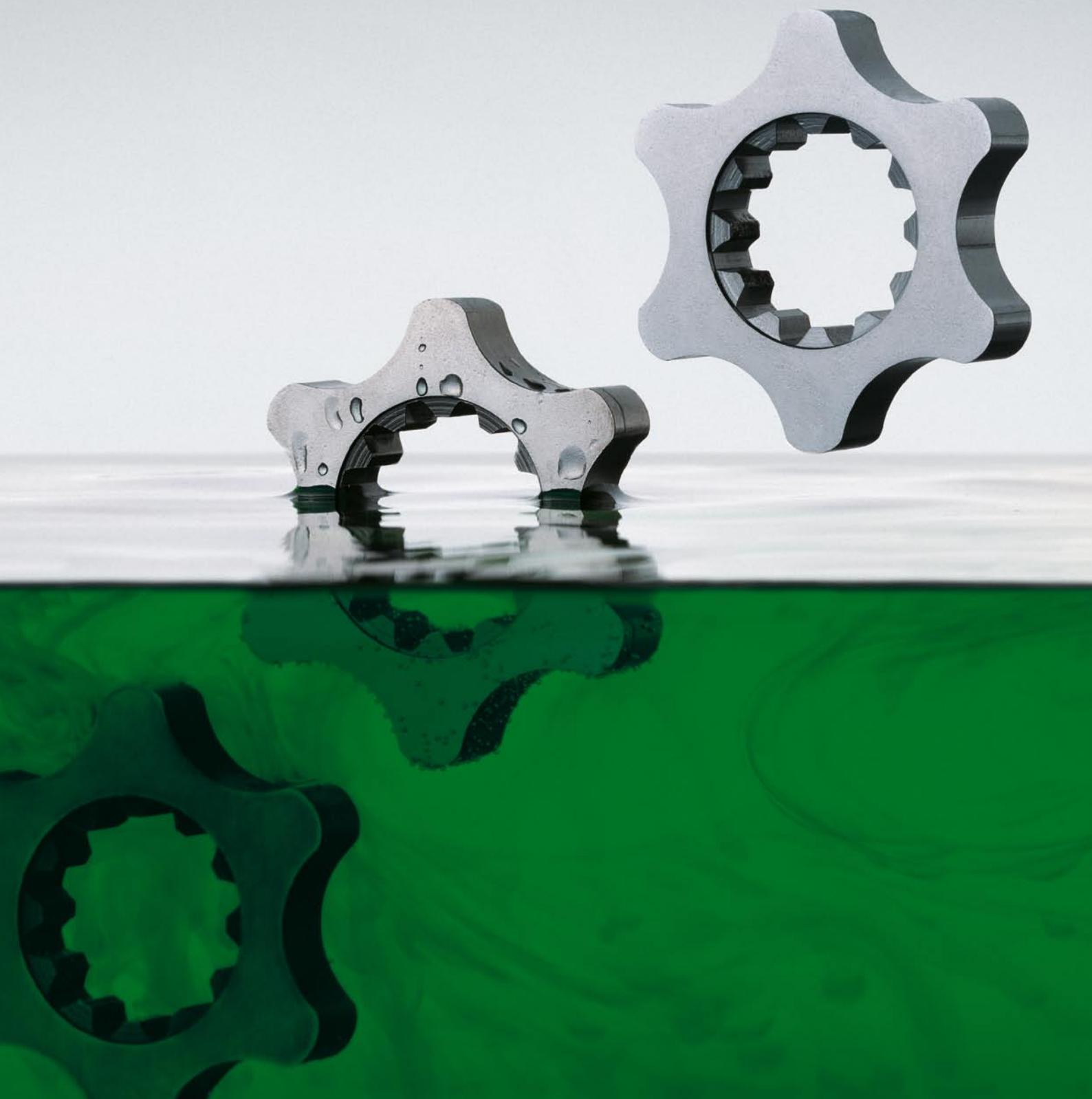


POLIGRAT

Chemical Polishing



POLIGRAT processes polish and deburr the surfaces of metals. They effectively remove all fine and super-fine burrs from surfaces and corners. Reduction of the surface micro-roughness is also achieved.



Rotor of a fuel injection pump before and after processing with CARBOCHEM to remove burrs and achieve a particle-free surface. (approx. half full size)

The advantages of the POLIGRAT Processes

All surfaces of the component being treated are deburred and micro-smoothed, including those areas where normal access is impossible.

Surface fissures are removed giving improved service life and component durability.

Friction and wear and tear are reduced.

Dimensional accuracy within fine limits can be maintained on edges and surfaces.

Significant improvement in homogeneity and adhesion of subsequent plating deposits or CVD and PVC coatings.

The quality and strength of welded and soldered joints is positively influenced.

The fusing action with glass is improved.

The effects of the POLIGRAT Processes

POLIGRAT PROCESSES

- deburr and micro-smooth corners and faces over the entire wetted surfaces, extending to insides of holes, cross bores and recessed cavities
- remove recessed burrs resulting from drilling and grinding operations
- completely remove surface flaking, overlapping and particles in general
- generate a clean metallic surface
- produce precision components within close tolerances by controlled removal of metal
- operate without any mechanical distortion occurring, allowing even the most sensitive components to be processed without risk of damage
- exclude the risk of thermal damage to components, since the solutions operate at room temperature



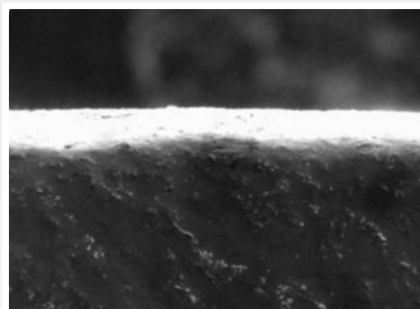
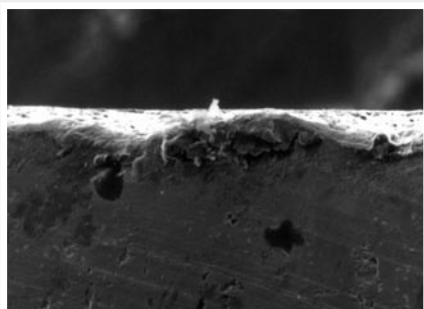
Ground needle point smoothed using the CARBOCHEM Process (enlarged approx. 190 times)



Hydraulic piston valve treated with the CARBOCHEM Process to achieve fine deburring and micro-smoothing, (approx. full size)



Drilled edge of two cross ports before and after deburring with the POLIGRAT Process (enlarged approx. 30 times)



Sheared edge of a stamping (ball bearing cage) before and after deburring with the CARBOCHEM Process (enlarged approx. 300 times)

The application of POLIGRAT Processes

POLIGRAT Processes for chemical polishing and deburring are reliable and economical in use. They have been successfully employed in several areas of industry including for example:

- machined components and pressings
- hydraulic and pneumatic controls
- pistons, tubes and nozzles
- textile machine components and needles
- gear wheels, pinions and ball bearing cages
- stator plates
- spring and control switch elements
- apparatus, containers and fittings
- wire and strip

The principle of the POLIGRAT Processes

POLIGRAT Processes for chemical polishing and deburring use chemical solutions which operate at room temperature without electrical current. Controlled chemical erosion polishes and deburrs the surface of the metal.

Unlike electrochemical processes there is no requirement for contacting the components electrically or employing cathodes in the tank. Treatment involves immersing components singly on jigs or loose in a basket or barrel. Large objects, such as vessels, can be treated by using a spray-on technique. Processing of tubes or extended bores of components is achieved by pumping the solution through the items being treated.

The amount of metal removed is controlled by the immersion time. The degree of metal removal will not vary greatly within the permitted variations in the concentration of the polishing solution.

The rate of removal is 0.5 – 5 µm/minute (20-200 microinches/min.) dependent upon the hardness and composition of the material being processed. Agitation of the solution, for instance by pumping, can greatly increase the rate of metal removal.

Treatment time depends upon the desired amount of metal removal and can vary between a few seconds and several minutes.

The chemicals are supplied in the form of salts and require dissolving in water to produce a satisfactory bath.

Chemical usage when operating is determined by means of a simple analysis control. Maintenance of the bath is carried out by replenishing and replacing the chemicals consumed. Correct control of the solutions ensures stable and consistent processing results over a lengthy period of time.

The Processes

The POLIGRAT CARBOCHEM Process

The POLIGRAT CARBOCHEM Process deburrs and micro-smooths parts made of hardened and unhardened carbon steel with a carbon content up to 1.3%, low alloy steel and soft iron. A bright polished finish can be achieved provided the carbon content does not exceed 0.4%. A higher carbon content causes a dark finish. The POLIGRAT CARBOCHEM Solution operates at room temperature and cooling may be required to maintain the working temperature when processing components. Under production conditions the CARBOCHEM solution can be loaded with approximately 0.5 dm² (3.88 in²) of component surface area per litre of solution.

The POLIGRAT ZIRCHEM Process

The POLIGRAT ZIRCHEM Process polishes and deburrs components made

of zirconium and zirconium alloys. Operation and application are very similar to the CARBOCHEM Process.

The Equipment

POLIGRAT equipment for operating the CARBOCHEM and ZIRCHEM Processes incorporates the following:

- Pre-treatment** – Degreasing
– Activating
- Main treatment** – Chemical polishing and deburring
- Post-treatment** – Passivating
– Drying

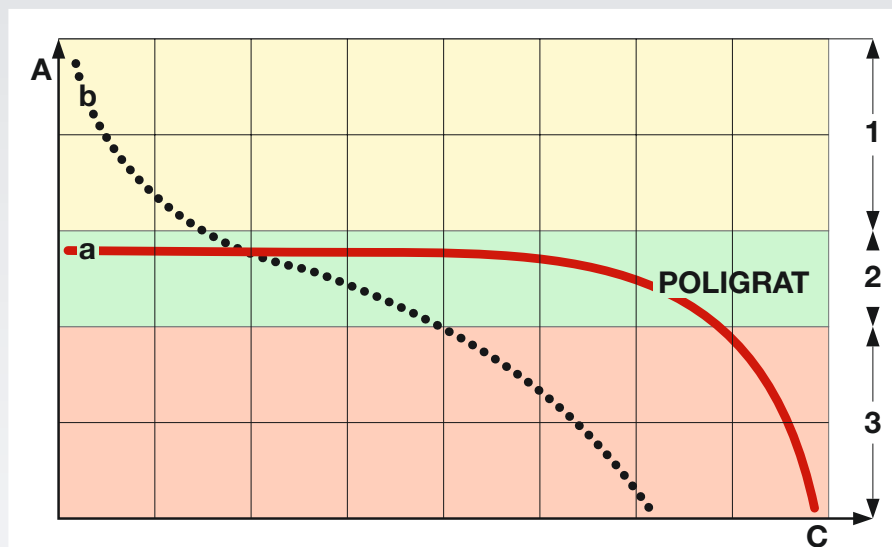
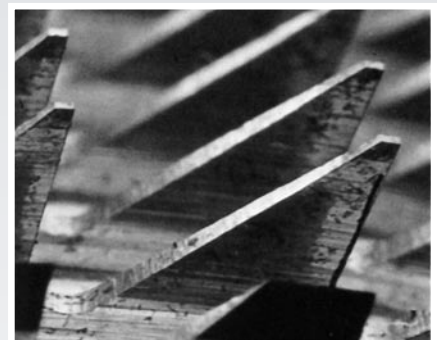
Rinsing with water is carried out between the process stages.

In addition to the pre- and post-treatment stations, the plant also incorporates the work tank for the CARBOCHEM or ZIRCHEM solution with bath agitation, filtration and temperature control. The plant is supplemented by equipment for loading the work into the tanks, such as racks, baskets or barrels. These can be loaded into the tanks either manually or automatically.

For continuous processing of wire, strip and chain, reel to reel equipment can be employed.

Special equipment for spraying or pumping the solution through component parts can supplement the basic plant when required.

Saw teeth before and after fine deburring with CARBOCHEM (enlarged approx. 20 times)



Behavioural pattern of chemical polishing processes

Curve a:
Behavioural pattern of the POLIGRAT Process

Curve b:
Behavioural pattern of ordinary chemical polishing processes

A Rate of removal **C** Bath concentration

1 Initial ageing range

2 Operating range

3 Uneconomical range as a result of lengthy processing time

The Range of Our Supplies and Services

POLIGRAT provides solutions to problems and supplies turn-key equipment.

POLIGRAT can determine the optimum processing procedure for the customers production components and ensure consistent results when operating under continuous production conditions.

The basis for this is

- the supply of the complete plant package, tailored to the process criteria and incorporating pre- and post-treatment stations
- the supply of the chemicals

- the training of the operators
- the provision of technical services and advice on engineering applications.

POLIGRAT-SERVICE GMBH is qualified in operating these processes and offers a service on a sub-contract basis.

The Environment

Operating with the POLIGRAT Processes for chemical polishing and deburring produces weak acidic rinse waters which require treatment and disposal in line with the regulations of the local water authority.

POLIGRAT builds and supplies compact units for this purpose.



POLIGRAT-CARBOCHEM equipment C600-F with a bath volume of 600 l.



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