

Stators

The electric motors in Flygt products, are designed and manufactured in-house, and optimized for their purpose. This applies both to the motor's performance and the manufacturing materials.

A new Flygt stator incorporates several beneficial features not always found in a rewind stator. This ensures that a new Flygt stator will perform reliably for years and years with less risk of heat buildup and other electrical or mechanical problems.



Insulation

Class H

Stators in most Flygt pumps and mixers are built to class H standards, which is the highest insulation class available where all insulation materials are tested together. Insulation materials are defined by international standards with different temperature classes; third-party laboratory tests are required to receive class H approval.

High safety margin extends motor life

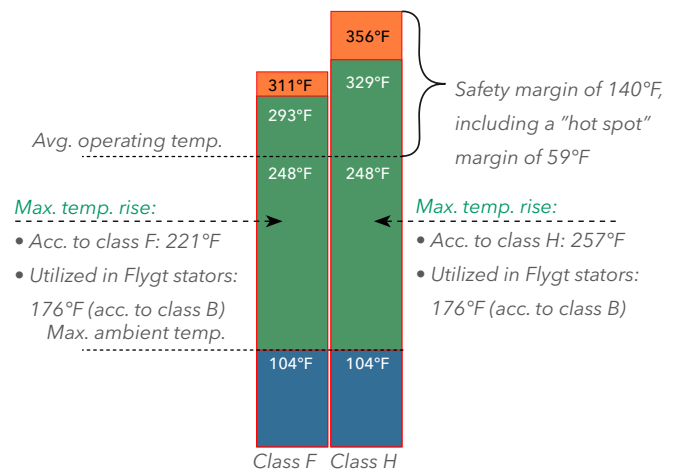
The maximum operating temperature in a motor is 248°F. However, class H insulation enables the motor to operate at a maximum temperature of 329°F. Class H insulation, with a 140°F safety margin, significantly improves the possibilities of extending stator lifetime. Long-term mechanical stress and strains also influence the lifetime of the motor; however, with class H insulation, the theoretical lifetime of a Flygt motor is well above 20 years.

Thermal switches

Flygt stators are supplied with thermal switches, one in each phase, that trip at 257°F or 284°F. This is well below the class H 356°F temperature limit. Optional sensors, such as PTC thermistors and PT-100 temperature sensors, are also available.

Efficient slot liners provide solid insulation

The three-ply Nomex-Mylar-Nomex composite slot liners are highly compatible with the resin, which ensures that all materials are perfectly "glued" together after impregnation. This provides a solid insulating system that withstands vibrations.



Comparison of class F and class H stators.



Efficient slot liners.

High quality copper wire insulation

Flygt stators are equipped with magnet wires according to temperature class 392°F and grade 2 (Norm IEC-60317-13), insulated with 12 layers of insulation varnish to prevent short circuiting. The insulation provides the proper resistance and withstands voltage stress between turns in slots and coil ends.

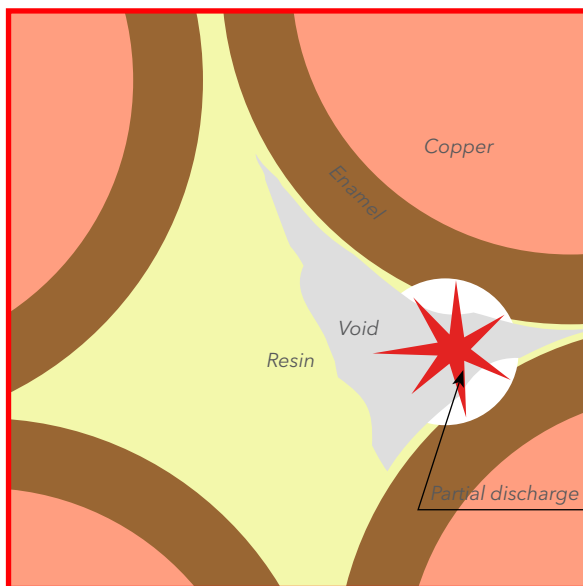
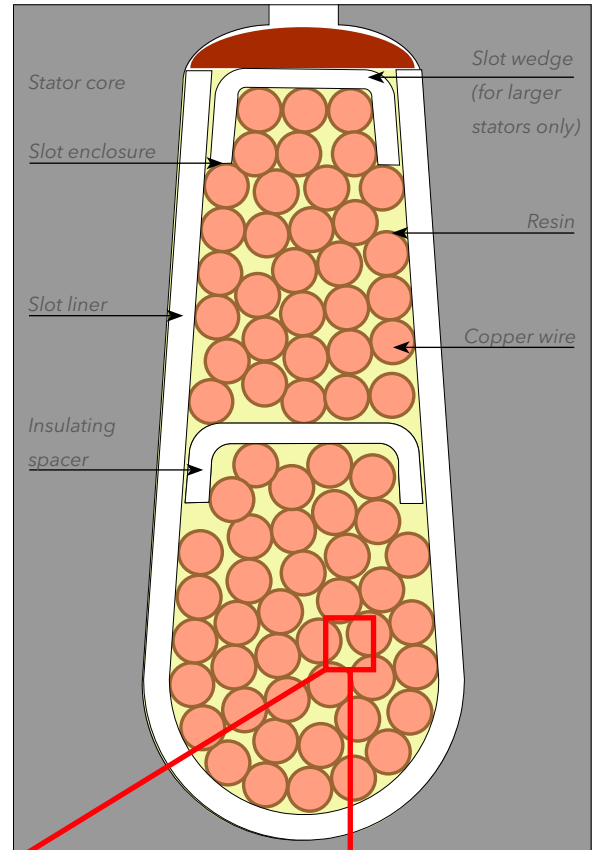
Impregnation

Reliable VFD operation and minimized risk for heat buildup

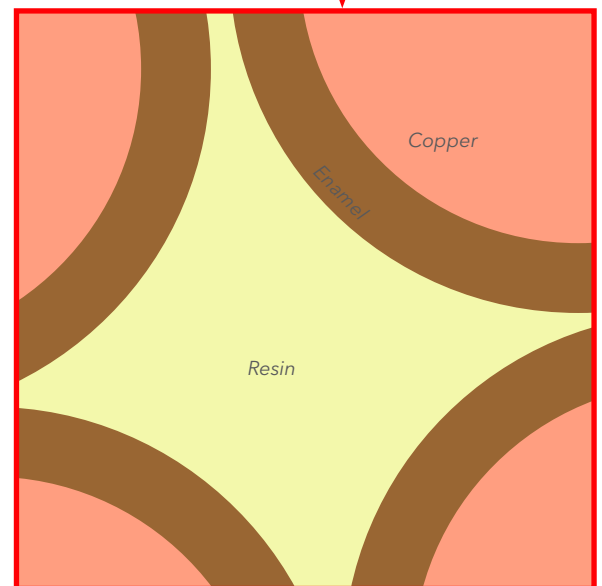
The impregnation in Flygt stators optimizes the overall performance of the Flygt product. It withstands the stress and temperature variances generated during variable frequency drive (VFD) operation, minimizes the risk for short circuits in the windings and increases the heat transfer, which in turn, prolongs the lifetime of the motor. An incorrect or insufficient impregnation method can considerably shorten motor lifetime.

Solid resin fill reduces the risk of partial discharge

The impregnation techniques used in Flygt electric motors, trickle impregnation and dip coating with current/UV curing generate a solid resin fill and eliminate air pockets around the winding. This forms a compact and homogenous insulation with resin filling all the spaces between the wires, thereby reducing the risk of partial discharges in the winding which is very important in applications with VFDs. Partial discharges gradually deteriorate the insulation and lead to stator breakdown. The resins used contain no solvents and have negligible environmental impact. Only 1.5% of the resin vaporizes during curing, which contributes to achieving high resin fill. Other types of resins or varnishes often vaporize at higher rates, causing less resin fill around the winding and creating pockets of air.



A partial discharge can destroy all organic parts of the insulation and lead to premature stator breakdown.



The impregnation techniques used in Flygt stators generate a solid resin fill.

Stator core

High motor performance with correct magnetic properties

Visual inspection is often insufficient to establish a core fault. Stators in Flygt products are always supplied with brand new stator cores to ensure the correct magnetic properties. A damaged stator core may result in stator breakdown or impaired motor performance. It is therefore absolutely necessary to assess the dry-burned stator core before rewinding. However, if an incorrect diagnosis is made after motor failure, a rewind stator may prove to be a costly solution in the long run.



The stator core.

Winding data and dimensions

Extensive testing ensures correct winding properties and insulation system quality

All factory-made stators have windings with the correct number of turns and correct wire dimensions according to the respective technical specifications. Winding resistance measurement tests, insulation tests and surge tests are conducted on all stators at our factory to ensure the correct winding properties. All coil ends on the stators are also checked to ensure that they meet the dimensional tolerances.



The coil ends are always manufactured within the dimensional tolerances.

CSA-approved leads

The stator leads meet criteria for insulation, thermal properties and color coding according to international standards (IEC). In addition, the stator leads are approved by the Canadian Standards Association (CSA).



CSA-approved leads.