

MATRIKX + CTO<sup>®</sup>/2  
TECHNICAL  
BULLETIN  
DATA CHARTS

Revised  
12/28/2004

# Chlorine Taste and Odor Reduction

Test Results: Standard 2.50" O.D. x 1.25" I.D. x 9.75" L. MATRIKX® CTO extruded carbon filters removed chlorine taste and odor (<0.05 ppm) from an influent containing 2 ppm chlorine taste and odor and flowing continuously at 1 gpm, for more than 1,250 gallons, removed greater than 90% of influent chlorine taste and odor for more than 3,750 gallons, and greater than 80% of influent chlorine taste and odor at 6,000 gallons.

Test Conditions: Two randomly selected production cartridges were evaluated for chlorine taste and odor reduction.

Flow: 1 gpm, constant.

System Pressure: 60 psi, constant.

Prefiltration: None

Influent water: 250 gallon batches.

Chlorine taste and odor challenge: sodium hypochlorite @ 2 ppm

Analysis: Standard methods for the examination of water and wastewater method number 4500-Cl G

Total challenge: 6,000 gallons.

Influent water analysis:

Turbidity: <2.2 NTU.

pH: 7.9 ± .5

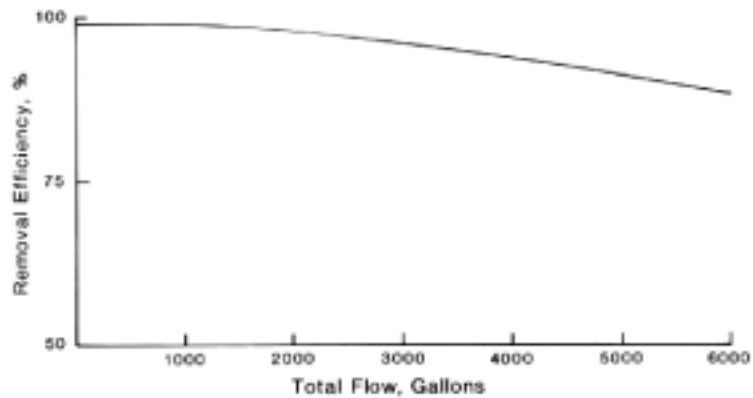
TDS: 200 mg/L

Hardness: 171 mg/L.

Alkalinity: 26.8 mg/L.

Temperature: 24° ± 2° C.

Phosphate: <1mg/L.



Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# Flow Resistance

Test Results: Standard 2.50" O.D. x 1.25" I.D. x 9.75" L. MATRIKX® CTO extruded carbon filters were tested with municipal tap water from Bridgeport, CT, at 60 psig system pressure, to determine differential-pressure vs. flow curves. MATRIKX® CTO filters have a measured P=1.10 psid at 1.0 gallon per minute.

Test Conditions: Three randomly selected production cartridges were subjected to varying flows to determine the initial-differential-pressure vs. flow curve.

Influent water: Bridgeport, CT municipal water.

pH of Influent water: 6.3-6.5.

Temperature: 16°C.

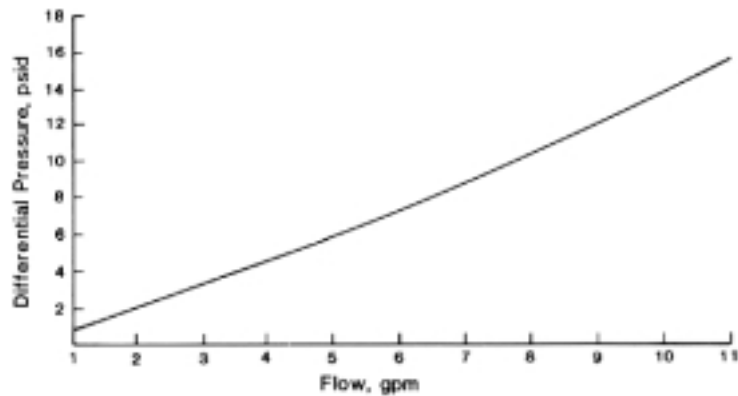
Range of tested flows: 1-11 gpm.

Duration of test: approx. 4 minutes

Instrumentation: Omega Engineering FL710 Series,

1 to 11 gpm range, with 0.2 gpm accuracy.

Orange Research, Inc. differential pressure gauges, 0 to 40 psid.



Source of test data: KX Industries, LP, Bridgeport, CT.

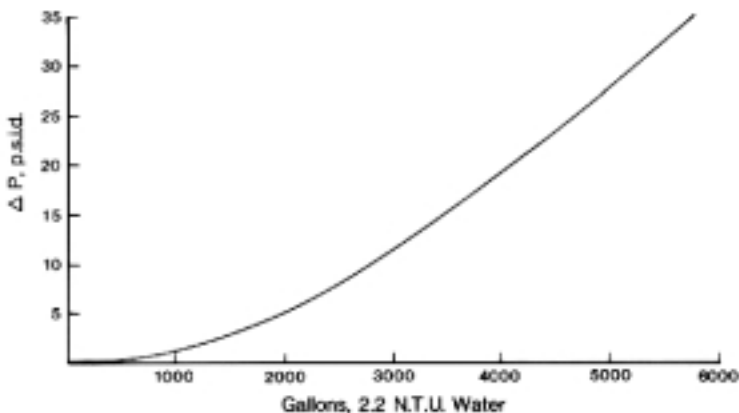
# Dirt Capacity

Test Results: Standard 2.50 O.D. x 1.25 I.D. x 9.75 L. MATRIKX® CTO extruded carbon filter cartridges were tested with Minneapolis, Minnesota tap water at 2.2 NTU turbidity and 60 psig system pressure to determine differential pressure vs. cumulative flow curves. The standard MATRIKX® CTO filters demonstrated a back pressure of 20 psid following 3,500 gallon cumulative flow of high turbidity influent water.

Test Conditions: Two randomly selected production cartridges were evaluated for dirt life under the following conditions.

Flow rate: 1 gpm, constant.  
 System Pressure: 60 psi, constant  
 Prefiltration: None  
 Influent water: 250 gallon batches.  
 Total challenge: 6,000 gallons.

Influent water analysis:  
 Turbidity: <2.2 NTU. Alkalinity: 26.8 mg/L.  
 pH: 7.9 ± 0.5 Temperature:  
 TDS: 190 mg/L 24° ± 2° C.  
 Hardness: 171 mg/L Phosphate: <1 mg/L.



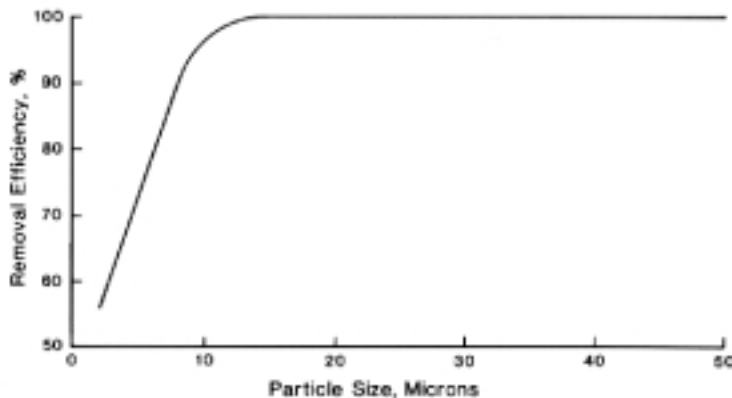
Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# Particulate Removal

Test Results: Five standard 2.50 O.D. x 1.25 I.D. x 9.75 L. MATRIKX® CTO filters were tested for particulate removal with two different particle counting instruments, and demonstrated greater than 98% removal of 10 μm diameter particles.

Test Conditions #1: Performed by KX Industries, LP.

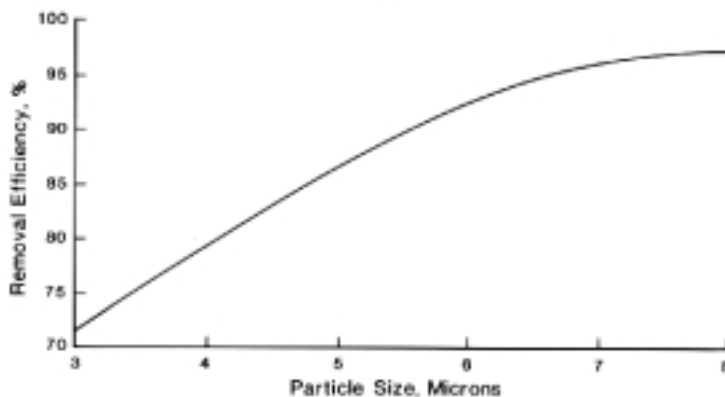
Instrumentation: Met-One particle counting system, model 233-S157;  
 Instrument capability: 2 μm to 200 μm.  
 Influent water temperature: 24° C.  
 Challenge: 1,500 particles/ml influent, size range: 2 μm to 50 μm.  
 Flow: 1 gpm, constant.  
 Sensor flow rate: 50 ml/min.  
 Sample pretreatment: performed at 30 minutes after start of flow through filter element.



Source of test data: KX Industries, LP, Bridgeport, CT.

Test Conditions #2: Performed by third party testing lab.

Test method: single pass retention efficiency per IBR TM E-100.  
 Instrumentation: Hiac 4200 with Hach 2100A sensor elements.  
 Fluid: deionized water.  
 Contaminant: AC fine test dust, LN 1538.  
 Temperature: ambient  
 Flow rate: 1 gpm.  
 Description of samples: filter elements, preflushed for 15 minutes.



Source of test data: Inter Basic Resources, Inc. Ann Arbor, Michigan.

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# SOLUBLE LEAD REMOVAL

**Test Results:** Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® Pb1 extruded carbon filter cartridges were challenged with influent water flowing at 0.75 GPM and containing approximately 150 ppb of soluble lead at both high pH and alkalinity, and low pH and low alkalinity. The results demonstrate that the MATRIKX® Pb1 will reduce soluble and insoluble lead to below 15 ppb for greater than 2,500 gallons.

**Test Conditions:** Two randomly selected, standard production cartridges were challenged with water containing an average of 150 ppb of soluble lead nitrate at a flow rate of 0.75 GPM to determine the filters efficiency for the reduction of soluble lead at low pH, TDS and alkalinity. A second set of filters were tested under similar conditions, but with influent water at high pH, high TDS and alkalinity.

Flow rate: 0.75 GPM  
 System pressure: 60 psig  
 Operating cycle: 50% on / 50% off  
 Influent water analysis:

	Low Ph	High Ph
Alkalinity	30mg/L	210 mg/L
pH	6.7	8.3
TDS	144 mg/L	284 mg/L
Turbidity	<0.1 NTU	<0.1 NTU
Temperature:	20° C.	20° C.
Hardness:	24 mg/L	120 mg/L
Polyphosphate:	<0.05 mg/L	<0.05 mg/L



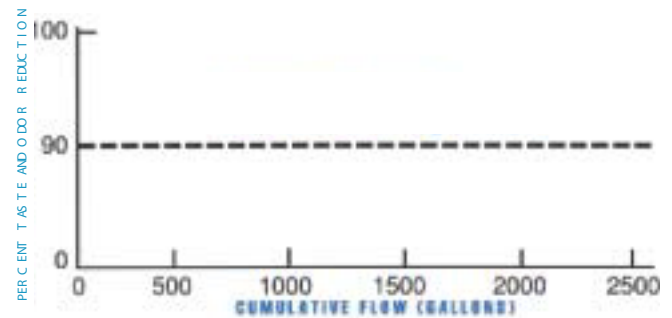
Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# CHLORINE TASTE AND ODOR REDUCTION

**Test Results:** Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® Pb1 extruded carbon filters removed chlorine taste and odor (<0.1 ppm) from an influent challenge containing an average of 2.0 ppm chlorine taste and odor flowing at 0.75 GPM, and maintained this level of performance for 2,500 gallons.

**Test Conditions:** Two randomly selected, standard production cartridges were evaluated for chlorine taste and odor reduction.

Flow rate: 0.75 GPM  
 System pressure: 60 psig  
 Operating cycle: 50% on / 50% off  
 Chlorine Taste and Odor challenge: 2 - 2.5 ppm  
 Total challenge: 2,500 gallons  
 Influent water analysis: pH ..... 7.5  
 TDS ..... 280 mg/L  
 Turbidity ..... <0.1 NTU  
 Temperature ... 20° Celsius



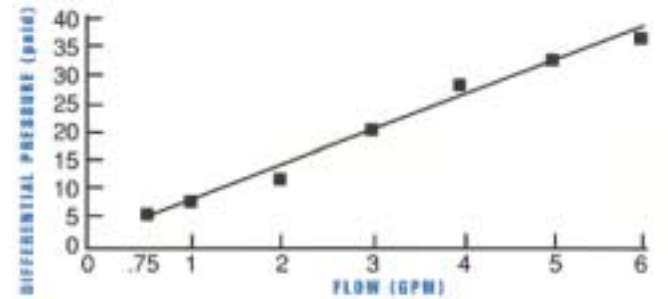
Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# FLOW RESISTANCE

**Test Results:** Standard MATRIKX® Pb1 extruded carbon filter cartridges were tested with municipal tap water from Bridgeport, CT, at 60 psig system pressure, to determine differential-pressure vs. flow curves. The standard 2.50ŽO.D. x 9.75ŽL MATRIKX® Pb1 filter has a P = 4.00 psid at 1.0 GPM flow.

**Test Conditions:** Three randomly selected, standard production cartridges were subjected to varying flows to determine the initial-differential-pressure vs. flow curve.

Influent water: Bridgeport, CT municipal drinking water  
 pH of Influent water: 6.5  
 Temperature: 20° C  
 System pressure: 60 psig, constant  
 Range of tested flows: 1 - 10 GPM.  
 Instrumentation: Omega Engineering FL710 Series,  
 1 to 11 GPM range, with 0.2 GPM accuracy

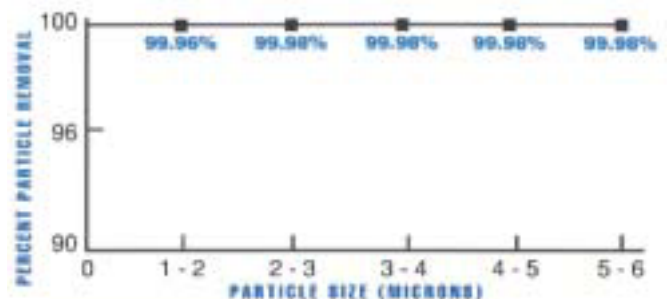


Source of test data: KX Industries L.P., Bridgeport, CT

# PARTICULATE, CYST AND TURBIDITY REDUCTION

**Test Results:** Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® Pb1 extruded carbon filters were evaluated for particulate reduction using in-line particle counting instruments, and demonstrated 99.984% reduction at 3-4 μm particles ( 99.96% reduction at 1 - 2 μm particles) which exceeds the current NSF requirement for cyst and turbidity reduction under NSF Standard 53.

**Test Conditions:**  
 Instrumentation: HIAC ROYKO 8000A, automatic particle counter.  
 Sensor: LD 400  
 Influent water temperature: 20° C.  
 Challenge: Fine test dust  
 Flow rate: 4.0 GPM



Source of test data: Inter Basic Resources, Inc. Ann Arbor, Michigan.

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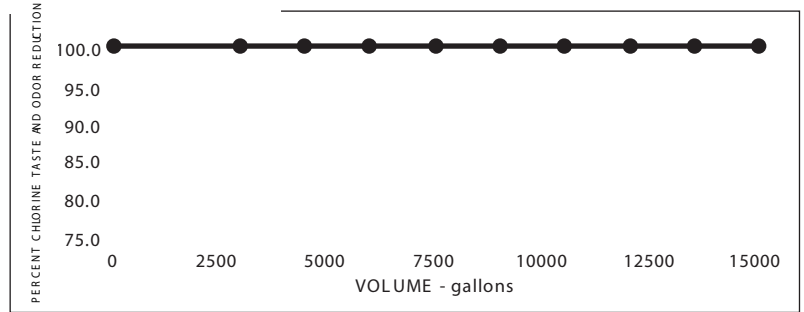
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# CHLORINE TASTE AND ODOR REDUCTION

Test Results: Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® CR1 extruded carbon filters removed chlorine taste and odor (<0.1 ppm) from an influent challenge containing an average of 2.0 ppm chlorine taste and odor flowing at 2.50 GPM, and maintained this level of performance for 15,000 gallons.

Test Conditions: Two randomly selected, standard production cartridges were evaluated for chlorine taste and odor reduction.

Flow rate: 2.5 GPM  
 System pressure: 60 psig  
 Operating cycle: 50% on / 50% off  
 Chlorine Taste and Odor Challenge: 1.8 - 2.1 ppm  
 Total challenge: 15,000 gallons  
 Influent water analysis: pH . . . . . 7.71 - 7.83  
 TDS . . . . . 200-240 mg/L  
 Turbidity . . . . . 0.06-0.23 NTU  
 Temperature . . . 20-23° Celsius

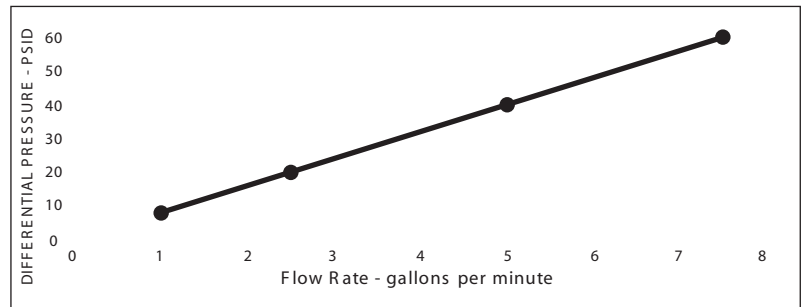


Source of test data: NSF International, Ann Arbor, Michigan. Actual test performed on 2.50ŽO.D. x 1.25ŽI.D. x 20ŽL filter at 5.0 GPM. Above data is scaled to depict performance of the same filter at half the length and half the flow rate.

# FLOW RESISTANCE

Test Results: Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® CR1 extruded carbon filter cartridges were tested with municipal tap water from Orange, CT, at 60 psig system pressure, to determine differential pressure vs. flow curves. The standard 2.50ŽO.D. x 9.75ŽL MATRIKX® +CR1 filter cartridge has an initial differential pressure of 8.0 psid at 1.0 GPM flow.

Test Conditions:  
 Influent water: Orange, CT municipal drinking water  
 pH of Influent water: 6.5 - 7.0  
 Temperature: 20° C  
 System pressure: 60 psig, constant  
 Flow range: 1 - 7.5 gallons per minute



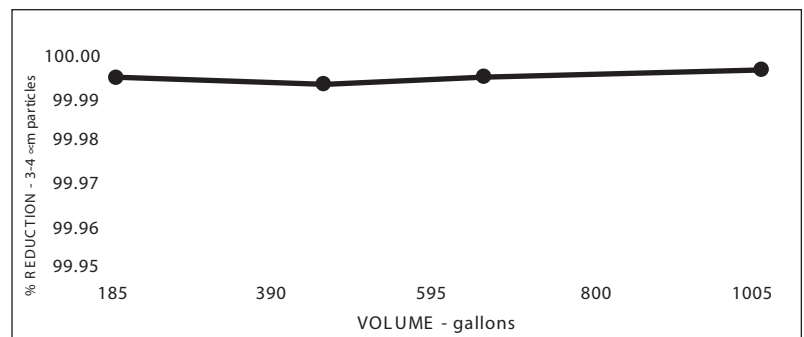
Source test data: KX Industries L.P., Orange, CT

# PARTICULATE, CYST AND TURBIDITY REDUCTION

Test Results: Standard 2.50ŽO.D. x 1.25ŽI.D. x 9.75ŽL MATRIKX® CR1 extruded carbon filters were evaluated using NSF Standard 53 cyst reduction test protocol and demonstrated >99.99% reduction of 3-4 µm particles. These results greatly exceed the NSF requirement of 99.95% reduction of 3-4 µm particles throughout the life of the filter.

Test Conditions:  
 Water temperature: 19.3° Celsius  
 3-4 µm challenge: 6.5 - 7.0  
 pH: 20° C  
 Hardness, Total: 60 psig, constant  
 Solids, Total Dissolved: 1 - 7.5 gallons per minute  
 Flow rate: 5.0 GPM

Parameter/Test Description	NSF REFERENCE
Cyst Reduction Test	-P901CR
Cyst Reduction Test¹	-P901CRA
Hardness, Total	-I52003130
Solids, Total Dissolved	-I420071601
Turbidity Reduction Test	-P901TRP
Turbidity Reduction Test¹	-P901TR
Water Analysis, Mechanical Filtration	-P908



Source test data: NSF International, Ann Arbor, Michigan. Actual test performed on 2.50ŽO.D. x 1.25ŽI.D. 20ŽL filter at 5.0 GPM. Above data is scaled to depict performance of the same filter at half the length and half the flow rate.

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# Chlorine Taste & Odor Reduction

Test Results: Standard 2.50 O.D. x 1.25 I.D. x 9.75 L. MATRIKX® 1 extruded carbon filters removed chlorine taste and odor (<0.05 ppm) to provide greater than 99% removal of chlorine taste and odor from an influent containing 6 ppm chlorine taste and odor, continuously flowing at 1 gpm, and maintained this removal efficiency to the end of the test (total flow of 6,000 gallons).

Test Conditions: Two randomly selected production cartridges were evaluated for chlorine taste and odor reduction claims under the following test conditions.

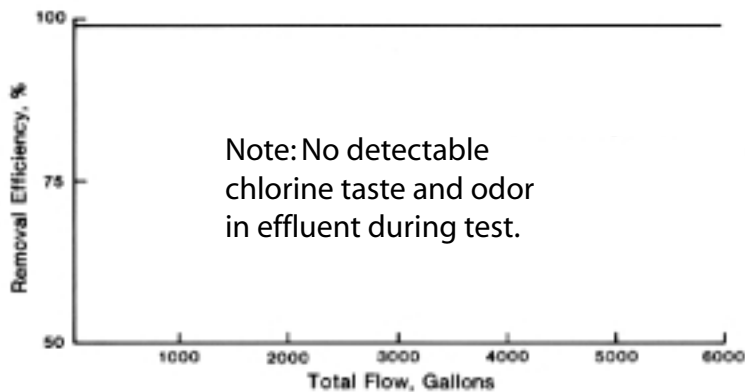
Flow: 1 gpm, constant.  
 System Pressure: 60 psi, constant.  
 Prefiltration: 0.2µm absolute.  
 Influent water: 250 gallon batches.  
 Chlorine taste and odor challenge: sodium hypochlorite @6 ppm

Analysis: Standard methods for the examination of water and wastewater method number 4500-Cl G, used to analyze both influent and effluent water.

Total challenge: 6,000 gallons.

Influent water analysis:

Turbidity: <1.0 NTU,	Hardness: 171 mg/L
Prefiltered with 0.2 µm absolute prefilter.	Alkalinity: 26.8 mg/L
pH: 7.9 ± 0.5	Temperature: 24° ± 2° c.
TDS: 190 mg/L	Phosphate: <1 mg/L



Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# Flow Resistance

Test Results: Standard 2.50 O.D. x 1.25 I.D. x 9.75 L. MATRIKX® 1 extruded carbon filters were tested with municipal tap water from Bridgeport, CT, at 60 psig system pressure, to determine differential-pressure vs. flow curves. MATRIKX® 1 filters have an initial flow resistance of 3.0-3.5 psid at 1.00 gpm.

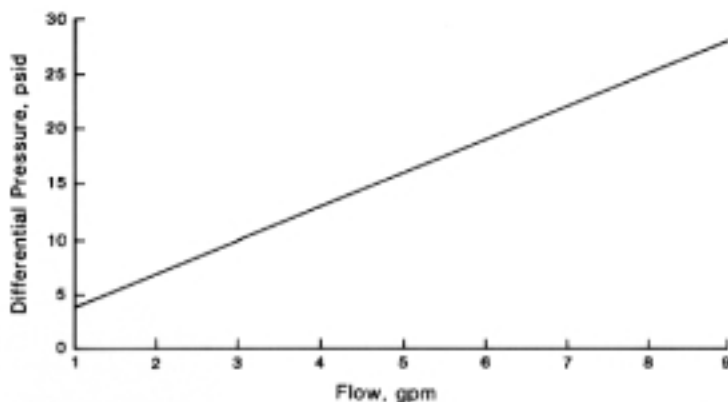
Test Conditions: Three randomly selected 2.50 O.D. x 9.75 L. MATRIKX® 1 extruded carbon filter cartridges were tested with municipal tap water from Bridgeport, CT at 60 psig system pressure, to determine differential-pressure vs. flow curves.

Influent water: Bridgeport, CT municipal water.  
 pH of Influent water: 6.3-6.5.  
 Temperature: 16°C.

Range of tested flows: 1-9 gpm.

Duration of test: approx. 4 minutes.

Instrumentation: Omega Engineering FL710 Series, 1 to 11 gpm range, with 0.2 gpm accuracy. Orange Research, Inc. differential pressure gauges, 0 to 40 psid.



Source of test data: KX Industries, LP, Bridgeport, CT.

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# Chlorine Taste and Odor Reduction

Test Results: Standard 2.50" O.D. x 1.25" I.D. x 9.75' L. MATRIKX® 5 extruded carbon filters removed chlorine taste and odor (<0.05 ppm) from an influent containing 2-2.5 ppm chlorine taste and odor flowing continuously at 1 gpm, and maintained this level of removal for a total flow of 3,500 gallons. A chlorine taste and odor reduction efficiency of 90% was maintained even after a total flow of 6,000 gallons.

Test Conditions: Two randomly selected, standard production cartridges were evaluated for chlorine taste and odor reduction.

Flow: 1 gpm, constant.

System Pressure: 60 psi, constant.

Prefiltration: 0.2 µm absolute.

Influent water: 250 gallon batches.

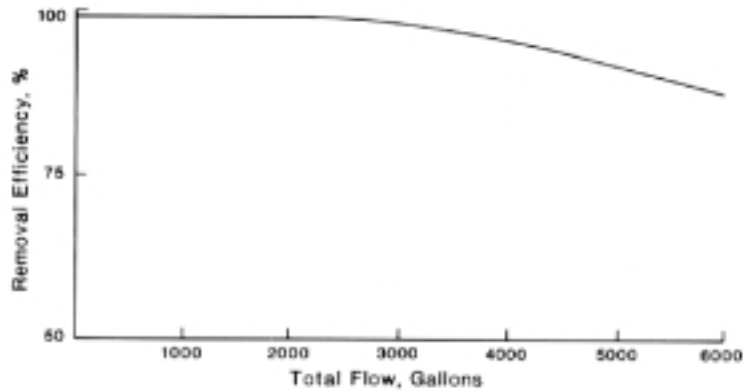
Chlorine taste and odor challenge: sodium hypochlorite @ 2-2.5 ppm

Analysis: Standard methods for the examination of water and wastewater method number 4500-Cl G, used to analyze both influent and effluent water.

Total challenge: 6,000 gallons.

Influent water analysis:

Turbidity: <1.0 NTU,	Hardness: 171 mg/L
Prefiltered with 2.0 µm absolute prefilter.	Alkalinity: 26.8 mg/L.
pH: 7.6	Temperature: 21°C
TDS: 200 mg/L	



Source of test data: Spectrum Laboratories, New Brighton, Minnesota.

# Flow Resistance

Test Results: Standard 2.50" O.D. x 1.25" I.D. x 9.75' L. MATRIKX® 5 extruded carbon filters were tested with municipal tap water from Bridgeport, CT, at 60 psig system pressure, to determine differential-pressure vs. flow curves. The standard MATRIKX® 5 filters have a P=1.10 psid at 1.0 gallon per minute flow.

Test Conditions: Three randomly selected, standard production cartridges were subjected to varying flows to determine the initial-differential-pressure vs. flow curve.

Influent water: Bridgeport, CT municipal water.

pH of Influent water: 6.3-6.5.

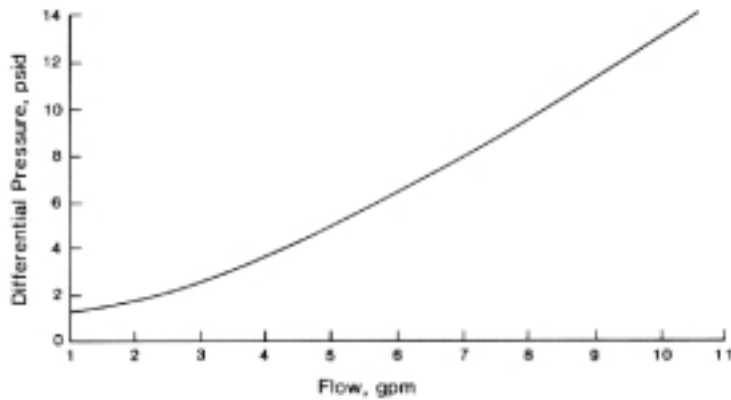
Temperature: 16°C.

System Pressure: 60 psig, constant.

Range of tested flows: 1-9 gpm.

Instrumentation: Omega Engineering FL710 Series, 1 to 11 gpm range, with 0.2 gpm accuracy.

Orange Research, Inc. differential pressure gauges, 0 to 40 psid.



Source of test data: KX Industries, LP, Bridgeport, CT.