



TEST REPORT

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Report Number: 2173-15001

Project No. 25384

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Client: H2O Degree
3580 Progress Drive, Suite L
Bensalem, Pennsylvania, 19020
Contact: Richard Whiffen

Source of Samples: The samples were delivered to IAPMO R&T Lab by H2O Degree on August 26, 2015. The samples were received in good condition.

Date of Evaluation: September 07, 2015 to October 19, 2015.

Sample Description: H2O Degree part number M10100, SIKA part number VTY 10K5-30-1

Scope of Testing: The purpose of this testing was to determine if the H2O Degree part number M10100, SIKA part number VTY 10K5-30-1, met the requirements of NSF/ANSI 61-2014a, section 8.

CONCLUSION: **Samples tested of the Cash Acme H2O Degree part number M10100, SIKA part number VTY 10K5-30-1 COMPLIED with NSF/ANSI 61-2014a at room temperature (23°C). Please refer to pages 2 to 10 for more detailed findings.**

By our signatures below we certify that all the testing and sample preparation for this report was performed under continuous, direct supervision of IAPMO R&T Lab.

Tested by,

Lin Nguyen, Senior Chemist

Reviewed by,

Michael N. Briggs, Manager, Analytical Lab

Primary Standards: NSF/ANSI 61 – 2014a, section 8:

Preparation of Test Samples

Test samples were rinsed and conditioned as described in NSF/ANSI 61- 2014a, annex B, sections B.4.2 and B.4.3.

Conditioning and Exposure

In-product conditioning and exposure were conducted as described in NSF/ANSI 61 annex B, sections B.4.3 and annex B section B.4.4.1. A test assembly contained sample with enough inert tubing attached that the sample was exposed to 1 liter as required in the standard. Three (3) separate assemblies were prepared and exposed to three (3) conditioning solutions (pH5 and pH 10 for metal evaluation, pH8 none chlorine for organic evaluation) at room temperature (23°C) for 17 days as specified in the standard, in annex B section B.4.3.

Exposure and Normalization

Following conditioning, the samples were exposed to extraction water according to the applicable scheme detailed in annex B, Sections B.4.4. The samples were exposed at room temperature conditions following the time sequence shown in Table B8. The final exposure was for 17 hours.

The concentration of extracted contaminants were normalized to service line and residential products according to the normalization procedure outlined in annex B, section B.8.4

The laboratory concentration was normalized using the equation of: Lab concentration * N3 *(12/final exposure time).

Extraction Water

The extraction water was prepared as described in ANSI/NSF61-2014a, annex B section B9. pH5 and pH10 waters were prepared with chlorine using volumes shown in Table B15.

Collection/preservation of extraction water

Immediately following the exposure period, extraction waters collected for analysis were poured into previously prepared sample containers for storage until analysis, as specified in annex B, Section B.6 and Table B8.

Extracts for metal analysis were acidified with nitric acid as specified in EPA protocols.

Samples for volatile organic contaminants were preserved with sodium thiosulfate and HCl as outlined in EPA 524.2 protocol.

Samples for semi-volatile organic contaminants were preserved with sulfuric acid as described in EPA 525.2 and SW-846 protocol.

Evaluation of Contaminant Concentrations

Metal and organic contaminants, were determined as single point determinations. The normalized results were compared to MCL, TAC, or action level as applicable.

Analytical methodology

Metal determinations: EPA 200.8, Metal determinations by iCAPQ ICP/MS

Volatile organic contaminants: EPA 524.2, Volatile organic determinations by Purge and Trap, GCMS.

Semi-volatile contaminants: EPA 525.2 / SW-846 8270, Semi-volatile organic determinations by liquid/liquid extraction followed by GC/MS determinations.

Analytical Instrumentation

Metal determinations: Thermo Electron iCAPQ ICP/MS

Volatile organic determinations: Thermo Electron DSQII GC/MS with Tekmar Velocity Purge and Trap system.

Semi-volatile organic determinations: Thermo Electron DSQII GC/MS with AS2000 auto sampler.

Discussion:

Noryl GFN3V-801 from SABIC Innovative Plastics is used in the flow control. This material is listed to NSF/ANSI-61 by NSF as a potable water material for maximum exposure rate of 250 in²/liter. The PMI indicates the total wetted surface area of 3.023 in² which is within the acceptance of the criteria and no additional testing is required by this material.

Sabic Noryl GFN3V-73701 is used in the flow control. This material is listed to NSF/ANSI-61 by NSF as a potable water material for maximum exposure rate of 250 in²/liter. The PMI indicates the total wetted surface area of 1.178 in² which is within the acceptance of the criteria and no additional testing is required by this material.

Hard ferrite HF26/24 is used in the flow control. This material is iron oxide and either barium carbonate or strontium carbonate. Regulated metals, barium and strontium were monitored on appropriate water.

Stainless steel 1.4305 or SUS 303 is used in the flow control. The DSA is calculated based on the formulation

$$DSA \text{ (in}^2\text{/L)} = NF = N1 * N2 * N4 = (\text{SAF} \times \text{VL} \times \text{VF}(\text{static}) \times \text{VTC}) / (\text{SAL} \times \text{VF}(\text{static}) \times \text{VF}(\text{flowing}) \times \text{VWT})$$

SAF = surface area exposed in the field = 0.07 in²

SAL = 1 (per DSA definition)

VL = 1 (per DSA definition)

VF(static) cancels out of the equation.

VF(flowing) = VTC

VWT = 680 liter/day

The DSA was found 0.000103 in²/liter which is less than 0.001 in²/liter. According to section 3.3.2 the formulation and the testing for SUS 303 are not required

CTU17R is in the flow control. Its DSA is calculated based on the above formulation and found to be 1.47059E-05 which is less than 0.001 in²/liter. According to section 3.3.2 the formulation and the testing for CTU17R are not required

Sapphire is in the flow control. Its DSA is calculated based on the above formulation and found to be 2.94118E-05 which is less than 0.001 in²/liter. According to section 3.3.2 the formulation and the testing for Sapphire are not required.

Victrex PEEK 450GL30 is in the flow control. Its DSA is calculated based on the above formulation and found to be 2.94118E-05 which is less than 0.001 in²/liter. According to section 3.3.2 the formulation and the testing for Victrex PEEK 450GL30 are not required.

To verify the compliance, regulated metals and organic were monitored on appropriate water.

The normalized metals concentrations of all the analytes are well below the MCL, TAC or AL in both exposure waters.

VOCs were measured by GC/MS. No target analytes were observed in the resulting volatile GC/MS. No non-target analytes were observed in the resulting volatile GC/MS chromatogram.

Semi-volatile organic compounds were monitored by GC/MS. Caprolactam was the only target analyte was observed in the resulting semi-volatile GC/MS analysis at normalized concentration well below the MCL value set in the standard. One (1) non-target analytes was observed in the resulting semi-volatile GC/MS chromatogram and was identified as dimethylsiloxane cyclic trimer. The estimate normalized concentration of this compound is well below the risk assessment concentration that have been reported in Combined JPRSC Action List (Current to 2/3/2015)

Metal Evaluation at Room Temperature:

Metal	MCL (ug/L)	pH5 Analytical Data (ug/L)	pH5 Static Normalized (ug/L)	pH10 Analytical Data (ug/L)	pH10 Static Normalized Data pH 10	Test Methods
Aluminum	9000	2.582	0.602	ND (< 0.968)	ND (< 0.226)	EPA 200.8
Antimony	6	ND (< 0.064)	ND (< 0.015)	ND (< 0.064)	ND (< 0.015)	EPA 200.8
Arsenic	10	ND (< 0.092)	ND (< 0.021)	ND (< 0.092)	ND (< 0.021)	EPA 200.8
Barium	2000	ND (< 0.163)	ND (< 0.038)	ND (< 0.163)	ND (< 0.038)	EPA 200.8
Beryllium	4	ND (< 0.209)	ND (< 0.049)	ND (< 0.209)	ND (< 0.049)	EPA 200.8
Bismuth	100	ND (< 0.050)	ND (< 0.012)	0.055	0.013	EPA 200.8
Cadmium	5	ND (< 0.084)	ND (< 0.020)	ND (< 0.084)	ND (< 0.020)	EPA 200.8
Chromium	20	ND (< 0.061)	ND (< 0.014)	ND (< 0.061)	ND (< 0.014)	EPA 200.8
Copper	1300 (AL)	ND (< 0.304)	ND (< 0.071)	0.811	0.189	EPA 200.8
Mercury	2	ND (< 0.111)	ND (< 0.026)	ND (< 0.111)	ND (< 0.026)	EPA 200.8
Nickel	100 (TAC)	0.117	0.027	ND (< 0.088)	ND (< 0.020)	EPA 200.8
Selenium	50	ND (< 0.435)	ND (< 0.101)	ND (< 0.435)	ND (< 0.101)	EPA 200.8
Strontium	4000	2.187	0.509	2.650	0.617	EPA 200.8
Thallium	2	ND (< 0.027)	ND (< 0.006)	ND (< 0.027)	ND (< 0.006)	EPA 200.8
Tin	4000	ND (< 0.110)	ND (< 0.026)	0.774	0.180	EPA 200.8
Zinc	3000 (TAC)	1.407	0.328	1.078	0.251	EPA 200.8
Lead	5 (AL)	0.187	0.044	0.030	0.007	EPA 200.8

MCL: Maximum Contaminant Level

TAC: Total Allowable Concentration

AL: Action Level

Note: Static Normalized Contaminant Concentration for in line products =

$$\text{Laboratory Concentration} \times N1 * N3 * 12/\text{final exposure time}$$
 where:

$$N1 = \text{SAF/SAL} \times V1/V\text{fstatic} = 1$$

$$N3 = 0.33$$

final exposure time = 17 hour

Test Result of Organics:

Target Analyte	Test Method	Result	Normalized
Volatile Organic Compounds:	EPA 524.2	(ug/L)	Result (ug/L)
Difluorodichloromethane		ND < 0.3	ND < 0.0699
Chloromethane		ND < 0.3	ND < 0.0699
Vinylchloride		ND < 0.3	ND < 0.0699
1,3-Butadiene		ND < 0.3	ND < 0.0699
Bromomethane		ND < 5.0	ND < 1.1647
Chloroethane		ND < 5.0	ND < 1.1647
Trichlorofluoromethane		ND < 0.3	ND < 0.0699
1,1-Dichloro-1-fluorethane		ND < 0.3	ND < 0.0699
1,1-Dichloroethene		ND < 0.3	ND < 0.0699
Carbon disulfide		ND < 0.3	ND < 0.0699
Dichloromethane		ND < 0.30	ND < 0.0699
t-Butanol		ND < 0.3	ND < 0.0699
MtBE		ND < 0.3	ND < 0.0699
trans-1,2-Dichloroethene		ND < 0.5	ND < 0.1165
Acrylonitrile		ND < 0.3	ND < 0.0699
Vinylacetate		ND < 0.3	ND < 0.0699
Chloroprene		ND < 0.3	ND < 0.0699
1,1-Dichloroethane		ND < 0.3	ND < 0.0699
2,2-Dichloropropane		ND < 0.3	ND < 0.0699
2-Butanone		ND < 0.3	ND < 0.0699
cis-1,2-Dichloroethene		ND < 0.3	ND < 0.0699
Bromochloromethane		ND < 0.3	ND < 0.0699
Tetrahydrofuran		ND < 0.3	ND < 0.0699
Chloroform		ND < 0.3	ND < 0.0699
1,1,1-Trichloroethane		ND < 0.3	ND < 0.0699
Carbon tetrachloride		ND < 0.3	ND < 0.0699
1,1-Dichloropropene		ND < 0.3	ND < 0.0699
Isopropylacetate		ND < 0.3	ND < 0.0699
Benzene		ND < 0.3	ND < 0.0699
1,2-Dichloroethane		ND < 0.3	ND < 0.0699
Trichloroethene		ND < 0.3	ND < 0.0699
Methylmethacrylate		ND < 0.3	ND < 0.0699
1,2-Dichloropropane		ND < 0.3	ND < 0.0699
Dibromomethane		ND < 0.3	ND < 0.0699
Bromodichloromethane		ND < 0.3	ND < 0.0699
cis-1,3-Dichloropropene		ND < 0.3	ND < 0.0699
Toluene		ND < 0.3	ND < 0.0699
Ethylmethacrylate		ND < 0.3	ND < 0.0699

Test Result of Organics:

Target Analyte	Test Method	Normalized
Volatile Organic Compounds:	EPA 524.2	Result (ug/L)
trans-1,3-Dichloropropene	ND < 0.3	ND < 0.0699
1,1,2-Trichloroethane	ND < 0.3	ND < 0.0699
Tetrachloroethene	ND < 0.3	ND < 0.0699
1,3-Dichloropropane	ND < 0.3	ND < 0.0699
Butylacetate	ND < 0.3	ND < 0.0699
Dibromochloromethane	ND < 0.3	ND < 0.0699
1,2-Dibromoethane	ND < 0.3	ND < 0.0699
Chlorobenzene	ND < 0.3	ND < 0.0699
Ethylbenzene	ND < 0.3	ND < 0.0699
1,1,1,2-Tetrachloroethane	ND < 0.3	ND < 0.0699
m and p - Xylenes	ND < 0.3	ND < 0.0699
o-Xylene	ND < 0.3	ND < 0.0699
Styrene	ND < 0.3	ND < 0.0699
Tribromomethane	ND < 0.3	ND < 0.0699
Isopropylbenzene	ND < 0.3	ND < 0.0699
Cyclohexanone	ND < 0.3	ND < 0.0699
1,1,2,2-Tetrachloroethane	ND < 0.3	ND < 0.0699
Propylbenzene	ND < 0.3	ND < 0.0699
Bromobenzene	ND < 0.3	ND < 0.0699
1,2,3-Trichloropropane	ND < 0.3	ND < 0.0699
1,3,5-Trimethylbenzene	ND < 0.3	ND < 0.0699
2-Chlorotoluene	ND < 0.3	ND < 0.0699
4-Chlorotoluene	ND < 0.3	ND < 0.0699
t-Butylbenzene	ND < 0.3	ND < 0.0699
1,2,4-Trimethylbenzene	ND < 0.3	ND < 0.0699
sec-Butylbenzene	ND < 0.3	ND < 0.0699
p-Isopropyltoluene	ND < 0.3	ND < 0.0699
1,3-Dichlorobenzene	ND < 0.3	ND < 0.0699
1,4-Dichlorobenzene	ND < 0.3	ND < 0.0699
n-Butylbenzene	ND < 0.3	ND < 0.0699
1,2-Dichlorobenzene	ND < 0.3	ND < 0.0699
1,2-Dibromo-3-chloropropane	ND < 0.3	ND < 0.0699
1,2,4-Trichlorobenzene	ND < 0.3	ND < 0.0699
Hexachlorobutadiene	ND < 0.3	ND < 0.0699
Naphthalene	ND < 0.3	ND < 0.0699
1,2,3-Trichlorobenzene	ND < 0.3	ND < 0.0699

No non-target analytes observed in the chromatogram

Test Result of Organics :

Target Analyte	EPA 8270/EPA 625	Result	Normalized
Semi-Volatile Organics	C.A.S. Number	(ug/L)	Result (ug/L)
1,1-(1,4-Phenylene)bis-ethanone	1009-61-6	ND < 0.50	ND < 0.1165
1,2,3-Trioxane	110-88-3	ND < 0.50	ND < 0.1165
1,2,4-Trichlorobenzene	120-82-1	ND < 0.50	ND < 0.1165
1,3-Dichlorobenzene	541-73-1	ND < 0.50	ND < 0.1165
1,4-Dichlorobenzene	106-46-7	ND < 0.50	ND < 0.1165
1,2-Dichlorobenzene	95-50-1	ND < 0.50	ND < 0.1165
2,3,4,6-Tetrachlorophenol	58-90-2	ND < 0.50	ND < 0.1165
2,4,5-Trichlorophenol	95-95-4	ND < 1.20	ND < 0.2795
2,4,6-Trichlorophenol	88-06-2	ND < 1.00	ND < 0.23
2,4 Dichlorobenzoic_acid	50-84-0	ND < 20.00	ND < 4.6588
2,4-Dichlorophenol	120-83-2	ND < 0.50	ND < 0.1165
2,4-Dimethylphenol	105-67-9	ND < 0.50	ND < 0.1165
2,4-Dinitrophenol	51-28-5	ND < 10.00	ND < 2.3294
2,4-Dinitrotoluene	121-14-2	ND < 0.50	ND < 0.1165
2,6-Dichlorophenol	87-65-0	ND < 0.50	ND < 0.1165
2,6-Dinitrotoluene	606-20-2	ND < 0.50	ND < 0.1165
2-Chlorophenol	95-57-8	ND < 0.50	ND < 0.1165
2-Chloronaphthalene	91-58-7	ND < 0.50	ND < 0.1165
2-Ethylhexylmethacrylate	688-84-6	ND < 0.50	ND < 0.1165
2-Methylphenol	95-48-7	ND < 0.50	ND < 0.1165
2-Nitrophenol	88-75-5	ND < 10.00	ND < 2.3294
2-Phenyl 2-Propanol	617-94-7	ND < 0.50	ND < 0.1165
3-and 4-Methylphenol	108-39-4, 106-44-5	ND < 1.00	ND < 0.2329
4,6-Dinitro-2-methylphenol	534-52-1	ND < 0.70	ND < 0.1631
4-Bromophenylphenylether	101-55-3	ND < 0.50	ND < 0.1165
4-Chloro-3-methylphenol	59-50-7	ND < 0.50	ND < 0.1165
4-Chlorophenyl phenyl ether	7005-72-3	ND < 0.50	ND < 0.1165
4-Nitrophenol	100-02-7	ND < 10.00	ND < 2.3294
a,a,a'-Tetramethyl-1,4-benzenedimethanol	2948-46-1	ND < 0.50	ND < 0.1165
a,a,a'-Tetramethyl-1,3-benzenedimethanol	1999-85-5	ND < 0.50	ND < 0.1165
Acenaphthene	83-32-9	ND < 0.50	ND < 0.1165
Acenaphthylene	208-96-8	ND < 0.50	ND < 0.1165
Acetophenone	98-86-2	ND < 0.50	ND < 0.1165
Anthracene	120-12-7	ND < 0.50	ND < 0.1165
Azobenzene	103-33-3	ND < 0.50	ND < 0.1165
Benzo(a)anthracene	56-55-3	ND < 0.50	ND < 0.1165
Benzo(a)pyrene	50-32-8	ND < 0.50	ND < 0.1165
Benzo(b)fluoranthene	205-99-2	ND < 0.50	ND < 0.1165
Benzo(ghi)perylene	191-24-2	ND < 0.50	ND < 0.1165

Test Result of Organics:

Target Analyte	EPA 8270/EPA 625	Result	Normalized
Semi-Volatile Organics	C.A.S.Number	(ug/L)	Result (ug/L)
Benzo(k)fluoranthene	207-08-9	ND < 0.50	ND < 0.1165
Benzoic acid	65-85-0	ND < 0.50	ND < 0.1165
Benzothiazole	95-16-9	ND < 0.50	ND < 0.1165
Benzyl alcohol	100-51-6	ND < 0.50	ND < 0.1165
Benzylbutylphthalate	85-68-7	ND < 5.00	ND < 1.1647
Bis(2-Ethylhexyl)adipate	103-23-1	ND < 0.70	ND < 0.1631
bis-2-Chloroethoxy methane	111-91-1	ND < 0.50	ND < 0.1165
bis-2-Chloroethyl ether	111-44-4	ND < 0.50	ND < 0.1165
bis-2-Chloroisopropyl ether	108-60-1	ND < 0.50	ND < 0.1165
bis-2-ethylhexyl phthalate	117-81-7	ND < 1.00	ND < 0.2329
Bisphenol A	80-05-7	ND < 0.50	ND < 0.1165
Caprolactam	105-60-2	0.54	0.126
Carbaryl	63-25-2	ND < 0.50	ND < 0.1165
Carbazole	86-74-8	ND < 0.50	ND < 0.1165
Chrysene	218-01-9	ND < 0.50	ND < 0.1165
Dibenz(ah)anthracene	53-70-3	ND < 0.50	ND < 0.1165
Dibutoxyethoxyethyl_adipate	141-17-3	ND < 0.50	ND < 0.1165
Diethylphthalate	84-66-2	ND < 0.50	ND < 0.1165
Dimethylphthalate	131-11-3	ND < 0.50	ND < 0.1165
Di-n-butylphthalate	84-74-2	ND < 1.60	ND < 0.3727
Di-n-octylphthalate	117-84-0	ND < 0.50	ND < 0.1165
Dinoseb	88-85-7	ND < 1.00	ND < 0.2329
Fluoranthene	206-44-0	ND < 0.50	ND < 0.1165
Fluorene	86-73-7	ND < 0.50	ND < 0.1165
Hexachlorobenzene	118-74-1	ND < 0.50	ND < 0.1165
Hexachlorobutadiene	87-68-3	ND < 0.50	ND < 0.1165
Hexachlorocyclopentadiene	77-47-4	ND < 0.50	ND < 0.1165
Hexachloroethane	67-72-1	ND < 0.50	ND < 0.1165
Indeno(1,2,3-cd)pyrene	193-39-5	ND < 0.50	ND < 0.1165
Isophorone	78-58-1	ND < 0.50	ND < 0.1165
Methyl 4-methoxysalicylate	5446-02-6	ND < 0.50	ND < 0.1165
Naphthalene	91-20-3	ND < 0.50	ND < 0.1165
Nitrobenzene	98-95-3	ND < 0.50	ND < 0.1165
N-Nitrosodimethylamine	62-75-9	ND < 0.50	ND < 0.1165
N-Nitroso-di-n-propylamine	621-64-7	ND < 0.50	ND < 0.1165
N-Nitrosodiphenylamine	86-30-6	ND < 0.50	ND < 0.1165
Pentachlorophenol	87-86-5	ND < 1.20	ND < 0.2795
Phenanthrene	85-01-8	ND < 0.50	ND < 0.1165
Phenol	108-95-2	ND < 0.50	ND < 0.1165
Pyrene	129-000-0	ND < 0.50	ND < 0.1165
Solfolane	126-33-0	ND < 0.50	ND < 0.1165
Tributylacetylacitrate	77-90-7	ND < 0.50	ND < 0.1165

Semi-volatile TIC Compounds:

RT	CAS	ID	Estimated Concentration	Normalized Concentration
12.84	541-05-9	Dimethylsiloxane cyclic trimer	3.57	0.833