safetykleen
Parts Cleaning Experts

INDUSTRY WHITEPAPER

Ultrasonic Precision Cleaning

for Machinery & Equipment

Introduction

In the machinery and equipment industry, precision and cleanliness are critical to performance. However, traditional cleaning methods — such as prolonged soaking, manual scrubbing, or the use of harsh chemicals — often fall short when dealing with modern manufacturing challenges. These methods may leave residues, compromise surface integrity, or damage sensitive components like bearings, sensors, and precision tooling.

In a sector where downtime is costly and product quality is paramount, adopting robust, advanced cleaning technologies tailored to industrial machinery is no longer optional.

Here's what you'll learn:

Challenges in Machinery & Equipment Parts Cleaning

The machinery and equipment industry faces a complex array of cleaning challenges. Common issues include:

Intricate and Complex Part Geometries

Machinery and equipment often feature intricate designs and complex geometries, such as narrow channels, blind holes, or interlocking components. These areas are challenging to clean using traditional methods, which may fail to reach hidden surfaces or remove stubborn contaminants effectively.

Environmental and Safety Considerations

The machinery and equipment industry faces increasing pressure to adopt environmentally friendly practices. Cleaning methods must minimise the use of hazardous chemicals, reduce waste, and improve workplace safety.

High-Volume or Batch Cleaning

Manufacturers often need to clean large volumes of parts or entire batches efficiently. This requires cleaning processes that can accommodate high throughput without sacrificing quality.

Contaminant Diversity

Industrial equipment encounters a wide range of contaminants, including oils, grease, metal shavings, and environmental debris. Effective cleaning solutions must be versatile enough to handle various residues while adapting to different materials and contamination levels, ensuring consistent results across all equipment.

Risk of Damage to Parts

Sensitive components in machinery, such as precision bearings, electronic sensors, or finely machined surfaces, are prone to damage from abrasive cleaning methods or harsh chemicals

Surface Preparation Standards

Many parts require precise surface preparation for processes like coating, welding, or assembly. Cleaning solutions must not only remove contaminants but also achieve the specific surface conditions necessary for downstream operations.

The Wish List for Parts Cleaning Solutions

To meet these challenges, the machinery and equipment industry must adopt advanced technologies that enhance efficiency, ensure consistent results, and align with the growing emphasis on sustainability. But the wish list is substantial.

Efficient, Affordable Solutions

Cleaning technologies must be effective and reduce time and cost.

Sustainability

Cleaning solutions must be eco-friendly and support in meeting regulations.

Reliability

They must deliver precision cleaning without damage, even to complex parts.

Versatility

They must be compatible with a range of parts, contaminants and complexities and allow for batch cleaning.

Why Upgrade to Ultrasonic Cleaning?

Ultrasonic cleaning offers an innovative solution to these pain points .With its proven ability to deliver precision cleaning, whether for intricate or large and heavily soiled parts, ultrasonic systems save time. reduce operational costs, and eliminate reliance on harmful substances..

What is Ultrasonic Cleaning?

Ultrasonic cleaning works by creating microscopic cavitation bubbles in a cleaning solution.
These bubbles collapse with force, dislodging contaminants from even the most complex and challenging surfaces. This technology is particularly well-suited to machinery and equipment manufacture.

The result is high quality, evenly distributed cleaning without corrosion or the use of hazardous chemicals. Ultrasonic cleaning is innovative, sustainable and offers value for money.

Key Benefits of Ultrasonic Cleaning

for the Machinery and Equipment Industry

Thorough, Residue-Free Cleaning

Ultrasonic waves effectively reach intricate geometries, tight spaces, and hard-to-access surfaces in machinery components, ensuring complete removal of grease, oils, metal shavings, and other contaminants without leaving residues.

Safe for Sensitive and High-Value Parts

Ultrasonic cleaning is non-abrasive, making it ideal for precision-machined parts, electronic components, and other high-value equipment. It preserves structural integrity and extends the lifespan of critical assets.

Reduces Maintenance Interruptions

With quick and efficient cleaning, ultrasonic technology reduces the time needed for maintenance, minimising equipment downtime and keeping production lines operational with fewer delays.

Efficiency and Speed

Ultrasonic cleaning completes tasks in minutes that could take hours with manual or traditional methods. This accelerates maintenance schedules and allows for faster turnaround times in demanding industrial environments.

Environmentally Friendly

Ultrasonic systems use water-based or mild cleaning solutions, reducing reliance on harsh chemicals and volatile organic compounds (VOCs). This aligns with environmental standards and improves workplace safety.

Energy Savings

Operating at lower temperatures and with shorter cycles, ultrasonic cleaning is energy-efficient, helping reduce utility costs while maintaining high standards of cleanliness..

Main Use Cases for Ultrasonic Cleaning

in Machinery and Equipment Manufacture

Ultrasonic cleaning is invaluable for a range of metalworking to machinery & equipment applications, addressing both traditional and advanced needs.

1 Cleaning Precision Bearings and Components

Ultrasonic cleaning removes grease, oil, and microscopic debris from intricate components like bearings, ensuring smooth operation and extending their lifespan without risk of damage.

2 Maintenance of Hydraulic and Pneumatic Systems

Ultrasonic cleaning effectively cleans valves, cylinders, and other components in hydraulic and pneumatic systems, removing built-up residues that could hinder performance or cause system failures.

3 Restoring Cutting Tools and Nozzles

Ultrasonic cleaning removes material buildup and debris from cutting tools, spray nozzles, and similar equipment, maintaining precision and ensuring consistent performance.

4 Degreasing Large Machinery Parts

Ultrasonic technology handles heavy-duty degreasing of large or complex machinery parts, penetrating hidden areas and removing stubborn contaminants quickly and thoroughly.

Effective Ultrasonic Cleaning

Safetykleen's parts cleaning experts can provide you with bespoke cleaning advice, including the temperature, chemistry, and time. Get in touch for a free consultation and a trial wash.

CALL FOR A FREE TRIAL:
0330 912 7419

The **Sonickleen Eco** is our most sustainable parts cleaning solution and is 57% more energy efficient than our previous Ultrasonic cleaner.

Our unique blend of purified water and non-hazardous cleaning solutions break down the contaminants while the cavitation process lifts it off. This dual part process optimises the cleaning to be 13% better at cleaning, even at lower temperatures and with less chemicals.

The **Sonickleen Eco** is fully automatic, has improved set up and easy loading and is suitable for batch cleaning. It offers 99% machine uptime, and we provide onsite repairs for the times you need it.

Sonickleen Eco is Safetykleen's Best-In-Class Ultrasonic Parts Cleaner

57% more energy efficient

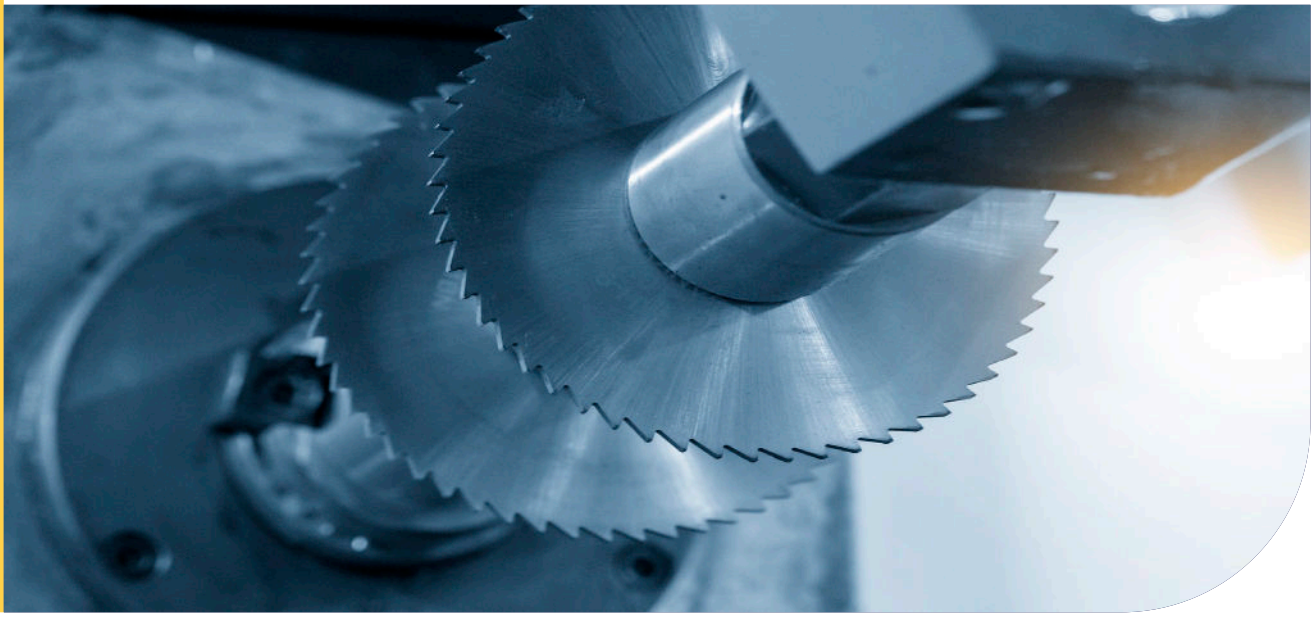
13% better cleaning

11% faster cleaning

50% quicker programme setting

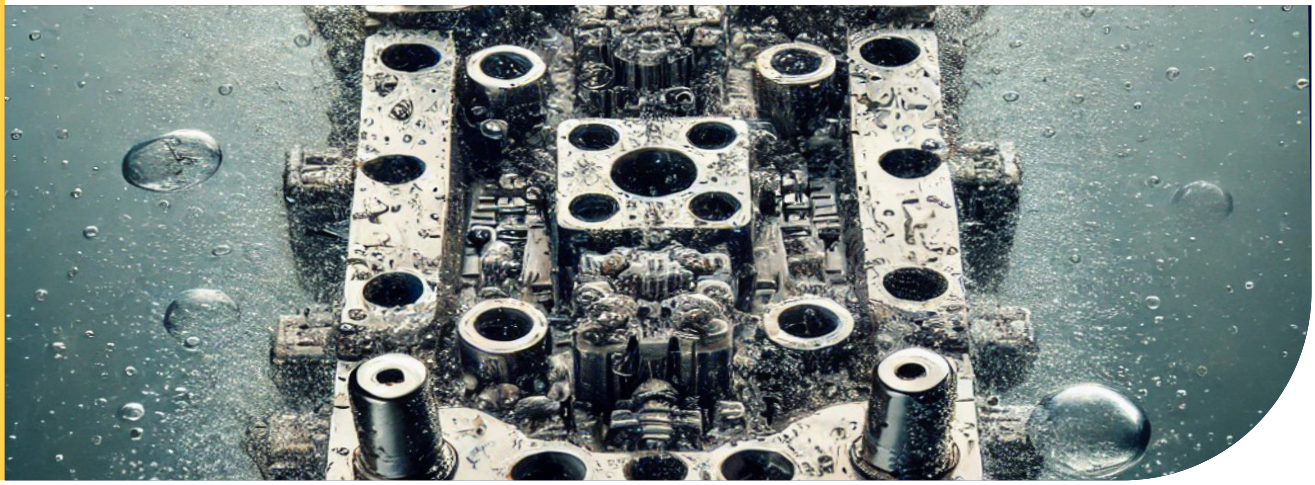
The following table presents the typical use cases for Ultrasonic parts cleaners in the machinery and equipment industry. This is based on Safetykleen's most innovative Ultrasonic parts washer, the SonicKleen Eco.

Part For Cleaning	Contaminant	Ultrasonic Cleaning Applications
CUTTING AND MACHINING TOOLS (DRILL BITS, END MILLS, TAPS, DIES, REAMERS)	Cutting oils, metal chips, coolant residues.	Removes fine metal particles, coolant, and oils from intricate cutting edges and threads, improving tool lifespan and cutting precision.
TURBINE BLADES AND ROTORS	Carbon deposits, grease, and environmental debris.	Restores aerodynamic surfaces without abrasion, ensuring optimal performance.
PRECISION BEARINGS	Grease, oil, dirt, and fine debris.	Penetrates tight spaces to remove contaminants without damaging rolling surfaces, ensuring smooth operation.
GEARS AND SPROCKETS	Grease, oil, dirt, and metal shavings.	Thoroughly cleans intricate teeth and surfaces, enhancing performance and reducing wear.
CUTTING TOOL INSERTS	Metal shavings, oils, and coolant residues.	Removes contaminants without damaging sharp edges, maintaining cutting performance.
CUTTING BLADES AND KNIVES	Adhesives, resin, and cutting debris.	Effectively removes residue and buildup, restoring sharpness and extending blade life.



Part For Cleaning	Contaminant	Ultrasonic Cleaning Applications
SPRAY NOZZLES	Dried residues, scale, and blockages.	Removes blockages and deposits, restoring spray pattern precision.
CHAINS AND DRIVE COMPONENTS	Grease, dirt, and rust.	Reaches all links and surfaces, ensuring smooth operation and reducing wear.
PRECISION VALVES AND SEALS	Fluids, grease, and debris.	Ensures thorough cleaning of tight seals and passageways, preserving functionality.
FASTENERS AND THREADED COMPONENTS	Dirt, grease, and rust.	Cleans threads and surfaces thoroughly, ensuring proper assembly and corrosion resistance.
WELDING FIXTURES AND JIGS	Welding spatter, soot, and oil residues.	Effectively removes spatter and debris, maintaining fixture precision and usability.
VACUUM AND PUMP COMPONENTS	Oil, grease, and fine particulates.	Cleans internal surfaces and components, ensuring efficient vacuum and pump operation.
HYDRAULIC AND PNEUMATIC COMPONENTS (VALVES, PISTONS, SEALS)	Hydraulic fluids, grease, dirt, and particulate matter.	Removes fluid residues and particulate buildup, ensuring optimal system performance.

Part For Cleaning	Contaminant	Ultrasonic Cleaning Applications
HEAT EXCHANGERS AND RADIATORS	Scale, grease, and environmental debris.	Cleans hard-to-reach fins and passages, restoring heat transfer efficiency and preventing overheating.
CONVEYORS AND ROLLERS	Dust, grease, and spilled materials.	Removes buildup efficiently, reducing the risk of misalignment and operational interruptions.
ELECTRICAL COMPONENTS (CONNECTORS, CIRCUIT BOARDS)	Dust, oils, and solder flux.	Gently cleans without damaging delicate components, ensuring reliable electrical performance.
FILTERS (OIL, AIR, HYDRAULIC)	Clogged debris, oil, and particulate matter.	Clears blockages and restores filtration efficiency, extending filter life.
ENGINE COMPONENTS (PISTONS, CYLINDER HEADS)	Carbon buildup, oil, and grease	Cleans thoroughly without damaging surfaces, maintaining performance and longevity.
METAL ADDITIVE MANUFACTURED PARTS	Powder residues, support material, and oils.	Removes all residues from intricate geometries, ensuring parts meet quality standards.
INJECTION MOLDS AND DIES	Plastic residues, oils, and carbon deposits.	Cleans delicate surfaces and grooves without abrasion, ensuring defect-free molds and precise products.



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CONTACT DETAILS

Contact us today to explore how ultrasonic cleaning can elevate your operations, reduce downtime, and ensure compliance:

Call us on **0330 912 7419**

www.safetykleeninternational.com