



Dr. Fastener

Kesternich Testing

Q: What is the Kesternich Test?

A: The Kesternich Test is an accelerated corrosion test that was developed by Wilhelm Kesternich in 1951 which exposes test parts to a moist environment of water and sulfur dioxide (SO₂).

Q: What conditions is the Kesternich Test Trying to Simulate?

A: The addition of Sulfur Dioxide (SO₂) creates an acidic condition in the mist or fog created in the chamber which is intended to simulate acid rain or a similar industrial chemical exposure. It is used to evaluate the corrosion resistance of parts or the coatings on parts in this type of environment.

Q: What Kind of Fasteners Might be Validated with Kesternich Testing?

A: There are a number of accelerated corrosion tests employed on fasteners. The most common is a Neutral Salt Spray Test which exposes parts or test surrogates (such as test coupons) to a continuous warm "fog" comprised of water and 5% salt. Kesternich testing is intended to simulate exposure to acid rain or similar conditions; therefore, it is predominantly used to test parts or finishes for external construction applications, such as screws used for metal roofing, metal cladding, decking, and window and door frames. Of course, it could be employed on any fastener or finish, but because of its very focused purpose, it really only makes sense for those fasteners or fastener finishes that would be exposed to outdoor conditions.

Q: Are There Formal Test Procedures or Protocols?

A: Yes, there are actually several standards that are commonly accepted to provide guidance on how to conduct this testing. They include: DIN EN ISO 6988, DIN 50018, ASTM G87, ISO 3231 and ISO 22479.

Q: What does the Test Chamber Look Like?

A: Like Neutral Salt Spray test chambers they may vary from manufacturer to manufacturer. However, there will be many aspects that are common including the capacity and internal composition. This test calls for a 300L test chamber which can produce warm, moist air mixed with prescribed amounts of Sulfur Dioxide (SO₂). The inside of the chamber must also be completely inert to corrosion, so that it will be lined or composed of materials that do not corrode.

Q: How does the Test Chamber Work?

A: Deionized or distilled water is introduced into the floor pan of the test chamber where it is heated to create a warm mist or fog. A fixed amount of Sulfur Dioxide (SO₂) is introduced into the chamber to create either a .33% or .66% fog composition. Parts are fixtured above the water level in the bottom of the chamber and the entire chamber is tightly sealed. The test is conducted in 24 hour cycles with standard tests being 2 to 50.

Q: What is a Test Cycle?

A: One cycle is comprised of two parts. Part 1 is an 8 hour warm-up at 40° +/-3° C at a relative humidity of 100%. Part 2 is a 16 hour cooling between 18°-28° C with a relative humidity of 75%. Together they add up to one twenty-four hour cycle.

Q: How are Parts Assessed?

A: After completing the prescribed number of cycles, parts are removed from the chamber and allowed to dry in room air. They are then assessed for corrosion by mass loss, visual inspection, or other methods stipulated by a relevant standard. ■

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