

ALPHASONICS

ULTRASONIC CLEANING SYSTEMS

David S. Jones

Managing Director



ALPHASOUND
a world of difference

BetaSound
Ultrasonics. Advanced.

active
CAVITATION

Anilox Roll Cleaning Systems • Parts Washers • Industrial Water Recycling •
Zero Contact Plate Washers

Advanced Ultrasonics and The Benefits of An Effective Anilox Cleaning Regime

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 **MADE IN BRITAIN**

Presentation Structure

ALPHASONICS
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- A brief history of Alphasonics
- Why do rolls fill up?
- A History of Anilox Cleaning
- The Development of Alphasound and Betasound
- Introducing Active Cavitation
- The Importance and benefits of Control
- Ticking the Four Boxes

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Who we are...

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Formed in 1993, Alphasonics have gained a reputation worldwide for technical excellence and unrivalled service in the field of ultrasonic cleaning systems, with over 2500 active clients worldwide.

The secret to our success lies in a commitment to innovation and technical excellence in the application of high frequency sound as used for the regular cleaning of delicate items such as anilox rolls.

We know of no other ultrasonic equipment manufacturer that utilises the technology of ultrasound in the same way as we do.



What we face...

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It is widely accepted across the whole of Flexography that up to 80% of print quality problems stem from the condition of the anilox roll.

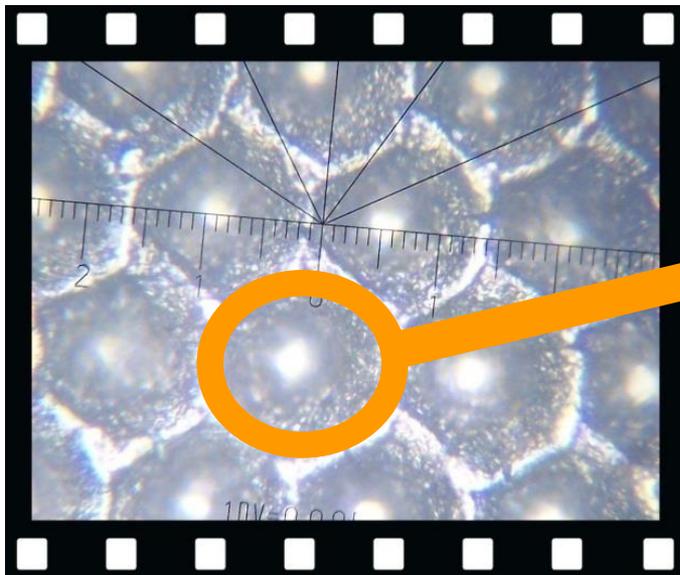


Why do rolls fill up?

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In a word, **STICTION**

- the force that holds two different materials together by virtue of their surface texture.



Cross-section

History of anilox cleaning

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Controlling the anilox is crucial to producing high quality print consistently.
Over the years, many different methods have been proposed as a means for solving “the anilox problem”.



**Chemical
Cleaning
by Hand**



1980

**Single Low
Frequency
Ultrasonic
cleaning**



**Bi-Carbonate
of Soda Blasting
Polymer Bead
Blasting**



1990

**Alphasonics
starts 1993**



2000

**Dual Frequency Variable
Power Ultrasonic
Cleaning**

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**Multiple Frequency
Ultrasonic
Cleaning**

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2012



2014

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A brief history of Alphasound

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- Developed to ensure safe and effective cleaning across a wider screen count range. A technology driven by 20 years of continual anilox development
- The first dual frequency, variable power, super sweeping ultrasonic cleaning system that delivers a very even distribution of ultrasound.
- Uses higher frequencies - more gentle than other systems
- Very successful, safe and effective, resulting in many print awards won by its users since 2000.

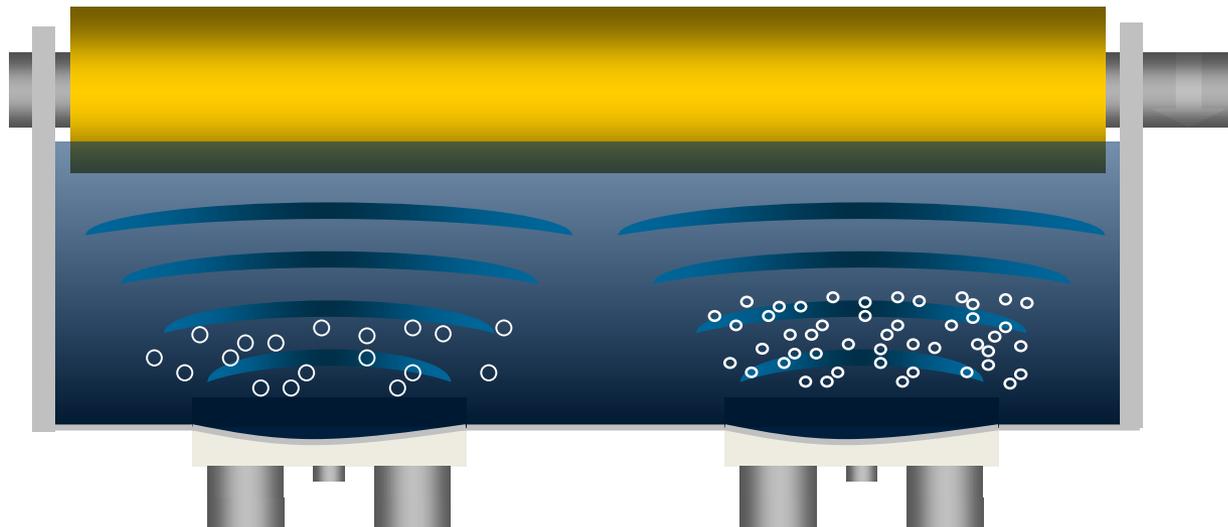
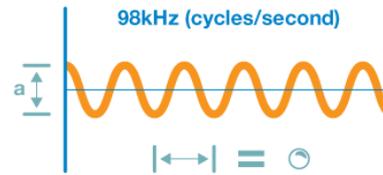
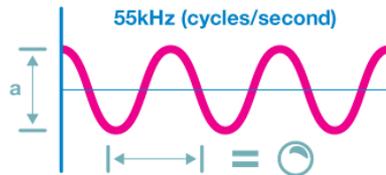


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Dual-Frequency, Variable Power Super-Sweeping Ultrasonics



Flexure of the tank base produces vacuum chambers.

The area under the curve of the sine wave is directly proportional to the size and intensity of the vacuum chamber produced in the fluid.

High frequency setting produces more bubbles for the same input power but these will be individually smaller and more gentle

Development of Betasound

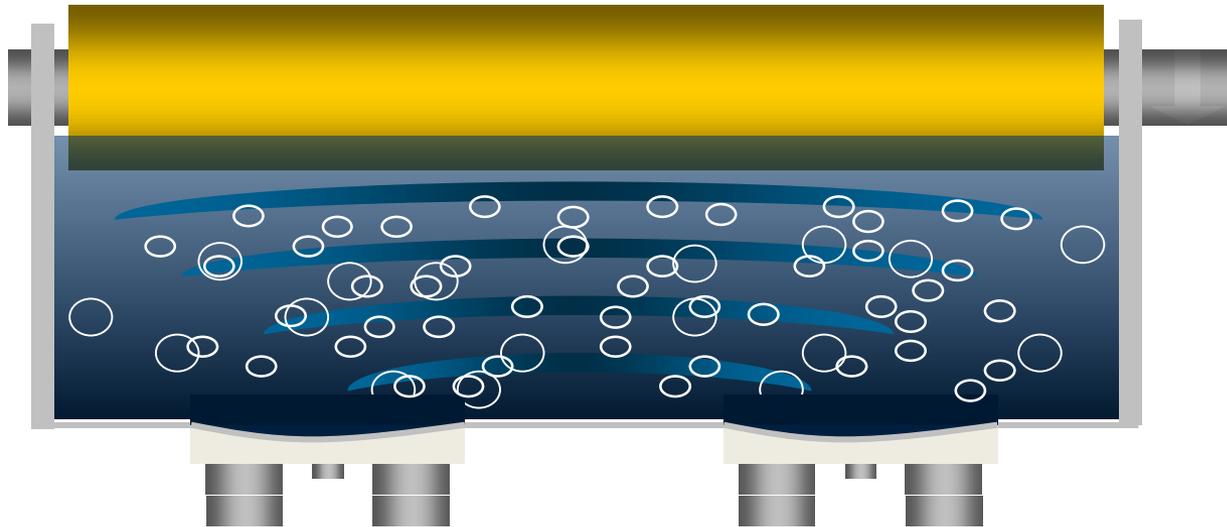
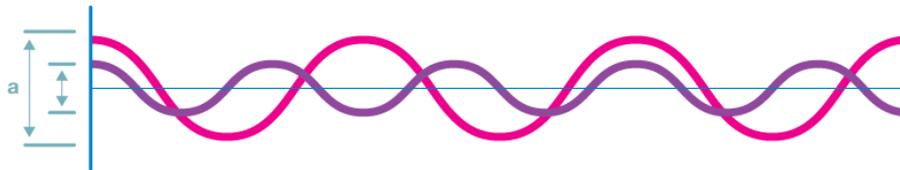
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- Developed for safe, even and effective cleaning across an even wider screen count range. Developed especially for HD Flexo
- The first multiple frequency, super sweeping, variable power ultrasonic cleaning system that delivers the ultimate in even distribution of ultrasound.
- Uses higher frequencies - more gentle than other systems
- Future proof, ultra-safe and effective cleaning across the whole screen count range.



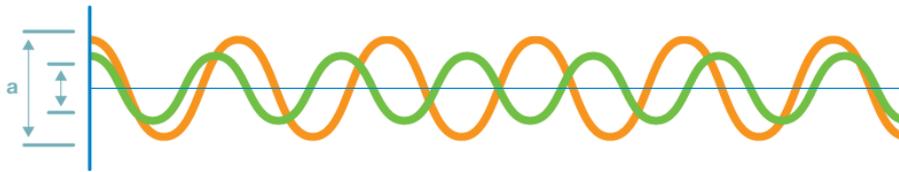
Multiple Frequency Variable Power Multi-Super-Sweeping Ultrasonics



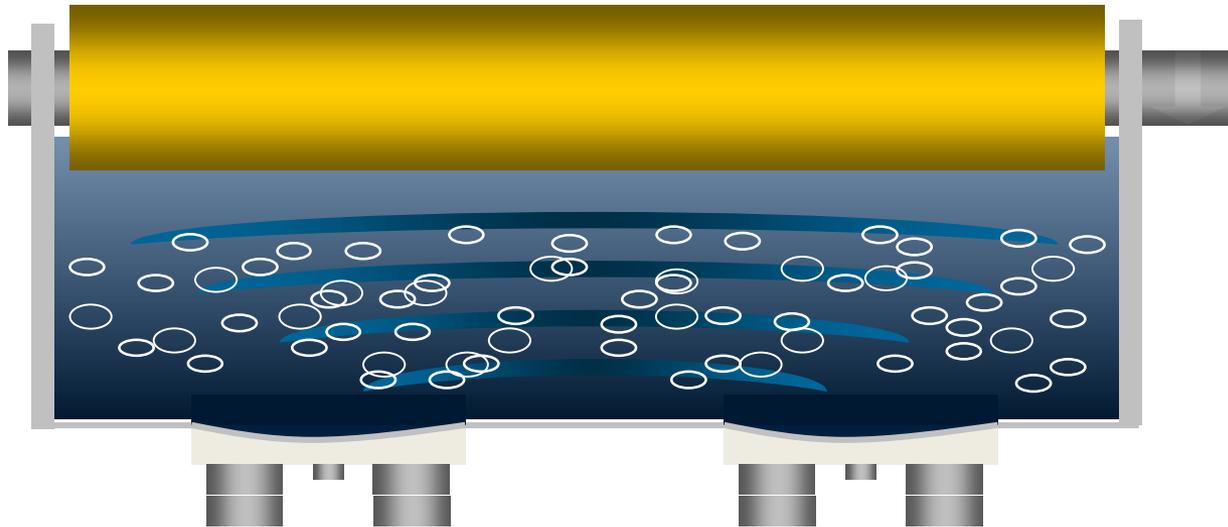
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The low frequency setting will utilize two combined lower frequencies for the safe, thorough and regular cleaning of lower screen aniloxes up to 800lpi (315lpc)

Multiple Frequency Variable Power Multi-Super-Sweeping Ultrasonics



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The high frequency setting will utilize combined high frequencies for the safe thorough and regular cleaning of ultra high screen anilox rolls as used in high-definition flexo.

'Enhanced Super Sweep' Explained

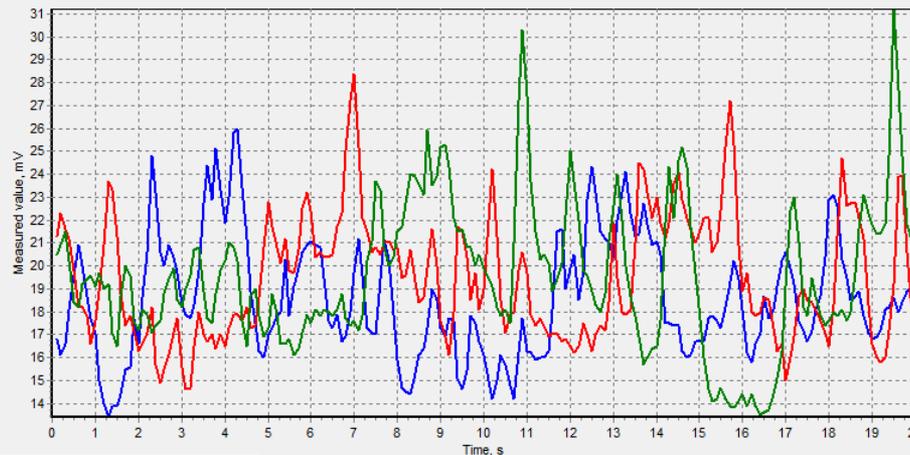
Multiple Frequency Variable Power Multi-Super-Sweeping Ultrasonics

Reading 1
Max = 26.0 mV, Min = 13.4 mV
Mean = 18.594 mV, Spread = 12.6 mV
STD = 2.574 mV, N_out_SZ = 15
N_below_mean = 113

Reading 2
Max = 28.4 mV, Min = 14.6 mV
Mean = 19.501 mV, Spread = 13.8 mV
STD = 2.669 mV, N_out_SZ = 22
N_below_mean = 107

Reading 3
Max = 31.2 mV, Min = 13.5 mV
Mean = 19.546 mV, Spread = 17.7 mV
STD = 3.122 mV, N_out_SZ = 27
N_below_mean = 108

Reading 1-3
Max = 31.2 mV, Min = 13.4 mV
Mean = 19.214 mV, Spread = 17.8 mV
STD = 2.833 mV, N_out_SZ = 63
N_below_mean = 328



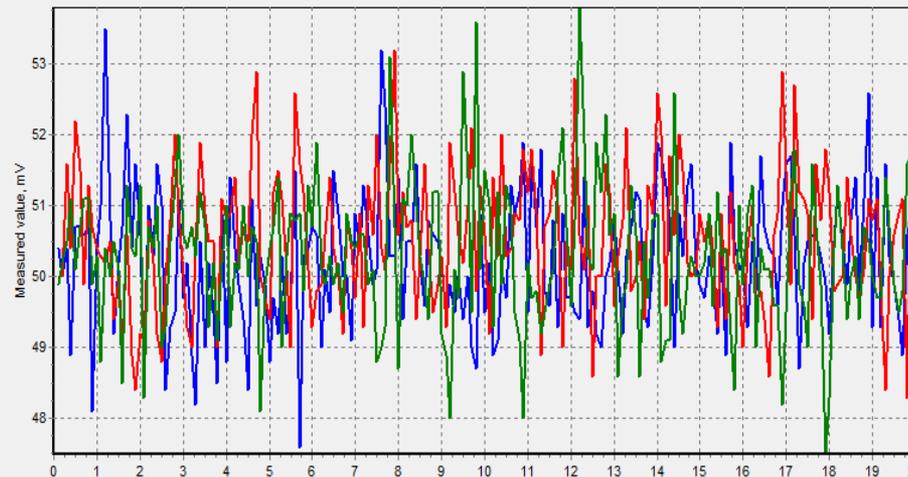
Reading 1-3

Reading 1
Max = 53.5 mV, Min = 47.6 mV
Mean = 50.254 mV, Spread = 5.9 mV
STD = 0.951 mV, N_out_SZ = 0
N_below_mean = 96

Reading 2
Max = 53.2 mV, Min = 48.3 mV
Mean = 50.540 mV, Spread = 4.9 mV
STD = 0.956 mV, N_out_SZ = 0
N_below_mean = 100

Reading 3
Max = 53.8 mV, Min = 47.5 mV
Mean = 50.282 mV, Spread = 6.3 mV
STD = 1.006 mV, N_out_SZ = 0
N_below_mean = 98

Reading 1-3
Max = 53.8 mV, Min = 47.5 mV
Mean = 50.359 mV, Spread = 6.3 mV
STD = 0.980 mV, N_out_SZ = 0
N_below_mean = 294



The ability to distribute sound evenly into water. Enhanced Super Sweep delivers a more consistent ultrasonic distribution with little variation.

This guarantees roll safety and roll cleaned to 100% of its deliverable volume.

This technology is unique to Alphasonics.

Super Sweeping Ultrasonics

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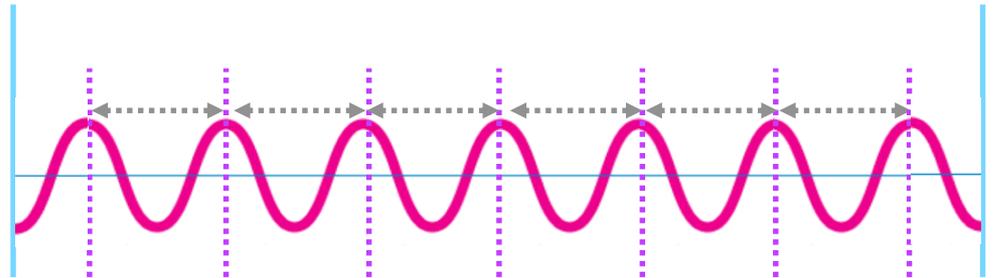
Utilisation of seven 'harmonic peaks'. These are the optimum frequencies at which the ultrasonic transducers operate.



By utilising these harmonic frequencies as the point at which to 'sweep' to, the ultrasound within an Alphasonics system has a sweeping rate of a minimum $\pm 12\text{kHz}$.

This works by sweeping from one harmonic to the adjacent lower harmonic, then up to higher harmonic.

Modulating in this manner delivers an incredibly even distribution of sound.



The sweep between harmonics also means the end point of each sweep is not into dead space, but at the optimum frequency, suited to the transducer's capabilities.

The Next Step – Active Cavitation

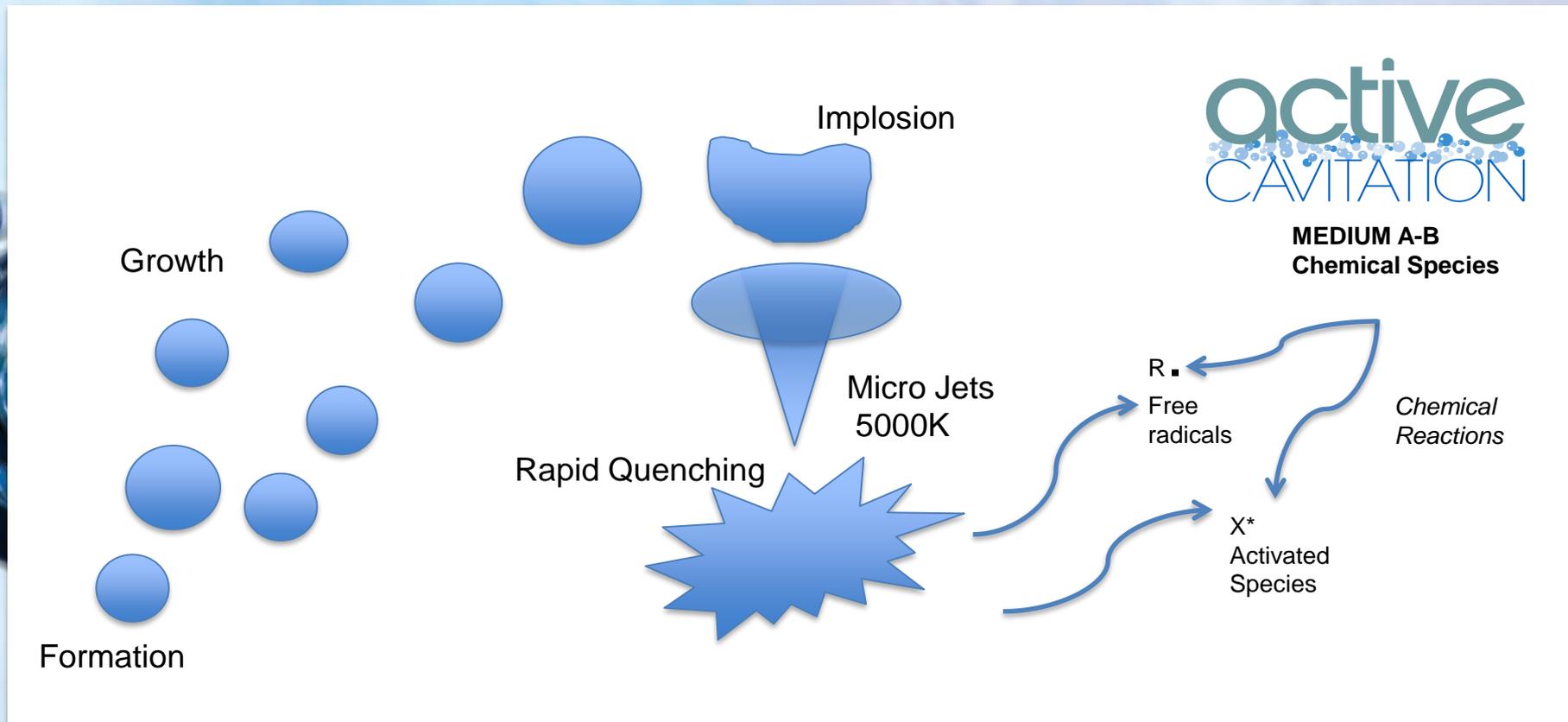
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- Built on the effect of ‘Sonolysis’.
- Designed to greatly reduce cleaning times.
- Future proof, ultra-safe and effective cleaning across the whole screen count range.



- The use of Ultrasonics to accelerate chemical reactions.

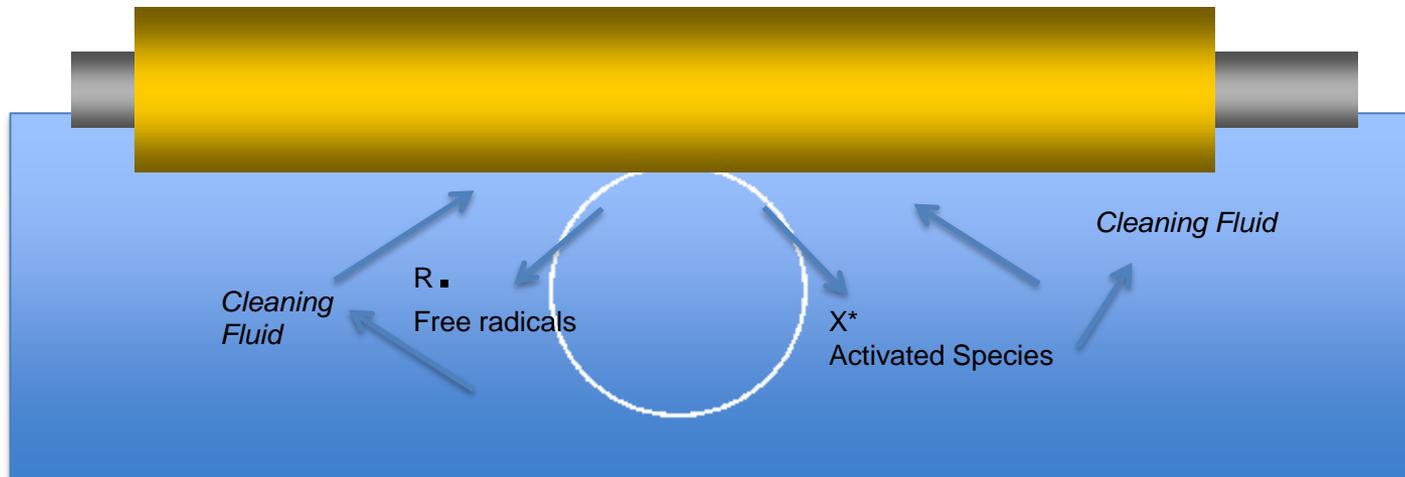


SOURCE: Carlos Alberto Ávila-Orta, Pablo González-Morones, et al. (2013). **Toward Greener Chemistry Methods for Preparation of Hybrid Polymer Materials Based on Carbon Nanotubes, Syntheses and Applications of Carbon Nanotubes and Their Composites.**

Available from: <http://www.intechopen.com/books/syntheses-and-applications-of-carbon-nanotubes-and-their-composites/toward-greener-chemistry-methods-for-preparation-of-hybrid-polymer-materials-based-on-carbon-nanotub>

Sonolysis and your anilox.

The micro jet formed in the collapse of the bubble impacts the roll and draws out contamination. Meanwhile, the free radicals and species produced as a result of the high pressure and 5000K temperature from the bubble's collapse allow high energy chemical reactions to take place between the cleaning medium and the ink contamination.



So what does Active Cavitation Do?

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Active Cavitation enhances the positive effects of degassing by extending time in which Free Radicals are produced.

Through the re-introduction of oxygen into the cleaning fluid at strategic points, the further production of Free Radicals and energy delivers an increase in reactions between the cleaning chemical and the contamination resulting in **enhanced and faster cleaning.**



Control is key...



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Controlling the anilox delivers 5 tangible benefits;-

No requirement for over-pigmentation of inks.

Much quicker and more consistent make-ready.

Greatly reduced waste.

Consistently higher print quality.

Much easier anilox inventory management



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Ticking the Four Boxes



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- **ROLL SAFETY**
Tight system controls ensures roll damage is impossible
- **QUALITY**
Delivers 100% Roll Volume across the whole face width
- **TIME**
Active Cavitation – Quicker than ever
Reduced make ready time
Cycle flexibility
- **COST SAVINGS**
Delivers the five tangible benefits at a low running cost
Greatly reduced labour costs



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What do these technologies mean for Flexo?

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100% consistent cleaning across the whole screen count range.

Anilox Control

Anilox Safety

Regime Flexibility

Positive impact on production quality

Tangible Cost savings



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THANK YOU

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