





Requested by Danish Technological Institute (DTI)
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Order Flemming Petri Steinfeldt, 17 August 2015

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Assignment **To study whether the pipes are suitable for transport of drinking water in accordance with the standard SFS 2335, clause 3.3.**

Specimen MultiPex 15x2.5 PEXc –pipe, 30 x 1 meter pieces, marked:

00001m #Roth# MultiPex® 15 x 2.5 PE-Xc Oxygen-stop DIN 4726/16892 95
grad C 10 bar   TG0446  PS 0516 #TEKNOLOGISK INSTITUT# 
1.14/ 18077  ET 28.04.15 283761 006485 06

The manufacturer of the pipe is Roth Nordic A/S, Germany
The PE raw material of the pipe is Borealis HE2590.

The customer delivered the sample pipe on 19 August 2015.

Performance and results

Evaluation of compositional data

The raw material supplier has delivered detailed information on the composition of the plastic raw materials and adhesives used for the manufacture of the pipe. On the basis of the information obtained, we consider that substances used in the manufacture of the above mentioned pipe are mentioned in the substance lists of the Commission Regulation (EU) No 10/2011 (monomers and additives).

Chemical analysis*

The procedure described in standard SFS-EN ISO 8795:2001 '*Plastics piping systems for the transport of water intended for human consumption. Migration assessment. Determination of migration values of plastics pipes and fittings and their joints*' was used in the chemical analysis. In order to determine any substances migrating into water, the pipes (two parallel samples) were filled with purified water which was let to stand in the pipes for 72 hours at 23 ± 2 °C. The migration tests were conducted three times in all.

The amount of migrated organic substances, specified as total organic carbon (TOC) was determined according to standard SFS-EN 1484:1997 by Labtium Ltd (FINAS T025). The TOC contents (mg TOC/ l) in the first, second and third test water and calculated results for the amount of migrated organic substances calculated per day and per pipe inner surface area in contact with water (mg TOC / (dm² · 24 h)) are in Table 1.

Table 1. TOC results

Test water	mg TOC / l	Migration value	mg TOC / (dm ² · 24 h)
$C_{24;1}^{23}$	0.45	$M_{24;1}^{23}$	< 0.01
$C_{24;2}^{23}$	< 0.2	$M_{24;2}^{23}$	< 0.01
$C_{24;3}^{23}$	< 0.2	$M_{24;3}^{23}$	< 0.01

The chemical determination was performed between 3 and 25 September 2015.

Sensory evaluation*

Any taint possibly migrating from the pipes into water and the intensity of the taint was analysed in accordance with the method of the standard SFS 2335, appendix A. Tap water was let to flow through the pipes (two parallel samples) for 2 hours at 20 ± 2 °C. Water was stored for 4 x 24 hours (the water was replaced three times at intervals of 24 hours) at 22 ± 2 °C. The fourth water sample stored for 24 hours was evaluated.

Sensory evaluation was performed by using the extended triangle test, the reference sample being tap water stored in an odourless glass vessel at 22 ± 2 °C for 24 hours. The taint intensity was determined on a scale of 0 to 3.

Intensity scale:

- 0 = no off-odour or off-flavour
- 1 = weak off-odour or off-flavour
- 2 = clear off-odour or off-flavour
- 3 = strong off-odour or off-flavour

A ten member panel with proven skills and experience in sensory assessment evaluated the samples.

The results of the sensory evaluation are presented table 2.

Table 2. Results of the sensory evaluation.

Sample	Off-odour 0-3	Off-flavour 0-3	Off-flavour, odd sample detected by	Statistical significance of difference*	Possible descriptions
Pipe 1	0.1	0	0/10	ns.	-
Pipe 2	0.1	0.2	2/10	ns.	-

* The statistical significance of the difference between the odd sample and the reference in the triangle test:
p<0.001 = very significant, p<0.01 = significant, p<0.05 = almost significant, **ns** = **not significant**.

The results indicate that the pipes tested at room temperature were not inclined to bring about deterioration in the organoleptic characteristics in water.

The storage tests and sensory evaluations were performed between 3 and 11 September 2015.

Conclusions

On the basis of the chemical and the sensory research results and the information on the composition of the pipe, we consider that pipes identical to the sample meet, to the extent studied, the general requirements of regulation (EC) No 1935/2004 of the European parliament and of the council. The regulation entered into force on 3 December 2004 and repeals Decree 364/85 mentioned in standard SFS 2335. The pipes are in compliance with the standard SFS 2335 concerning cold drinking water.

Espoo, 28 September 2015



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