

Table 5 – Effectiveness of bearing current countermeasures

Counter measure	Current type			Additional comments
	Circulating currents (8.1.2, 8.2.2)	Shaft earthing currents (8.2.3)	Capacitive discharge currents (8.2.4)	
1) NDE insulated, or ceramic rolling elements	Effective	Not effective: Only protects one bearing	Not effective: Only protects one bearing	NDE insulated to avoid need for an insulated coupling
2) NDE and DE insulated, or ceramic rolling elements	Effective: One insulated bearing is adequate for this current type	Effective	Effective: May require additional brush contact	Most effective for small frame sizes. Less practical for large frame sizes
3) NDE and DE insulated, or ceramic rolling elements + additional insulated coupling and shaft earthing brush	Effective	Effective	Effective	Most effective (especially for larger electrical machines). Helps to prevent possible damage to driven load. Servicing necessary
4) One brush contact No bearing insulation	Not effective: Only protects one bearing	Effective: Does not protect bearings in driven load	Effective: Care needed to ensure low brush contact impedance	Servicing necessary
5) Two brush contacts, DE and NDE No bearing insulation	Effective: Care needed to ensure low brush contact impedance	Effective: Does not protect bearings in driven load	Effective: Care needed to ensure low brush contact impedance	Servicing necessary
6) Low resistance lubrication and/or carbon-filled bearing seals	Poor	Poor	Effective: Depends on condition of materials	No long term experience. Lubrication effectiveness reduced
7) Rotor in Faraday cage	Not effective	Not effective	Very effective	Problems from converter generated circulating currents that normally only occur in larger electrical machines
8) Common-mode voltage filter	Effective: Reduced HF voltage also decreases LF currents	Effective	Effective	Greatest reduction of common-mode voltage if filter is fitted at converter output
9) Insulated coupling	Not effective	Very effective	Not effective	Also prevents possible damage to driven load
10) Frame to driven load connection	Not effective	Effective	Not effective	Also prevents possible damage to driven load
DE: Drive End; NDE: Non Drive End.				