Quaker Houghton Technical Training

MW Cleaners



August 2025

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Agenda

1. Introduction – The Basics
2. Cleaner Processes
3. Product Line
4. Troubleshooting
5. Questions

The Basics

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The Basics – What do cleaners do?

The cleaning task involves:

- The removal of a soil from the surface of the material.
- More specifically, removing previous metal working fluids (dirt, fines, etc.) from processed parts.
- At the end of the cleaning process, the material is left unchanged/undamaged.

The function/purpose involves:

- Providing a clean surface for the rust preventive to function properly.

The Basics – Function/Purpose

Cleaning – Washing

- Chips removal (Chips, fines, graphite…)
- Soils removal (Grease, Drawing oil, Cutting neat oil, soluble oil, Quenching oil…)

Rinsing (optional)

- Minimize the amount of chemicals on the metal surface
- Avoid the formation of residues during drying

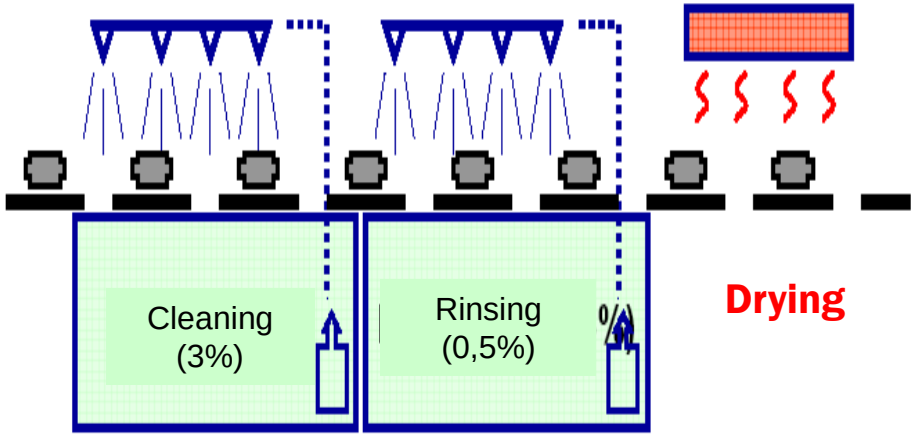
Protection

- Provide corrosion protection to the cleaned part (parts may be stored prior to assembly or other production steps)

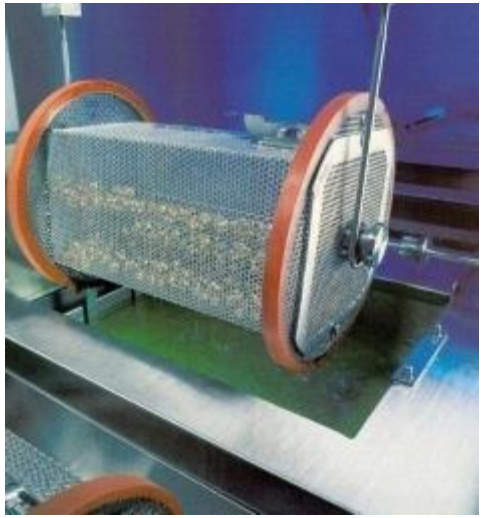
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The Basics - Function/Use

- **Used in aqueous solutions**
- **Typical dilution**
  - Wash 1% - 20%
  - Rinse 0.5% - 1%



- **Application applications**
  - Spray (medium and high spray)
  - Ultrasound
  - Immersion
  - Hand washing





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The Basics - Function/Trends

Washing temperature

- Lower washing temperatures close to room temperature (30-35°C).
- Provides energy savings.

Cosmetic appearance

- Lowering part's cleanliness thresholds. Parts must be clean with no visible residue.

Anti-corrosion protection

- Avoids the use of oily rust preventive oils and thus eliminates a step after washing. The cleaner should provide a good protection for the parts during transport in a VCI bag.

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The Basics – Types of Metals

Steel

- Can be processed in a high pH range
- Needs rust protection

Aluminum

- pH needs to be low or inhibited
- Prone to oxide formation

Yellow metals

- Sensitive to amines

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The Basics – Types of Soils

- Coolants
- Hydraulic Oils
- Way Lubricants
- Quench Oils
- Cutting Oils
- Drawing, Stamping, and Forming Compounds
- Rust Preventives

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The Basics - Water Based Soils

Cutting fluids/coolants are the most common type of water-based soil which include:

- Assembly
- Storage
- Inspection
- Coolant Change/Secondary Operation

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Process and Equipment

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Cleaner Process - Equipment

Different applications require different chemistries







Cleaner Process - Washer Types

Spray

- Most common
- Higher throughput
- Longer sump life
- Many configurations
- Minimal emulsification
- Low foam
- Good wetting
- Oil splitting

Immersion/Ultrasonics

- Less common
- Good cleaning for difficult geometry
- Builds up soils
- Slower process
- Good emulsification
- Some foaming

Maintenance/Floor Cleaning

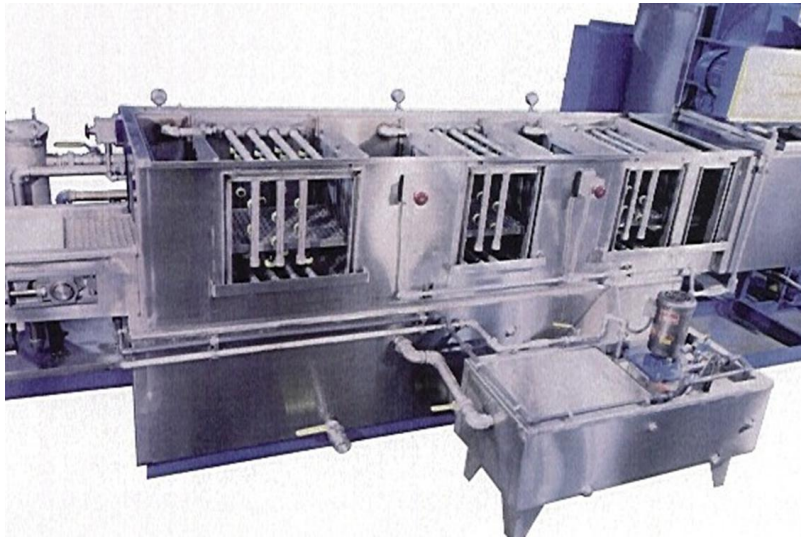
- Floor Scrubber

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Cleaner Process - Spray Cabinet Washer

- Parts loaded on conveyor lines and are carried through the washer
- Large footprint
- Continuous cleaning
- Separated stages
- Wash, rinse and RP stage





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Cleaner Process - Clamshell Washer

- Top loading washer
- Batch cleaning
- Trays or baskets



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Cleaner Process - Drum Washer

- Internal spiral unit to turn parts as they move through the washer
- Good for small flat parts that may stick together
- Size and weight limitations
- Ruggedly constructed for optimal durability
- Latest in spray system and dry off technology
- Consistent high quality cleaning results



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Cleaner Process – Soak/Immersion

Advantages

- Can be Multi-metal
- Good detergency
- Good for difficult part geometry

Disadvantages

- High soil loading
- Shorter system life
- Possible foam issues



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Cleaner Process – Spray vs Soak

Spray

- Advantages
  - Low foaming
  - Rust protection
  - Oil rejection
  - Longer sump life
  - Better filtration
- Disadvantages
  - Requires good impingement
  - Needs proper orientation
  - Rinse/RP/Drying?

Soak

- Advantages
  - Good detergency
  - Good for difficult part geometry
- Disadvantages
  - High soil loading
  - Shorter system life
  - Needs adequate agitation

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Cleaner Process – Floor and Maintenance

Properties

- High detergency
- General purpose maintenance cleaning
- Moderate to high foam
- Good solvency for cutting grease



Uses

- Floor scrubbers
- Manual bucket cleaning
- General maintenance cleaning

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Cleaner Process – Other Equipment



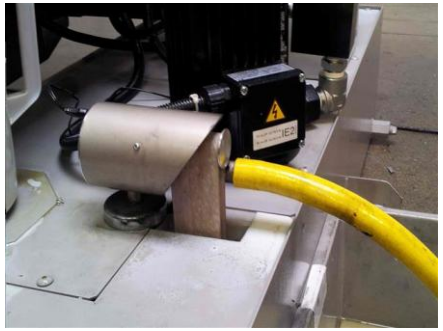
Dosatron or Dosmatic pump



Disc skimmer



Paper filtration



Belt skimmer



Coalescence oil remover

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MW Cleaner Product Line

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Cleaners – MW Product Line

Spray washer cleaners

- major sales group
- largest Range

Immersion cleaners

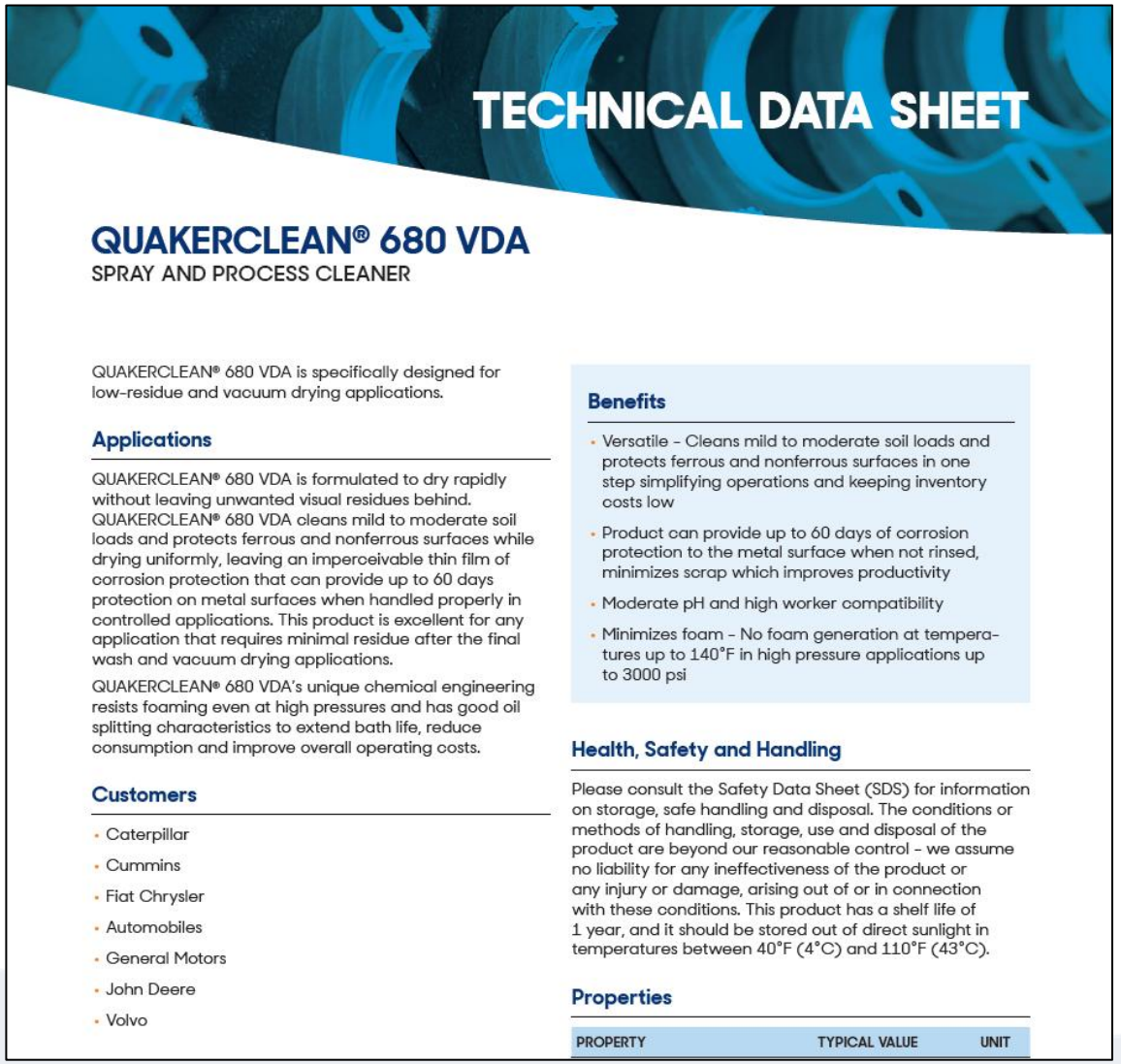
- minor sales group
- limited selection

Floor/Maintenance cleaners

- support sales group
- minimal upkeep

Cleaners – QUAKERCLEAN 680 VDA

- Rapid dry
- Up to 3000 psi
- Low foam
- Cleans mild to moderate soil loads
- Ferrous and nonferrous
- Provides longer RP (up to 60 days)



TECHNICAL DATA SHEET

QUAKERCLEAN® 680 VDA

SPRAY AND PROCESS CLEANER

QUAKERCLEAN® 680 VDA is specifically designed for low-residue and vacuum drying applications.

Applications

QUAKERCLEAN® 680 VDA is formulated to dry rapidly without leaving unwanted visual residues behind. QUAKERCLEAN® 680 VDA cleans mild to moderate soil loads and protects ferrous and nonferrous surfaces while drying uniformly, leaving an imperceivable thin film of corrosion protection that can provide up to 60 days protection on metal surfaces when handled properly in controlled applications. This product is excellent for any application that requires minimal residue after the final wash and vacuum drying applications.

QUAKERCLEAN® 680 VDA's unique chemical engineering resists foaming even at high pressures and has good oil splitting characteristics to extend bath life, reduce consumption and improve overall operating costs.

Customers

- Caterpillar
- Cummins
- Fiat Chrysler
- Automobiles
- General Motors
- John Deere
- Volvo

Benefits

- Versatile - Cleans mild to moderate soil loads and protects ferrous and nonferrous surfaces in one step simplifying operations and keeping inventory costs low
- Product can provide up to 60 days of corrosion protection to the metal surface when not rinsed, minimizes scrap which improves productivity
- Moderate pH and high worker compatibility
- Minimizes foam - No foam generation at temperatures up to 140°F in high pressure applications up to 3000 psi

Health, Safety and Handling

Please consult the Safety Data Sheet (SDS) for information on storage, safe handling and disposal. The conditions or methods of handling, storage, use and disposal of the product are beyond our reasonable control - we assume no liability for any ineffectiveness of the product or any injury or damage, arising out of or in connection with these conditions. This product has a shelf life of 1 year, and it should be stored out of direct sunlight in temperatures between 40°F (4°C) and 110°F (43°C).

Properties

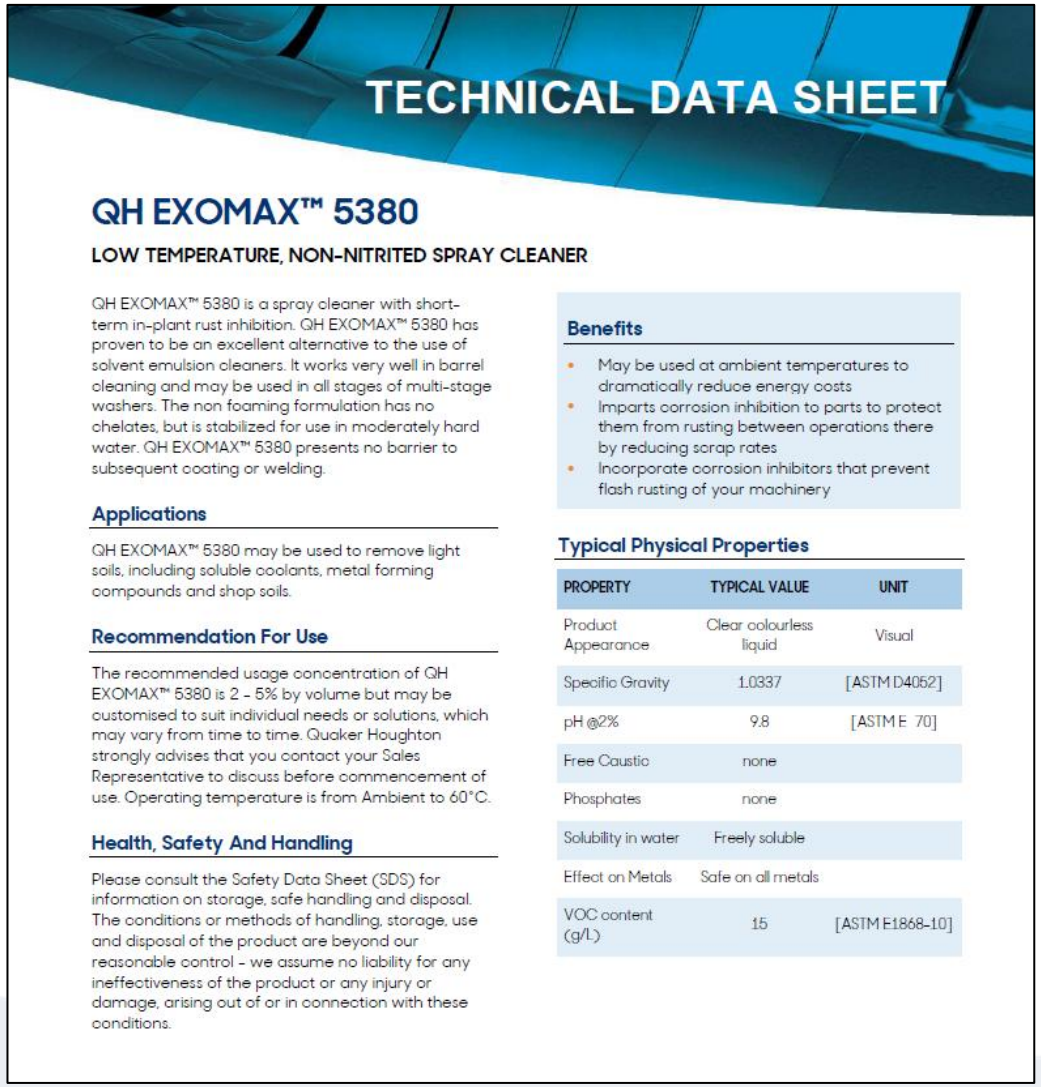
PROPERTY	TYPICAL VALUE	UNIT

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Cleaners – QH EXOMAX 5380

- Low temperature
- Non-nitrited spray cleaner
- Non-chelating
- Good for moderately hard water
- Provides short term RP
- Vibratory



TECHNICAL DATA SHEET

QH EXOMAX™ 5380

LOW TEMPERATURE, NON-NITRITED SPRAY CLEANER

QH EXOMAX™ 5380 is a spray cleaner with short-term in-plant rust inhibition. QH EXOMAX™ 5380 has proven to be an excellent alternative to the use of solvent emulsion cleaners. It works very well in barrel cleaning and may be used in all stages of multi-stage washers. The non foaming formulation has no chelates, but is stabilized for use in moderately hard water. QH EXOMAX™ 5380 presents no barrier to subsequent coating or welding.

Applications

QH EXOMAX™ 5380 may be used to remove light soils, including soluble coolants, metal forming compounds and shop soils.

Recommendation For Use

The recommended usage concentration of QH EXOMAX™ 5380 is 2 - 5% by volume but may be customised to suit individual needs or solutions, which may vary from time to time. Quaker Houghton strongly advises that you contact your Sales Representative to discuss before commencement of use. Operating temperature is from Ambient to 60°C.

Health, Safety And Handling

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Benefits

- May be used at ambient temperatures to dramatically reduce energy costs
- Imparts corrosion inhibition to parts to protect them from rusting between operations there by reducing scrap rates
- Incorporate corrosion inhibitors that prevent flash rusting of your machinery

Typical Physical Properties

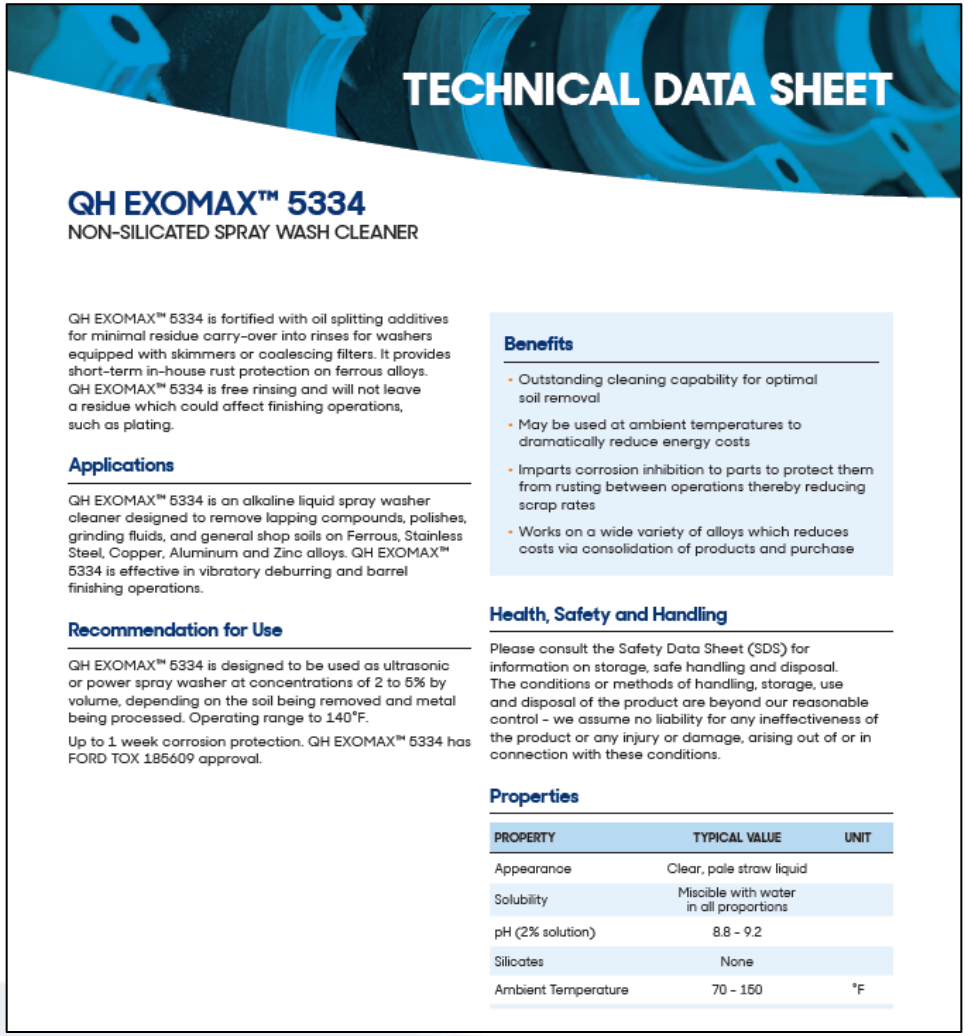
PROPERTY	TYPICAL VALUE	UNIT
Product Appearance	Clear colourless liquid	Visual
Specific Gravity	1.0337	[ASTM D4052]
pH @2%	9.8	[ASTM E 70]
Free Caustic	none	
Phosphates	none	
Solubility in water	Freely soluble	
Effect on Metals	Safe on all metals	
VOC content (g/L)	15	[ASTM E1868-10]

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Cleaners – QH EXOMAX 5334

- Good on all metals
- Oil rejecting
- In process RP (up to 7 days)



TECHNICAL DATA SHEET

QH EXOMAX™ 5334

NON-SILICATED SPRAY WASH CLEANER

QH EXOMAX™ 5334 is fortified with oil splitting additives for minimal residue carry-over into rinses for washers equipped with skimmers or coalescing filters. It provides short-term in-house rust protection on ferrous alloys. QH EXOMAX™ 5334 is free rinsing and will not leave a residue which could affect finishing operations, such as plating.

Applications

QH EXOMAX™ 5334 is an alkaline liquid spray washer cleaner designed to remove lapping compounds, polishes, grinding fluids, and general shop soils on Ferrous, Stainless Steel, Copper, Aluminum and Zinc alloys. QH EXOMAX™ 5334 is effective in vibratory deburring and barrel finishing operations.

Recommendation for Use

QH EXOMAX™ 5334 is designed to be used as ultrasonic or power spray washer at concentrations of 2 to 5% by volume, depending on the soil being removed and metal being processed. Operating range to 140°F.

Up to 1 week corrosion protection. QH EXOMAX™ 5334 has FORD TOX 185609 approval.

Benefits

- Outstanding cleaning capability for optimal soil removal
- May be used at ambient temperatures to dramatically reduce energy costs
- Imparts corrosion inhibition to parts to protect them from rusting between operations thereby reducing scrap rates
- Works on a wide variety of alloys which reduces costs via consolidation of products and purchase

Health, Safety and Handling

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Properties

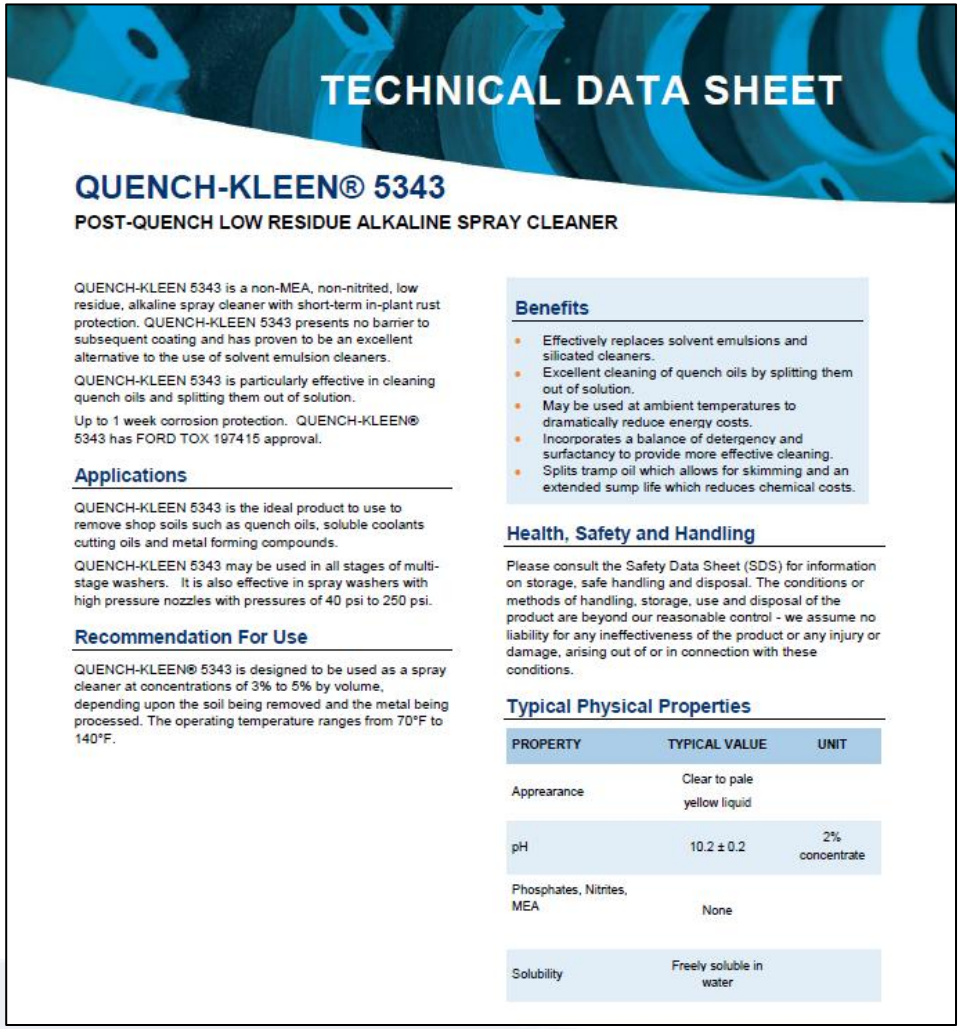
PROPERTY	TYPICAL VALUE	UNIT
Appearance	Clear, pale straw liquid	
Solubility	Miscible with water in all proportions	
pH (2% solution)	8.8 - 9.2	
Silicates	None	
Ambient Temperature	70 - 150	°F

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Cleaners – QUENCH-KLEEN 5343

- MEA and Nitrite free
- Low residue
- In process RP (up to 7 days)



TECHNICAL DATA SHEET

QUENCH-KLEEN® 5343

POST-QUENCH LOW RESIDUE ALKALINE SPRAY CLEANER

QUENCH-KLEEN 5343 is a non-MEA, non-nitrited, low residue, alkaline spray cleaner with short-term in-plant rust protection. QUENCH-KLEEN 5343 presents no barrier to subsequent coating and has proven to be an excellent alternative to the use of solvent emulsion cleaners.

QUENCH-KLEEN 5343 is particularly effective in cleaning quench oils and splitting them out of solution.

Up to 1 week corrosion protection. QUENCH-KLEEN® 5343 has FORD TOX 197415 approval.

Applications

QUENCH-KLEEN 5343 is the ideal product to use to remove shop soils such as quench oils, soluble coolants cutting oils and metal forming compounds.

QUENCH-KLEEN 5343 may be used in all stages of multi-stage washers. It is also effective in spray washers with high pressure nozzles with pressures of 40 psi to 250 psi.

Recommendation For Use

QUENCH-KLEEN® 5343 is designed to be used as a spray cleaner at concentrations of 3% to 5% by volume, depending upon the soil being removed and the metal being processed. The operating temperature ranges from 70°F to 140°F.

Benefits

- Effectively replaces solvent emulsions and silicated cleaners.
- Excellent cleaning of quench oils by splitting them out of solution.
- May be used at ambient temperatures to dramatically reduce energy costs.
- Incorporates a balance of detergency and surfactancy to provide more effective cleaning.
- Splits tramp oil which allows for skimming and an extended sump life which reduces chemical costs.

Health, Safety and Handling

Please consult the Safety Data Sheet (SDS) for information on storage, safe handling and disposal. The conditions or methods of handling, storage, use and disposal of the product are beyond our reasonable control - we assume no liability for any ineffectiveness of the product or any injury or damage, arising out of or in connection with these conditions.

Typical Physical Properties

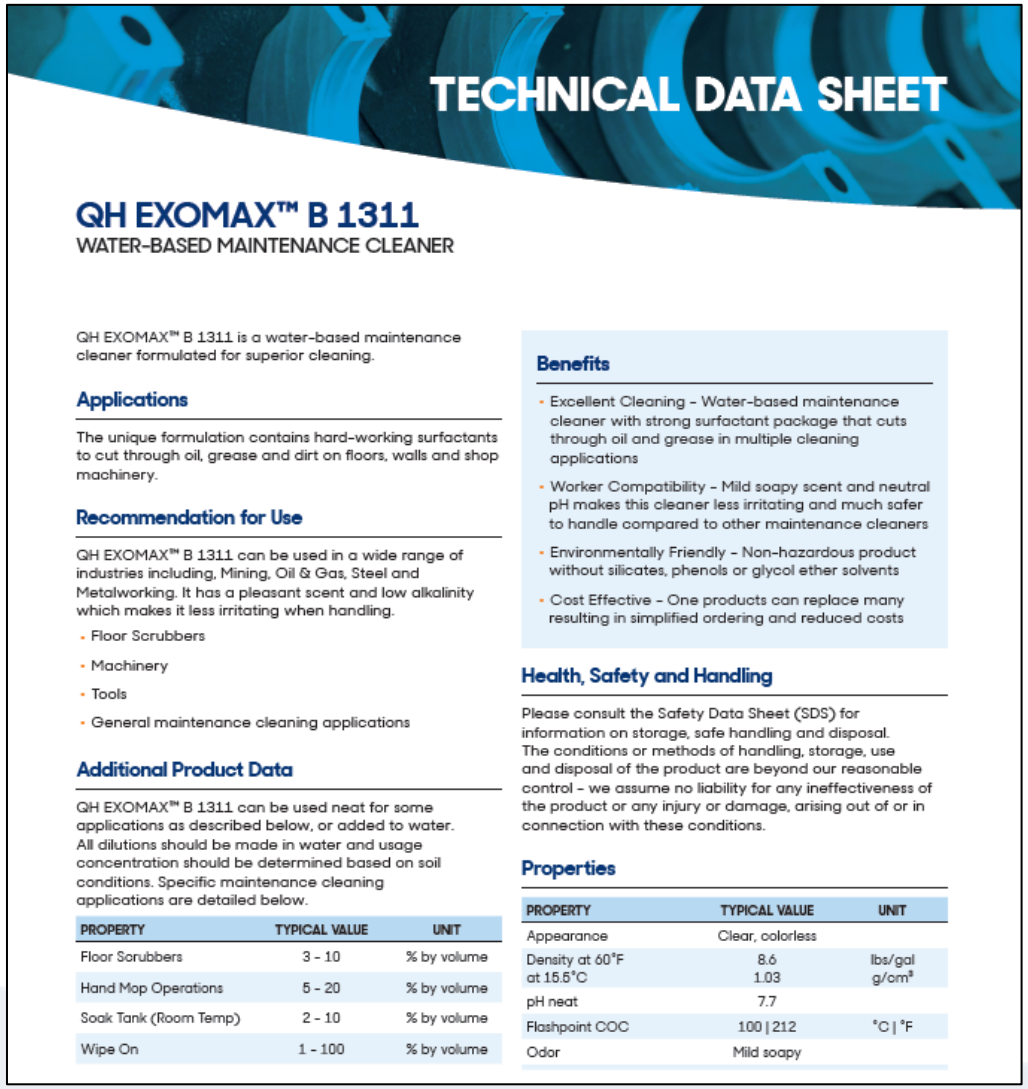
PROPERTY	TYPICAL VALUE	UNIT
Apprearance	Clear to pale yellow liquid	
pH	10.2 ± 0.2	2% concentrate
Phosphates, Nitrites, MEA	None	
Solubility	Freely soluble in water	

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Cleaners – QH EXOMAX B 1311

- Non hazardous
- pH neutral
- low cost maintenance cleaner
- compatible with epoxy floors



TECHNICAL DATA SHEET

QH EXOMAX™ B 1311

WATER-BASED MAINTENANCE CLEANER

QH EXOMAX™ B 1311 is a water-based maintenance cleaner formulated for superior cleaning.

Applications

The unique formulation contains hard-working surfactants to cut through oil, grease and dirt on floors, walls and shop machinery.

Recommendation for Use

QH EXOMAX™ B 1311 can be used in a wide range of industries including, Mining, Oil & Gas, Steel and Metalworking. It has a pleasant scent and low alkalinity which makes it less irritating when handling.

- Floor Scrubbers
- Machinery
- Tools
- General maintenance cleaning applications

Additional Product Data

QH EXOMAX™ B 1311 can be used neat for some applications as described below, or added to water. All dilutions should be made in water and usage concentration should be determined based on soil conditions. Specific maintenance cleaning applications are detailed below.

PROPERTY	TYPICAL VALUE	UNIT
Floor Scrubbers	3 - 10	% by volume
Hand Mop Operations	5 - 20	% by volume
Soak Tank (Room Temp)	2 - 10	% by volume
Wipe On	1 - 100	% by volume

Benefits

- Excellent Cleaning - Water-based maintenance cleaner with strong surfactant package that cuts through oil and grease in multiple cleaning applications
- Worker Compatibility - Mild soapy scent and neutral pH makes this cleaner less irritating and much safer to handle compared to other maintenance cleaners
- Environmentally Friendly - Non-hazardous product without silicates, phenols or glycol ether solvents
- Cost Effective - One products can replace many resulting in simplified ordering and reduced costs

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Properties

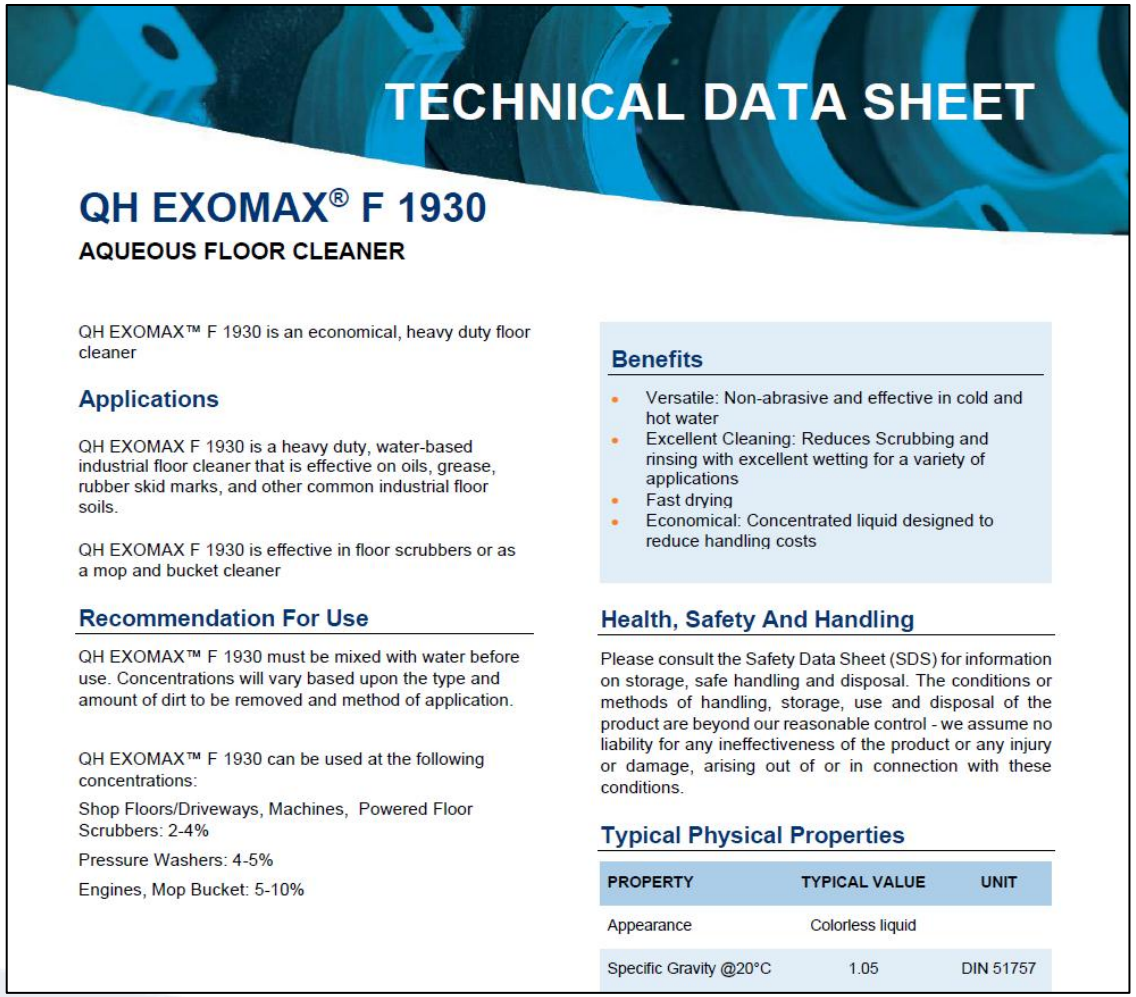
PROPERTY	TYPICAL VALUE	UNIT
Appearance	Clear, colorless	
Density at 60°F at 15.5°C	8.6 1.03	lbs/gal g/cm³
pH neat	7.7	
Flashpoint COC	100 | 212	°C | °F
Odor	Mild soapy	

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Cleaners – QH EXOMAX F 1930

- Fast Drying
- Tenacious Soils
- Economical



TECHNICAL DATA SHEET

QH EXOMAX® F 1930

AQUEOUS FLOOR CLEANER

QH EXOMAX™ F 1930 is an economical, heavy duty floor cleaner

Applications

QH EXOMAX F 1930 is a heavy duty, water-based industrial floor cleaner that is effective on oils, grease, rubber skid marks, and other common industrial floor soils.

QH EXOMAX F 1930 is effective in floor scrubbers or as a mop and bucket cleaner

Recommendation For Use

QH EXOMAX™ F 1930 must be mixed with water before use. Concentrations will vary based upon the type and amount of dirt to be removed and method of application.

QH EXOMAX™ F 1930 can be used at the following concentrations:

Shop Floors/Driveways, Machines, Powered Floor Scrubbers: 2-4%

Pressure Washers: 4-5%

Engines, Mop Bucket: 5-10%

Benefits

- Versatile: Non-abrasive and effective in cold and hot water
- Excellent Cleaning: Reduces Scrubbing and rinsing with excellent wetting for a variety of applications
- Fast drying
- Economical: Concentrated liquid designed to reduce handling costs

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Typical Physical Properties

PROPERTY	TYPICAL VALUE	UNIT
Appearance	Colorless liquid	
Specific Gravity @20°C	1.05	DIN 51757

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Metalworking Cleaners - Core Products

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Product	Item Number	Performance	Cleaner Application	Soil Load	Metals			Product Data							Notes
					Aluminum	Ferrous	Yellow Metals	Bio-Stable	Oil Rejecting	RP (Max Days)	pH	VOC(g/l)	Operating Temp	Pressure (PSI)	
Sump, Machine, Maintenance & Floor Cleaners															
MTC 53	202499	Better	Sump	Mod-Heavy	✓	✓	✓	×	×	0	9-11	NA	<140F	NA	
QH EXOMAX B 1311	301427	Better	Floor & Maint	Moderate	✓	×	×	×	×	0	6-9	0	Amb	NA	
QH EXOMAX F 1410	202502	Best	Floor & Maint	Moderate	×	✓	×	×	×	0	9-11	9.4	<140F	NA	
QUAKERCLEAN 624 LX	009226	Best	Sump	Heavy	✓	✓	×	×	×	0	>11	NA	<180	NA	
Process Cleaners															
KLEENSOL #7	204309	Better	Solvent	Mod-Heavy	✓	✓	✓	×	×	0	NA	NA	<120F	10-20	
QH EXOMAX 154	202478	Better	Spray	Moderate	✓	✓	✓	✓	✓	14	9-11	NA	<140F	<3000	
QH EXOMAX 5285 US	202482	Best	Spray	Mod-Heavy	✓	✓	✓	✓	✓	30	9-11	NA	<140F	<3000	
QH EXOMAX 5333	202483	Better	Vib/Soak	Mod-Heavy	×	✓	✓	×	✓	7	9-11	NA	<140F	<250	
QH EXOMAX 5334	202484	Better	Vibratory	Heavy	✓	✓	✓	×	✓	7	9-11	33	<140F	<250	
QH EXOMAX 5354	202485	Best	Spray/Vib	Light-Mod	✓	✓	✓	✓	×	14	6-9	31	<140F	<3000	
QH EXOMAX 5380	205518	Best	Spray/Soak/Vib	Light	✓	✓	×	×	✓	30	9-11	15	<140F	<3000	
QH EXOMAX 5398	202495	Best	Spray	Light	×	✓	✓	×	×	7	>11	209	<140F	<3000	
QH EXOMAX P 5718	202479	Better	Spray	Heavy	×	✓	×	✓	×	7	9-11	111	<140F	<300	
QH EXOMAX P 6411	301396	Best	Spray	Moderate	×	✓	✓	×	✓	30	9-11	NA	<140F	<250	
QUAKERCLEAN 624 CP	014292	Better	Spray/Deburr	Light	✓	✓	×	✓	×	30	9-11	143	<140F	<7500	
QUAKERCLEAN 680 VDA	016084	Best	Spray/Vacuum	Moderate	✓	✓	✓	×	✓	60	9-11	NA	<140F	<3000	
QUENCH KLEEN 5343	200320	Best	Spray	Moderate	×	✓	×	×	✓	7	>11	NA	<140F	<250	

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Troubleshooting

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Cleaners - Troubleshooting

What to look for

- Physical appearance – reasonably clean looking bath
- pH – loss of pH can mean biological issues or poor cleaning
- Concentration control – by titration, not refractometer
- Biological issues
- Soil load – as soil increases cleaning decreases
- Elements – hardness and chlorides can affect performance

All the parameters can be interrelated

- Concentration affects all other issues
- pH affects biologicals, foam, RP, dermatitis
- Biological activity affects pH, cleaning, residue

Cleaners – Typical Problems

- Inadequate Cleaning
- Corrosion & Staining
- Biostability
- Filtration
- Foam
- Residue
- Control

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Cleaners – Inadequate Cleaning

- Check Cleaner integrity
- Check for process changes
  - Temperature
  - Time
  - Concentration
- Check operation of washer
  - Clogged nozzles
  - Oil Skimmer not working
- Check previous processes for change
  - New soils in process or changed

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Cleaners - Corrosion and Staining

- Steel
  - Rusting
  - Low pH, concentration, high bios, high hardness, high chlorides
- Aluminum
  - Staining
  - Can be caused by alkalinity
  - Can be caused by hard water source and evaporation make-up
- Alloy incompatibility
  - Mixed metals in contact

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Cleaners - Corrosion

Causes:

- Infection by Acid generating bacteria.
- Check infection carry-over from coolant from previous operation.
- Insufficient degree of protection from Degreaser.
- Concentration of product too low.
- Severe storage/atmospheric conditions.
- High chloride level in water supply.
- Contamination by particles.



Solutions:

- Tank-side addition of bactericide.
- Use product which contains bactericide in formulation.
- Use product with better anti corrosion properties.
- Correct product concentration.
- Use softened / de-ionised water.
- Require filtration system to remove particulate soil.

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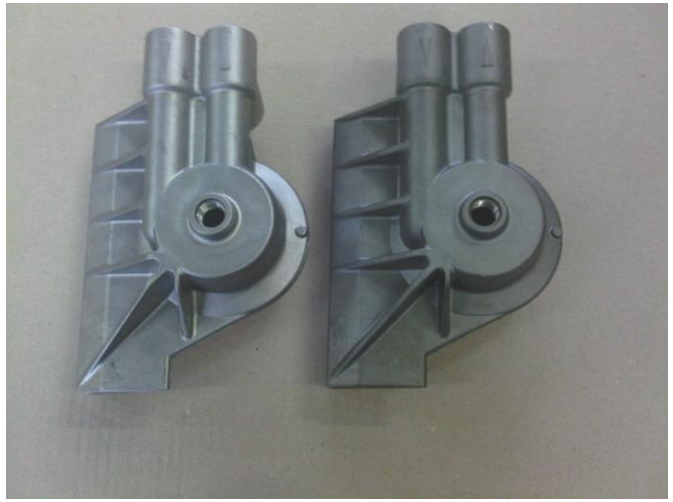
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Cleaners - Staining

Causes:

- Zinc and aluminium are attacked by alkalis and some amines
- Copper is attacked by amines to form blue complexes



Solutions:

- Select product designed for these materials.
- Check compatibility in lab before making recommendation.
- Use amine-free or inhibited amine-containing products.
- Decrease concentration, contact time or cleaning temperature.
- Add an additive for non-ferrous anticorrosion.

Cleaners – Biostability Issues

Causes:

- Concentration is low
- pH is low
- Previous soil contamination
- Build-up in lines and overhead areas

Solutions:

- Biostable cleaners
- Complete system cleanouts may be necessary from time to time
- Keep tramp oil concentration as low as possible
- Biocides (Preventol)
  - If severe repeated bacterial attacks, consider running at high temperatures.
  - Move towards a washing product designed for low temperature washing and containing biocides

Cleaners – Filtration

Increased Soil Load

- Causes decreased free alkalinity to achieve cleaning
- Dirty cleaner can redeposit soil on the part
- Can result in excessive foaming in spray applications

Use filtration and splitting additives to increase sump life

- Polypropylene filters strip defoamers from solution.
- Use Polyester or Polyethylene

Cleaners – Foam Issues



Causes:

- Contamination from previous process fluid
- Pumps drawing air
  - Poor air release from high turnover/low air release time
- Low water hardness
- Soap formation during cleaning
- High foam Degreasers in Spray Washing Machines.
- Incorrect operating temperature
  - Too High
  - Too Low

Solutions:

- Treat with antifoam.
- Increase cleaning temperature.
- Replace with lower foam product.
- Check compatibility with the previous process fluid

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Cleaners – Residues

- Gaging or inspection
- High Concentration
- RP application
- Subsequent processes
  - Soil build up
- Water quality
  - Hard water soaps
  - Water Residue

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Cleaners - Control

pH Control

- Corrosion control
  - The higher the alkalinity, the fewer problems with steel corrosion
- Biological control
  - Bacteria and fungus grow faster below pH of 9.0
- Excessive pH can lead to excess soap formation, excess foam, dermatitis

Concentration Control

- Refractometer does not work when tramp oil is present
- Titration methods – burette or test kits
- Low concentration
  - Possible rust, risk of bacteria and fungus, incomplete cleaning
- High concentration – more rinsing needed, excess cost, can effect metal being cleaned

Cleaners – Monitor

Daily

- pH
- Concentration

Weekly

- Concentration
- Tramp oil
- Biological counts
- Possibly metals analysis

Thank You!

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