

## What are the big trends with respect to VOC emissions?

The European Environmental Agency reports that since 1990, emissions of non-methane volatile organic compounds (NMVOC) have decreased by 59% in EEA countries and 62 % in the EU27+UK. Further breakdown shows that more than half of the reduction was achieved in the 1990s. Since then, the rate of reduction has been decreasing and for the last 5 years, the emissions seem to have stabilised. As all sectors sought to reduce its VOC emissions the 2020 ceilings set in the National Emissions Ceilings Directive were achieved already in 2017.

For solvents part in those NMVOC emissions a reduction of 49% between 1990 and 2018 and 27% since 2005 can be observed. So, when it comes to “solvents & product use”, the emissions have been reduced to almost half of 1990 emission levels. Important EU regulatory measures, such as the Solvent Emissions Directive (1999) — now part of the Industrial Emissions Directive (2010) and the Paints Directive (2004) — were introduced and have contributed to reductions in the solvent content of products and emissions from industries using solvents. Hence the stabilisation for solvents VOC emissions has started slightly earlier, and no substantial reductions can be noted since 2012.

In parallel to these outstanding reductions, the solvents VOC emission has proportionally become one of the biggest contributing categories. The largest source of current NMVOC emissions is the 'Solvent and product use' sector (approximately 50 % of total EEA-33 emissions) which includes a multitude of different processes and products.

VOC emissions from biogenic sources are not included in those anthropogenic emission inventories. Biogenic VOC emissions may vary with future climate change patterns and, in some regions, be a major fraction of the atmospheric burden of hydrocarbons during ozone episodes.

## Are solvents still needed?

Yes, solvents deliver key benefits to society in allowing an optimization of processes and in maintaining undisputed product performances. Solvents are crucial in many different processes and products because they are simply needed to perform their function. Solvents provide solutions in many sectors from coating vehicles to manufacture of tyres or used in cleaning agents to diverse printing applications.

In pharmaceutical industry they are necessary to achieve purity required of modern medicine or they serve as process chemicals in the production of active ingredients in contrast media to detect cancer or leukemia. Alcohols are used in the manufacturing of disinfectants and handgels.

By far the biggest application field are coatings. Outdoor paints and coatings must be durable enough to withstand the heat of summer, freezing rain, melting snow and it is because of solvents, they can. Paints made with solvents stay brilliant and strong in some of the toughest weather conditions. Without proper protection, metals exposed to the outdoors will inevitably experience corrosion. Solvent-based paints for metals offer the most resilient, long-lasting protection. They



are essential to maintain the integrity of critical infrastructure like bridges and pipelines for decades to come. Blends of solvents are used to achieve optimum solvency or to regulate the evaporation and hence drying time.

## How are solvent VOC emissions regulated?

There are two types of emissions to be considered : **Industrial emissions from solvent using plants and VOC emissions from products**

- **Industrial emissions from solvent using plants**

The industrial emissions are covered by the Industrial Emissions Directive and there is a dedicated Best Available Technique (BAT) reference document (BREF) for the surface treatment using organic solvents (STS BREF) that has been reviewed recently.<sup>1</sup> The BAT conclusions were published on 9<sup>th</sup> December 2020, in the Official Journal of the European Union. The STS BREF defines operating conditions and emission rates in installations for the surface treatment of substances, objects or products using organic solvents, from many sectors<sup>2</sup> In the scope of the BREF are plants with an organic solvent consumption capacity of more than 150 kg per hour or more than 200 tonnes per year.

Companies need to comply with the new legislation by 2024 to maintain their licence to operate. Any new solvents using plant in the scope of the STS BREF in Europe will need to comply with the new limits immediately when it starts production. The BATs will be in operation until 2031 and the review process will start again in 2026.

Therefore, any effects of the STS BREF will only be sizable after 2024. The STS BREF implementation and enforcement are done at EU Member State Level. They can deviate from the binding BAT conclusion by less stringent emission limit values if the imposition of BAT would lead to disproportionately higher costs compared to the environmental benefits. But a the respective Member State authority could also opt for stricter emissions limit values where this is required by an environmental quality standard.

As a policy option a Member State could consider applying the limit values to smaller installations in the scope of the STS BREF.

- **VOC emissions from products**

When it comes to products the crucial point should be the actual VOC emissions and not the VOC

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<sup>1</sup> <https://eippcb.jrc.ec.europa.eu/reference/surface-treatment-using-organic-solvents-including-wood-and-wood-products-preservation>

<sup>2</sup> coating of vehicles, coating of ships and yachts, coating of aircrafts, coatings of other metal or plastic surfaces, coil coating, manufacture of adhesive tapes, manufacture of winding wires, coating of textiles, foils & papers, coating and printing of metal packaging, heatset web offset printing, flexography and rotogravure printing, coating of wooden surfaces & wood preservation).



content. The only product regulation in the EU is the so called “Paints Directive” which covers paints for use on buildings, their trims and fittings and structures associated to buildings and products for vehicle refinishing. For the decorative paints and varnishes, Annex II A to the Directive sets out two sets of limit values for the maximum contents of VOCs (in grammes per litre of the product ready for use). The first set of limit values applied from 1 January 2007 on. The second, and stricter, set of limit values apply since 1 January 2010.

Whilst the « Paints Directive » has undeniably contributed to significantly reduced emissions, it has also lead to reach a content limit of what is technically **possible** meaning the limit values cannot be further reduced and even if small reductions would be achievable the effect for the actual emissions is negligible . A certain amount of solvents is simply needed to achieve functionalities. The very same applies to other products.

Another product regulation the European Commission has been planning the issue since several years is a Delegated Regulation on the classification of performance of construction products in relation to their emissions of dangerous substances into indoor air (VOC). The Delegated Act is intended to assure the communication of VOC emissions from construction products in the form of VOC classes. A key prerequisite for defining the VOC classes is the completion of the EU-LCI list currently being carried out by a group of experts from ten European countries.<sup>3</sup>

When it comes to product emissions there are also several voluntary schemes such as the EU ecolabels that specify VOC emissions for some product categories.

## Are further VOC reductions from solvents realistic?

The solvent industry has always been a front runner in optimizing its solvent use. Innovation started early and the industry was the first sector to drastically reduce its VOC emissions. The industry continues anticipating policy trends toward sustainability and complying with the strict legislative framework related to health and environmental protection.

Industry is constantly working towards technical and economic solutions and VOC emissions have already been optimized in processes and products.

**However, it is still not technically feasible in most cases to remove all VOCs while retaining process or product performance. All uses are necessary applications where solvents fulfill their dedicated function.** Due to the need for solvents in industrial processes and in daily life, VOC emission from solvents will always be present at a degree.

It is interesting to note that over the last decades, solvent sales have not been declining, meaning solvents are used in those applications that need them, but at the same time emission have declined and now stabilized.

<sup>3</sup> [https://ec.europa.eu/growth/sectors/construction/eu-lci-subgroup/eu-lci-values\\_en](https://ec.europa.eu/growth/sectors/construction/eu-lci-subgroup/eu-lci-values_en)



Industrial processes are cleaned up to the maximum level by applying the best available abatement techniques, thus contributing to lower emission factors. Implications of the updated STS BREF will need to be analyzed once it has been fully implemented throughout all Member States (2024).

Recently the presence of solvents in several application fields is also measured against sustainability criteria, such as comparing short term emission versus emissions from Life Cycle Analysis point of view.

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About ESIG

The European Solvents Industry Group represent the EU manufacturers of oxygenated and hydrocarbon solvents and promotes the safe and sustainable use of solvents.

