Top 5 Reasons Not to use Bronze or Stainless Steel Impellers and Pumps for Corrosive Applications.

1.) Bronze and Stainless Steel Impellers and Pump Casings rapidly corrode and erode when exposed to corrosive mediums such as Seawater, Sewage, Waste Water, Chlorine, Bromine, and many Chemicals.

2.) Bronze and Stainless Steel Impellers and Pumps are subject to Cavitation, and Electrolysis (galvanic corrosion) which prematurely destroys the impeller and pump casing and drastically increases pump maintenance expenses.

3.) Bronze and Stainless Steel Impellers and Pumps are subject to casting defects, and stress cracks. These defects shorten the life of the pump and adversely affect pump performance and efficiency.

4.) Bronze and Stainless Steel Impellers and Pumps are approximately 6 times heavier than Structural Composites. The heavy weight increases shaft deflection and vibration and prematurely destroys the motor bearings, mechanical seal faces, guide bushings, and casing rings.

5.) Bronze and Stainless Steel Impellers and Pumps are less efficient than machined Structural Composites like SIMSITE® manufactured by the SIMS PUMP COMPANY, which are engineered and designed for each customer's application using state-of-the-art CFD (Computational Fluid Dynamic) techniques. The machined structural composites impellers and pumps are much more efficient because they enable the operating point to be the Best Efficiency Point.
In an ever increasing market dominated by low quality, short life-cycle, and low priced metallic (Bronze, Stainless Steel, Cast Iron) products primarily from China and India, Structural Composite Engineered Aftermarket Solutions, manufactured entirely in the USA, offers Customers a much better solution! Structural Composites like SIMSITE® are excellent value-added alternatives to cheap imports.

Instead of repairing your pump, or replacing the old pump with a new pump of the same material, type, or quality, a much better solution would be to upgrade these parts and pumps with products that last much longer! With most pumps and pump parts coming directly, or indirectly from out of the Country, the reliability and quality of materials and parts for pumps and pumping systems have substantially deteriorated in the past few years forcing Customers to replace, or repair products much more rapidly.

Fortunately today, there are specialized pump companies offering Structural Composite Pumps and Pump Upgrade Solutions, which enable pumps to last many times their original life. Pump engineering companies, like SIMS PUMP, right here in the United States, manufacture machined structural engineered pumps, impellers, rings, sleeves, bearings, bushings, and mechanical seals, for ANY centrifugal pump. These computer engineered, designed, and precision machined structural composite products are designed with the objective of maximizing longevity, reliability and energy savings!

Structural Composite Pump Upgrades not only improve performance, and reduce maintenance & repair expenses, but they also improve efficiency as well, so they will extend pump life and reliability.

A machined Simsite® Structural Graphite Composite Impeller obtained from SIMS Pump (an Aftermarket Pump Manufacturer)- Engineered for Light Weight, Corrosion Resistance, Cavitation Resistance, and Engineered for High Efficiency & Longer Life!

This vertical In-Line Structural Graphite Composite pump manufactured by the SIMS Pump Company replaced and upgraded a type 316 Stainless Steel Pumps onboard the Navy Military Sea Lift Command Vessel.

Machined on a 5-axis machining center, this Structural Graphite Composite Pump was engineered and designed to maximize efficiency, longevity, and to operate at the Best Efficiency Point in the Customer’s system!
Structural composites offer the additional advantage of having excellent mechanical properties as well as being light-weight, corrosion, erosion and cavitation resistant. These machined structural composite pumps, impellers and rings, and pump parts offer many advantages, which will not only last longer, but will also reduce maintenance and repair expenses. Utilizing these excellent aftermarket upgrades will allow Customers to cut both downtime costs, maintenance & repair expenses and energy consumption. By installing these Structural Composite “upgraded” aftermarket products into existing pumps, or pumping systems, enables the Customer to realize significant life-cycle and monetary savings. The implementation of these superior pumps, impellers & rings, and pump parts directly contributes to the increase in pump efficiency, and eliminates corrosion, erosion, cavitation, electrolysis, rotor imbalance, premature bearing failure, and leakage between the wear rings, casing rings & interstage bushings. These detrimental occurrences quickly destroy metallic pumps and pump parts leading to inefficiency and a drastic increase in energy consumption.

In difficult times, it may be hard to allocate the funds, however the payback will prove to be extremely quick – in most cases less than a year. The resulting savings from the upgrades frees up funds that otherwise would have been wasted on downtime, additional labor, energy, and more expensive repairs at a later date. In almost all cases, the incremental costs of upgrades are minimal when compared to the loss in downtime and expensive repairs.

Structural Composite engineered upgraded solutions for pump applications can be purchased on a quick delivery basis in a fraction of the time. Aftermarket Engineered Solutions are also excellent alternatives for replacement upgraded parts for old, or obsolete pumps.

Engineered Aftermarket Companies like SIMS PUMP in Hoboken, N.J. specialize in solving pump problems such as imbalance, cavitation, corrosion, electrolysis, erosion, and radial thrust problems. SIMS PUMP focuses on life extension, which is a very different concept from traditional pump manufacturers who make their money selling spare parts.

Upgrading Existing Pumps with qualified structural composite components can reduce Energy and Maintenance Expenses in Major Ways:

1. Structural Composite Impellers & Rings are Engineered to operate at the Best Efficiency Point (BEP).
2. Structural Composite Products Do Not Corrode in Sea Water, Waste Water, Sewage, and Chlorinated Water so efficiency, and performance will not deteriorate over time.
3. Structural Composite Pumps, Impellers & Rings, and other pump parts are designed with state of the art CFD Techniques to maximize Efficiency.
4. Structural Composite Impellers are precision machined from one center position and therefore perfectly balanced and remain perfectly balanced for the life of the pump.

Traditional Metallic pump parts are not only heavy, but they corrode, erode, and wear very quickly in corrosive environments causing them to fail prematurely. Today, these inferior products are being upgraded with high quality composite aftermarket upgrades designed to last!
It is an all too common problem – You purchased a pump for one specific performance and when you put the pump into service in your plant, or ship, the pump operates at another point completely different from the original design point (BEP – best efficiency point) of the pump because your system requirements have changed. In addition to being very inefficient, when you operate the pump away from the original design point or BEP, it causes a multitude of problems. These problems include excessive noise & vibration of the pump, shaft oscillation, cavitation, premature wear and failure of the mechanical seals, bearings, rings, sleeves and impellers. In extreme cases, the pump shaft will break right behind the impeller from the excessive radial forces that occur when you operate a pump away from the original design point.

The effect of operating a pump away from the best efficiency point (BEP) has a detrimental effect on pump efficiency and wastes energy and money. The larger the pump, the more energy is wasted when a pump operates off the original design point; however, operating any pump away from the BEP wastes a tremendous amount of money since 85% of the total cost of owning a pump is the Operational Cost (Maintenance cost plus the cost of energy).

Fortunately, these problems can be easily resolved by installing Engineered Structural Composite Impellers & Rings, which have been engineered for your system requirements. Not only is the efficiency of the pump improved, but also the reliability and longevity of the complete pump is substantially improved.

Another critical area where composites significantly help in the reduction of Energy Consumption and Repair and Maintenance is in the area of Shaft Deflection. Structural Composites Impellers & Casing Rings like Simsite®, manufactured by SIMS, are only 15% the weight of traditional metallic materials. The lower weight not only reduces start-up load, but also reduces shaft deflection, which allows the rotating element to run with tighter clearances between the rings and the impeller. The tighter ring clearance reduces leakage, which increases efficiency and reduces energy consumption. The reduction in shaft deflection increases efficiency. The reduction in shaft deflection enables bearings, sleeves, mechanical seals, and rings to last much longer which saves on repair and maintenance costs.

**Structural Graphite Composite Casing Rings and Wear Rings**

- Corrosion Resistant
- Light Weight
- Prevents Electrolysis
- Prevents Damage to the Casing
- Non-Sparking
- Non-Galling
- Allows less Leakage
- Allows for Higher Efficiencies
- Prevents Catastrophic Failure
- Outlasts Metallic Rings

SIMSITE® Engineered Structural Composite Rings do not corrode and wear much better than metallic rings! Because they will not seize, or gall, like metallic rings, they run with tighter clearances, which increases efficiency and decreases energy consumption.
Composite Casing Rings will seal against the pump casing like a gasket and prevent pump “wash out” (Damage to the casing from flow circulating behind the ring). Wear between the casing rings and the impeller wear rings create large clearances, which result in substantial decreases in pump efficiency, as well as huge increases in the energy consumed to operate the pump.

Historically, most pump companies, and repair facilities have used metallic parts for Wear Rings, and Casing Rings. These metallic parts have the potential to gall and seize, and therefore, require larger clearances between the parts. Compounding the issue is that these metallic parts do not have self-lubricating qualities like many structural engineered composites, and metallic parts are always subject to corrosion, which further increases clearances and energy consumption.

**Structural Composite Sleeves and Guide Bearings:**

There is no reason to use bronze, or stainless steel, (metallic) shaft sleeves and guide bearings when you can use Structural Graphite Composite Bearing & Sleeves upgrades, which not only protect the shaft, but they are light weight, and seal better. Wear between metallic rings create large clearances, and increase shaft deflection, which results in substantial decreases in pump efficiency, premature pump failure, and huge increases in the energy consumed to operate the pump.

Engineered Structural Graphite Composite Sleeves & Bearings, will not corrode in salt water, waste water, sewage, or chlorinated water and are excellent with most acid and alkaline solutions. Most composite Sleeves & Guide Bearings have self-lubricating qualities, which allow for tighter clearances and prevents excessive shaft movement. Wear problems can be overcome by installing composite bearings. The self-lubricating qualities of the structural composite bearings and sleeves substantially reduces frictional wear on the shaft. Additionally, the structural fibers in Structural Guide Bearings such as Simsite® offer extremely high anti-galling characteristics. The highly polished surface finish of Simsite® bearings reduces unnecessary wear on the shaft as well as the bearings.
**Structural Graphite Composite Mechanical Seals:**

Composite seals are unique, because they incorporate light weight, high mechanical strength, and superior corrosion resistance. SIMSITE® Structural Graphite Composite mechanical seal upgrades have a superior sealing design, which incorporates silicon carbide seal faces. The glands have an O-ring design for sealing against the pump casing, which enables the composite seal to be used on rougher surfaces or split-case pump housings.

![A Simsite® Cartridge-Style Mechanical Seal with a Simsite® Structural Composite Sleeve located inside is lightweight and corrosion resistant!](image)

Plant Outages, Ship Overhauls, Building New Vessels, Building New Manufacturing Plants, Plant Expansions, and New System Installations are good opportunities to specify pumps with upgraded efficiency and reliability features such as Simsite® Structural Graphite Composite Pump Internals (Impellers, Casing Rings, Sleeves, Bushings, Bearings, and Mechanical Seals). By installing High-Quality Alternative Solution Impellers & Rings, which have been engineered for your system requirements, not only is the efficiency of a pump improved, but also the reliability and longevity of the complete pump is substantially improved. Structural Composite Upgrades not only reduce *maintenance and repair* costs, but they also can drastically reduce *Energy Costs*, proving the more logical option when choosing your pump supplier.

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