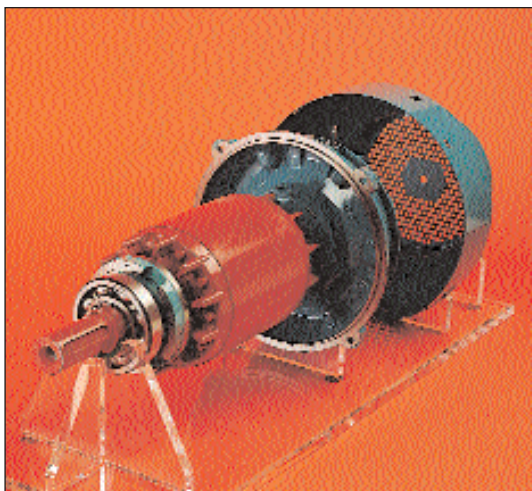
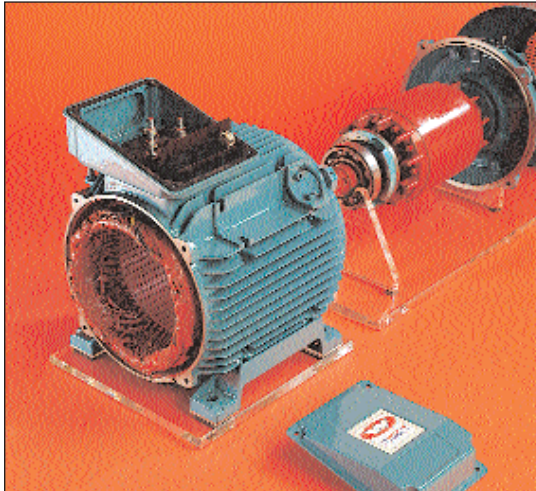




Monsoon motors

For extremes of temperature and humidity

**BROOK
CROMPTON**



Motors operating in tropical climates are invariably subjected to the hot, humid and wet conditions which produce considerable amounts of condensation on internal surfaces. In these areas, fluctuating temperatures can vary between 25-40°C (76-105°F), with relative humidity often reaching 100%. Intermittent periods of tropical rainfall are also part of the natural environment.

Condensation occurs when the surface temperature of the motor is lower than the dew-point temperature of the ambient air and, if motors do not have special internal protection, resulting corrosion can cause irreparable damage to stator windings and moving parts. In such conditions, motors are most at risk from deterioration when not in use – particularly when stored in humid or un-ventilated areas.

For motors operating in such volatile operating conditions, Brook Crompton has developed Monsoon Tropical Equipment – an enhanced form of protection which ensures that both internal and external surfaces are free from corrosive attack. This same treatment is also suitable for motors subjected to frequent deluge and heat/thermal cycling, as is often experienced in the petrochemical, paper, glass-making and textile industries.

Monsoon tropical treatment

During manufacture, the surfaces of external components are grit blasted to Swedish standard SA 2.5 and various parts of the motor's enclosure, including stator frame, endshields, bearing caps and terminal box, are coated with etch primer.

All internal components of the motor are treated with a specially developed tropic proof varnish, which is carefully applied to ensure complete coverage to all surfaces.

Machined surfaces, which are particularly vulnerable, are treated with a rust inhibitive primer and a proprietary non-setting liquid gasket material.

For extremes of temperature and humidity

Following the standard impregnation of stator windings with electrical varnish, the complete stator assembly, including winding overhangs, wound pack end faces and stator bore, are treated with tropic proof varnish.

As standard, all motors are fitted with tapped holes in drive-end shafts, to facilitate assembly, securing and removal of fitments. Internal and external earth terminals are provided to ensure maximum safety and bearings with C3 diametrical clearances are fitted to ensure long life and optimum reliability in service. Every motor has a stainless steel nameplate for ease of identification, even after lengthy periods of operation in hostile and corrosive atmospheres.

All Monsoon Tropical Treatment motors are covered by an extended 2 year guarantee.

External paint system

All treatments are well in excess of requirements for exterior, exposed, polluted and coastal atmospheres for medium term (5-10 years), as specified in BS5493* 1977 Section 2, Part 3.

Treatment is as follows:

Offshore Paint System 2 Grit blast SA 2.5, 50 microns J984 Epoxy zinc rich primer coat, 250 microns L653 High build epoxy intermediate coat,

50 microns M137 overcoatable polyurethane finish coat,

Total thickness: DFT 350 microns

The final high quality paint system meets the standard required for offshore use by all leading oil company operators.

* BS5493: Code of Practice for protective coating of iron and steel structures against corrosion.

Testing

To ensure that Brook Crompton Monsoon Tropical Treatment motors fully comply with various international requirements (defined under IEC 68-2-38, Environmental Testing, Guidance for damp heat tests and IEC 68-2-28, Test Z/AD, Composite temperature humidity cyclic test) – a number of samples were exposed to



independent accelerated testing procedures at the UK laboratories of a leading international testing organisation – ERA Technology, Leatherhead, Surrey. Under controlled conditions, carried out in an environmental test chamber, motors were subjected to temperatures between 25 and 65°C and much greater levels of condensation than would normally be experienced in actual tropical climates. Rigorous tests were also carried out to accelerate the rate at which changes in the condition of the motor would occur in practice, but without radically changing the degradation mechanisms. Acceleration of these test conditions was achieved by increasing the maximum rapid changes in temperature; maintaining high humidity and increasing the number of environmental cycles per day. The capability of the stator winding insulation to withstand these same conditions was carefully monitored.

Tests were designed to increase and decrease temperature by 20°C per hour, ie twelve times the rate of change for category B2 – Wet Hot, experienced under the most extreme tropical conditions described in UK defence standard Def Stan 00-1/2.

The extent of any degradation was determined by measuring the winding

insulation resistance during the test and by post-test inspection of all internal and external surfaces of the motor. Test results, received from ERA, in its Report 94-0421, proved the exceptional quality, not only of the motor's external paint system – which remained totally free from corrosion – but also of the special treatment given to all internal surfaces. The quality and effectiveness of the treatment given to the stator windings ensured that insulation resistance, at the end of the test period, was at least an order of magnitude greater than the minimum values which could normally be expected from a new motor working at 25°C.

Applications

A substantial number of Brook Crompton Monsoon Tropical Treatment motors are currently operating in extreme climatic conditions in a number of Middle and Far Eastern countries, providing cost-effective solutions to drive applications in a wide range of chemical and process industries. The Monsoon Tropical Treatment system is offered on all cast iron motors including hazardous area BASEEFA certified motors - EEx d, EEx de, EEx e, Ex N as well as D, DF and W ranges.

Rotating Electrical Machines



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Brook Crompton
St Thomas' Road Huddersfield
West Yorkshire HD1 3LJ UK
Tel: +44 (0) 1484 557200
Fax: +44 (0) 1484 557201
E-mail: csc@brookcrompton.com
Internet: www.brookcrompton.com

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