



# THERE ARE MANY WAYS SIMSITE® IMPELLERS MAKE PUMPS MORE EFFICIENT AND LAST MUCH LONGER!

Many pump companies offer cheaper pumps with cheaper metallic solutions, and it is often tempting to purchase these items, but like everything in life, nothing is for free. When these cheaper pumps do not last, because they cavitate, corrode, deteriorate, lose performance and efficiency, you do not save money; rather, you lose money!

**1** The easiest one to describe is start-up load. SIMSITE® Impellers are 85% lighter than metallic impellers, so every time the pump starts and stops, it will save energy, because of the reduction of the weight of the rotating element.

The reduction in weight has many other benefits such as a reduction in shaft deflection and vibration as seen in the illustration below. The 85% reduction in weight reduces the startup load, and when combined with the perfect balance of a Simsite® Impeller, (mechanical as well as hydraulic) mechanical seals, bearings, rings, sleeves and motors last much longer! The reduction in vibration also contributes to energy savings.

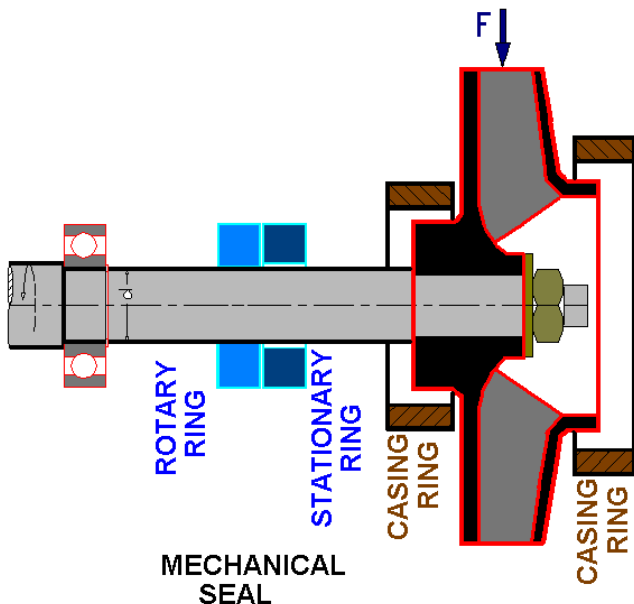
- 85% Less Weight than Bronze, or Stainless Steel Impellers & Rings.
- Less Shaft Deflection  $F = M * Ac$
- Less Start Up Load  $y = WL^2 / CEI$

$y$  = deflection, in;  $W$  = weight of rotating element, lb;  $L$  = shaft span, in;

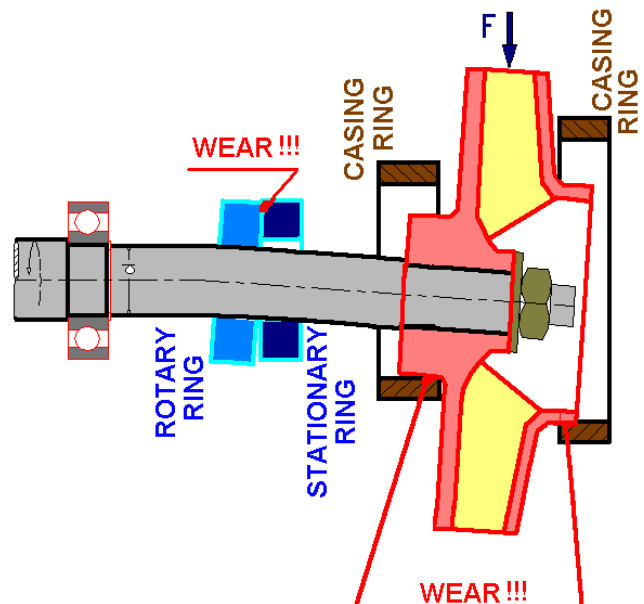
$C$  = coefficient depending on shaft-support method and loading;

$E$  = modulus of elasticity of shaft material, lb/in<sup>2</sup>;

$I$  = moment of inertia ( $\pi D^4/64$ ), in<sup>4</sup>.



**SIMSITE IMPELLER — 20 Lb**



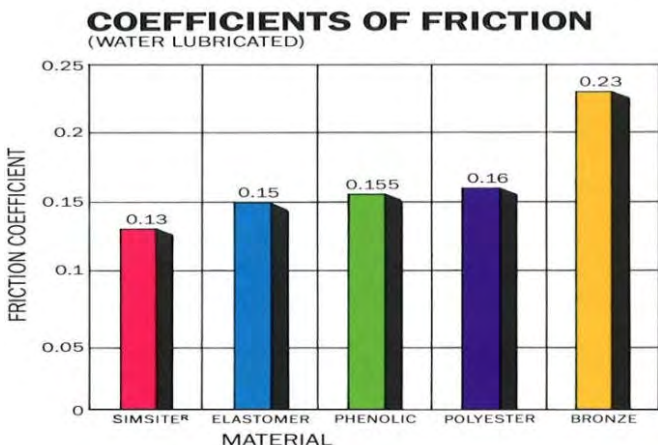
**BRONZE IMPELLER — 120 Lb**

**2** SIMSITE® Structural Composite Impellers are machined from one center position on 5 to 8 axis machining centers. They are machined on the inside as well as the outside as opposed to being cast, or molded, so the impeller vane surfaces are much smoother and much more accurate. In addition to continuously interwoven graphite fibers, SIMSITE® Structural Composite also has loose graphite embedded in the resin system which has a very low coefficient of friction which helps to increase efficiency.

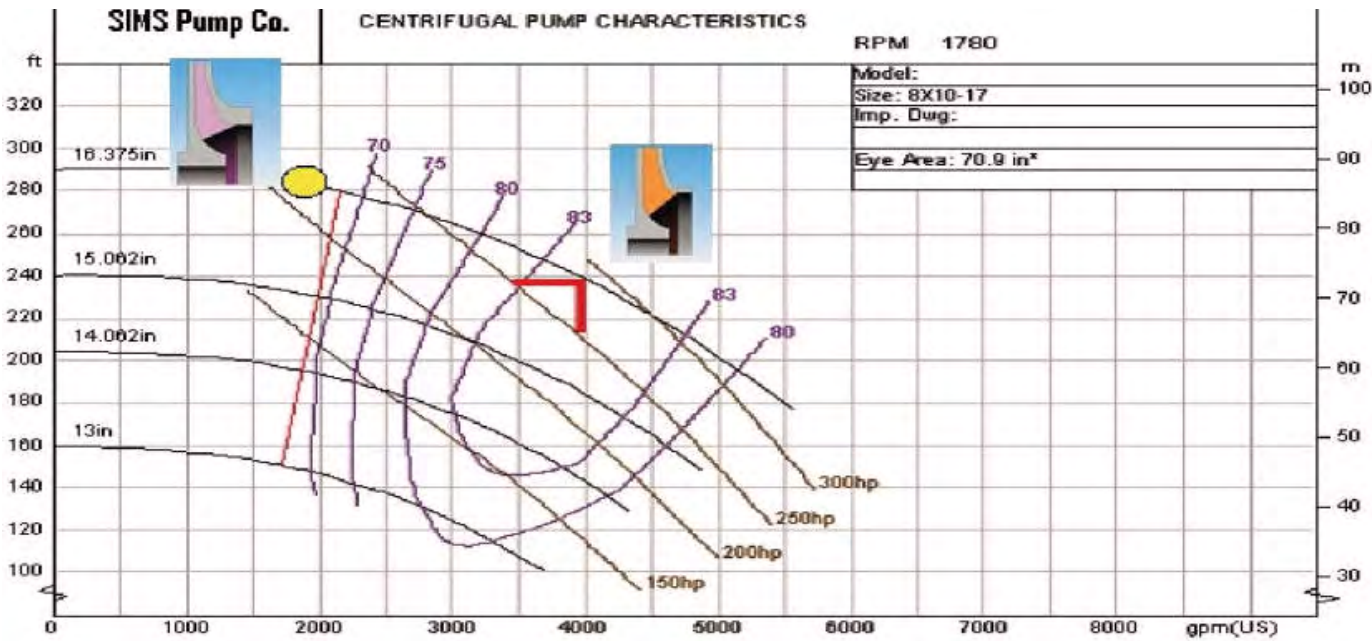
Because the vane surfaces are completely machined from a center position, the impeller has perfect balance (both hydraulic and mechanical) and remains perfectly balanced throughout the life of the pump, which also contributes to an increase in efficiency.

**3** Because of the excellent lubrication qualities of our SIMSITE® Structural Composite, and because of the low coefficient of friction of the material, our ring clearances are less than metallic rings when immersed in the fluid it is pumping. The tighter ring clearances allow less “leakage” between the Impeller Casing Rings and the Impeller Wear Ring, which also contributes to an increase in efficiency.

**4** The greatest increase in efficiency comes from the “engineering” of the impeller to operate at the Best Efficiency Point (BEP) of the Pump in the plant, or system. Normally, pumps do not operate at the BEP in a plant system, because Customers are purchasing “production pumps” not specifically designed for the Customers Operating System. At SIMS PUMP, we work differently. We can make any pump more efficient, or “green” by “engineering” the impeller to operate at the best efficiency point saving the Customer huge amounts of money in electrical savings.



In order to “engineer” an impeller for the Customer’s Operating System to make the pump more energy efficient, the suction and discharge pressure readings must be obtained from the pump when it is operating in the system with the original impeller.



## SIMSITE IMPELLER THAT NEVER CORRODES



## CORRODED BRONZE IMPELLERS



As you can see in the Performance Curve (above), the original impeller was designed for 4000 GPM at 240 Feet of Head. But in operation the system is forcing the pump to operate back on the curve at 2000 GPM at 280 Feet of Head. The original impeller was designed to operate efficiently at 4000 GPM at 240 Feet of Head (83% Efficiency); however, at 2000 GPM at 280 Feet of Head the Pump is very inefficient operating at only 60% to 65% Efficiency!

Making matters worse is that when you operate at more than 5% away from the original design efficiency, the rotating element becomes subject to High Radial Loading (Shaft Deflection) and Cavitation!

Without changing the pump, the only solution in this case is to **upgrade** the impeller and install a SIMSITE® **Impeller & Casing Ring** set, which will be designed to operate efficiently at 2000 GPM at 280 Feet of Head. Not only will the SIMSITE® Impeller operate more efficiently (88% instead of 60%) the SIMSITE® Impeller and Ring set is **not** subject to Corrosion, or Performance Deterioration, and is 85% less weight and balanced both mechanically and hydraulically!

**5** Performance Deterioration — In corrosive applications such as Seawater, or Waste Water, metallic impellers and casing rings start to corrode, erode, and cavitate. As they corrode, the efficiency of the pump deteriorates making the pump more and more inefficient! Not only does this cost more money in electrical, or fuel consumption, as the impeller and ring wear, the rotating element goes into an imbalance! This shaft deflection is the main cause of mechanical seal failure, bearing failure, bushing & ring failure and even motor failure!

Performance Deterioration is eliminated by upgrading to a SIMSITE® Impeller & Casing Ring set, which never corrodes in Seawater, Waste Water, Sewage, River Water, Bromine, Chlorine, and is excellent with most chemicals. As seen above, the SIMSITE® impeller is 100% machined on the inside as well as the outside from one center position from solid blocks of the patented SIMSITE® Structural Composite. This enables the SIMSITE® impeller to be perfectly balanced both mechanically and hydraulically. Additionally, the SIMSITE® Impeller and PUMP are designed and engineered specifically for the Customer's operating point!



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