Job Shop Services

Patented processes to help eliminate gear-tooth pitting &
Patented equipment specializing in high volume peening production of Automotive Gears

- ISO/TS16949 Registered
- ISO 14001 Registered
- FORD Q1 Approved

• Most advanced Shot Peening Indexing Systems for high volume production

Leaders in Blast Finishing & Shot Peening Services for your Critical Parts

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Mission Statement

Engineered Abrasives® Quality Assurance policies, objectives, and the application of principles are to assure that all services comply fully with the customer’s stated requirements and quality expectations.

Quality Policy

Engineered Abrasives® provides the world’s finest Shot Peening and Deburring processes with zero defects.

Company Background

Since 1935, Engineered Abrasives® has been in the Blast Finishing and Shot Peening business, we have had Shot Peening Standards to keep up with the latest technology. Complete turn-key system design is also available.

Engineered Abrasives® can analyze any situation to meet our customers’ requirements. All services are performed at Engineered Abrasives® plant.

President, Michael J. Wern
ENGINEERED ABRASIVES®
The finest and highest quality Shot Peening and De-burring services offered in the world

ISO/TS16949 - ISO 14001 - FORD Q1 Operating Work Environment

Leaders in Blast Finishing & Shot Peening Services for your Critical Parts

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Special Peening machines that will solve the problem of gear tooth pitting.

All direct pressure machines are manufactured by Engineered Abrasives® and are the most advanced state-of-the-art equipment of its kind on the world market today.

Machines and processes are patented

High pressure spray wash, ultrasonic wash/rinse and dry systems are used to assure your parts are cleaned before they are sent back to you.
Patented Fine Steel® Peening Process

Our production machines can do many different parts for high volume production

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WHAT IS SHOT-PEENING?

Shot Peening is a cold-working procedure used primarily to increase fatigue life and prevent stress, corrosion, and cracking of metal parts.

In Shot Peening, the surface of the finished part is bombarded with round steel shot in custom built machines under fully-controlled conditions. Every piece of shot acts as a minute peening hammer. When the surface has been peened by the abundance of impacts, the resulting compressed surface layer is highly resistant to the formation of stress cracks.

It is well known that a crack will not expand into a compressed layer. Nearly all fatigue and stress corrosion failures originate at the surface of a part, the layer of compressive stress induced by Shot Peening produces a significant increase in the useful life of the part. The maximum compressive residual stress produced at or near the surface is at least as great as half the ultimate tensile strength of the material.

Shot Peening is used to eliminate failures of present designs, or to allow the use of higher stress levels, which, in turn, permit weight reduction for new designs.

SHOT-PEENING CONTROL

The primary object of controlled Shot Peening is to generate a compressively stressed surface layer in which the amount of stress, the uniformity of the stress, and the depth of the layer can be controlled from piece to piece. As it is practically impossible to inspect the stress distribution on a qualified part, the full control of all aspects of the process becomes imperative. The basic variables of stress, depth, and coverage are accomplished in practice by the use of the right mixture of shot, exposure time, choice of air pressure or wheel speed, nozzle size, distance of nozzle from part, and angle between shot stream and peened surface. It is extremely important that the relative motion between shot stream and part be controlled for uniformity and reproducibility. Our fully automated process accomplishes that control.
PEENING MEDIAS that are used are CERAMIC, CUT WIRE, GLASSBEAD or Fine Steel®

The fillets at the root of the gear are usually the areas of high stress and should be Shot-Peened. However, it has also been found that the fine indentations produced by Shot-Peening on the face of the gear-tooth act as tiny oil reservoirs which help to give better lubrication, reduce fretting and scoring, and reduce operating temperature. Gears which have to be held to very close tolerances may be lapped after Shot Peening or the gear face can be masked if desired.

New Technology of peening by Engineered Abrasives® has been tried, tested and proven on parts which after going through our special peening process has eliminated gear-tooth pitting. (Patents 6238268 B1, 6612909 B2)

NOTE: Also this special process will eliminate the need to Shot Peen in root radius

Let's define peening and why it is needed.

What is it: Peening consists of bombarding a metal surface with glassbeads or other media.
What it does: Peening causes the material in the surface zone to yield. It literally shakes the metal grains into a more relaxed state. Thus, a thin layer of the surface is placed in uniform compression. This compressively-stressed "skin" counteracts tensile stresses within and effectively blocks cracks.

Why it is needed: Machining and forming metal parts create stress concentrations internally. Burrs, scratches, welds, etc. may cause additional defects.

These problems may be responsible for premature fatigue failure, porosity, loss of strength and corrosion...unless something is done.

Since fatigue cracks generally begin at surface imperfections, a compressively-stressed peened skin is highly effective in preventing crack formation and growth.

Gears are frequently Shot Peened after carburizing. In recent years, increasing use has been made of steel at hardness levels above Rockwell 60RC, for fatigue and shock applications such as gears. Such parts are always Shot Peened in all critical areas. Figure 1 shows the close connection between Shot Peened and unpeened gears.

Air pressure, time and shot size will determine depth and KSI. (Figure 1)
Types of Gears and Shafts for peening and deburring to improve fatigue life

Engineered Abrasives® machines are designed and set-up to peen critical areas of the part to meet your customer’s demands.

Deburred Parts

Engineered Abrasives®
Machine features that perform the quality service for your parts

Patent-pending Part Hold-Down to keep parts from spinning during the peening process.

**Benefit:**
Parts are peened accurately and properly

Patent-pending Part Hold-Down on Pinion

Patent-pending Part Hold-Down in up position

Patent-pending Part Hold-Down in down position

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Machine features that perform the quality service for your parts

Tooling fixtures custom fitted for your parts

**Benefit:** Proper peening of parts

Multiple blast stations mean parts are done in an efficient time period to get back to our customers location

Engineered Abrasives® heavy duty machines are built to operate 24 hours a day, 7 days a week

**Benefit:** Quality assurance that your parts will be at your location on time

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Electrical Controls that keep the Peening System in control

Screen Monitors to view the performance of the peening process

**Benefit:** Keeps peening of parts in control

Engineered Abrasives® electrical systems are designed to automatically shut-down the peening process when adjustments need to be made

**Benefit:** Quality assurance for the parts

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Media Flow Controls for Peening & DeBurring

Media Flow

Engineered Abrasives® Media on/off Valve ensures that correct amount of media is flowing through the peening process with our proprietary features that nobody else offers.

Our Media Valve has been proven to work under extreme Shot Peening conditions from our extensive Job Shop testing that no other machine manufacture can claim.

Special Media Regulators — Media flows first through the Magnavalve; sight glass; second and Media on/off valve; third. This special designed system enables trouble shooting of valves much easier and more efficient, keeps production time at higher levels.

Engineered Abrasives®
Media Flow Controls for Peening & DeBurring

Each Peening Gun in the peening process is MagnaValve monitored to ensure proper air pressure.

Benefit: Keeps Peening of parts in control.

Media on/off valve with MagnaValve work in harmony with each other to keep the correct media and air flow pressures. Each nozzle has its own air pressure monitor and media flow system.
Operational view of a Suction Gun System

OPERATIONAL NOTE:
WHEN SUCTION GUN IS TURNED ON IT WILL PULL MEDIA OUT OF STORAGE HOPPER. WHEN GUN IS TURNED OFF MEDIA FLOW STOPS. (80% AIR - 20% MEDIA)

MEDIA FROM STORAGE HOPPER

CLEAN AIR INTAKE

ADJUSTABLE FEED TUBE FOR MEDIA-FLOW

PIPE TEE

DRAIN PLUG

LOCKING BOLT FOR MEDIA-FLOW SETTING

3/4" ID X 1/8" WALL SUPERTHANE BLAST HOSE TO SUCTION GUN

3/8" ID X 3/16" WALL AIR HOSE TO SUCTION GUN

AIR CONTROL SOLENOID (ON/OFF)

AIR SUPPLY FROM MANIFOLD

GUN HOLDER

AIR JET

BLAST NOZZLE

BLAST FLOW MIXED AIR/MEDIA

POLYURETHANE SUCTION GUN BODY

AIR/MEDIA MIX POINT
Operational view of a Pressure Vessel System

Engineered Abrasives® uses only a Pressure Vessel System that is 4 to 5 times more powerful and shoots the peening media faster than a Suction Gun System, assuring the fatigue life of your part.

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Operational view of a Double-Chamber Pressure Vessel System
In Conclusion,

Blast finishing and Shot Peening are the state-of-the-art technology to deburr, clean, and enhance the appearance and improve the fatigue life of parts. Such as; gears, housings, shafts, etc. The parts after being Shot Peened have a higher magnitude of compressive stress which means longer life of a part under its specific function that our customers design.

ENGINEERED ABRASIVES® can analyze a particular part and enhance the appearance and the fatigue life of the part through the Blast Finishing and Shot Peening process available through our Shot Peening Job Services Program. Call us to analyze your particular parts.

ENGINEERED ABRASIVES® is committed to the highest standards and quality in our industry, such as the SAE and International Standards. We also have many patents and are ISO/TS16949 and ISO 14001 registered, we are also FORD Q1 approved.