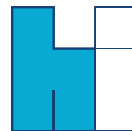




High Voltage Coils

ELECTRICAL TESTING



Houghton International
Electro mechanical innovation



High Voltage Coils

ELECTRICAL TESTING

Houghton international is a leading global manufacturer of high voltage coils with over 35 years of experience across a wide range of sectors.

As a market-leading electro mechanical engineering company ourselves, we understand the challenges faced by the repair industry and have refined our services, insulation systems and processes to address these.

Over the years we have continually monitored and tested the high voltage coils we manufacture and worked to develop the dielectric quality of the electrical insulation systems to produce the highest standard of coils possible.

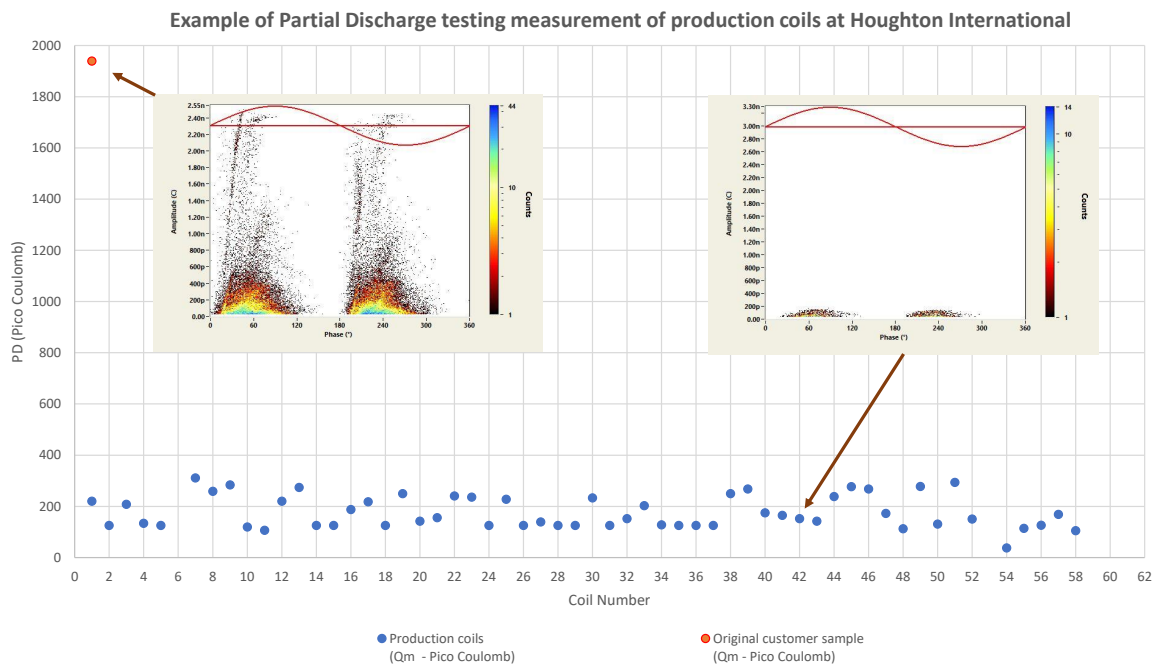
Quality coils, designed with repairers in mind...

Our coils are renowned for their quality - a reputation that is only confirmed by the exemplary test results they produce.

Partial Discharge

Typically, a sample of HV coils (6kV to 13.8kV) that have been manufactured at Houghton International are monitored for Partial Discharge (PD) in accordance with IEC 60034-27 & IEEE 1434.

Our HV coils have been shown to have extremely low levels of Partial Discharge. This is important both for us and all our customers, as any imperfections in the design and quality can lead to a shorter than expected service life.



Sample Voltage Endurance Test

Voltage Endurance

Sample coil designs are also selected and evaluated for voltage endurance (VE), an accelerated life cycle test, which provides an indicator of expected coil lifespan. Performed in compliance with IEEE 1034 & IEEE 1553 standards, typically Houghton International coils exceed IEC & IEEE requirements over three times before the testing is stopped.

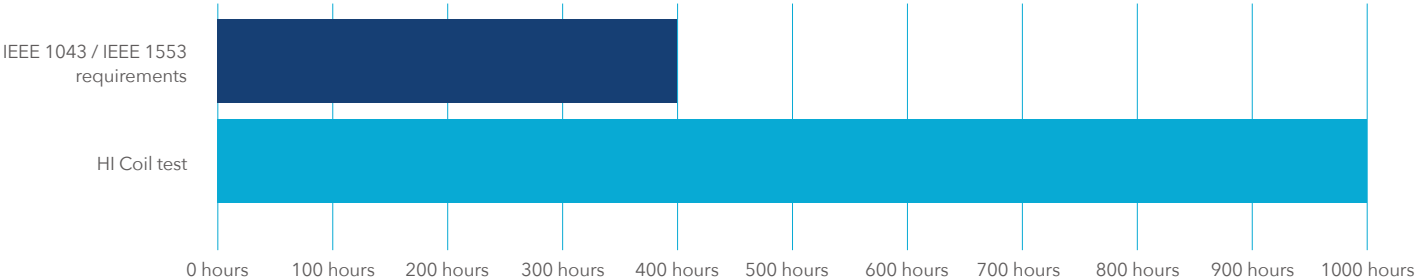
This typically extrapolates to over 20 years operational service life of the coil insulation under normal operating conditions.

An example of our superior voltage endurance is a sample 13.8kV HiFLEX (hot pressed resin rich) coil, which was recently manufactured for a customer in Canada and VE tested in accordance to IEEE 1043 in our in-house VE testing cell.

Test schedule A of IEEE 1553 was followed for the applied voltage of 30kV at 100°C, with the pass requirement of 400 hours.

The test was stopped after 1000 hours. The coil then passed further post-dielectric testing, confirming the dielectric integrity of the insulation.

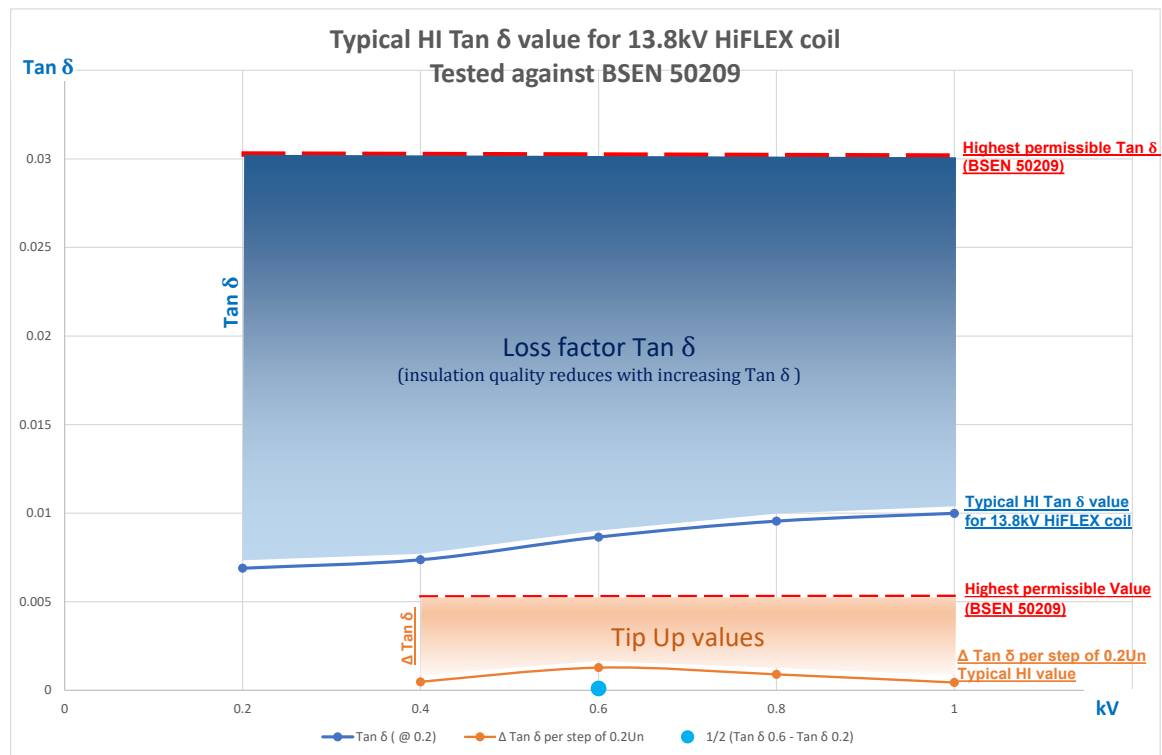
Voltage Endurance Testing



Tan Delta

Tan delta ($\tan \delta$) testing, also called dissipation factor or loss angle, is a measure of the dielectric quality of the HV insulation. Dielectric quality is dependent on the selection of high quality insulation materials and high level of process control.

As demonstrated by the table below our tan delta values surpass the acceptable criteria and customers have often fed back that our tan delta results are the best results they have seen.



Customer testimonials

Jason Znidarich, Traction & Mining Motor Repairs:

We had set a very high type test and routine test standard for the coil set for Houghton International to meet and the coils passed with flying colours in their manufacturing facility. During the rewind process the coils were an excellent fit and windability was second to none. We had every confidence that the coils would pass all dielectric testing once installed and they did with flying colours.

Joe Higgs, Armature Electric:

Our winding team are very impressed with the precision of the coil geometry and the overall high quality of the coil build and finish. The final PD testing of the last large HV Motor, a 14,000HP GE refiner duty motor, produced the best test results we have ever seen. This is a true testament to the high quality standards built into the HIFLEX coil design.

Octavio Quezada, GrupoMoller:

Houghton International's engineering expertise was an asset during this rewind, from initial assistance on coil specification through to state of the art testing. We would not hesitate to work with them again.

Houghton International

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