

A solution to increase reliability and machine uptime

[INSOCOAT electrically insulated rolling bearings](#)

Prevention of electrical erosion in bearings



Whenever an electric current passes through rolling bearings, there is a potential threat to the reliability of your machines. Electrical erosion can damage and degrade bearings in traction motors, electric motors and generators, leading to costly downtime and unplanned maintenance. With its latest generation of insulated bearings, SKF has raised the performance standard. INSOCOAT bearings offer high levels of reliability and uptime for electrical applications, even in the most challenging environmental conditions.

[The impact of electrical erosion](#)

In recent years, demands on insulated bearings used in electrical machinery have increased.

Higher motor speeds and greater use of variable frequency drives mean that insulation needs to perform lawlessly if damage from electric currents is to be avoided. The insulation's properties must also remain

stable regardless of environmental conditions; this is a particular issue where bearings are stored and handled in humid climates.

Electrical erosion harms bearings in three different ways:

[1. Excessive current erosion](#)

When an electric current passes through a bearing from one ring to the other via the rolling elements, it creates a process similar to electric arc welding, concentrating a high current density onto a small contact surface. This heats the material to temperatures ranging from tempering to melting levels. It cre-

ates discoloured areas, varying in size, where the material has been tempered, re-hardened or melted and can form craters where material has melted.

[2. Current leakage erosion](#)

If a current flows continuously through a bearing in service in the form of arcs, even at low intensity, the raceway surfaces are affected by the heat and erode as thousands of microcraters are formed, mostly on the rolling contact surfaces. These craters are closely positioned to one another and are small

in diameter compared to the damage from excessive current.

Over time, as a secondary effect, this will lead to lutes (washboarding) on the raceways of rings and rollers. The extent of damage depends on several factors:

type of bearing, bearing size, electrical regime, bearing load, speed and lubricant. In addition to bearing steel surface damage, the lubricant close to the damage might be degraded, eventually resulting in poor lubricating conditions and ultimately surface distress and spalling.

[3. Lubricant degradation](#)

Local high temperatures caused by electric current can cause the additives in the lubricant to char or burn, resulting in the additives being consumed more quickly. In case of grease lubrication, the grease turns black and hard. This rapid breakdown dramatically reduces grease and bearing service life.