

# Case Study

ADVANCED DIAMOND TECHNOLOGIES, INC.

## UNCD® Components

### UNCD Bearings™ operate EMD Millipore's mixers dry for hours

Advanced Diamond Technologies UNCD® journal and thrust bearings perform exceptionally well during hours of dry running conditions for EMD Millipore's GMP line of NovAseptic® magnetic drive mixers.

#### Problem:

Field failures in the pharmaceutical and biotech community are forcing many companies to implement new strategies to increase equipment reliability. EMD Millipore identified a highly desired feature for magnetic-drive NovAseptic mixers - improve their ability to withstand inadvertent dry-running and poor lubricating conditions. These conditions often exist when mixers are operated between production mixing steps or during SIP and CIP processes. Unfortunately, all other bearings materials on the market are damaged within seconds when exposed to dry-running conditions rendering the mixer out-of-service until maintenance occurs. This unplanned bearing failure puts thousands of dollars of product at risk.



NovAseptic® Mixer

#### EMD Millipore's Challenge:

NovAseptic GMP magnetic drive mixers are widely accepted as a standard for general mixing in the biotech and pharmaceutical industries. The NovAseptic GMP line provides extremely efficient mixing and low maintenance in part due to its bottom-mounted magnetic drive design. The design challenge is to ensure that the process-lubricated bearing is robust enough to withstand intermittent operation outside of the mixer's design envelope. Silicon carbide (SiC) is the benchmark material due to its extreme chemical resistance, bio-compatibility, and excellent mechanical and tribological properties. When SiC bearings operate without lubrication the bearings typically crack within seconds from the frictional forces between the two bearing elements. When this occurs, the mixer heads and male bearing assemblies need to be replaced - a painstaking and expensive process.



UNCD Bearings

#### Solution:

Advanced Diamond Technologies worked closely with EMD Millipore to qualify a solution to this debilitating problem. USP Class VI certified UNCD, a thin-film form of diamond, **Bearings** were developed that provide the hardness and chemical compatibility of natural diamond to the NovAseptic mixer bearings. UNCD has the durability of diamond and a coefficient of friction similar to Teflon®, enabling UNCD **Bearings** to extend the mean time between failure upon loss of lubrication from seconds to over several hours.

#### Benefits:

- Resistant to dry & poor lubricating environments
- Tolerates intermittent out-of-design operation
- Low friction and cooler operation
- Low wear & longer lasting bearings
- Reduced energy consumption
- Bio & pharma compatibility

#### Result:

UNCD's amazing properties benefit industrial users who are concerned about wear and friction. UNCD is both durable and smooth enough to extend the reliability of the bearings used in NovAseptic's mixers without risking introduction of contaminants into the process. UNCD **Bearings** allow customers the ability to avoid costly unplanned maintenance that occurs when bearings lose lubrication. UNCD **Bearings** increase product throughput and uptime, creating a direct bottom-line benefit.