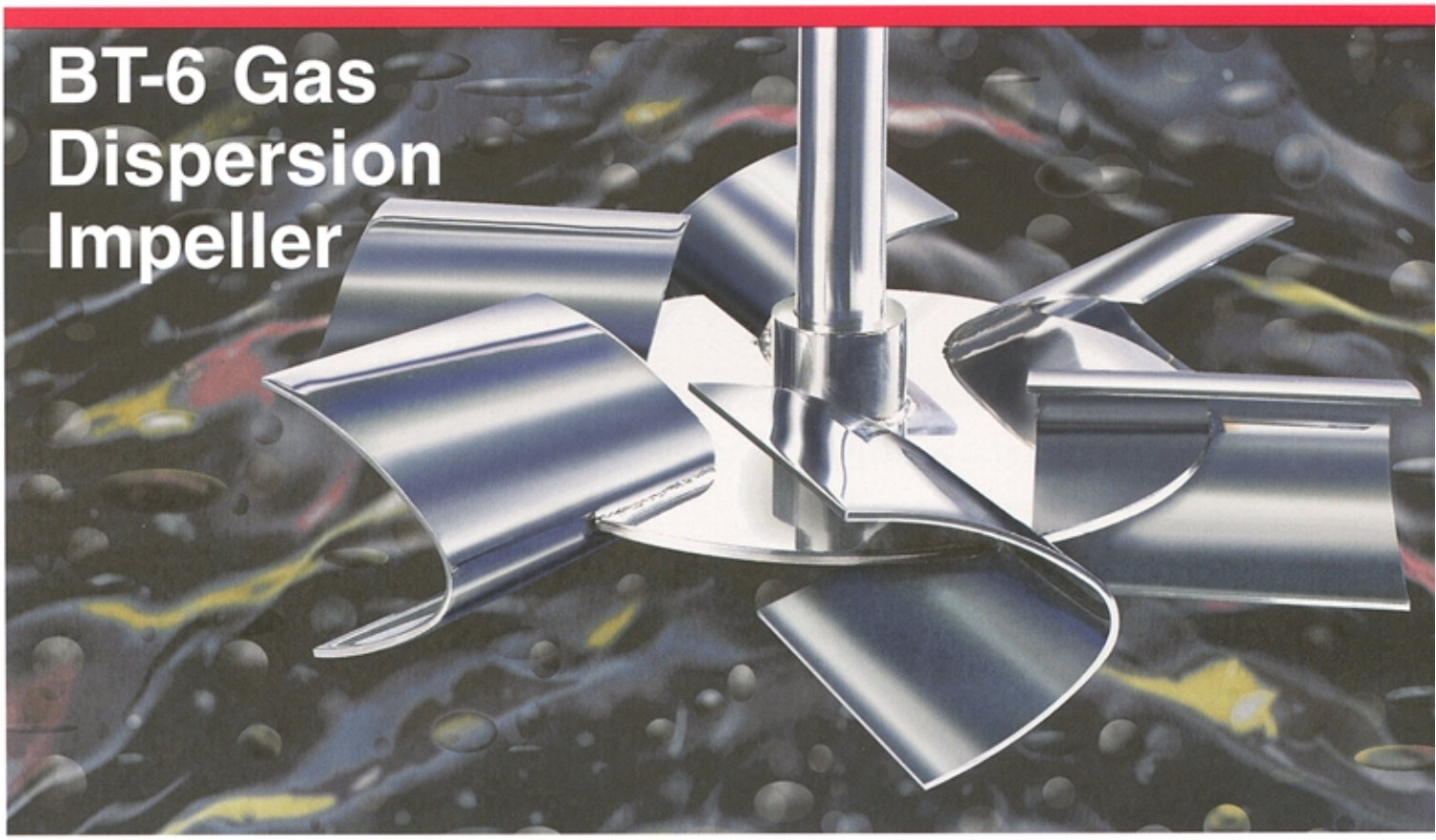
Chemineer

BT-6 Gas Dispersion Impeller



Chemineer's new Bakker turbine (BT-6) provides you with the latest technology in gas dispersion. This new generation impeller, the result of a cooperative venture between the Chemineer, Inc. R&D group and its academic affiliates, was developed using the most modern flow measurement techniques. Its unique patent-pending blade geometry efficiently disperses gas at even the highest flow rates.

Because the BT-6 has such an efficient dispersion mechanism, this impeller can handle more than five times as much gas as the D-6 impeller (Rushton turbine) before flooding, and more than twice as much as Chemineer's concave blade CD-6 impeller (Smith turbine).

Another benefit is a very flat power draw curve under gassed conditions. Since its power draw varies little with gas flow rate, the BT-6 impeller is particularly well suited for applications where flow rates change during the process. Another advantage of the more constant power draw is that changes in mass transfer during the process are smaller than with other impellers. Additionally, the power draw of the BT-6 shows minimal variation when exposed to changes in liquid viscosity; it remains constant for Reynolds numbers well below one thousand, which corresponds to viscosities of several thousand centipoise in typical industrial applications.

The blade design, asymmetric about the plane of the disc, has been optimized to take into account the different flow conditions above and below the disc. The Bakker BT-6 impeller's asymmetric design allows the overhang on the top of the blade to capture the rising gas flow. The gas flow is then dispersed from a strong turbulent vortex on the inside of the deep blade. No cavities form on the trailing edges of the blades.

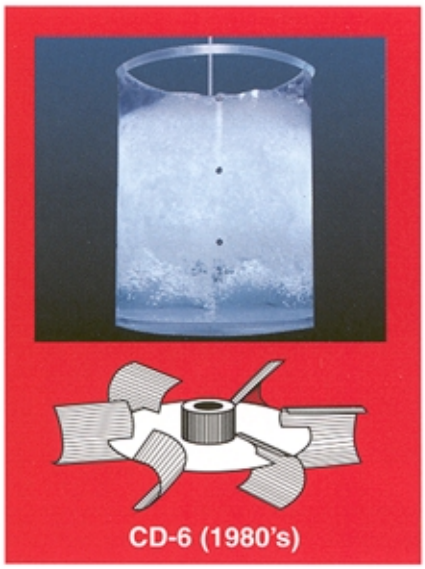
In tall tanks the radial pumping BT-6 is used as the primary gas dispersion impeller mounted directly above the gas sparger in the bottom of the tank. Axial flow impellers, such as the wide blade Maxflo hydrofoil or the narrow blade HE-3 high-efficiency impeller, are used as upper impellers. This impeller configuration combines efficient gas dispersion with good overall top-to-bottom blending. Uniform dissolved gas distribution is achieved throughout the vessel.

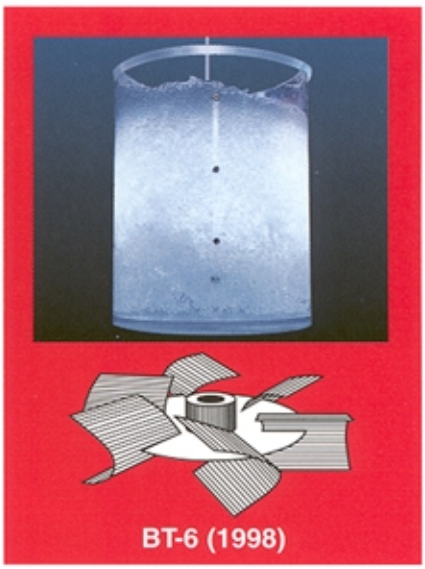
Chemineer's new Bakker BT-6 impeller offers many advantages over conventional gas dispersion technology:

- greater dispersion capability,
- higher rates of interphase mass transfer,
- minimal power draw sensitivity to changes in liquid viscosity and gas flow rate.

Impeller Features

BT-6 impellers are available in the normal configuration of 6 blades with a choice of welded, bolted, or bolted-adjustable blades. Standard materials of construction are carbon steel or 316 stainless. Fabrications from special alloys are also available. Please contact your Chemineer sales representative for assistance with your specific gas dispersion requirements.

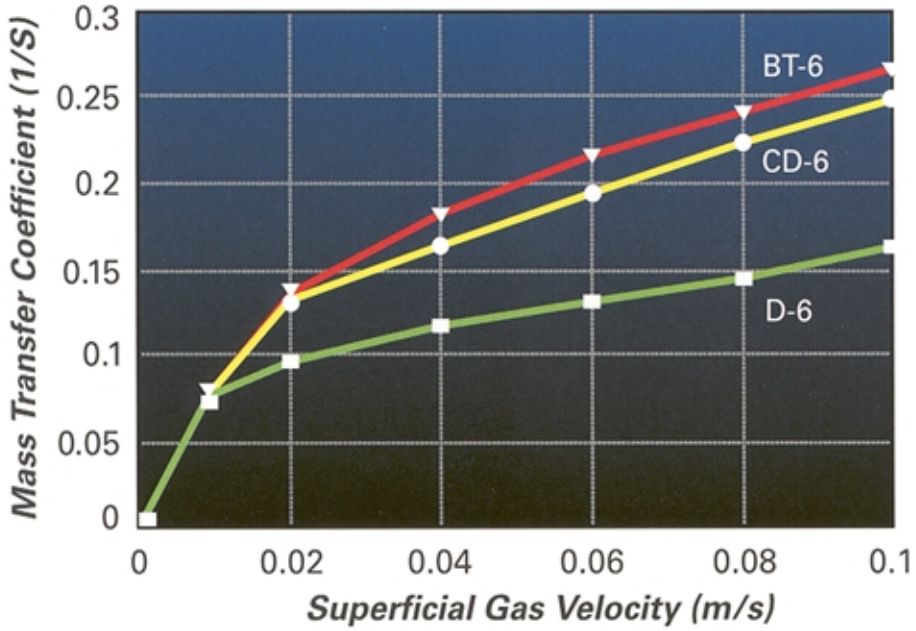




Three Generations of Gas Dispersion Impeller Technology

The BT-6 is the latest innovation in gas dispersion impeller technology. For over thirty years the D-6 disc style turbine with flat blades was the primary choice for gas dispersion applications. In the late 1980's Chemineer developed the CD-6 impeller which is characterized by its concave blade shape. The CD-6 rapidly established itself as far superior to the D-6 with its capability of dispersing more gas combined with a power draw considerably less sensitive to changes in the gas flow rate. The CD-6 revolutionized the field of gas-liquid agitation and quickly became the standard design. There are more than 100,000 HP of agitators installed with this impeller. The next generation gas dispersion impeller, the BT-6, is the result of the knowledge gained from our broad CD-6 installation base and our extensive research and development efforts. The BT-6 technology combines the concave blade concept with vertically asymmetric blades that are shaped to make optimum use of the different flow conditions above and below the impeller. The photos above show a comparison between the dispersion performance of the three impellers at a very high gas flow rate of 13 VVM, corresponding to a superficial gas velocity of more than 0.1 m/s (0.33 ft/s) at this scale. At this high gas flow rate, the D-6 (left) is clearly flooded and cannot disperse the gas. This is apparent from the gas that shrouds the impeller and the surging surface as large gas bubbles jet through the system. The CD-6 (center) disperses the gas, driving it to the vessel wall and producing a smooth surface. The BT-6 (right) not only forces the gas to the wall, it distributes the gas throughout the entire liquid volume, bottom to top, providing better mass transfer and uniformity. The higher liquid level in the vessel indicates a higher gas holdup, one of the reasons for the improved mass transfer. In studies of dozens of different impeller styles the BT-6 consistently produced the most uniform gas dispersion.

Mass Transfer Comparison



The rate of mass transfer between the gas and the liquid is of critical importance in many processes. The graph shows a mass transfer comparison between the BT-6, the CD-6 and the D-6. The mass transfer coefficient is plotted as a function of the superficial gas velocity. All impellers are operating at the same speed and are designed to draw the same ungassed power. As the gas flow rate increases so does the mass transfer coefficient. At the highest gas flow rates the CD-6 impeller provides more than 40% improvement in mass transfer over the D-6. The BT-6 increases the mass transfer rate by as much as 60% when compared to the D-6.

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