



**Delivering Best Available
Techniques for wastewater
treatment to the chemical
manufacturing industry.**

Introduction

Chemicals are widely used in the manufacture of everyday products including non-stick coatings, paints, adhesives and cleaning agents. General scientific laws such as chemical and/or physical equilibria make the occurrence of waste inevitable during chemical processes (syntheses) and side products must be removed.¹

These unwanted organic compounds are often persistent in nature, meaning they can pass through traditional wastewater treatment systems, resulting in their release into waterways within wastewater effluent.

Improvements in analytical capabilities over recent years has meant that the visibility of compounds in waterbodies has increased. This has led to consumer pressure over human health and the environment along with new technological developments to cope with compounds of emerging concern and new regulations from controlling bodies.

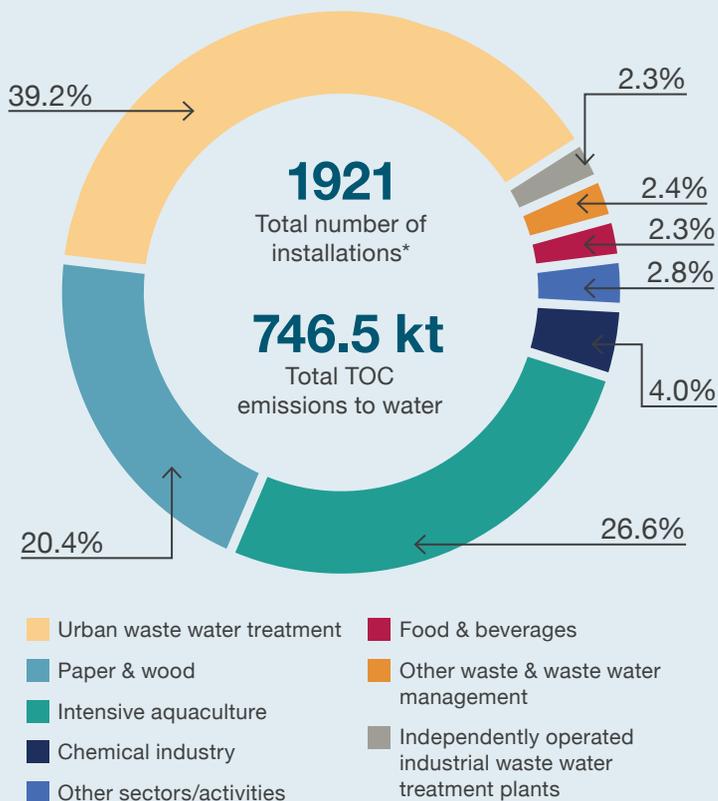
The EU Chemical Industry

The EU chemical sector provides a significant contribution to the EU economy. In 2011, the EU-27 was the leading exporter and importer of chemicals in the world, accounting for nearly 40% of global trade¹.

In 2010, the chemical industry in Europe was responsible for 4% of the total organic carbon (TOC) emissions to water. (Figure 1).

Within the chemical sector, the production of basic organic chemicals was responsible for more than 65% of all TOC emissions¹ (Figure 2).

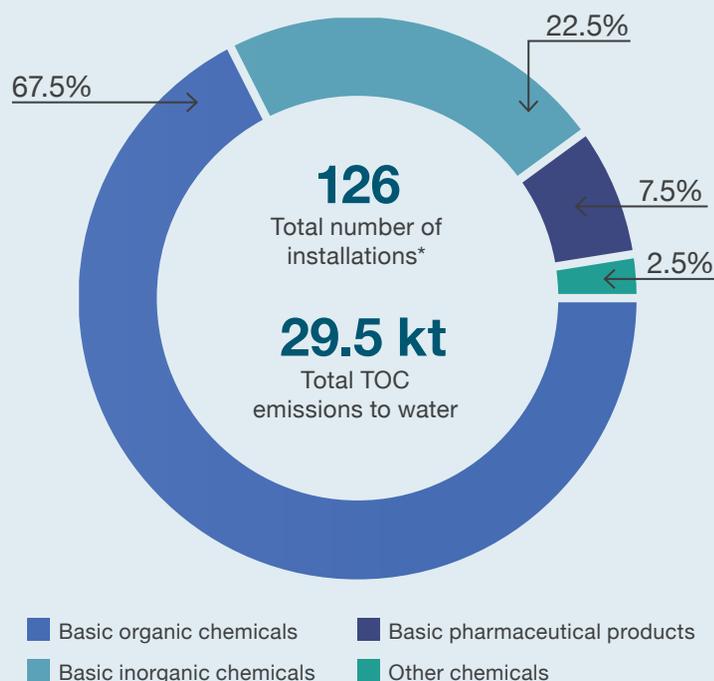
Figure 1. Emissions of organic compounds to water by industry sector, 2010



*Coverage: EU-27 plus Iceland, liechtenstein, Norway and Serbia; industry sectors covered by Annex I of the E-PRTR with capacity thresholds described therein; installations with emissions of total organic carbon (TOC) (as total C or COD/3) of more than 50 t/yr; normal operation.

NB: COD = chemical oxygen demand

Figure 2. Origins of TOC emissions from the Chemical industry in 2010



With specific regard to emissions to air and water, the EU chemical industry is required to implement EU Directive 2010/75/EU. On 30th May 2016, the European Union published Best Available Techniques (BAT) conclusions for wastewater management systems in the chemical sector. Subsequently the 'Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector'¹ was published.

'Best Available Techniques' (BAT) means the available techniques which are the best for preventing or minimising emissions and impacts on the environment. Organisations need to use BAT if operational activities are an installation of sufficient size (e.g. a facility that carries out an industrial process like a refinery or manufacturing facility).

The European Commission is updating BREF notes and the updated versions also include 'BAT conclusion documents'. These contain emission limits associated with BAT ('BAT AELs') which must be complied with, unless the Environment Agency agrees certain criteria have been met.

Arvia Technology's Treatment Solution

Arvia's Nyex™ Treatment Systems offer a unique solution for the reduction of hard-to-treat organics, micropollutants and colour from water and wastewater streams.

Each on-site system (figure 3.) is tailored to meet specific water treatment requirements, guaranteeing environmental and regulatory discharge limits are achieved. Furthermore, Nyex Treatment Systems can also be designed and optimised to ensure treated water is safe for reuse within the business.

The ability to safely reuse process water does not only reduce utility costs but also builds positive Corporate Social Responsibility through the protection of the environment in water stressed times.



Figure 3. The Nyex-a containerised system.



The Nyex process combines two of the BATs to enable BREF compliance.

Nyex systems provide a chemical free and environmentally sound solution which combines adsorption with electrochemical oxidation in a single, scalable unit.

Problematic contaminants are concentrated on the surface of Arvia's proprietary media, which is non-porous with high electrical conductivity. This patented adsorbent media allows for targeted and continuous oxidation.

Unlike granular activated carbon, Nyex media is effectively regenerated in-situ and the process can continue without interruption or replacement. Results are achieved without chemical dosing or the generation of sludge, reducing costs in terms of transport of chemicals and specialist waste disposal.



Benefits of Nyex treatment to the Chemical manufacturing sector:

A cost effective, environmentally responsible solution for the treatment of water emissions.

Add value and enhance business performance by fine tuning water treatment processes.

An optimisable solution to enable compliance with increasingly stringent regulation.



Speak to one of our application experts today to discuss the targeted removal of problematic organics from your wastewater with Nyex.

1. Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control). Thomas Brinkmann, Germán Giner Santonja, Hande Yükseler, Serge Roudier, Luis Delgado Sancho. 2016.

http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf

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