidized particle medium conducts heat rapidly and uniformly for quick heat-ups and reduced cycle times. Less energy is needed to bring up the processing temperature, which is much lower than the temperatures required for conventional processes such as carbonitriding or carburizing. Most parts can be processed two to three times faster using ferritic nitrocarburizing.

Lack of Distortion: There is no distortion when parts are treated using ferritic nitrocarburizing. Therefore, the need to grind away hardened distortion areas is virtually eliminated. Significant savings are realized when parts don't have to be machined after heat treating, and keeping parts within SPC limits is much easier.

Amazing Flexibility: Complete atmosphere changes within the fluidized bed furnaces are performed in minutes. Because of this, many different treatment processes can be performed daily in a single furnace. And the furnace's 24-inch diameter and 120-inch length provide ample room to treat parts of all sizes.

Satisfied Customers: Dynamic's customers want close tolerances, fast turnaround times, and competitive prices. Ferritic nitrocarburizing allows Dynamic to meet all of these needs. "When you add the inherent cost and time savings to the performance results, I believe ferritic nitrocarburizing can't be beat! And my customers agree with me," says Loren Epler, Dynamic's owner.

The Equipment

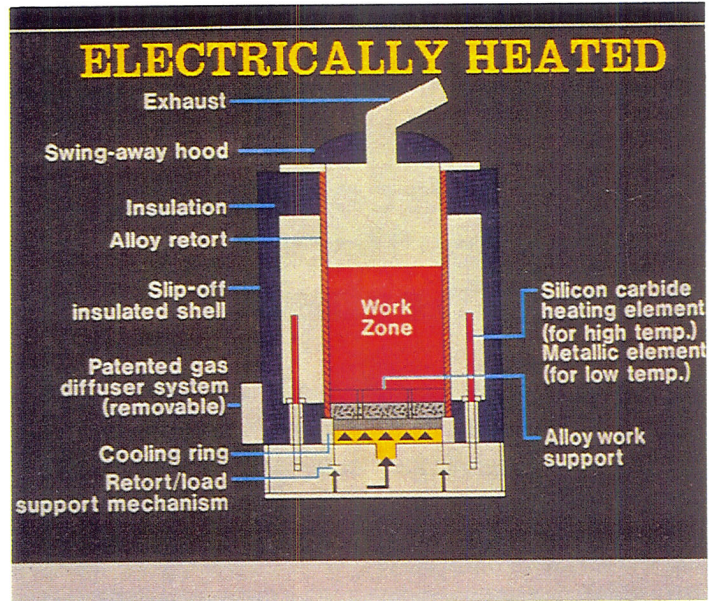
Dynamic Metal Treating has two Can Eng fluidized bed furnaces and two Fluidtherm fluidized bed furnaces representing capital investments of \$100,000 each.

Other Applications Using Fluidized Bed Furnaces

Using this relatively new heat treating technology, Dynamic services a wide variety of markets in addition to the automotive industry. High-volume parts like the valve guide for the GM V-6 engines are processed just as quickly and efficiently as low-volume parts such as cutting tools, dies, and molds.

Dynamic offers ferritic nitrocarburizing to the following industries:

- Aerospace
- Computer
- Printing
- Cutting tool
- Conveyor systems
- Tooling accessories
- Appliance
- Railway
- Calculating machine
- Robotics
- Textile



Cross-section of a typical fluidized bed furnace.

Dynamic also offers carburizing, carbonitriding, nitriding, a complementary surface treatment called steam blueing, and neutral hardening.

Company Profile

Loren Epler opened Dynamic in Royal Oak, Michigan in 1984. He started the company with a modest up-front investment of \$450,000. The company outgrew its original 3,000 square foot facility, expanded operations, and moved to a new 15,000 square foot facility in Canton Township. Today, Dynamic is one of the most modern, high-tech heat-treating facilities in the country. Eight employees operate four furnaces three shifts a day, five days a week, with one or two shifts on weekends.



A programmable controller increases process capability and reduces operator error.

For more information on electrotechnologies and special rates, contact your Detroit Edison representative.