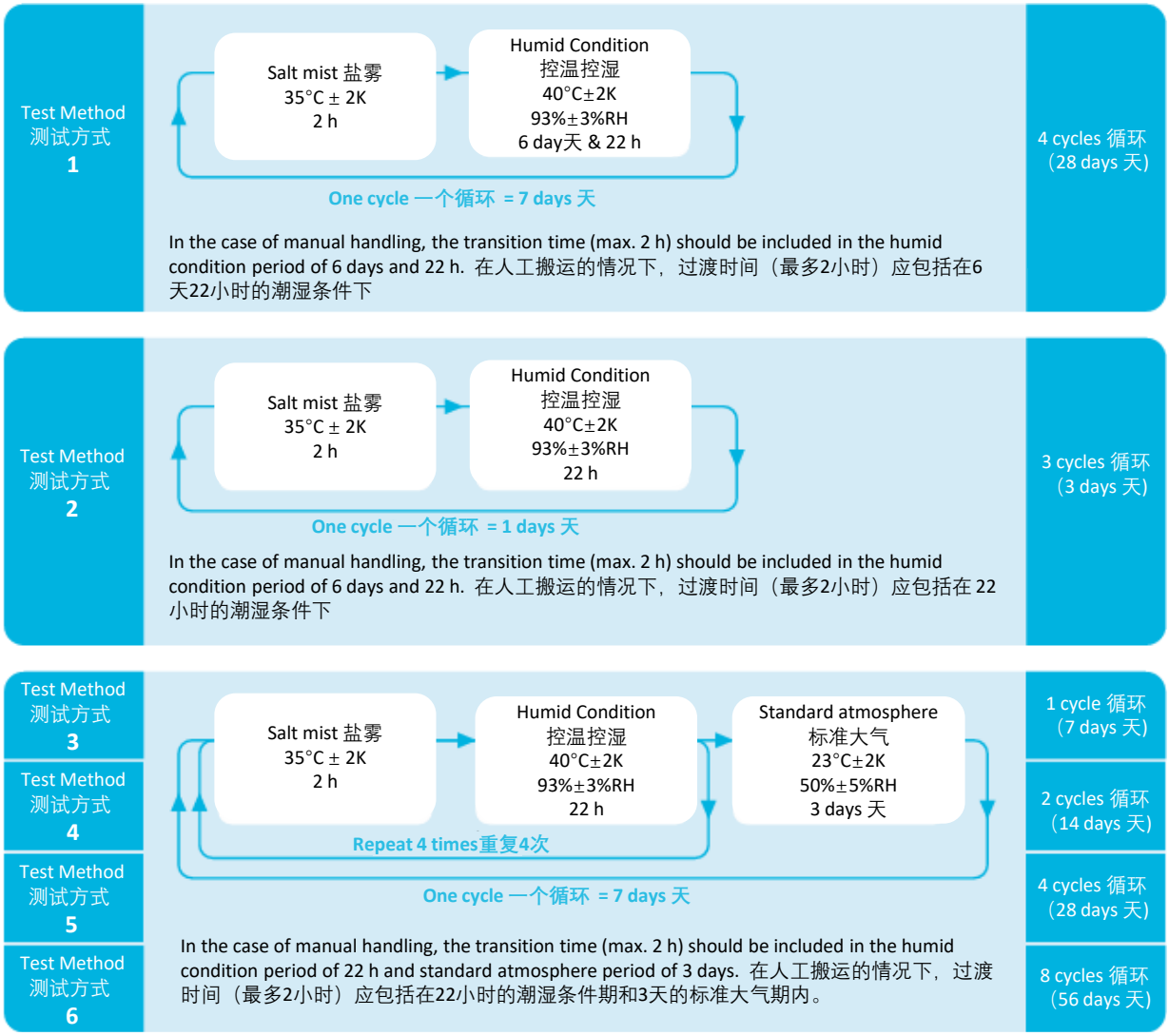
STANDARD 标准: IEC 60068-2-52 Testing Method Statement 测试方法说明
EQUIPMENT 设备: Ascott Cyclic Corrosion Chambers & Accessories 循环腐蚀试验箱及配件

1. Scope范围

1.1 This methodology is to be used to perform all methods of IEC 60068-2-52 Cyclic Corrosion Test standard in an Ascott corrosion chamber. This document should be used in conjunction with the IEC 60068-2-52 test standard document. The test standard takes precedence over this method statement and this method may need to be altered to follow/comply with the standard.
该方法用于在 Ascott 腐蚀试验箱中执行IEC 60068-2-52循环腐蚀试验标准的所有方法。本文件应与IEC 60068-2-52测试标准文件一起使用。测试标准优先于本施工方案，可能需要更改此方法以遵循/符合标准。

1.2 This method is based on IEC 60068-2-52 which has 8 methods and consists of：
该方法基于IEC 60068-2-52，其具有8种方法，包括：

1.3



Test Method 测试方式 **7**	Salt mist 盐雾 35°C ± 2K 2 h → Humid Condition 控温控湿 40°C±2K 93%±3%RH 6 day天 & 22 h → Humid Condition 控温控湿 40°C±2K 93%±3%RH 6 day天 & 22 h One cycle 一个循环 = 8h	3, 6, 12, 30, 45, 60, 90, 150, 180 cycles 循环 (1, 2, 4, 10, 15, 20, 30, 50, 60 days 天)
Test Method 测试方式 **8**	The transition times (time allowed to reach the temperature and relative humidity specified for a condition after changing to that condition) are within 30 min or between 30 min and 60 min from salt mist to dry condition, within 15 min or between 15 min and 30 min from dry condition to humid condition and within 30 min from humid condition to salt mist. Those transition times shall be included in next condition period.从盐雾到干燥条件的过渡时间（在改变到该条件后达到为该条件指定的温度和相对湿度所允许的时间）在30分钟内或30分钟至60分钟之间，从干燥条件到湿润条件的15分钟内或15分钟至30分钟之间，以及从湿润条件到盐雾的30分钟内。这些过渡时间应包括在下一个条件期内	

Note: The ± tolerences given for temperature and relative humidity are the allowable fluctuations which are defined as the positive and negative deviations from the setting of the sensor at the operational control set point during eqilibrium conditions. This does not mean that the set value can vary by plus/minus the amount indicated from the given value.
注：温度和相对湿度的±公差是允许的波动，定义为在平衡条件下，传感器在操作控制设定点的正负偏差。这并不意味着设定值可以从给定值中增减指示的量。

Test method 1 should be used to test products which are exposed to the environment for much of their operational life (e.g. ship radar, deck equipment).
测试方法1 应用于测试在其大部分使用寿命内暴露在环境中的产品（例如船舶雷达、甲板设备）。

Test method 2 should be used to test products which may be exposed to the marine environment from time to time but will normally be protected by an enclosure (e.g. navigational equipment which will normally be used on the bridge or in a control room).
测试方法2 应用于测试可能不时暴露在海洋环境中但通常会受到外壳保护的产品（例如通常在驾驶台或控制室使用的导航设备）。

Test methods 3 to 6 can be used for products where, under normal use, there is a frequent change between salt-laden and dry atmosphere, for example automobiles and their parts.
测试方法3至6 可用于在正常使用情况下，含盐和干燥环境之间频繁变化的产品，例如汽车及其零件。

Test method 7 defines a specific number of test cycles that include spraying salt mist, followed by dry conditions and humid conditions. The process can be used as a general corrosion test for many materials including automobiles and their parts.
测试方法7 定义了特定数量的测试循环，包括喷洒盐雾，然后是干燥条件和潮湿条件。该工艺可用于包括汽车及其零件在内的许多材料的一般腐蚀试验。

Test method 8 contains the same cyclic exposure as test method 7, but utilizes an acidified salt solution instead of a neutral salt solution to induce a corrosion that occurs in acidified salt environment.
试验方法8 包含与试验方法7相同的循环暴露，但使用酸化盐溶液而不是中性盐溶液来诱导在酸化盐环境中发生的腐蚀。

1.4 The chamber will be loaded with test samples as required by the customer or in accordance with IEC 60068-2-52.
根据客户要求或IEC 60068-2-52，试验箱将装载试验样品。

2. Instrumentation 仪器仪表

2.1 All measuring equipment must be calibrated. The recalibration renewal date must not fall within the test duration.
所有测量设备必须校准。重新校准更新日期不得在测试持续时间内。

2.1.1 The Ascott corrosion chamber should be calibrated for chamber air temperature and relative humidity as a minimum. If required, the following 'chamber' items may also be calibrated:
Ascott 腐蚀试验箱应至少针对室内空气温度和相对湿度进行校准。如果需要，还可以校准以下"试验箱"项目：

- Chamber air saturator temperature. 试验箱空气饱和器温度。
- Chamber air pressure gauge (atomiser pressure). 试验箱气压计（雾化器压力）。

2.2 Peripheral devices also should be calibrated prior to use and may include the following:
外围设备在使用前也应进行校准，可能包括以下内容：

- Hand Held pH Meter – is calibrated using buffer solutions and following manufacturers' instructions. The first solution pH 4.01 and second solution pH 7.01. Tolerance acceptable is +/- 0.01.
手持式pH计 — 使用缓冲溶液并按照制造商的说明进行校准。第一溶液pH 4.01，第二溶液pH 7.01。可接受的公差为+/-0.01。

  Once completed the electrode is rinsed using Electrode Rinse solution. The buffer solution is certified to NIST Standard Reference material.
一旦完成，使用电极冲洗溶液冲洗电极。缓冲溶液已通过NIST标准参考物质认证。

Hand Held pH Meter (Ascott Accessory No. ACC11) **手持式pH计**（Ascott 配件编号ACC11）

Digital pH meter, for measuring the pH of salt solution fallout over range 0-14 pH with a resolution of 0.01pH. Supplied complete with buffers for calibration.
数字pH计，用于测量0-14 pH范围内盐溶液沉降物的pH值，分辨率为0.01pH。配有校准用缓冲器。

- Salinity Refractometer is calibrated using Refractometer calibration liquid calibration solution (3.5%)
使用折射仪校准液校准溶液（3.5%）校准盐度折射仪

Salinity Refractometer (Ascott Accessory No. ACC100) **盐度折射仪**（Ascott 配件编号ACC11）

A Salinity refractometer optimized to give a direct reading of percentage sodium chloride in the range 0 to 28%, with automatic temperature compensation.
盐度折射计经过优化，可直接读取0至28%范围内的氯化钠百分比，并具有自动温度补偿功能。

- Conductivity meter is calibrated using standard solution, used for checking the conductivity of the water used for the salt solution.
  电导率仪使用标准溶液进行校准，用于检查盐溶液用水的电导率。

2.3 The chamber temperature may be continuously monitored if required, using an independently calibrated data logger. For salt spray testing, it may be satisfactory to record the chamber temperature manually using the Ascott chamber display on a daily basis.
如果需要，可以使用独立校准的数据记录器连续监测试验箱温度。对于盐雾测试，每天使用Ascott 试验箱显示器手动记录试验箱温度可能是令人满意的。

2.4 The test can be ran in multiple chambers, or in a single test chamber capable of meeting the following requirements:
试验可以在多个试验箱中进行，也可以在能够满足以下要求的单个试验箱中运行:

2.4.1 Salt mist chamber to the requirements of ISO 9227. It shall maintain a temperature of 35 °C (±2°C).
盐雾试验箱符合ISO 9227的要求。它应保持35°C（±2°C）的温度。

2.4.2 Humidity chamber which conforms to the requirements of IEC 60068-2-78. It shall maintain a relative humidity of 93 % (± 3%)at a temperature of 40 °C (± 2°C) or a relative humidity of over 95 % at a temperature of 50 °C (±2°C).
符合IEC 60068-2-78要求的湿度箱。它应在40°C (±2°C) 的温度下保持93%（±3%）的相对湿度，或在50°C (±2 °C) 温度下保持95%以上的相对湿度。

2.4.3 Standard atmosphere chamber which conforms to the requirements of IEC 60068-1. It shall maintain a relative humidity of 50 % (± 5%) at a temperature of 23 °C (±2°C).
符合IEC 60068-1要求的标准大气室。它应在23°C（±2°C）的温度下保持50%（±5%）的相对湿度。

2.4.4 Dry chamber which can maintain a relative humidity of less than 30 % at a temperature of 60 °C (±2°C).
干燥箱，可在60°C（±2°C）的温度下保持相对湿度小于30%。

This test can be ran in its entirety in an Ascott Cyclic Corrosion chamber fitted with Dehumidification Unit (Ref ACC112), heater blower system (ref ACC47) and wall wash facility (ref ACC42).
该测试可以在配备除湿装置（参考ACC112）、加热器鼓风机系统（参考ACC47）和箱壁清洗设施（参考ACC42）的Ascott循环腐蚀箱中完整运行。

2.5 Exposure to Salt Solution 盐溶液暴露
Collection rates are monitored manually using collection vessels placed at sample height. The collection rates are to be within the range of range of 1-2ml/hr/80cm2.
使用放置在样品高度的收集容器手动监测收集量。收集沉降量应在1-2ml/hr/80cm2的范围内。

2.6 The salt solution exposure is by means of atomisation using compressed air. The air delivered to the spray nozzle must be 'heated and moistened' by passing the air through an air saturator, the temperature of the chamber air saturator is set according to the pressure at the atomiser gauge. (See ISO 9227-2017(E) table for reference)
盐溶液的暴露是通过使用压缩空气进行雾化来实现的。输送到喷嘴的空气必须通过空气饱和器进行"加热和加湿"，试验箱空气饱和器的温度根据雾化器压力设定。（参考ISO 9227-2017（E）表）

Corrosalt for Salt Spray Testing (Ascott Accessory No. SALA530)
盐雾测试用高纯度盐（Ascott 配件编号SALA530）

Highest purity salt for fully compliant testing. For all salt spray testing including the stringent ASTM B117. Availabe in 25 kg (55 lb) drums or bags.
用于完全符合测试要求的最高纯度盐。适用于所有盐雾测试，包括严格的ASTM B117。可装在25公斤（55磅）的桶或袋中。

3. Salt Solution Preparation 盐溶液制备

3.1 Salt solution to be prepared in accordance with ISO 9227-2017(E).
盐溶液应按照ISO 9227-2017（E）制备。

Check that the water conductivity is measured and monitored and is within the requirements of the standard using a conductivity meter. (Less than 20 µS/cm at 25°C ± 2°C)
使用电导率仪检查水的电导率是否被测量和监测，是否在标准要求范围内。（25°C±2°C时小于20µS/cm）

Salt solution concentration is measured & monitored and is within the requirements of the standard using a calibrated Salinity Refractometer.
使用校准的盐度折射仪测量和监测盐溶液浓度，使其符合标准要求。

Salt solution pH is measured & monitored and is within the requirements of the standard using a calibrated pH Meter.
使用校准的pH计测量和监测盐溶液的pH值，使其符合标准要求。

3.1.1 **Test Methods 1-7 = NSS** - After allowing the solution to stabilise for several hours, the salinity and pH is measured and recorded. Any adjustments to the pH can be made using reagent grade hydrochloric acid (HCL) to increase the acidity or regent grade Sodium hydroxide (NaOH) or Sodium Bicarbonate (NA2CO3) to reduce the acidity. Record all results.
试验方法1-7=NSS - 让溶液稳定几个小时后，测量并记录盐度和pH值。pH值的任何调整都可以使用试剂级盐酸（HCL）来增加酸度，或使用试剂级氢氧化钠（NaOH）或碳酸氢钠（NA2CO3）来降低酸度。记录所有结果。

3.12 **Test Method 8 = AASS** – Glacial Acetic acid Salt Spray is added to the salt solution so that the pH meets the required limits stipulated within the standard. Any adjustments to the pH can be made using Glacial Acetic Acid to increase the acidity or regent grade Sodium hydroxide (NaOH) or Sodium Bicarbonate (NA2CO3) to reduce the acidity. Record all results.
试验方法8=AASS —将冰醋酸盐雾加入盐溶液中，使pH值达到标准规定的要求限值。pH值的任何调整都可以使用冰醋酸来增加酸度，或使用再生级氢氧化钠（NaOH）或碳酸氢钠（NA2CO3）来降低酸度。记录所有结果。

3. Sample Preparation 样品制备

4.1 The test samples should be thoroughly cleaned before testing commences. This should not include the use of abrasives or solvents. This process should be agreed with the customer.
在测试开始之前，应彻底清洁测试样品。这不应包括使用研磨剂或溶剂。此过程应与客户达成一致。

Latex gloves must be worn at all times when handling samples.
处理样品时必须始终戴乳胶手套。

Photographs should be taken of each sample prior to starting the test.
在开始测试之前，应拍摄每个样品的照片。

5. Operation 操作

5.1 Pre-test evaluation试验前评估

- Run a 24-hour salt spray test with the chamber empty and collection funnels positioned. Record the temperature and ensure it remains in tolerance of 35°C (±2°C).
在试验箱为空且收集漏斗就位的情况下进行24小时盐雾试验。记录温度并确保其保持在35°C（±2°C）的公差范围内。
- Ensure the salt fog collection rates are within the expected range of 1-2ml/hr/80cm2. Record all results.
确保盐雾收集量在1-2ml/hr/80cm2的预期范围内。记录所有结果。
- Check that the collected salt solution has a concentration of 50(±5) g/L.
检查收集的盐溶液浓度是否为50（±5）g/L。
- Check that the collected solution pH falls within the requirement of the standard. Record all results.
检查收集的溶液pH值是否在标准要求范围内。记录所有结果。
- If required, adjust the pH of the salt solution within the solution reservoir to offset any change to the pH when collected; so that the collected solution is within requirements of the standard. This may require additional testing to prove results before testing with samples commences.
如果需要，调节溶液储器内盐溶液的pH值，以抵消收集时pH值的任何变化；以便收集的溶液在标准要求范围内。这可能需要在开始使用样品进行测试之前进行额外的测试以证明结果。
- Create and run a complete 24-hour cycle of the controlled humidity (E.g. 6 hours of Condensation humidity at 40°C (±2°C) 93%RH (±3%) followed by 6 hours Controlled humidity at 23°C (±2°C) 50% RH (±5% RH) – Applicable to Test Methods 3 to 8 only.
创建并运行一个完整的24小时湿度控制循环（例如，在40°C (±2°C) 93%相对湿度 (±3%)下冷凝6小时，然后在23°C (±2 °C) 50%相对湿度 (±5 %RH)下控制6小时—仅适用于测试方法3至8。
- Record the profile using an independent data logger or Ascott's logging software (ACC121).
使用独立的数据记录器或Ascott 的记录软件（ACC121）记录资料。
- Verify that the chamber can follow the example test profile and that the transition times and values for temperature and relative humidity are within tolerance of the standard.
验证试验箱是否可以遵循示例测试曲线，温度和相对湿度的转换时间和值是否在标准公差范围内。

5.2 Starting the test cycle开始测试循环

5.2.1 Test Exposure Conditions试验暴露条件

- Position samples within the chamber in accordance of the test standard.
根据测试标准将样品放置在试验箱内。

- Set the chamber air saturator temperature according to the table within the test standard.
  根据测试标准中的表格设置试验箱空气饱和器温度。
- Ensure that no samples 'shadow' other samples and that droplets from one sample cannot fall onto other samples.
  确保没有样品"遮挡"其他样品，并且一个样品的液滴不会落到其他样品上。
- Insert clean and empty salt spray collection vessels around the samples within the chamber, preferably at sample height, and never underneath samples or anything else that may drip into them from above.
  在试验箱内样品周围插入干净的空盐雾收集容器，最好在样品高度，不要在样品下方或从上方滴入样品的任何其他地方。
- Start the test cycle and record test parameters at start.
  开始测试循环，并在开始时记录测试参数。
- Spray continuously with atomised salt solution at a constant chamber temperature of 35°C (±2°C).
  在35°C（±2°C）的恒定室温下连续喷洒雾化盐溶液。
- Exceptions to continuous testing are permitted to record fallout collection rates and PH of collected solution daily. Typically, this would be at the same time daily and omitted at weekends. Chamber open time must be minimal and no more than 1hr/24hr.
  允许连续测试的例外情况，以记录每天的沉降物收集量和收集溶液的PH值。通常，这将在每天的同一时间进行，并在周末省略。试验箱打开时间必须最小，不得超过1小时/24小时。
- Photographs to be taken prior to starting the test and at customer specified times.
  在开始测试之前和客户指定的时间拍摄照片

5.3 Quality Control质量控制

5.3.1 Daily checks to ensure the standard is being followed with variable parameters within limits– Record all parameters.

- Check that the chamber temperature is within acceptable limits.
  检查试验箱温度是否在可接受的范围内。
- Check that air saturator temperature is within acceptable limits.
  检查空气饱和器温度是否在可接受的范围内。
- Check that atomiser air pressure is within acceptable limits.
  检查雾化器气压是否在可接受的范围内。
- Check that collected solution is within acceptable limits for fallout rates.
  检查收集的溶液是否在可接受的沉降率范围内。
- Check the reservoir salt solution is within 5.0% ±1.0% NaCl.
  检查盐溶液储罐是否在5.0%±1.0%NaCl范围内。
- Record the reservoir salt solution pH.
  记录盐溶液储罐pH值。
- Check that collected salt solution pH is within acceptable limits.
  检查收集的盐溶液pH值是否在可接受的范围内。

- Record the conductivity of the DI water when used.
  记录使用时去离子水的电导率。
- Monitor the level of salt solution in the reservoir and ensure that there is enough for the next 24/48 hours. (Allow extra for weekends).
  监测储液罐中的盐溶液液位，确保在接下来的24/48小时内有足够的盐溶液。（周末应额外准备盐溶液）

5.4 After Exposure暴露后

5.4.1 The handling of the tested specimens varies depending upon their material. Refer to the test standard and agree the correct procedure with the customer.
试样的处理因材料而异。请参阅测试标准，并与客户商定正确的程序。

Latex gloves must always be worn when handling samples.
处理样品时必须始终戴乳胶手套。

Photographs of the samples should be taken.
应拍摄样品的照片。

5.5 Deviation Handling偏差处理

5.5.1 General deviations such as downtime, out of tolerance recordings should be noted in the test report, including details of any alterations made.
应在测试报告中注明停机时间、超差记录等一般偏差，包括任何更改的详细信息。

In the event of any inconsistency between the Chinese translation and the original English version, the original English version shall be deemed authentic and shall prevail.
如果中文翻译与英文原版不一致，应以英文原版为准。

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Typical Daily Checks

Hours	Temp' Check	Humidity Check	Salt Solution pH	Reservoir Salinity %	Oscillation Pump Speed	Spray down Water Pressure PSI	Photos Taken	Initials