

Hydro Dynamics, Inc.

Harnessing the Power of Cavitation



The Hydro Dynamics ShockWave Power™ Reactor (SPR) provides solutions for many of the most difficult mixing and heating challenges for food and beverage processing. Whether it's heating liquids without scale buildup, mixing shear sensitive compounds, producing stable emulsions, or uniformly blending thick liquids, the SPR can solve your toughest mixing issues.

Benefits for Food & Beverage Processing

Our stainless steel, high performance mixers are ideal for food and beverage applications. The benefits of Shockwave Power include:

- Improved process efficiencies (time, operating costs, and/or capital costs)
- Enhanced product quality, yield and/or raw material savings from increased mass transfer
- Elimination or reduction of process downtime from maintenance requirements
- Smaller footprint than traditional technology
- The SPR is easily disassembled, full CIP and can be manufactured to meet 3-A standards.



The Next Generation in Mixing Technology



The SPR uses our patented mixing technology that produces superior results. As the device spins, cavitation is produced, and shockwaves are released into the liquid which can heat and/or mix. The cavitation is controlled and limited to the cavities in the rotor, rendering it non-damaging to the device, while providing a mass transfer rate that far exceeds that of typical impellers or blades mixers. The patented technology is considered a paradigm shift in the mixing industry, where process intensification, acceleration and the replacement of batch processing with continuous processing are necessary to compete in a global economy.

Scale-Free Heating

During heating, temperature increases uniformly throughout the entire liquid without any heat transfer surfaces. This allows the SPR to heat liquids without scaling or fouling. There are no hot or cold spots and no temperature gradients. Products can be heated and homogenized simultaneously. Pinpoint temperature control can be achieved by varying the tip speed with a variable frequency drive.



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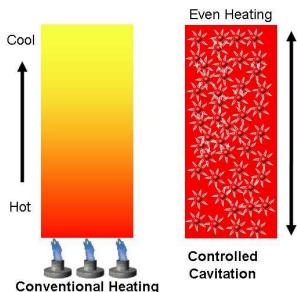
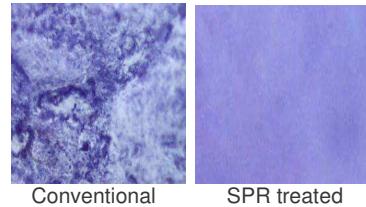
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Market Applications

Applications that can be improved with the SPR encompass eggs, processed meats, non-carbonated beverages, milk products and cheeses. Select applications with breakthrough benefits in mixing and heating include:

Continuous Powder Hydration: The SPR can be used for the hydration of gums, gels and thickening powders to create a more even product. Applications include powdered cheeses, icings, and powdered drinks. The pictures to the right show a gum that has been stained. The dark areas indicate unhydrated gums. Full hydration results in reduced raw material costs, shorter processing time, and a more homogeneous product than those made with conventional technology.



Scale-Free Heating: Eggs, pudding, gels, cheeses, sauces, and high protein food products can be heated without scorching. The SPR can also be used for “polishing”, performing the final heating step where scaling is prevalent and aggressive.

One Step Homogenization and Pasteurization: The SPR can be used to heat and homogenize in a single step with a single piece of equipment. This allows for process simplification and minimizes footprint.

Mixing Thick Liquids: The efficient mixing of the SPR has been proven in applications such as processed meats, where the even mixing of meat and fillers maximizes raw material cost savings. The ability to efficiently mix is illustrated in the images to the right which show a paste mixed with a color. The SPR creates a much more homogeneous gel compared to a conventional mixer or homogenizers.



Mixing of Shear Sensitive Compounds: The SPR can be configured for low shear mixing. This allows for the treatment of shear sensitive compounds such as proteins, polymers, and citrus pulp without damage.

Mixing of Particulates: The SPR excels at mixing solids and particulates. The device has large clearances and minimally damages fibers, vegetable chunks, spices and other particulates normally damaged in homogenization. This also allows effective mixing after particulate addition.

Emulsification: The SPR can be used to “tune” emulsion particle size by varying mixing intensity. This can be accomplished continuously and with no air entrainment.

Aeration: The gas/liquid mixing of the SPR allows it to be used for aeration.

UV (R&D Application): Shockwave Power is being coupled with a clear housing and UV light to allow for low temperature pasteurization of opaque liquids.

Please contact us if you have a specific mixing or scale-free heating need or would like additional information about this patented technology.