ENVIROTEK LABORATORIES, INC.
33 Third Street, Bordentown, NJ 08505
PHONE 856-478-0010 www.enviroteklab.com
EPA ID # NJ01298 NJ DEP ID # 03048

TEST RESULTS

FOR

TYENT USA

137 HURFFVILLE CROSSKEYS ROAD

SEWELL, NEW JERSEY, 08080

ULTRA PLUS FILTRATION SYSTEM

FILTER MODELS:

MMP 9090T / UCE 9000 / EDGE-9000T

MMP11, UCE11, ACE11, ACE13

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TYENT MMP 9090T / UCE 9000T/ EDGE-9000T / MMP11 / UCE11 / ACE11 / ACE13

FILTERED WATER TEST REPORT

Report # 14-226 (Tyent MMP 9090T UCE 9000 T/MMP11/ UCE11/ YT20-TL11 Ultra Filtration System)
Report Date: 08/16/2014
Customer Name: Tyent USA

Drinking Water Contaminant Tested	Influent Water Concentration in µg/L	Tyent MMP 7070T Filter System Effluent Concentration in µg/L	% Reduction
Volatile Organic Contaminants			
1, 1, 1, 2-Tetrachlorethane	22.06	<0.5 µg/L	100
1, 1, 1-Trichloroethane	600	<0.5 µg/L	100
1, 1, 2, 2-Tetrachloroethane	21.49	<0.5 µg/L	100
1, 1, 2-Trichloroethane	15.5	<0.5 µg/L	100
1, 1-Dichloroethane	27.90	<0.5 µg/L	100
1, 1-Dichloroethene	21.2	<0.5 µg/L	100
1, 1-Dichloropropane	15.4	<0.5 µg/L	100
1, 2, 3-Trichlorobenzene	21.75	<0.5 µg/L	100
1, 2, 3-Trichloropropane (TCP)	22.41	<0.5 µg/L	100
1, 2, 4-Trichlorobenzene	210	<0.5 µg/L	100
1, 2, 4-Trimethylbenzene	22.37	<0.5 µg/L	100
1, 2-Dibromethane (EDB)	21.60	<0.5 µg/L	100
1, 2-Dibromo-3-Chloropropane	20.54	<0.5 µg/L	100
1, 2-Dichlorobenzene	1820	<0.5 µg/L	100
1, 2-Dichloroethane	15.3	<0.5 µg/L	100
1, 2-Dicholopropane	22.78	<0.5 µg/L	100
1, 3, 5-Trimethylbenzene	22.50	<0.5 µg/L	100
1, 3-Dichlorobenzene	22.50	<0.5 µg/L	100
1, 3-Dichloropropane	21.88	<0.5 µg/L	100
1, 4-Dichlorobenzene	225	<0.5 µg/L	100
2, 2-Dichloropropane	24.18	<0.5 µg/L	100
2-Chlorotoluene	22.43	<0.5 µg/L	100
4-Chlorotoluene	22.41	<0.5 µg/L	100
4-Isopropyltoluene	22.36	<0.5 µg/L	100
Benzene	15.1	<0.5 µg/L	100
Bromobenzene	22.43	<0.5 µg/L	100
Bromochloromethane	22.31	<0.5 µg/L	100
Bromodichloromethane	70	<0.5 µg/L	100
Bromoform	100	<0.5 µg/L	100
Bromomethane	21.59	<0.5 µg/L	100
Carbon Tetrachloride	15.2	<0.5 µg/L	100
Chlorobenzene	2020	<0.5 µg/L	100
Chlorodibromomethane	70	<0.5 µg/L	100
Chloroethane	22.75	<0.5 µg/L	100
Chloroform	220	<0.5 µg/L	100
Chloromethane	23.66	<0.5 µg/L	100
cis-1, 2-Dichloroethene	1400	<0.5 µg/L	100
cis-1, 3-Dichloropropene	22.71	<0.5 µg/L	100
Dibromomethane	21.79	<0.5 µg/L	100
Dichlorodiflouromethane	23.29	<0.5 µg/L	100
Dimethyl Ether	26.21	<0.5 µg/L	100
Ethylbenzene	2120	<0.5 µg/L	100
Flourotrichloromethane	22.75	<0.5 µg/L	100
Hexachlorobutadiene	22.02	<0.5 µg/L	100
Isopropylbenzene	22.78	<0.5 µg/L	100
Methylene Chloride	25.78	<0.5 µg/L	100
MTBE	15.2	<0.5 µg/L	100
Naphthalene	20.62	<0.5 µg/L	100
n-Butylbenzene	22.18	<0.5 µg/L	100
n-propylbenzene	22.49	<0.5 µg/L	100
sec-Butylbenzene	22.43	<0.5 µg/L	100
Styrene	2000	<0.5 µg/L	100
Tert-Butylbenzene	22.83	<0.5 µg/L	100

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Volatile Organic Contaminants			
Tetrachloroethene	15.2	<0.5 µg/L	100
Toluene	3000	<0.5 µg/L	100
Total Trihalomethanes (THM's)	460	<0.5 µg/L	100
trans-1, 2-Dichloroethene	2040	<0.5 µg/L	100
trans-1, 3-Dicloropropene	22.01	<0.5 µg/L	100
Trichloroethene	310	<0.5 µg/L	100
Vinychloride	23.02	<0.5 µg/L	100
Xylenes	30000	<0.5 µg/L	100
Heavy Metal Contaminants			
Aluminum	200	31.2	84.4
Antimony	6.2	<2	100
Beryllium	50.2	<2	100
Bismuth	50.2	2	96.0
Chromium	302	6.7	97.8
Copper	3020	82.6	97.3
Iron	3350	14.8	99.6
Lead	152	<2	100
Manganese	1050	5.7	99.5
Mercury	6.2	<0.5	100.0
Nickel	102	6.6	93.5
Selenium	103	8.6	91.7
Silver	51.2	<2	100
Zinc	1000	105	89.5
Pesticide Contaminants			
4,4'-DDD	50.9	<0.1	100.0
4,4'-DDE	50.9	<0.1	100.0
4,4'-DDT	50.8	<0.1	100.0
Alachlor	41.1	<0.1	100.0
Aldrin	50.7	<0.1	100.0
Alpha-BHC	49.9	<0.1	100.0
Ametryn	50.1	<0.1	100.0
Atraton	52.3	<0.1	100.0
Atrazine	9.0	<0.1	100.0
Beta-BHC	49.8	<0.1	100.0
Bromacil	51.4	<0.1	100.0
Carbofuran	80.0	<0.1	100.0
Chlordane	40.2	<0.1	100.0
Chlorneb	51.3	<0.1	100.0
Chlorobenzilate	49.8	<0.1	100.0
Chlorothalonil	50.5	<0.1	100.0
Chlorprophane	51.2	<0.1	100.0
Chlorpyrifos	51.2	<0.1	100.0
Cyanizene	51.2	<0.1	100.0
Delta-BHC	50.2	<0.1	100.0
Dichlorvos	50.3	<0.1	100.0
Dieldrin	49.8	<0.1	100.0
Diphenamid	51.4	<0.1	100.0
Disulfoton	50.7	<0.1	100.0
Endosulfan Sulfate	51.9	<0.1	100.0
Endrin	6.0	<0.1	100.0
Endrin Aldehide	51.9	<0.1	100.0
Endrin Ketone	53.1	<0.1	100.0
Endusulfan I	48.8	<0.1	100.0
Endusulfan II	50.8	<0.1	100.0
Ethoprop	50.8	<0.1	100.0
Fenamiphos	51.3	<0.1	100.0
Fenarimol	50.2	<0.1	100.0
Fluoridone	51.4	<0.1	100.0
Gamma-BHC (Lindane)	51.0	<0.1	100.0
Heptachlor	81.2	<0.1	100.0
Heptachlor Epoxide	4.9	<0.1	100.0
Methoxychlor	120	<0.1	100.0
Molinate	50.6	<0.1	100.0
PCB's	10.0	<0.1	100.0

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Semivolatile Contaminants			
Picloram	49.1	<0.1	100.0
Prometron	50.2	<0.1	100.0
Simazine	12.0	<0.1	100.0
Toxaphene	15.0	<0.1	100.0
Acenaphthylene	50.1	<0.1	100.0
Anthracene	50.3	<0.1	100.0
Benz[a]anthracene	51.3	<0.1	100.0
Benzo[b]fluoranthene	50.4	<0.1	100.0
Benzo[k]fluoranthene	49.8	<0.1	100.0
Benzo[a]pyrene	51.4	<0.1	100.0
Benzo[g,h,i]perylene	50.0	<0.1	100.0
Butylbenzylphthalate	50.5	<0.1	100.0
Carboxin	51.2	<0.1	100.0
2-Chlorobiphenyl	51.7	<0.1	100.0
Chrysene	52.1	<0.1	100.0
Cycloate	50.8	<0.1	100.0
Dacthal (DCPA)	50.2	<0.1	100.0
Diazinon	51.0	<0.1	100.0
Dibenz[a,h]anthracene	51.2	<0.1	100.0
Di-n-Butylphthalate	49.1	<0.1	100.0
2,3-Dichlorobiphenyl	50.8	<0.1	100.0
Diethylphthalate	49.1	<0.1	100.0
Di(2-ethylhexyl)adipate	50.2	<0.1	100.0
Di(2-ethylhexyl)phthalate	52.0	<0.1	100.0
Dimethylphthalate	51.0	<0.1	100.0
2,4-Dinitrotoluene	50.3	<0.1	100.0
2,6-Dinitrotoluene	50.9	<0.1	100.0
EPTC	50.5	<0.1	100.0
Fluorene	49.8	<0.1	100.0
2,2', 3,3', 4,4', 6-Heptachlorobiphenyl	51.3	<0.1	100.0
Hexachlorobenzene	49.8	<0.1	100.0
2,2', 4,4', 5,6'-Hexachlorobiphenyl	50.8	<0.1	100.0
Hexachlorocyclohexane, alpha	51.4	<0.1	100.0
Hexachlorocyclohexane, beta	51.2	<0.1	100.0
Hexachlorocyclohexane, delta	51.2	<0.1	100.0
Hexachlorocyclopentadiene	50.2	<0.1	100.0
Hexazinone	50.5	<0.1	100.0
Indeno[1,2,3,c,d]pyrene	49.4	<0.1	100.0
Isophorone	51.2	<0.1	100.0
Merphos	51.9	<0.1	100.0
Methyl Paraoxon	51.2	<0.1	100.0
MGK	50.6	<0.1	100.0
Napropamide	50.1	<0.1	100.0
Norflurazon	51.2	<0.1	100.0
2,2', 3,3', 4,5', 6,6'-Octachlorobiphenyl	51.0	<0.1	100.0
Pebulate	51.2	<0.1	100.0
2,2', 3', 4,6'-Pentachlorobiphenyl	49.9	<0.1	100.0
Pentachlorophenol	50.0	<0.1	100.0
Phenanthrene	50.6	<0.1	100.0
cis-Permethrin	50.0	<0.1	100.0
trans-Permethrin	49.1	<0.1	100.0
Prometon	50.2	<0.1	100.0
Prometryn	52.0	<0.1	100.0
Pronamide	51.0	<0.1	100.0
Propachlor	50.6	<0.1	100.0
Propazine	50.3	<0.1	100.0
Triademefon	49.8	<0.1	100.0
2,4,5-Trichlorobiphenyl	49.5	<0.1	100.0
Tricyclazole	49.8	<0.1	100.0
Trifluralin	51.4	<0.1	100.0
Vernolate	50.4	<0.1	100.0
Disinfectant and Non-Metallic Contaminants			
Chloride	800	69	91.4
Free Chlorine	2.0	0.12	94.0

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Turbidity	11.5 NTU	0.28 NTU	97.6
Herbicide Contaminants			
Dalapon	151	<0.1	100.0
Dicamba	150	<0.1	100.0
Dinosep	152	<0.1	100.0
Dichlorporp	150	<0.1	100.0
2,4-D	210	<0.1	100.0
Pentachlorophenol	150	<0.1	100.0
Picoram	149	<0.1	100.0
2,4,5-T	151	<0.1	100.0
2,4,5-TP (Silvex)	150	<0.1	100.0
2,4-DB	152	<0.1	100.0
Bentazom	150	<0.1	100.0
DCPA	151	<0.1	100.0
Quinclorac	152	<0.1	100.0
Aciflurfen	151	<0.1	100.0
Pharmaceutical Drugs			
4-Androsterone-3,17-dione	21.1	<0.1	100.0
Equilin	20.2	<0.1	100.0
17-beta-Estradiol	22.3	<0.1	100.0
Estriol	21.0	<0.1	100.0
Estrone	21.0	<0.1	100.0
17-alpha-Ethynylestradiol	21.5	<0.1	100.0
Testosterone	21.4	<0.1	100.0
Acetaminofen	21.0	<0.1	100.0
Caffeine	20.1	<0.1	100.0
Carbamazepine	21.3	<0.1	100.0
Ciprofloxacin HCl	21.2	<0.1	100.0
Erythromycin USP	20.0	<0.1	100.0
Sulfamethoxazole	21.4	<0.1	100.0
Trimethoprim	21.3	<0.1	100.0
Bisphenol A	20.5	<0.1	100.0
Diclofenac Sodium	20.4	<0.1	100.0
4-para-Nonylphenol	20.8	<0.1	100.0
4-tert-Octylphenol	21.4	<0.1	100.0
Primidone	20.9	<0.1	100.0
Progestrone	20.4	<0.1	100.0
Gemfibrozil	21.4	<0.1	100.0
Ibuprofen	21.3	<0.1	100.0
Naproxen Sodium	20.7	<0.1	100.0
Triclosan	20.8	<0.1	100.0
Synthetic Organic Chemicals (MCHM)			
4-Methyl-1-cyclohexanemethanol	135 µg/L	1.88 µg/L	98.6
Cyanobacteria Toxins			
Microcystin	10.2 µg/L	<0.1 µg/L	99.0

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State of New Jersey
Department of Environmental Protection
Certifies That

Envirotek Laboratories, Inc.

Laboratory Certification ID # 03048

having duly met the requirements of the

Regulations Governing the Certification of
Laboratories and Environmental Measurements N.J.A.C. 7:18 et. seq.

is hereby approved as a

State Certified Environmental Laboratory

to perform the analyses as indicated on the Annual Certified Parameter List which must accompany this certificate to be valid

Expires June 30, 2016

Joseph F. Aiello
Assistant Director

THIS CERTIFICATE IS TO BE CONSPICUOUSLY DISPLAYED AT THE LABORATORY WITH THE ANNUAL CERTIFIED PARAMETER LIST IN A LOCATION ON THE PREMISES VISIBLE TO THE PUBLIC

JaimeYoung

Jaime Young
Lab Director

ENVIROTEK LABORATORIES, INC.
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EPA ID # NJ01298 NJ DEP ID # 08012

TYENT ULTRA PLUS MCHM REDUCTION TEST REPORT

Report # 14-43 (Tyent Ultra Plus Filtration System)
Report Date: 02/24/2014
Customer Name: Tyent USA, Inc.

EXECUTIVE SUMMARY

One Ultra Plus filtration system manufactured by Tyent USA was tested for the reduction of 4-Methyl-1-Cyclohexanemethanol (MCHM), passing a challenge water prepared with MCHM at a concentration of about 135 ppb using a pump system with a flow of about 0.5 gallons per minute at 60 PSI operated on a 20 minutes-on / 20 minutes off cycle during a 7 hour period. Samples of the effluent filtered water were taken at the startup, after 20, 40, 60, 80, and 100 gallons. The effluent samples and the influent challenge water were tested using the GC/MS EPA method 525 for drinking water. The Ultra Plus filter reduced the concentration in the challenge water by 98.6% after 100 gallons.

INTRODUCTION

One Ultra Plus filtration system manufactured by Tyent USA was tested for the reduction of 4-Methyl-1-Cyclohexanemethanol (MCHM), passing a challenge water prepared with MCHM at a concentration of about 135 ppb using a pump system with a flow of about 0.5 gallons per minute at 60 PSI operated on a 20 minutes-on / 20 minutes off cycle during a 7 hour period. Samples of the effluent filtered water were taken at the startup, after 20, 40, 60, 80, and 100 gallons. The effluent samples and the influent challenge water were tested using the GC/MS EPA method 525 for drinking water. The Ultra Plus filter reduced the concentration in the challenge water by 98.6% after 100 gallons.

REAGENTS, MATERIALS, AND LAB EQUIPMENT

4-Methyl-1-cyclohexanemethanol (MCHM) TCI America, Product Code M1412, CAS # 34885-03-5, Reagent grade >98.0%.
Hewlett Packard 5890/5972 GC/MS with Chem Station data system.
Micro syringes and type A glassware necessary to perform the EPA 525 method for drinking water analysis.
Aquatec delivery pump, Model DDP 5800, 60 PSI, average flow: 0.5 GPM.
DI water ASTM reagent type 3.
Tyent Ultra Plus filtration system.

PROCEDURE

Challenge Water preparation:
Tap water spiked with 4-Methyl-1-cyclohexanemethanol (MCHM) at a concentration of 135 µg/L was filtered through the Tyent Ultra Plus filter system using the Aquatec electric pump system at a rate of 0.5 GPM at 60 PSI operated on a 20 minutes-on / 20 minutes-off cycle during a 7 hour period. Filtered water samples were taken after passing 0.5 gallons through the Filter System, then after 20, 40, 60, 80, and 100 gallon points. The effluent and the influent challenge water samples were extracted and tested for MCHM using the GC/MS EPA method 525 for drinking water. The properties of the tap water are summarized in Table 1; the results of the influent and effluent water tested are summarized in Table 2 below.

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RESULTS

Table 1
MCHM Influent Water Properties

Parameter	Influent Water	NSF/ANSI Standard 53 Target (Section 7.2.1.5)
pH	7.20	7.50±0.5
Temperature	19.0 °C	20±3°C
Total Dissolved Solids (TDS)	270 mg/L	200 to 500 mg/L
Turbidity	0.45	<1 NTU

Table 2
TYENT ULTRA PLUS FILTER EFFLUENT WATER TEST RESULTS

VOC Parameter	Influent Water Concentration in µg/L	Tyent Ultra Plus Filter Effluent Concentration in µg/L	Accumulated Volume	% Reduction	Flow Rate after filter
4-Methyl-1-cyclohexanemethanol	135 µg/L	<0.1 µg/L	0.1 gallons	99.9	0.5 GPM
4-Methyl-1-cyclohexanemethanol	135 µg/L	<0.1 µg/L	24 gallons	99.9	0.5 GPM
4-Methyl-1-cyclohexanemethanol	135 µg/L	0.47 µg/L	48 gallons	99.7	0.5 GPM
4-Methyl-1-cyclohexanemethanol	135 µg/L	0.38 µg/L	72 gallons	99.7	0.5 GPM
4-Methyl-1-cyclohexanemethanol	135 µg/L	0.67 µg/L	90 gallons	99.5	0.5 GPM
4-Methyl-1-cyclohexanemethanol	135 µg/L	1.88 µg/L	100 gallons	98.6	0.5 GPM

Note: Method detection limit: 0.1 µg/L. There is not an EPA maximum concentration limit (MCL) established for this compound, similar toxic organic compounds have MCL of 5 µg/L in drinking water. West Virginia American Waters states that there is less than 10 µg/L in the Municipal Water Supply. This compound produces a significant amount of foam, and the water has a sweet smell at a concentration of about 0.2 µg/L.

CONCLUSION:

The Tyent Ultra Plus System filtration system reduced the 4-Methyl-1-cyclohexanemethanol concentration in the challenge water by 98.6% after passing 100 gallons of effluent water through the filter. This compound produces a significant amount of foam at this concentration.

Jaime Young
Lab Director