

**Advanced Lubricating Oil Purification**

**ISOPur Purification Systems**



**Balanced Charge Agglomeration (BCA®) Technology**

BCA® is designed to balance the net charge on contamination within the oil. The fluid is split into two equal paths. All fluid particles in one path are given a negative charge and all fluid particles in the other path are given a positive charge. When the two paths of fluid are recombined, the positively and negatively charged particles attract and grow in size, making them easily filterable. The net charges on the particles and the fluid are balanced, creating an environment which both prevents and removes varnish deposits.



Typical Gas Turbine Reservoir



ISOPur BCA Treated Gas Turbine

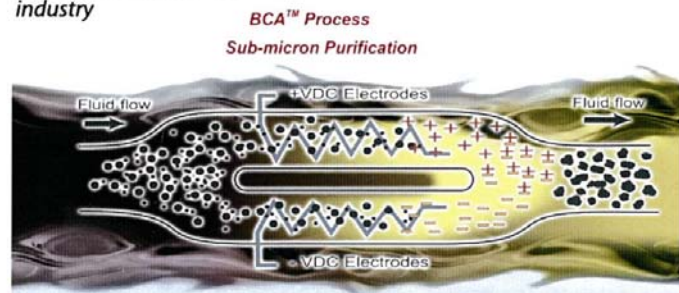


Main Bearing after 10 years

BCA® does not adversely effect additives within the oil because only non-soluable particles are removed. In many cases, the BCA® technology improves the conditions that most additives are designed to change.

**BCA® Benefits**

- Removal of pre-existing varnish
- Sub-micron particle removal
- Functional with water present
- Enhances current filtration
- Highest flow rates in the industry
- Quicker oil and system clean-up
- Reduced maintenance & repair costs
- Extended equipment life



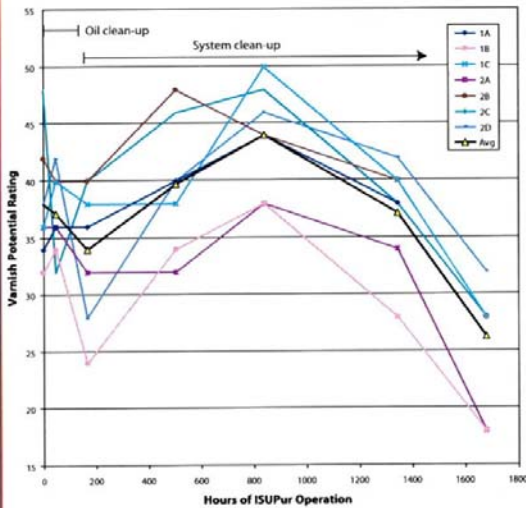
**1** The fluid enters the ISOPur system containing particles with an unbalanced average electrical charge. The fluid is split into two streams.

**2** Once split, the particles in one fluid path are charged positively and particles in the other path are charged negatively via electrodes.

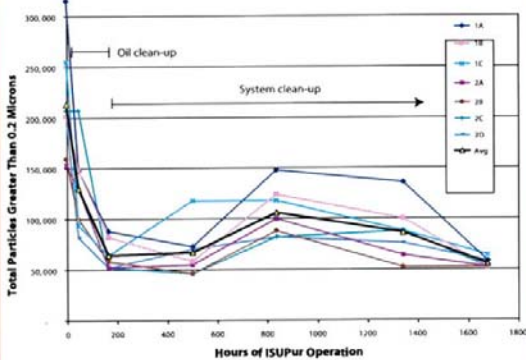
**3** Oppositely charged particles attract, grow in size and form an agglomerate (larger particulate). These agglomerates continue to combine with other charged particles, creating a scouring effect throughout the lube oil system.

**GE Frame 7FA Gas Turbine Lube Oil Analysis**

Varnish Potential Rating



Particulate Greater Than 0.2 Microns Per 100 ml



The graphs represent the actual performance of the BCA technology on seven GE 7FA gas turbines at one location over the course of 10 weeks.

The lube oil condition was analysed for Varnish Potential (QSA) and particle count above 0.2 microns. After 10 weeks, the varnish potential was substantially reduced and the particle count above 0.2 microns was reduced up to 90%.

The oil analysis was conducted by an independent US lab.

Oil type Group 2 Base Stock

**Effective Gas Turbine Varnish Clean-up & Oil Conditioning**

ISOPur Fluid Technologies BCA® reduces turbine trips by purifying lube oil and removing varnish.

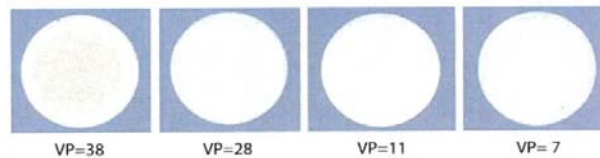
**Lubricating Oil Contamination**

Extreme gas turbine operating conditions cause an increase in lubricating oil degradation and contamination. Ultimately, this high stress on the oil leads to sticky deposits (varnish) on close-clearance mechanical components resulting in servo valve problems and associated turbine trips. It has been conclusively shown that the majority of these varnish deposits originate as sub-micron particles within the oil.

ISOPur's patented Balanced Charge Agglomeration (BCA®) is designed to remove varnish and sub-micron particulate from machinery internals and from oil. By conditioning lubricating oils and scouring the internals of turbomachinery; uptime is increased, oil change-outs are reduced, and equipment life is extended. ISOPur's BCA® technology is effective on both soft and hard sub-micron particulate. BCA® is proven to achieve exceptional oil quality well beyond that currently available through the use of other technologies.

**Varnish Potential Patches**

The patches were used in spectrophotometric analysis of an oil sample taken from one of the seven GE Frame 7FA Gas Turbines. After only 14 weeks of BCA® conditioning, the Varnish Potential Rating dropped from 38 to an impressive 7.



**After 11 years, and more than 60,000 hours The oil in all seven turbines is cleaner than new oil.**



VPR = 3 - 8 Gravimetric Patch = 2 to 14 mg/l RPVOT = 68 - 80%