Newsletter

LPD Lab Services
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One-Stop Shop for Industrial Process Problem Solving, Consulting and Routine Analysis

Welcome to the January 2026 edition of LPD Lab Services Newsletter

LPD Lab Services are the experts in materials, chemicals, technical engineering and scientific problem solving for products and manufacturing processes across all sectors within Quality Assessment, Facilities, Manufacturing, Engineering, Product and Process Development and Research. LPD Lab Services develop innovative and practical analytical solutions, as well as bespoke testing methods for in-process manufacturing, finished products and field failure, plus help to develop new production processes, products and materials. Staff pride themselves resolving some fascinating and complex technical problems from across diverse product ranges and sectors of industry. The laboratory offers pragmatic scientific and engineering solutions, with timely response times and clear communications, which are all core to the company's business model.

This Edition at LPD Lab Services:

Nickel Plating Integrity: Why It Matters and How We Assess It.

Nickel plating is widely used to improve corrosion resistance, durability and appearance on components ranging from steel to plastics. LPD Lab Services assess the quality of both electrolytic and electroless nickel coatings using optical microscopy and SEM/EDX to identify issues and recommend process improvements.

Typical defects include pits, porosity, inclusions, thin or incomplete coverage, loss of adhesion, cracking, dull or oxidised deposits and contamination affecting electroless nickel.

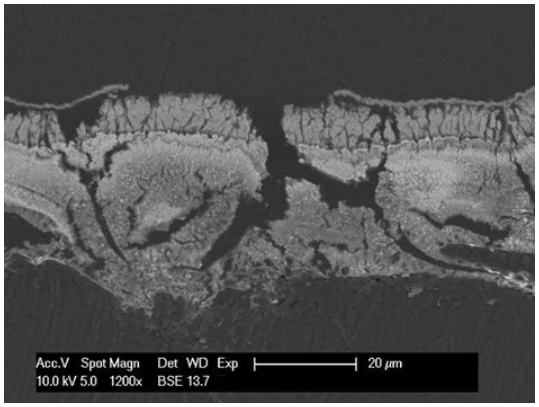
These flaws can compromise protection, especially because nickel is more noble than steel; any breach exposes the substrate to rapid galvanic corrosion.

Many problems originate not only from the plating bath, but also from substrate condition and preparation. Coupled with our metallurgy experience, the laboratory's investigations help determine the true cause of failure and ensure reliable, defect-free coatings.

Introduction to Carbon and Sulphur Analysis: Our new LECO CS230 Instrument.

A LECO Carbon/Sulphur (C/S) analyser is a laboratory instrument used to measure the carbon and sulphur content of solid materials using a non-dispersive infrared quantification method. Typical applications are metals, alloys, ores, ceramics, coal, and other organic materials.

A number of blank and C/S standards are run to produce a calibration curve. One gram of precisely weighed sample is placed into a ceramic crucible, accelerator is then added to the crucible. It is then heated in an induction furnace at high temperatures in an oxygen atmosphere. The carbon in the sample is converted to CO/CO_2 and the sulphur is converted to SO_2. The gases then pass through IR detectors that measure the CO_2 and SO_2 concentrations, which are then converted into carbon and sulphur percentages. The typical Limit of Quantification (LoQ) for carbon is 0.00097wt% or 9.7ppm and for sulphur is 0.0013wt%, or 13ppm. Maximum measurable concentrations are 3.5wt% for carbon and 0.4wt% for sulphur.



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Understanding mercurous nitrate ASTM B154 and ammonia vapour ASTM B858: Two key stress cracking corrosion testing methods for copper alloys.

In the world of copper-alloy manufacturing and quality assurance, corrosion-susceptibility testing plays a crucial role in preventing product failures in service. Two of the most widely referenced test methods - Mercurous Nitrate Testing (ASTM B154) and the Ammonia Vapour Test (ASTM B858): - They help identify materials that may be prone to Stress-Corrosion Cracking (SCC) or season cracking. Although both tests evaluate similar risks, they differ significantly in mechanism, sensitivity, cost, environmental concerns, and applicability. Both tests can be conducted by LPD Lab Services.

Mercurous Nitrate Test (ASTM B154)

ASTM B154 is an accelerated stress-corrosion test that immerses copper-base alloys in a standardised mercurous nitrate solution. The presence of mercury ions promotes rapid formation and propagation of cracks in stressed or cold-worked areas of susceptible alloys. Originally developed to detect "season cracking" in brass, the test has been used for decades as a rapid, reliable method to confirm the effectiveness of annealing and to detect residual stress.

How it Works

- A sample (often a fabricated component such as a tub, fitting, or strip) is partially or fully immersed in the solution.
- If residual stresses are present, mercury is absorbed along grain boundaries.
- Cracks may form within minutes to hours, depending on alloy and stress level.
- The sample is visually inspected for cracking or grain-boundary attack.

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Ammonia Vapour Test (ASTM B858)

ASTM B858 is a non-mercury alternative that exposes copper alloys to controlled ammonia vapour. This method induces stress-corrosion cracking in susceptible materials without environmental hazards associated with mercury. The test simulates real-world exposure scenarios such as environments containing ammonia, moisture, and oxygen, which are conditions known to cause dezincification and stress cracking in brasses.

How It Works

- The sample is placed inside a sealed test chamber above an ammonia solution.
- Ammonia vapour saturates the chamber, creating a corrosive atmosphere.
- Exposure duration is typically several hours to several days.
- Samples are inspected for cracking or corrosion.

Choosing the Right SCC Test Method

Selecting the appropriate test depends on the intended service environment, required sensitivity, testing turnaround, regulatory constraints and internal specifications. Many organisations are transitioning toward ASTM B858 as a safer, greener option,

Factor	ASTM B154 (Mercurous Nitrate)	ASTM B858 (Ammonia Vapour)
Environmental/Safety	Poor—mercury hazards	Excellent—no mercury
Sensitivity to Stress	Very high	Moderate–high
Real-world correlation	Moderate	High in ammonia environments
Speed	Minutes to hours	Hours to days
Regulatory Acceptance	Declining	Increasing
Risk of False Positives	Higher	Lower

while others maintain ASTM B154 for its sensitivity and long established track record which includes in trusted Defence applications

Both **ASTM B154** and **ASTM B858** remain valuable tools for assessing stress corrosion susceptibility in copper-base alloys. As industry moves toward more sustainable practices, ammonia vapour testing is gaining traction, but mercurous nitrate testing still offers unmatched sensitivity in certain applications. Knowing the strengths and limitations of each helps ensure reliable quality control and safer, longer lasting copper alloy components.