TEST REPORT

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Report No:	**20213771**
Client:	SUN YESIL EV ENERJI SAN.VE TIC.LTD.STI. 1. CADDE 5. SOKAK NO: 42/D TÜRKIYE – 68220
Receipt of sample:	2021-06-08
Order number:	-
Test object:	enamelled test plates
Type of enamel:	**MS 520F – RTU / 1375744**
Test period:	2021-06-28 – 2021-07-09
Test specification:	**Evaluation criteria document for enamels and ceramic materials in contact with drinking water** (enamel and ceramic evaluation criteria document of the German Environment Agency (5 August 2019)); section 8.3.

Date: 2021-07-19

Our reference:
IS-USL1-MUC/bs

Document:
SUN YESIL_MS 520F_RTU_20213771_UBA_BewG_en.docx

This document consists of 4 Pages and 1 Appendix

The test results refer exclusively to the units under test. Unless otherwise stated, assessments are made without considering the measurement uncertainty.

Result:

The concentrations of the measured elements show no rising tendency.

The mean values of the measured element concentrations meet the criteria of the test values in the 7th migration period.

With regard to the migration of the elements the requirements of the test standard are therefore met.

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Head of Department

(Benedikt Schaletzky, State-certified food chemist)
Technical Expert

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1. Purpose of the investigation

The company SUN YESIL EV ENERJI SAN.VE TIC.LTD.STI. commissioned TÜV SÜD Industrie Service GmbH with the migration test of enamelled test plates for the release of certain elements according to the "Evaluation criteria document for enamels and ceramic materials in contact with drinking water" (enamel and ceramic evaluation criteria document of the German Environment Agency (5 August 2019)), section 8.3, warm-water test at (60 ± 2) °C.

2. General items provided by the client

Type of enamel: **MS520F – RTU / 1375744**

The manufacturing conditions are described by SUN YESIL EV ENERJI SAN.VE TIC.LTD.STI. as follows:

Plate size / material:	105 mm x 105 mm / S235JR
Pre-treatment of the plates:	Surface cleaning has been done
Enamel type / Batch:	MS 520F – RTU / 1375744
Way of applying the enamel:	Dipping
Oven / Type:	Tunnel Oven
Oven parameter:	Length of firing zone: 920 cm Chain speed: 1,28 cm/sec Object temperature: 880 - 890 °C Reference time / holding time: 12 min
Production date:	2021-05-28
Production site address:	Erenler OSB 1. Cad. 5. Sok. No:42/D 68100 / Aksaray / TURKEY

3. Performing the tests

The preparation of the samples and the subsequent migration tests were carried out in compliance with DIN EN 12873-1.

In a repeated contact test with fully demineralized warm water at (60 ± 2) °C, the enamelled test pieces were tested for migration of the elements. Each test piece was subjected to a pre-treatment process comprising a rinsing, stagnation and further rinsing phase. The pre-treatment of the samples was followed by seven migration periods at a defined ratio of test piece surface to water volume. Two parallel migration tests and a blind test were carried out at the same time. At the end of each single migration period, the migration water was emptied and replaced with fresh water. The migration water from the first three and the last two migration periods were determined by means of ICP-MS in compliance with DIN EN ISO 17294-2.

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The measured element concentrations ($c_{measured}$) are converted to the maximum expected concentrations (c_{Tap}) at the consumers' tap:

$$c_{Tap} = \frac{F_C\,(c_{measured} - c_{blind})}{S/V \;\; t} \qquad F_c = 4\frac{d}{dm}$$

The abbreviations used are as follows:

c_{Tap} [mg/L]	expected concentration at the consumers' tap
$c_{measured}$ [mg/L]	respective element concentration
c_{blind} [mg/L]	respective element concentration of the blind trial
F_c [d/dm]	component-specific conversion factor for tanks in the drinking water installation
S/V [dm^{-1}]	the surface-to-volume ratio in dm^{-1}, where S is the surface area of the component in dm^2, and V the volume brought into contact with the component in dm^3
t [d]	contact time

4. Requirements

The requirements are deemed to be fulfilled if the following applies for all elements that are to be determined:

- the concentrations of the elements must not show a rising trend, until the 7th or 22nd [1] migration period

  There is a rising trend in the measured concentrations, if the following criteria are fulfilled simultaneously [2]:
  - *the measured concentration of the relevant migration period is over 1/10 of the test valve and*
  - *the measured concentration of the relevant migration period has increased significantly (doubled) compared to the lowest measured concentration and*
  - *the measured concentration of the relevant migration period is the highest measurement value of the migration series.*

- the mean value of each element has to comply with:

  $\bar{c}_{Tap} \leq PW$, for the 7th or 22nd [1] migration period

The abbreviations used are as follows:

$\bar{c}_{Tap}$: mean value of the double determination

PW: test value, this is the maximum allowed concentration of an element in drinking water arising through migration from the enamel material (see appendix)

[1] This applies only if $\bar{c}_{Tap}$ exceeds the test value for one or several elements in the 7th migration period or has a rising tendency. In this case the examination can be expanded to 22 migration periods as stated in enamel and ceramic evaluation criteria document

[2] Criteria of the German Environment Agency - Evaluation criteria for plastics and other organic materials in contact with drinking water of the German Environment Agency (KTW-BWGL) (as at: 9 March 2021 having regard to 2nd amendment)

5. Result of the investigation

The individual results of the investigation are listed in the appendix to this test report and can be summarized as follows:

The concentrations of the measured elements show no rising tendency.

The mean values of the measured element concentrations meet the criteria of the test values in the 7th migration period.

Evaluation criteria for enamels and ceramic materials in contact with drinking water
(enamel and ceramic evaluation criteria document of the German Environment Agency (5 August 2019))

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Appendix to test report 20213771

Type of enamel: MS 520F - RTU / 1375744

Element	PW[1)] [mg/L]	C_{Tap} [mg/L]											result
		migration period 1A	migration period 1B	migration period 2A	migration period 2B	migration period 3A	migration period 3B	migration period 6A	migration period 6B	migration period 7A	migration period 7B	$\bar{c}_{Tap,\ migration\ period\ 7}$	compliance with the requirements:
Al	**0,100**	0,017	<0,001	0,005	0,020	0,002	<0,001	0,003	<0,001	0,004	0,002	0,003	YES
Sb	**0,0005**	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	YES
Ba	**0,070**	<0,001	<0,001	<0,001	0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	YES
Pb	**0,0005**	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	YES
B	**0,100**	0,023	0,008	0,017	0,009	0,016	0,008	0,015	0,006	0,015	0,006	0,010	YES
Cd	**0,00015**	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	YES
Ce	**0,020**	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	YES
Cr	**0,005**	0,0002	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,001	YES
Co	**0,009**	0,0039	0,0031	0,0032	0,0021	0,0034	0,0017	0,0024	0,0010	0,0021	0,0010	0,002	YES
Cu	**0,200**	0,001	0,002	<0,001	0,002	0,002	0,003	0,002	0,004	0,003	0,003	0,003	YES
Mn	**0,025**	0,004	0,003	0,004	0,003	0,004	0,002	0,003	0,001	0,003	0,001	0,002	YES
Ni	**0,002**	0,0004	0,0003	0,0004	0,0003	0,0004	0,0002	0,0002	0,0002	0,0002	0,0002	0,0002	YES
Mo	**0,007**	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	YES
Sr	**0,210**	0,002	<0,001	<0,001	0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	YES
Ti	**0,070**	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	YES
Zr	**0,0050**	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	YES

[1)] PW = Test Value; this is the maximum allowed concentration of an element in drinking water, arising through migration from the enamel or ceramic materials

Requirements according to the testing standard: $\bar{c}_{Tap,\ migration\ period\ 7} \leq PW$ or $\bar{c}_{Tap,\ migration\ period\ 22} \leq PW$ (not examined);

The concentrations of the elements must not show a rising trend.