



ECCA Technical Note

Indoor Air Quality (IAQ) and Formaldehyde Emissions

Implications for Prepainted Metal Products

1. Indoor air quality regulation in Europe – overview

Indoor air quality in buildings is regulated in Europe through a combination of EU-level legislation, national regulations applicable to construction products and furnishings, and voluntary schemes widely used in public procurement and green building certification. While there is no single harmonised EU-wide limit value for indoor air concentrations of formaldehyde, a high degree of convergence exists in terms of test methods, reference conditions, and indicative limit values.

Key regulatory and policy drivers include:

- EU chemicals legislation (REACH), which increasingly addresses emissions from articles placed on the market, including construction and furnishing products,
- The Construction Products Regulation (CPR), which requires that dangerous substances released by construction products are assessed and declared where regulated at national level,
- National indoor air quality and VOC-emission regulations, which define acceptance criteria for products used inside buildings,
- Voluntary labels and certification schemes (often referenced in public procurement and green building frameworks such as BREEAM, HQE, and DGNB).

2. Formaldehyde – regulatory status and limit values

Formaldehyde is a central substance in indoor air quality regulation due to its widespread use in materials, its potential health effects, and its role as an indicator parameter in most VOC-emission schemes.

At EU level, Commission Regulation (EU) 2023/1464 amended Annex XVII of REACH (Entry 77) to introduce emission limits for formaldehyde and formaldehyde-releasing substances in articles. From 6 August 2026, articles placed on the EU market must not exceed defined emission limits when tested under the conditions specified in the Regulation.

The Regulation defines the following reference emission limits:

- 0.062 mg/m³ for furniture and wood-based articles,
- 0.080 mg/m³ for other articles.

Although prepainted metal products are typically very low emitters, these limits are increasingly used as benchmarks in specifications and customer enquiries relating to building interiors and occupied spaces.



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3. National IAQ regulations and standards relevant to construction products

In practice, IAQ compliance for construction products is most often demonstrated against national regulations or labels that reference harmonised test methods but apply country-specific acceptance criteria.

The most frequently encountered frameworks include:

- France: mandatory VOC-emission labelling (A+ to C) for many construction and decoration products, with formaldehyde as a key declared parameter,
- Belgium: national VOC requirements for certain construction product groups,
- Germany: the AgBB evaluation scheme, widely used as a benchmark by manufacturers and testing laboratories across Europe,
- Nordic and other voluntary schemes (e.g., M1), often requested in public buildings and office projects.

While limit values differ slightly between schemes, most rely on comparable chamber test data and show broad alignment with WHO guideline values for indoor formaldehyde concentrations.

4. Implications for prepainted metals

Indoor air quality requirements are increasingly relevant for construction products and systems, with formaldehyde acting as a key indicator substance across regulatory and voluntary schemes. Recent ECCA-coordinated testing confirms that prepainted metal products are capable of meeting the lowest formaldehyde emission limits used in current IAQ standards, provided that sampling, handling, and testing are performed correctly.

The results underline that IAQ performance is not a single intrinsic property of prepainted metal, but a function of coating chemistry, processing, sample preparation, storage, and the time elapsed since manufacture.

5. Summary of ECCA IAQ test programme and key findings

ECCA has coordinated a phased IAQ test programme on representative prepainted metal samples to better understand formaldehyde emission behaviour under standardised chamber test conditions.

Phase 1 testing on black and white polyester-coated samples demonstrated that prepainted metals are capable of meeting the lowest limits defined in current IAQ standards. However, results were shown to be sensitive to sample handling and storage after manufacture.

Phase 2 testing on white polyester-coated material (covered with a strippable protective film post production, the film was removed immediately before testing) involved daily measurement of formaldehyde emissions over 28 days. Emissions decreased over time and reached a steady state after approximately 23 days, consistent with migration of residual formaldehyde from the core of the coating to the surface.



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6. Implications for testing practice and laboratories

The observed behaviour is consistent with EN 16516 and ISO 16000 chamber-testing methodologies used by Eurofins and other accredited laboratories.

Key practical implications for members include:

- The timing of sample submission is critical; early testing may give higher measured values than testing after a defined ageing period,
- Protective films, packaging, and storage conditions can influence early emission results and must be documented,
- Multi-point sampling (e.g., 3, 7, 14, and 28 days) provides a more robust understanding than single-point testing,
- Laboratory reports should clearly state sample configuration, preparation, and time since manufacture.

7. Expanded guidance for ECCA members

- Avoid using generic IAQ test data as a universal proof of compliance; performance is coating- and process- specific,
- Develop internal guidance on minimum ageing periods before IAQ testing, informed by stabilisation after approximately three to four weeks,
- Ensure alignment between test samples and commercially supplied products, including strippable films and any other ancillary layers,
- When advising customers, emphasise system-level IAQ performance, as non-metal components often dominate emissions,
- Use accredited laboratories and recognised protocols (EN 16516 / ISO 16000) and ensure clarity on the evaluation scheme applied.
