SURFACE TREATMENT

Protecting the future. Together.

Surface Finishing - Quick Reference Guide

Quaker Houghton™
Forward Together™

The Quaker Houghton Approach

Our value proposition is based on advanced technology and unmatched performance. We take a solution driven approach comprised of world-class products and services to reduce operating costs, improve productivity, increase product quality and strengthen our customers' competitive advantage.

We have a dedicated team of technical and applications experts to support our customers' process and operations requirements. And we invest in innovation and product development in order to continuously provide cutting-edge technology.

Our products assist our customers in:

- Cleaning and removing a wide variety of soils
- Applying conversion coatings to promote paint adhesion and corrosion resistance
- Stripping paint, carbon, and rust from substrates being remanufactured

Surface Cleaning

Formulated to be used in single or multi-stage washers and offer a significant degree of rust protection. HOUGHTO-CLEAN® products are available as alkaline, acidic, or neutral pH cleaners and many offer the potential of a closed-loop zero discharge effluent system.

- **HOUGHTO-STRIP® Series**
- **HOUGHTO-CLEAN® Series**
- **HOUGHTO-DEOX™ Series**

Conversion Coatings

- **Zirconium:** HOUGHTO-PREP™ ZP Technology is a completely biodegradable process that cleans and produces a self-limiting coating for ferrous, aluminum, and other non-ferrous alloys in preparation for paint and other organic coatings. This technology displaces surface soils/oils and using efficient proprietary zirconium chemistry, produces an amorphous coating that promotes paint adhesion and corrosion resistance.
- **Iron Phosphates:** Complete line of traditional iron phosphate products like HOUGHTO-PHOS™ and HOUGHTO-PREP™ conversion coatings for both cleaner-coater and coater only applications.
- **Zinc Phosphates:** Complete line of HOUGHTO-PHOS™ zinc phosphate formulations for immersion and spray applications offer many auxiliary products for all paint finishing, cold-forming, and rust preventive (heavy zinc and oil) applications
- **Manganese Phosphates:** HOUGHTO-PHOS™ manganese phosphates are available in both traditional high temperature and improved low temperature formulations. HOUGHTO-CONDITIONER™ products provide excellent grain refinement for either technology.
- **Final Seal Rinses:** Multiple HOUGHTO-SEAL™ and HOUGHTO-RINSE™ final seal rinses to be used after zirconium, iron, or zinc phosphates to improve substrate surface quality and corrosion resistance.
- **Application Expertise:** The surface finishing's equipment division is one of many services available to provide turnkey solutions for all of your chemical processing needs. Our equipment engineers are experienced in providing solutions to industrial process problems, including pumps, pH/ORP measurement, refractometers, bath filtration, etc.

Metal Protection

- **Corrosion Preventives:** Complete line of HOUGHTO-SEAL®, LUPREP™, and RUST-VETO® products for a wide variety of corrosion preventive applications, both indoor and outdoor protection as needed.
- **Miscellaneous Applications:** From paint strippers and engine rebuild chemistry to innovative stainless steel passivation technology and patented acid etch products for aluminum substrates, Quaker Houghton surface finishing has the solution to your problem.

Why Use HOUGHTO-PREP™ ZP Technology

LOW TO ZERO ENERGY REQUIREMENTS: HOUGHTO-PREP™ ZP Technology cleans and conversion coats across a temperature band from ambient to 110°F. In most cases, no system heat is required.

LOW ENVIRONMENTAL IMPACT: High efficiency (>90%) means very low sludging and extremely long bath life, minimizing effluent generated waste and the costs associated with disposal.

NEGLIGIBLE WASTE GENERATION WHEN IN USE: Organic content that is 100% biodegradable and natural content which aids biodegradation, giving large reductions in BOD and COD.

LOW WATER USAGE REQUIREMENTS: Low bath solids means low water requirements in rinses. Preserves valuable environmental resources and saves high water usage costs.

OPERATIONAL EFFICIENCY: Single package cleaner-coater technology that can eliminate the need for prior alkaline cleaning and conversion coating additives. Can be used in mild steel washers and with either city or DI/RO water.

QUALITY IMPROVEMENT: Eliminates poor salt spray performance. Achieves the best paint adhesion possible – on all substrates.

NON-HAZARDOUS WHEN USED AS INTENDED: Moderate operational pH (4.0 to 6.0) means very low hazards to users.

ECONOMICAL AND COMPETITIVE VALUE: Chemical cost equal to that of premium iron phosphates.

PROVEN TECHNOLOGY: Currently in over 100 production lines throughout North America.

Surface Finishing Case Study

HOUGHTO-PREP™ ZP Technology Pre-Treatment Coating Increases Quality and Reduces Energy, Water Consumption, and Waste:

The Challenge:

- An automotive manufacturer of high quality power rack and pinion steering systems and hose assemblies was seeking significant cost reductions with respect to its powder coating activities, water usage and environmental benefits

The Solution and Benefits:

The customer converted to a HOUGHTO-PREP™ ZP Technology product from traditional iron phosphate products and benefited from the following improvements:

- Cost to maintain 5-stage washer system reduced by 81%
- Water usage reduced 87%
- Total costs savings of $180,000 per annum, not including energy
- More robust system – less control needed (only one chemical titration)
- Ambient temperature operation
- Fewer problems with spray nozzles
- Elimination of sludge and scale build-up in system
- Reduced environmental burden
- Labor cost significantly reduced

HOUGHTO-PREP™ ZP5 - zirconium based non-phosphate conversion coating

Zero Discharge Spray Washer Process

A common problem facing manufactures using metal and surfacing finishing conversion coating processes today is the need to consider the expense and effluent discharge liabilities of the process water. Houghton International has developed a proven approach combining our innovative chemistry with related equipment to allow our customers to eliminate all process water discharge from their spray washers. This process has allowed our customers to eliminate waste water permitting, notice of effluent violations, and all related cost associated with excessive water usage.

The components of the process include ...

Chemistry

The key component of the process is HOUGHTO-CLEAN®, HOUGHTO-PREP™ ZP and HOUGHTO-SEAL™ technology that provide extremely low conductivity in the processing baths. This combination of low bath solids is the cornerstone of reducing the volume of incoming water normally associated with traditional conversion coating processes. All Quaker Houghton chemistry is also designed for maximum oil rejection in order to facilitate longer bath life and easier removal of accumulating soil.

Equipment

The equipment portion of this process includes customized equipment to remove oil and other organic / inorganic soil, counter-flow both water and process chemicals, economically heat the process, and evaporate the small amount of residual process water potentially leaving the system.

Process Knowledge

It is essential that Quaker Houghton have an internal plant champion dedicated to working with our team on analysis of the current process, implementation of Quaker Houghton chemistry, and finally with process equipment planning and installation. The Zero Discharge Process must be viewed as a collaborative team effort in order to provide optimum results in the shortest time-frame.

Why Use Quaker Houghton Remanufacturing Products?

Automotive/Off-Road Industry:

The HOUGHTO-REMAN™ line of products contains specific formulated materials designed for cleaning oil, grease, paint, dirt, and carbon from motor blocks, transmissions, housings, pistons, connecting rods, etc. Products and systems are designed to perform on new multi-alloy components as well as older cast and steel only units. Quaker Houghton focuses on reconditioning aluminum alloys including castings, steel, magnesium, titanium, stainless alloys and other materials commonly used in engine and power components.

Aerospace Industry

Quaker Houghton Surface Finishing has developed chemical processes specific to the aerospace industry. These products are designed for aircraft engine and propulsion components and completely and effectively remove soils from turbines, rotors, fuel system components, and other critical system components.

Our Performance

Our products perform exceptionally on aluminum and magnesium castings including heads, blocks, manifolds, etc. in removing carbonized/burned-on petroleum byproducts that result from engine operation. During this chemical cleaning and stripping process, the components are deoxidized and will be restored to a like-new appearance and condition, thus allowing for OEM performance.

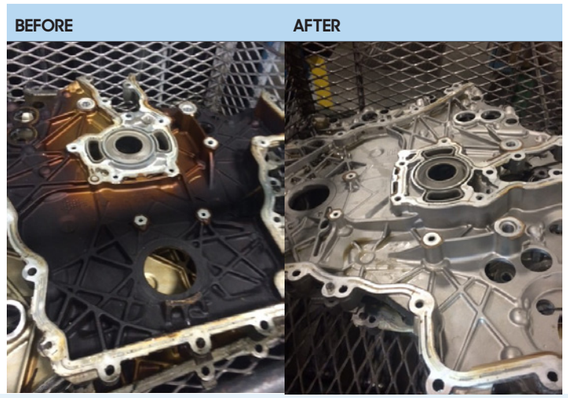
Surface Finishing Products for Remanufacturing

- **HOUGHTO-STRIP® SERIES:** Contains formulated paint strippers and heavy duty cleaner/paint stripper combinations designed for tough applications with high soil and grease loads for aluminum, titanium, and magnesium alloys. Paint, carbon and rust stripping for ferrous alloys, aluminum alloy-specific paint stripping booster/additives for many processes for difficult paint removal.

Engine block cleaned with HOUGHTO-STRIP®

Large engine block cleaned with HOUGHTO-STRIP®

- **HOUGHTO-CLEAN® Series:** Immersion cleaners for aluminum, titanium, and magnesium alloys including castings, extrusions, and stampings designed for cleaning, degreasing, and carbon removal.



Automotive AL die cast part cleaned with HOUGHTO-CLEAN®

- **HOUGHTO-DEOX™ Series:** Acid and neutral derusters, pickles, and particulate deoxidizers that are efficient, remove minimal base metal, and produce the least waste.
- **Specialty Additives:** Additional Houghton products offered Include a post-cleaning corrosion preventive designed to preserve cleaned parts until re-assembly and is compatible with normal engine operation systems. Emulsifier additives work as detergent boosters that significantly extend bath life through increased cleaning power and high soil loading tolerance.

We offer a range of services to help the world's most forward-looking metalworking companies run even more efficiently and effectively

- QH FLUIDCARE™ Managed Services
- QH Technical Services
- QH Engineering Services
- QH Equipment Solutions

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