



## Green Aspects of ResonantAcoustic® Mixing

The use of ResonantAcoustic® mixing to replace traditional impeller or paddle mixers is environmentally friendly at several levels. The following are a few key examples of how Resodyn Acoustic Mixers can help you increase energy efficiency in your mixing process.

### (1) Carbon Footprint Reduction

In a demonstrated example of mixing a typical client's product, the RAM 5 ResonantAcoustic® mixer had an average power consumption of 12 kVA for a duration of two minutes; a total energy consumption of 1.44 MJ. By contrast, a traditional mixer performing a similar task will consume approximately 14 kVA of power with a mix cycle lasting around 20 minutes; consuming 16.8 MJ of energy.

Using the RAM 5 mixer will therefore save approximately 5.8 lbs of CO<sub>2</sub> emissions<sup>(1)</sup> for every batch of material produced.



### (2) Reduction of Waste-Creation

The RAM 5 is capable of mixing in any sealed vessel, and does not have any impellers, paddles, or any mixing equipment hardware in contact with the mixed ingredients.

This eliminates the waste generation associated with equipment and impeller cleaning. In an optimized installation where mixing is performed in the vessel used to transfer the mixed ingredients to the next process step, all cleanup associated with the mixing process is eliminated. This approach eliminates the waste of cleaning materials, the processing of typically harsh solvents used to clean the product ingredients from the mixing container and impellers, as well as eliminating the resulting effluent. The carbon emissions from the sourcing and disposal of these materials are all eliminated.

### (3) Resonant Operation.

The core design feature of the RAM 5 mixer is to operate under system mechanical resonance. In this mode, there is a virtually complete exchange of energy between the mass elements and spring elements in the system and nearly zero energy loss from the transfer into the mixing medium. In particular, mixing performed by the ResonantAcoustic® mixer using 12 kVA would require over 230 kVA in a non-resonant equipment configuration.

(4) Regenerative Power Drives.

The electrical-mechanical drive elements in the RAM 5 use technology that both corrects the power factor of the applied load, and uses excess mechanical energy to generate electrical power. The generated power is returned to the customer's distribution network. This feature serves to greatly increase electrical efficiency when the mixer is using power, and reduces overall costs and carbon footprint when it is operating in a regenerative mode.

(5) Circulatory Cooling

In order to eliminate continuous water consumption, Resodyn Acoustic Mixers offers a water circulation chilling option for the RAM 5. This unit is interlocked and controlled by the mixing system, and provides cooling only during times when it is critically required. In an optimized installation, Resodyn Acoustic Mixers will work with the client's facility department to integrate the unit with the facility heat exchanger (in companies where such an installation is available) to preserve and divert the heat to other manufacturing processes.

Resodyn is committed to reducing the carbon footprint associated with both the manufacture and on-going use of its products. Suggestions for further improvements are welcomed, will be thoroughly investigated, and implemented wherever possible.

Reference 1. U.S Environmental Protection Agency eGRID2006 Version 2.1, April 2007



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