

TON and TOC requirements

4MS Common Approach:

Tests of products made of organic materials

23rd May 2018

France, Germany, the Netherlands and the United Kingdom (4MS) work together in the framework of the 4MS Common Approach. This common approach aims for the convergence of the respective national approval schemes for materials and products in contact with drinking water.

The 4MS have adopted this document to harmonize the requirements for the Threshold Odour Number (TON) and the release of Total Organic Carbon (TOC) from organic materials in contact with drinking water. The document is subject to revisions agreed by the 4MS.

Further information may be obtained from any of the competent authorities of the 4MS.

Bundesministerium für Gesundheit (Deutschland)
Ministère du Travail, de L'Emploi et de la Santé (France)
Ministerie van Infrastructuur en Milieu (Netherland)
Department for Environment, Food and Rural Affairs (United Kingdom)

1. Introduction

This document has been prepared in accordance with the 4MS agreement on co-operation concerning convergence and mutual recognition.

The 4MS (France, Germany, the Netherlands and UK) have committed themselves to work towards common practices for the assessment and approval of products in contact with drinking water. Principles have already been established for the organic materials by control of constituent substances and risk-based testing of finished products against defined acceptance criteria. In this document the specific requirements for the Threshold Odour Number (TON) and for the release of Total Organic Carbon (TOC) based of the product tests according to EN 1420 and EN 12873 series are defined respectively.

2. TON

The purpose of TON requirement is that the positive tested products do not produce any odour of the drinking water in real use.

Pipes and fittings are tested in accordance with EN 1420. The standard defines different S/V ratios for the testing of:

- Pipes (3 different groups)
- Fittings, ancillaries and membranes
- Sealings and adhesives

For the last two groups a fixed S/V is set considering the smaller impact of these products.

The following criteria are agreed:

Pipes with ID < 80 mm

These criteria apply to pipes with an internal diameter of less than 80 mm.

Pipes have to be tested in accordance with EN 1420 (smallest diameter pipe is filled).

Leachates collected after ten days (3rd migration period for cold water test and 7th migration period for warm/hot water test) have to be assessed. If the resulting TON is ≤ 8.0 then the product is deemed to have passed and the test can be stopped. If the resulting TON is > 8.0 but ≤ 16.0 then the testing can be continued to day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test). If the result is > 16.0 the product is deemed to have failed.

In case of an extended test leachates collected at day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test) have to be assessed. If the resulting TON is ≤ 8.0 then the product is deemed to have passed. If the resulting TON is > 8.0 the product is deemed to have failed. In case of an extended test no other leachates need to be assessed.

Pipes with ID \geq 80 mm

These criteria apply to pipes with an internal diameter of 80 mm or greater.

Pipes have to be tested in accordance with EN 1420. Leachates collected after ten days (3rd migration period for cold water test and 7th migration period for warm/hot water test) have to be assessed. If the resulting TON is \leq 2.0 then the product is deemed to have passed and the test can be stopped. If the resulting TON is $>$ 2.0 but \leq 4.0 then the testing can be continued to day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test). If the result is $>$ 4.0 the product is deemed to have failed.

In case of an extended test leachates collected at day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test) have to be assessed. If the resulting TON is \leq 2.0 then the product is deemed to have passed. If the resulting TON is $>$ 2.0 the product is deemed to have failed. In case of an extended test no other leachates need to be assessed.

Fittings, ancillaries, membranes, sealings and adhesives

The respective products have to be tested in accordance with EN 1420 (S/V ratios as expressed in table 1 of EN 1420 (2014)).

The criteria for these products are not agreed yet.

3. TFN

For the test of the Threshold Flavour Number (TFN) the same criteria as for TON apply. However, the need for TFN determination is under discussion.

4. TOC

The purpose of TOC requirement is to set-up a limit to the migrating organic substances in drinking water, preventing hence unnecessary exposure to chemicals.

As the TOC measurement is a simple and reliable parameter, a restrictive value for this parameter helps to ensure safe products available on the market.

The following criteria are agreed:

Products have to be tested in accordance with EN 12873 series (S/V ratio between 5 dm^{-1} and 40 dm^{-1} according to EN 12873-1). Leachates collected after ten days (3rd migration period for cold water test and 7th migration period for warm/hot water test) have to be assessed. The determined TOC concentrations are converted to an estimated concentration at the consumer's tap (c_{tap}) according to the 4MS Common Approach for Positive List for Organic Materials.

If the resulting c_{tap} is \leq 0.5 mg/l then the product is deemed to have passed and the test can be stopped. If the resulting c_{tap} is $>$ 0.5 mg/l but \leq 2.0 mg/l then the testing can be

continued to day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test). If c_{tap} is > 2.0 mg/l the product is deemed to have failed.

In case of an extended test leachates collected at day 31 (9th migration period for cold water test and 22nd migration period for warm/hot water test) have to be assessed. If the resulting c_{tap} is ≤ 0.5 mg/l then the product is deemed to have passed. If the resulting c_{tap} is > 0.5 mg/l the product is deemed to have failed.