

SC-3 High Efficiency Impeller - Optimal Design... Maximum Results



Deep tank mixing applications require long agitator shaft extensions, as well as lower rotational speeds to avoid critical speed problems. In the past, to develop the required flow in deep tanks, it was necessary to reduce the impeller speed and increase the impeller diameter to avoid critical speed problems. This technique added weight, as well as cost, and often pushed impeller-to-tank diameter ratios over 50%. When the impeller-to-tank diameter ratio exceeds 50%, a typical high efficiency impeller loses mixing effectiveness.

The new Chemineer® SC-3 Impeller features an advanced design that produces flow characteristics of much larger impellers, without the added

weight or the resulting loss in pumping efficiency. The highly efficient SC-3 Impeller's reduced weight allows for the use of longer shaft extensions for deeper tanks, and resolves associated critical speed limitations. The use of an SC-3 Impeller can frequently produce significant agitator cost savings.

Our laboratory LDA (Laser Doppler Anemometry) system was used

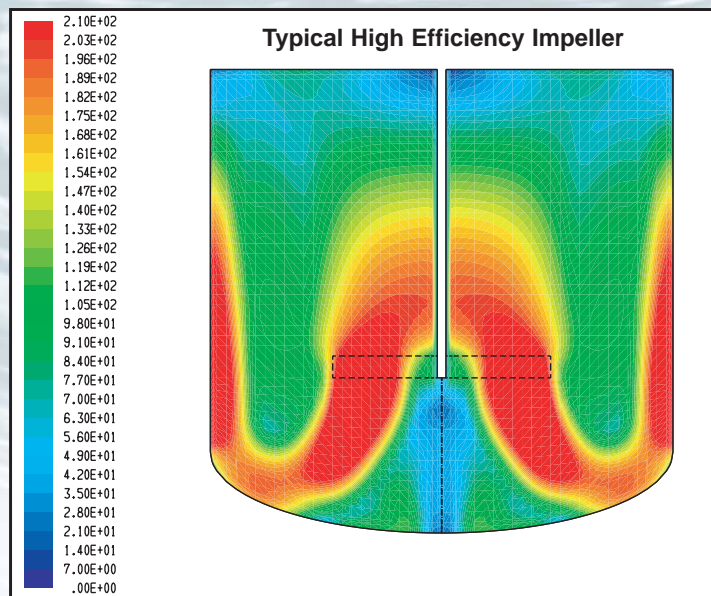
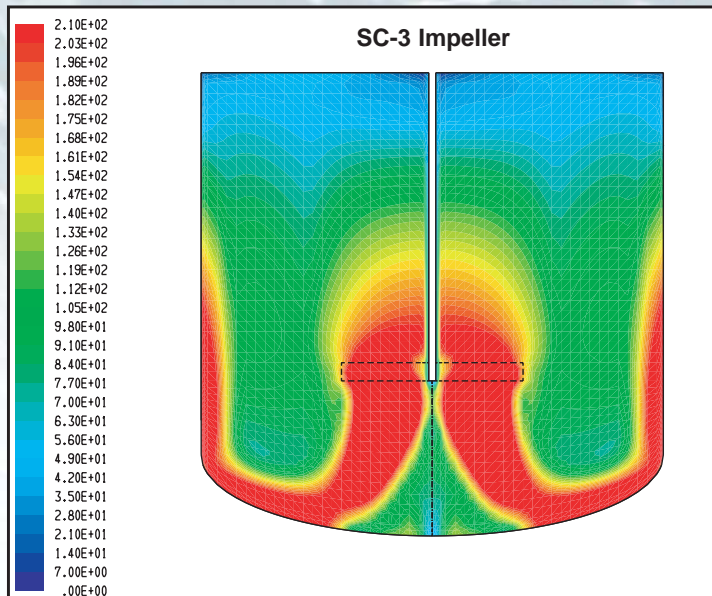
extensively in the design of the SC-3 Impeller. Because large variations in discharge velocity can produce inefficiencies, significant efforts were made in the development of the SC-3 to maintain a relatively flat velocity profile. The discharge velocity profile is flatter than for most other high efficiency impellers under turbulent flow conditions.

OPTIMAL DESIGN

Design Requirement	Solution	Benefit
Long in-tank shafts without steady bearings	Lighter-weight impeller	Ability to effectively operate in taller tanks while conserving drive size, maintaining ChemScale level.
Operate below first critical speed	High-flow impeller	Allows for smaller SC-3 diameters. Lower impeller weights are thus achieved, resulting in robust shaft designs operating below critical speed with unrestricted speed turndown.
Long-lasting	Advanced blade design	As a result of the contoured blade form, the SC-3 is inherently stronger than older designs and is able to handle demanding, high-fluid-force mixing conditions.
Materials variety	High-alloys and coatings	316SS and Hastelloy C-276 are standard. Other alloys and coatings available upon request.

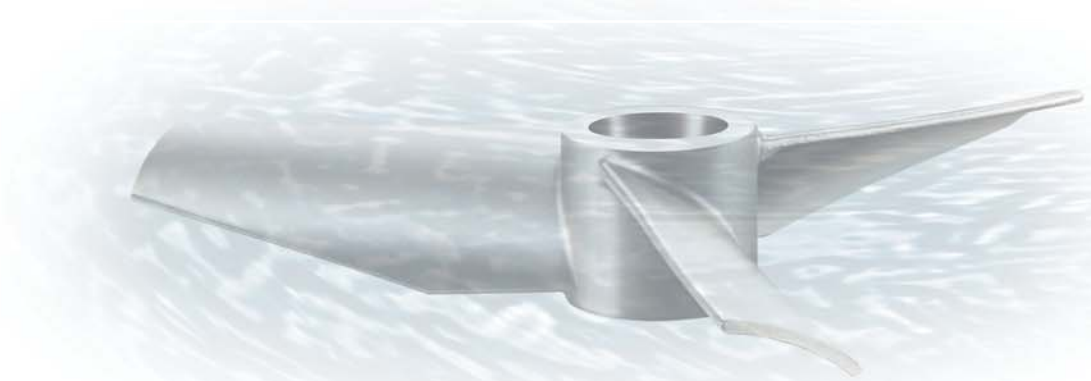
SC-3 High Efficiency Impeller

AVERAGE VELOCITY PROFILE COMPARISON



MAXIMUM RESULTS

Design Requirement	Solution	Benefit
Blending and solids suspension	"Flat" velocity profile	It is a highly axial, low shear, high efficiency impeller developed using both LDA and DPIV (Digital Particle Image Velocimetry) technologies. Average Velocity Profiles illustrate better SC-3 suspension capability compared to other high-efficiency impellers, even at larger D/T's (impeller-to-tank diameter ratio).
Low shear	"Flat" velocity profile	Flatter profiles yield significantly lower shear gradients. Well-suited for shear-sensitive applications.
Higher viscosity blending	Optimal angle of attack	Better performance at lower Reynolds Numbers (N _{re}) than other H.E. impellers.
Small tank opening	High-flow impeller	A high flow number enables the SC-3 to maintain ChemScale level at smaller diameters.



Chemineer, Inc.
A Unit of Robbins & Myers, Inc.

P.O. Box 1123
Dayton, Ohio 45401
Telephone: (937) 454-3200
Facsimile: (937) 454-3379
Toll-Free: 800-643-0641
Web: www.chemineer.com

Operating Locations in:

Dayton, OH Singapore
North Andover, MA Taipei, Taiwan
Derby, England Shanghai, China
Mississauga, Ontario Seoul, Korea
Mexico, D.F.

© 2003 by Chemineer, Inc.
© Chemineer is a registered trademark of Chemineer, Inc.

Printed in U.S.A.
5M EDGE 603