



Ultrasonic Cleaning Systems For Mold Cleaning

Presented By:

Jeff Hancock

Blue Wave Ultrasonics

Overview

- Ultrasonic Cleaning Systems, in conjunction with an aqueous based detergent, creates cavitation (microscopic scrubbing bubbles) to effectively and intricately clean molds and dies.

Overview (cont.)

- A properly designed System (including detergent solution) will effectively remove outgassing residues from plastics and elastomers, as well as oil, light grease, and rust.

Features & Benefits

- Reduces Labor - up to 50% of the time to PM a mold can be saved.
- Eliminates (or substantially reduces) dependence on hazardous solvents.
- Eliminates mold component damage from abrasives and handling.

Features & Benefits (cont.)

- Cleans in areas that manual cleaning simply can't reach, such as ejector pin holes, vents, & deep recesses.
- Cleans water lines, which improves heat transfer and molding efficiency.
- Utilizes biodegradable detergents, reducing disposal costs. Can generally be sent down the drain.

Applications

- Ultrasonic Cleaning Systems can be utilized for:
 - Injection Molding (Plastic & Rubber)
 - Vacuum Molding (Thermoforming)
 - Blow Molding (Plastic)
 - Compression Molding (Plastic & Rubber)
 - Extrusion (Plastic & Rubber)

Applications (Cont.)

- Die Casting (Aluminum & Zinc)
- Thixomolding (Magnesium)
- Machine Components, etc...

How It Works

- Ultrasonic Cleaning Tanks create ultrasonic sound (or pressure) waves in the aqueous bath, which creates “cavitation” - microscopic imploding vacuous bubbles.
- The high energy imploding bubbles, “scrub” the part clean with the help of the detergent.

How It Works (Cont.)

- The sound waves are created by vibrating a diaphragm in the tank - similar to a speaker in a sound system.
- By mounting transducers (which create electrical energy into mechanical vibrations) to the tank wall or bottom, we create the diaphragm.

How It Works (Cont.)

- An Ultrasonic Electric Generator is utilized to convert standard line frequency (60Hz or 50Hz) into a high frequency (20,000Hz or above)
- The Generator is then coupled to the Transducers, which causes the Transducers to vibrate at the design frequency.

How It Works (Cont.)

- The vibrating Transducers cause the Diaphragm to vibrate at the same frequency, which creates the sound (or pressure) waves in the tank.
- As the alternating pressure waves pass through the solution, cavitation is created - which is the intricate mechanical scrubbing action used for cleaning.

How It Works (Cont.)



Imploding Bubble

Ultrasonic Transducers

- The Transducer is the “heart” of any ultrasonic system. It’s durability to stand up the application is key for long life and consistent performance.
- There are two types of transducers used in ultrasonic cleaning systems:
 1. Magnetostrictive
 2. Piezoelectric

Ultrasonic Transducers (cont.)

- Magnetostrictive transducers are made of nickel. The transducers offer the following benefits:
 1. Long Life - virtually indestructable
 2. High Power - the choice for heavy duty, industrial applications such as mold cleaning.
 3. Blue Wave guarantees them for life.

Ultrasonic Transducers (cont.)

- Piezoelectric Transducers are man made ceramic elements. They offer the following disadvantages:
 1. Fragile - subject to cracking
 2. Limited Life - the ceramic loses ability to expand and contract.
 3. Thin diaphragms (tank walls) are subject to cavitation erosion.

Blue Wave Technology

- Blue Wave offers the following advantages over other ultrasonic systems:
 1. Zero-Spaced Magnetostrictive transducers, which offer higher mass and more cleaning power than spaced laminate designs or piezoelectric transducers.

Blue Wave Technology (cont.)

2. Silver Brazed transducer bonding to diaphragm which creates an all metal joint. This design provides better energy transmission and an indestructable bond. Other manufacturers typically use epoxy, which can fail over time and dampens energy transmission.

Blue Wave Technology (cont.)

3. Heavy gauge (7 ga.) 316L stainless steel diaphragm, which is impervious to cavitation erosion wear-through. Cavitation erosion wear-through is the leading cause of failure in piezoelectric systems, which typically use 14 ga. Diaphragms.

Blue Wave Technology (cont.)

4. Sweep Frequency 30kHz Ultrasonic Generators create even cavitation throughout the bath, providing thorough cleaning throughout the tank bath. Blue Wave is the only manufacturer to integrate Sweep Technology with Magnetostrictive Transducers.

Blue Wave Technology (cont.)

5. Blue Wave provides a Lifetime Guarantee on:

- Transducer Deterioration
- Transducer Disbondment
- Cavitation Erosion Wear-Through

6. Blue Wave provides a 20 Year Guarantee on tank welds and erosion wear through.

The Mold Cleaning Process

- The typical cleaning process consists of:
 1. Ultrasonic Cleaning
 2. Rinse
 3. Rust Inhibit
 4. Dry

The Mold Cleaning Process (cont.)

- There are a variety of ways to accomplish the process. A simple, very economical process might consist of:
 1. Ultrasonic Clean
 2. Rinse in sink or bucket
 3. Blow Off w/ compressed air
 4. Apply spray inhibitor

The Mold Cleaning Process (cont.)

- A more advanced process might consist of:
 1. Ultrasonic Clean w/ Oil Separation
 2. Heated Immersion Rinse to remove detergent.
 3. Heated Rust Inhibit Tank
 4. Dry Station utilizing compressed air

Mold Cleaning Systems

- Blue Wave Ultrasonics manufactures a broad variety of systems to meet most any application and budget - from small single tank systems for cleaning cores and inserts to large systems capable of cleaning mold frames and components.



BLUE WAVE ULTRASONICS

Mold

Cleaning Applications

Molding Material: Fiberglass Reinforced Thermoset Polyester
Cleaning Process: 25 minute Ultrasonic at 185°F w/ 4 oz. Dirl-Strip 606 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Fiberglass Reinforced Thermoset Polyester
Cleaning Process: 25 minute Ultrasonic at 185°F w/ 4 oz. Dirl-Strip 606 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



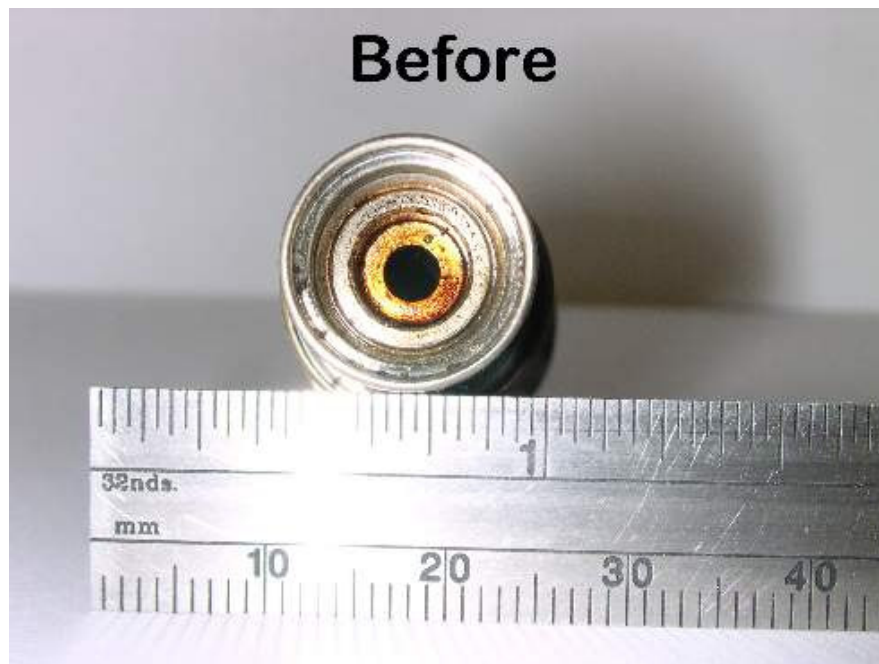
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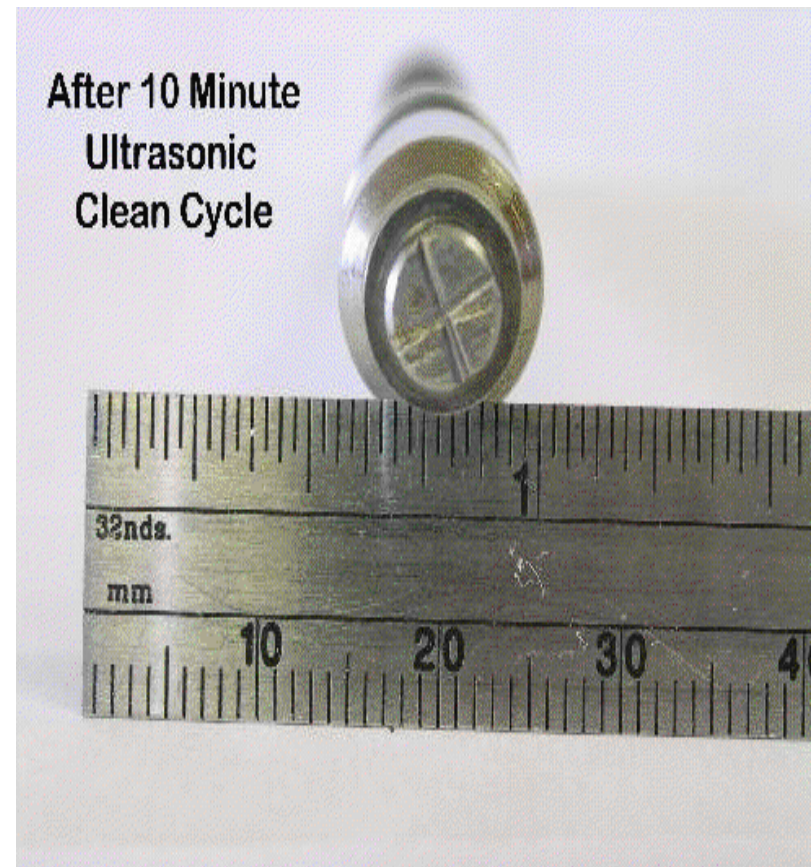
Molding Material: PPS (High Temperature Plastic)

Cleaning Process: 10 minute Ultrasonic at 185°F w/ 4 oz. Dirl-Strip 606 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



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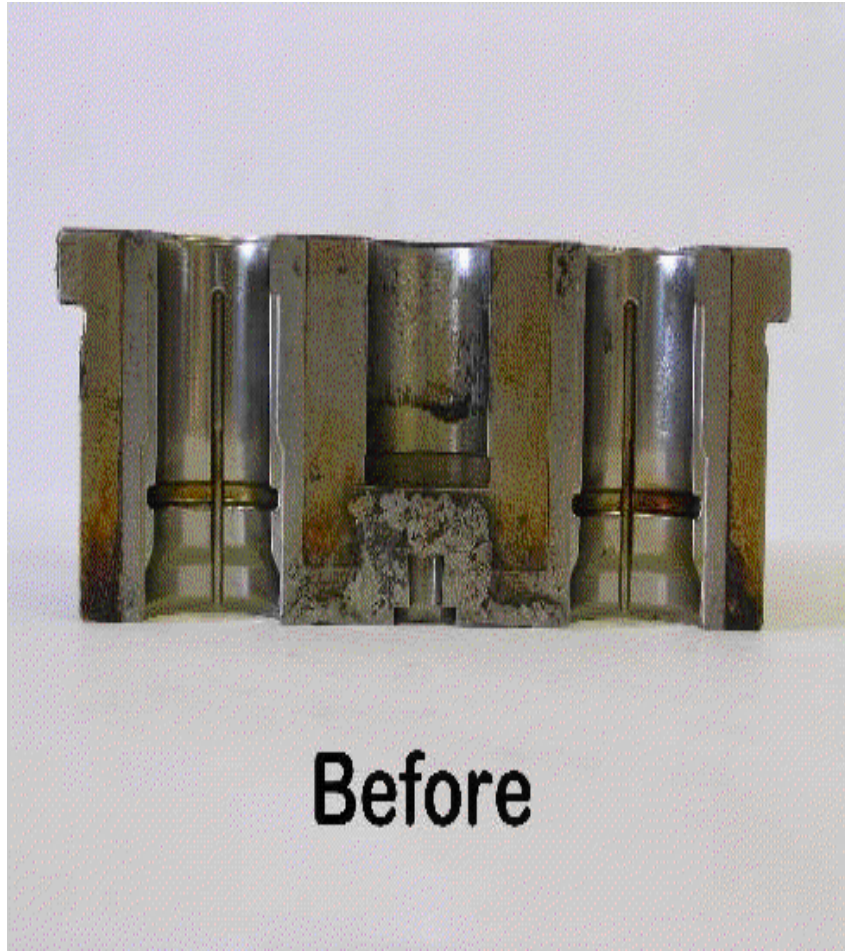
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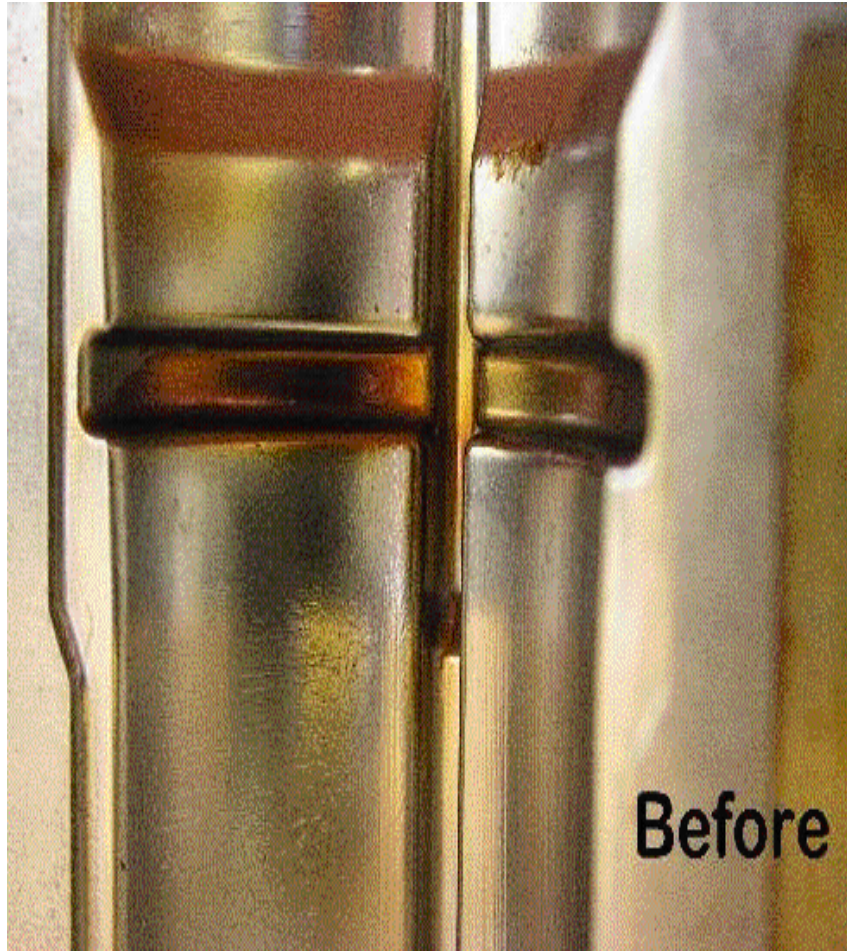
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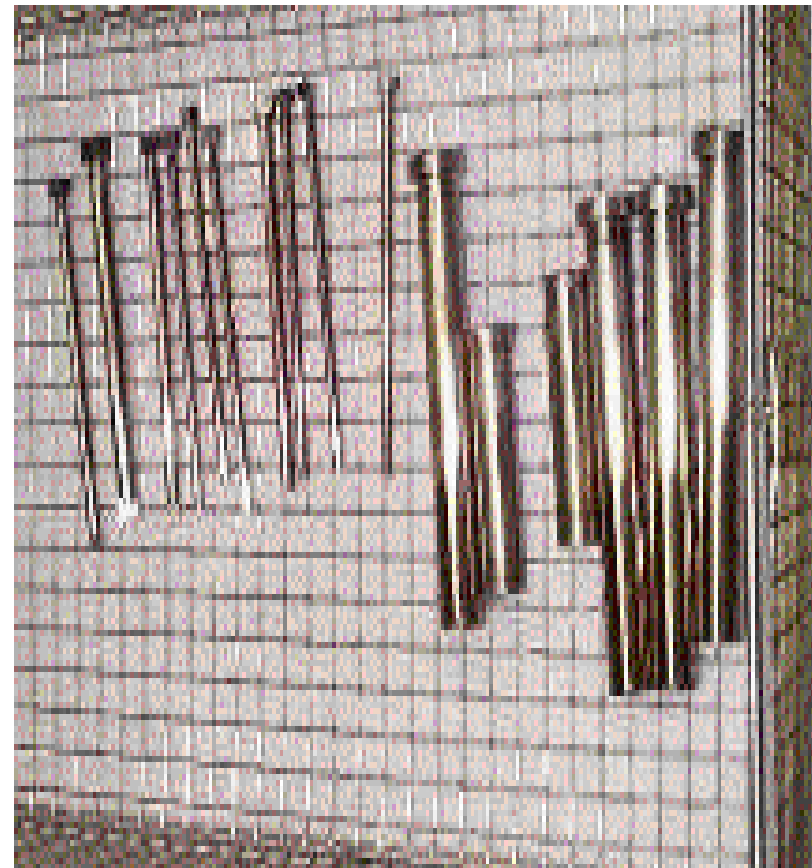


Molding Material: Polycarbonate

Cleaning Process: 25 minute Ultrasonic at 180°F w/ 4 oz. Dirl-Strip 606 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



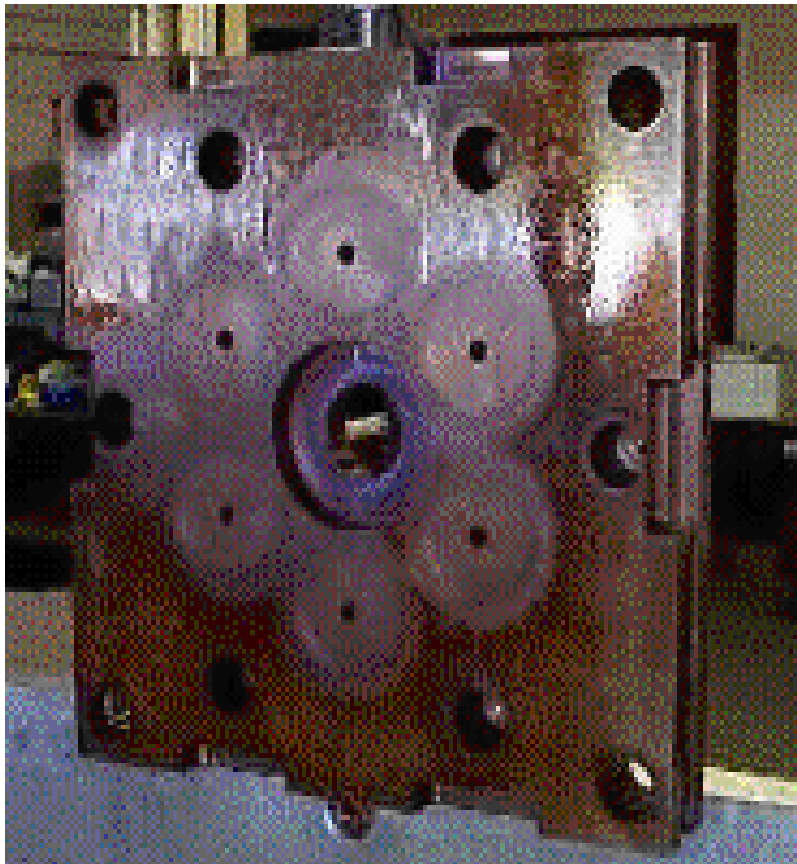
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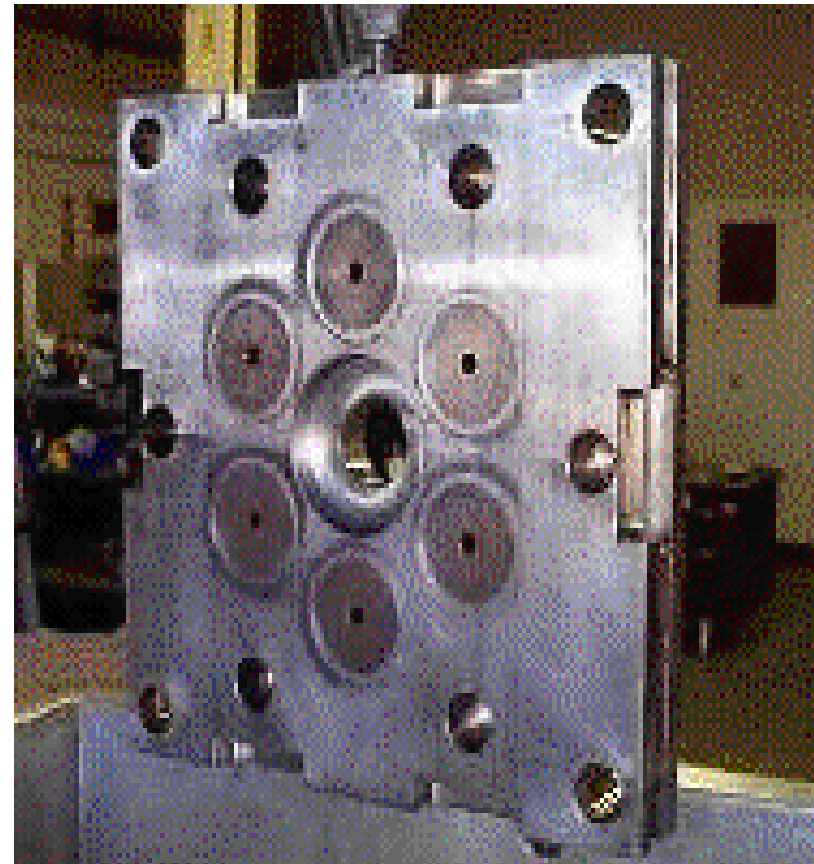
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Molding Material: Polycarbonate

Cleaning Process: 25 minute Ultrasonic at 180°F w/ 4 oz. Dirl-Strip 606 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: EPDM

Cleaning Process: 30 minute Ultrasonic at 180°F w/ 4 oz. Dirl-Strip 606 and 8 oz. BW-7808 per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



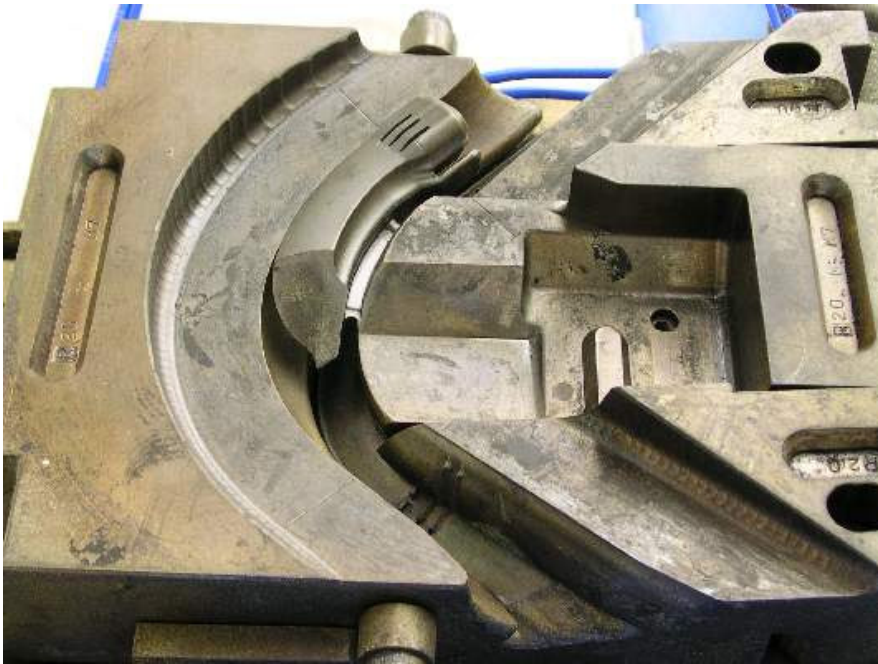
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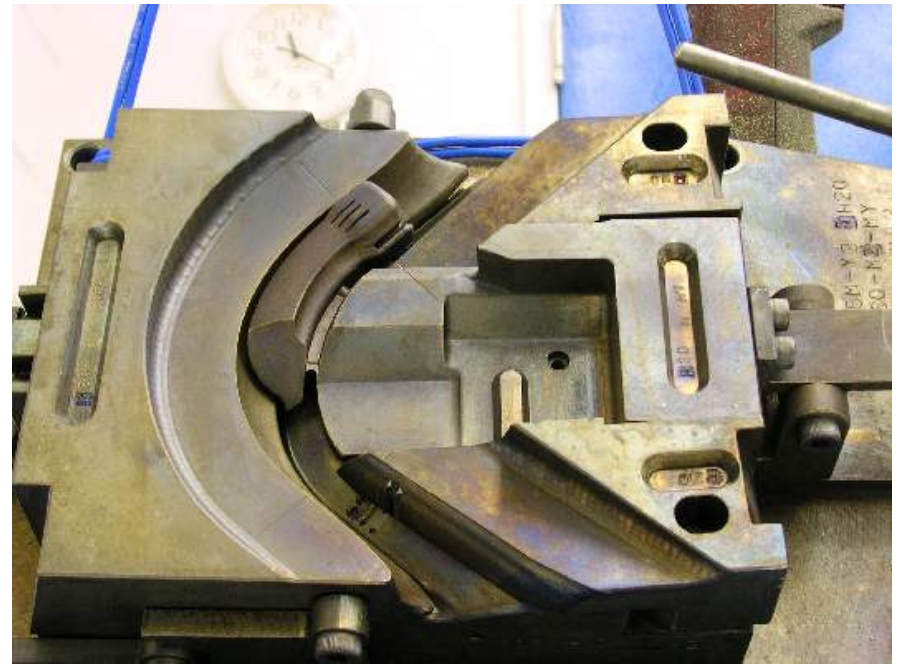
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BEFORE



AFTER

Molding Material: Polystyrene

Cleaning Process: 60 minute Ultrasonic at 190°F w/ 16 oz. Dirl-Strip 606 and 2 oz. 25-I per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Polystyrene

Cleaning Process: 60 minute Ultrasonic at 190°F w/ 16 oz. Dirl-Strip 606 and 2 oz. 25-l per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



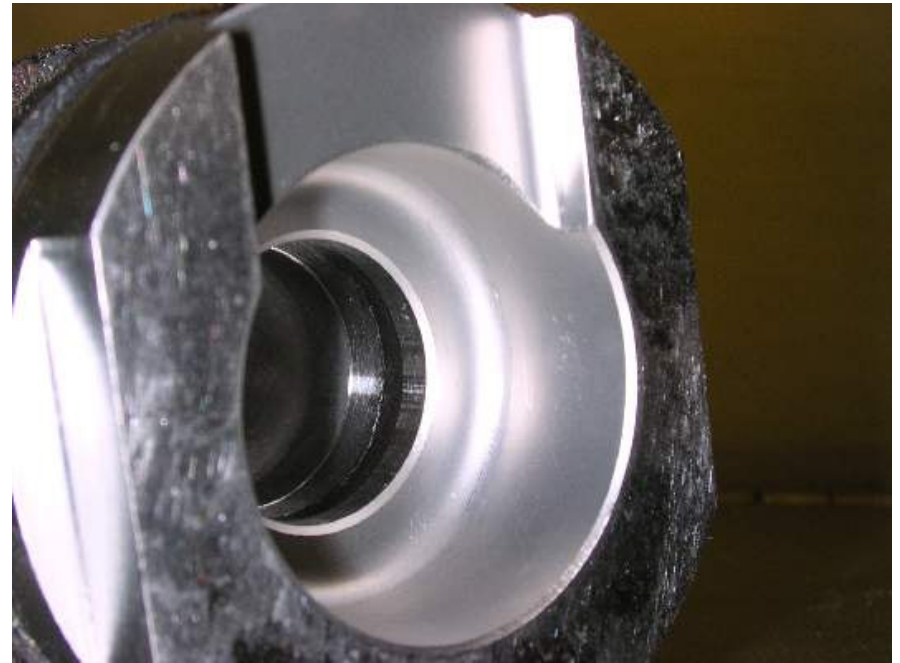
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BEFORE



AFTER

Molding Material: Polystyrene

Cleaning Process: 60 minute Ultrasonic at 190°F w/ 16 oz. Dirl-Strip 606 and 2 oz. 25-l per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Polystyrene

Cleaning Process: 90 minute Ultrasonic at 190°F w/ 16 oz. Dirl-Strip 606 and 2 oz. 25-l per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Polystyrene

Cleaning Process: 90 minute Ultrasonic at 190°F w/ 16 oz. Dirl-Strip 606 and 2 oz. 25-l per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



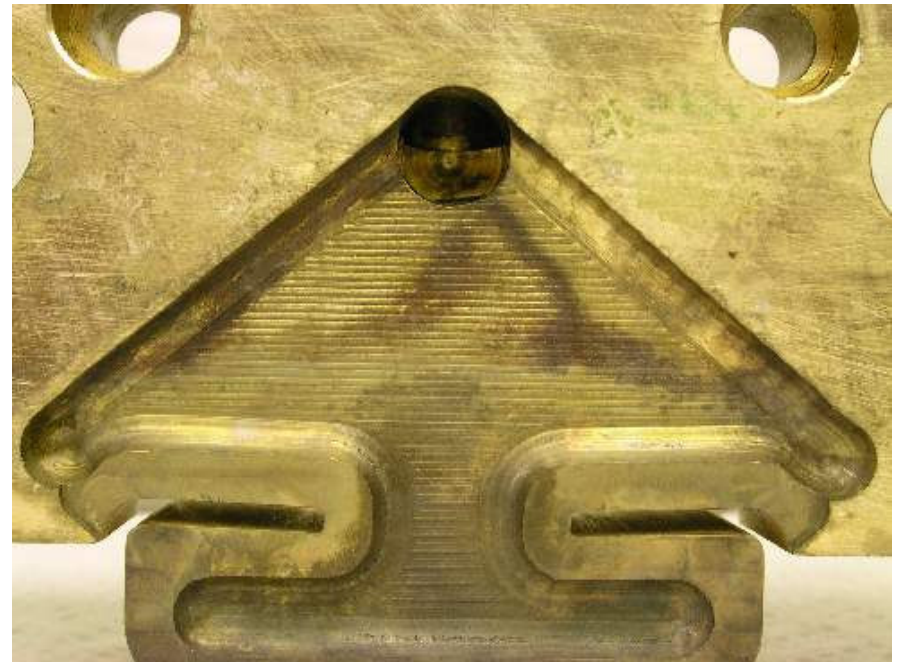
AFTER

Molding Material: Rigid PVC

Cleaning Process: 10 minute Ultrasonic at 180°F w/ 4 oz. 25-I per gallon water,
Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Rigid PVC

Cleaning Process: 10 minute Ultrasonic at 180°F w/ 4 oz. 25-I per gallon water,
Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

Molding Material: Vinyl

Cleaning Process: 60 minute Ultrasonic at 140°F w/ 2 oz. Organic Acid and 2 oz. 25-I per gallon water, Followed By Heated Immersion Rinse & Air Blow-Off



BEFORE



AFTER

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