



Markham Waterworks - Management System STANDARD OPERATING PROCEDURE

Title: Approved Waterworks Materials List		Control Number: SOP 13b
Revision: 8.0		Review Date: January 12, 2023
Section: O&M	Reviewer: Product Approval Committee	Approver: Sr. Manager, Waterworks Operations

Table 1: Approved Materials List

***Material approved for trial-use and specific projects only

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
Watermain Pipe	Polyvinyl Chloride (Up to and including 400mm)	NSF/ANSI 61 AWWA C900/905 CSA B137.3 ULC/FM	<ul style="list-style-type: none"> Class 150 PRODUCT SHALL BE CAPPED AT THE PRODUCTION FACILITY PRIOR TO SHIPPING DR 18 Rubber gasket Bell and Spigot joints Installed with 12 gauge TWU tracer wire 	Ipex	Blue Brute (C900) Bionax PVCO Pipe***
				NEXT Polymers	N/A
				National Pipe and Plastics (Formally LCP)	N/A
				Royal	N/A
				Diamond	N/A
	Ductile Iron (100-300mm)	ANSI A21.4 ANSI A21.51 AWWA C104 AWWA C150 AWWA C151	<ul style="list-style-type: none"> Class 52 Cement Lined Supplied with bonding straps/lock wedges Corrosion protection (see spec.) 	Canada Pipe	N/A
	Ductile Iron (400mm +)	ANSI A21.51 AWWA C104 AWWA C150 AWWA C151	<ul style="list-style-type: none"> Class 54 Cement Lined Supplied with bonding straps/lock wedges Corrosion protection (see spec.) 	Canada Pipe	N/A
	Concrete Pressure Pipe	AWWA C301 AWWA C304	<ul style="list-style-type: none"> Supplied with bell and spigot joints Joints sealed with wrap around cement mortar diapers Shop drawings shall be supplied to the City for review and approval prior to construction 	Hyprescon	N/A
				Munro	N/A
Watermain Fittings	Ductile Iron (cement lined, mechanical joint)	AWWA C153	<ul style="list-style-type: none"> Class 350 	Bibby	N/A

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
			<ul style="list-style-type: none"> All fittings will be supplied with restrained MJ glands and gaskets, cor blue or stainless tee bolt with epoxy coated nuts. Stainless nut and bolts Corrosion Protection Coatings MW11 (see spec.) 	Sigma Star	N/A N/A
Watermain Restraint Devices	Eye Bolts	N/A	<ul style="list-style-type: none"> Stainless steel all thread rod All epoxy coated nuts. Nuts and washers to be stainless steel 	N/A	N/A
	Tie Rods	N/A	<ul style="list-style-type: none"> Stainless steel All epoxy coated nuts. Nuts and washers to be stainless steel Corrosion Protection Coatings MW11 (see spec.)	N/A	N/A
	PVC pipe joint restraint	ANSI A21.51-91 ASTM A536 AWWA C151 ULC	<ul style="list-style-type: none"> Body must be epoxy coated or equivalent 2 Zinc Protecto Caps must be used on all pipe to pipe restrainers Corrosion Protection Coatings MW11 (see spec.) 	EBBA Iron	Series 2000
				Ford/Uni Flange	Series 1350
				Smith/Blair	Series 165
				Star Pipe Product	Series 1100
				Sigma	PV-LOC PWP
				SIP Industries	EZ Grip Joint Restraint***
	Mechanical Joint (MJ fitting restrainers)	ANSI A21.11 AWWA C11 ASTM A536	<ul style="list-style-type: none"> Body must be epoxy coated or equivalent Corrosion Protection Coatings MW11 (see spec.) 	EBBA Iron	Series 2200
				Star Pipe Products	Stargrip series 4000 and 3200
Smith/Blair				Cam-lock 111 and 120	
Sigma				One –Lok SLC and SLD	
Clow/Tyler				Tuff Grip	
Georg Fischer				Series 3000	
SIP Industries				C-110, C-153***	

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
Water Service Piping up to and including 50mm	Copper Up to 50mm	ASTM B88 NSF/ANSI 61	<ul style="list-style-type: none"> Drawing MW8 All copper piping will be type K Soft copper 	Great Lakes Copper	N/A
ALL WATERWORKS BRASS IN THE CITY OF MARKHAM WILL BE OF THE NO LEAD VARIETY.					
Mainstops	N/A	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> Must be Ball Valves AWWA thread on watermain side and compression joint on service side 	Ford	FB-1100
				Cambridge Brass	Series 301
				Mueller	Series 300
Curbstops	N/A	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> Must be Ball Valves Compression joints 	Ford	B-44 Series
				Cambridge Brass	Series 202
				Mueller	B-15209
Service Box	13 mm – 50mm	N/A	<ul style="list-style-type: none"> D1 or D3 style 	Sigma	N/A
				Mueller	N/A
				Clow	N/A
Corporation Couplings	N/A	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> Compression joints 	Ford	C-44 Series
				Cambridge Brass	Series 119/118
				Mueller	H-15403/12940
Service Saddles	Double bolt style	NSF/ANSI 61	<ul style="list-style-type: none"> AWWA thread on tap Manufactured of 304 stainless steel welded construction and passivated by chemical dip method 	Robar	2616
				Ford	F5303

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
				Cambridge Brass	403
				Smith/Blair	373,374
				Romac	306***
			<ul style="list-style-type: none"> Can only be used on cement piping. Trial product to be approved on a project basis 	Inserta Tee	Inserta Tee series***
Watermain Couplings	Straight or Transition Couplings (Can be substituted with mechanical joint ductile iron solid sleeve)	AWWA C219-11 AWWA C227-11 NSF/ANSI 61	<ul style="list-style-type: none"> Epoxy coated Stainless steel nuts and bolts Corrosion Protection Coatings MW11 (see spec.) 	Robar	1506
				Smith-Blair	441, 421 Top Bolt***
				Ford	FC1 & FC2
				Hymax	Hyjoint
				Dresser	38
				Romac	Alpha 501 Style – Bolted Sleeve Coupling*** Macro HP – 2 Bolt Wide Range (with cathodic protection port) ***
				Georg Fischer	3007
	Flanged x Restrained MJ Adaptors c/w threaded outlet	AWWA C219-11 AWWA C227-11 NSF/ANSI 61	<ul style="list-style-type: none"> Epoxy coated Stainless steel nuts and bolts Corrosion Protection Coatings MW11 (see spec.) 	Hymax	Grip
				Smith-Blair	920
				Georg Fischer	3057
Tapping Sleeves	Tapps smaller than host watermain outside diameter	AWWA C223 & C111 NSF/ANSI 61	<ul style="list-style-type: none"> Constructed entirely of type 304 stainless steel (including nuts and bolts) Welds are to be passivated by chemical dip method Corrosion Protection Coatings MW11 (see spec.) 	Robar	6606
				Ford	Fast 700-1900

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
				Smith Blair	663***
	Size on size taps	AWWA C223 NSF/ANSI 61	<ul style="list-style-type: none"> Fusion bonded epoxy coated (12 mm thickness) All nuts and bolts grade 304 stainless steel Corrosion Protection Coatings MW11 (see spec.) 	Smith Blair	622
Valves <ul style="list-style-type: none"> Valves supplied for project west of McCowan Rd (center line) LEFT HAND CLOSED Valves supplied for project east of McCowan Rd (center line) RIGHT HAND CLOSED 	CI Body or Full Body DI Resilient Seat Gate Valve Drawing No. <ul style="list-style-type: none"> MW1 MW2 MW3A MW19 	AWWA C509 NSF/ANSI 61 UL/ULC FM 1120/1130	<ul style="list-style-type: none"> 100mm – 400mm diameter Mechanical Joint or Flanged ends Trim nuts and bolts grade 304 stainless steel 50mm square operating nut Corrosion Protection Coatings MW11 (see spec.) Unionville GO Station (Series 45) 	Clow	2640
				Mueller	A-2360/A-2362
				AVK	Series 45
	Butterfly Valve Drawing No. <ul style="list-style-type: none"> MW1 MW2 MW3A 	AWWA C504 NSF/ANSI 61	<ul style="list-style-type: none"> Over 400mm diameter Mechanical joints with gland ring PT Gasket and Cor Blue or stainless T Head with epoxy coated nuts. Nuts and bolts to be stainless steel Corrosion Protection Coatings MW11 (see spec.) 	Mueller	Linesal
				Clow	M & H 4500
	Check Valve Drawing No. <ul style="list-style-type: none"> MW4 	AWWA C509 AWWA C519 FM/ULC NSF/ANSI 61	<ul style="list-style-type: none"> Outside lever and weight Flanged valves supplied with red rubber gaskets and grade 304 stainless steel nuts and bolts Corrosion Protection Coatings MW11 (see spec.) 	Mueller	A2600
				Clow	Kenflex 506
	Combination Air Valves Drawing No. <ul style="list-style-type: none"> MW3 MW3A 	AWWA NSF/ANSI 61	<ul style="list-style-type: none"> Size based on Engineer WM design 19mm-50mm supplied with FIP inlet Installed with approved service saddle, AWWA X FIP main stop, and brass nipple 	ARI	D-040 – 19-50mm D-060 – over 50mm (Flanged)
			Valmatic	N/A	
			Apco	N/A	

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
				Ventomat	RBX
	Pressure Reducing Valve and Pressure Sustaining Valve Drawing No. • MW4	AWWA C530 FM/ULC NSF/ANSI 61	<ul style="list-style-type: none"> Flanged ends 100mm – 400mm 	Cla-val	90-01 (pressure reducing) 92-01 (combination pressure reducing and pressure sustaining)
Valve Boxes	100mm Sliding Type	AWWA ULC/FM	<ul style="list-style-type: none"> 0.75m upper section 1.75m lower section Valve box extensions to be added from the lower section only 	Bibby	N/A
				Sigma	
Fire Hydrants	Draw No. MW-6	AWWA C502 NSF/ANSI 61 FM ULC Interior/Exterior coating: AWWA C502-05 (4.1.3) Surface preparation:	<ul style="list-style-type: none"> 2-63.5mm diameter CSA hose nozzles at 180 degrees to each other 1-100mm “Storz Nozzle” painted black stamped “STORZ” (at 90 degrees to the hose nozzle) Opens to the left Brass seat casing to brass main valve seat, fully draining mechanical joint boot. Safety break away flange and coupling at ground level 	Mueller	Century
				Clow	Mcavity M-67B
				Clow	Brigadier

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
		SSPC-SP6-63	<ul style="list-style-type: none"> Zinc anode installed on operating rod just above drip valve Intermediate section will be made of ductile iron Hydrant must be clearly marked brass to brass seating, drains anode, and bury depth <p>Upper barrel stamped with manufacturer's name, model number, and year manufactured</p> <ul style="list-style-type: none"> Coatings used on interior surfaces of a hydrant shall be suitable for contact with drinking water Ally hydrants supplied shall have protective coatings on upper barrel including the break away coupling <p>Surfaces shall meet the following specifications:</p> <ul style="list-style-type: none"> Surface Preparations: commercial sand blasting in accordance to Society for Protective Coatings Standard SSPC-SP6-63 Base Coat: Belzona 6111 liquid anode with a minimum 90% of granulated zinc by weight for the dry film; must be a minimum of 2mm dry film thickness (DFT) and extend 100mm below break flange. Finish Coat: Tremclad Rust Paint Standard yellow or approved equivalent; must be a minimum of 1mm DFT. Total base coat and finish coat together must be a minimum of 3mm 	Clow	Concord D-67M
				AVK	2780
Fire Hydrant Anti-Tamper Device (ATD)	N/A	N/A	<ul style="list-style-type: none"> Cadmium or zinc plated steel and have 75mm yellow reflective adhesive stripe on the entire length of both outer sides of the device. ATD's will be of the design that does not allow hydrant operating nut or nozzle caps to be turned and is secured to the hydrant with a stainless steel strap. (1/2 in. wide, .030in. thick) 	Chromer Industries	Markham Standard Version c/w round cap holes and yellow Pretzel Marker attached.
Valve Chamber Frame and Covers	3 Piece Round Style (For valves up to and including 300mm) Drawing No. <ul style="list-style-type: none"> MW1 MW3 MW3A MW9 	None Required	<ul style="list-style-type: none"> 3 piece style (frame, cover, and center plug) Frame to be attached to precast section as per Std. MW-1 Maximum of 6 courses of moduloc to adjust to grade 	Bibby	JW300A
				Sigma	N/A

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
	Standard Round Style (For valves up to and including 300mm) Drawing No. <ul style="list-style-type: none"> MW1 MW3 MW3A MW9 	None Required	<ul style="list-style-type: none"> Stamped "WATER" and "current year" Standard manhole to come with lift holes Frame to be attached to precast section as per Std. MW-1 Maximum of 6 courses of moduloc to adjust to grade 	Bibby	N/A
				Sigma	N/A
	Rectangular (not to be used on chambers less than 1800mm diameter) Drawing No. <ul style="list-style-type: none"> MW10 MW2 MW4 MW5 	None Required	<ul style="list-style-type: none"> Stamped "WATER" and "current year" <p>Comment:</p> <ul style="list-style-type: none"> Required for drain chambers, multiple valve chambers, pressure separation, and pressure reducing valve chambers 	Bibby	N/A
				Sigma	N/A
	Precast Structure (Concrete) Drawing No. <ul style="list-style-type: none"> MW1 MW3 	CSA A23.4 OPSS CPCI	<ul style="list-style-type: none"> 150 – 300mm valve size requires 1500mm ID 400 + / larger butterfly requires 1800mm ID Only one valve per chamber Drain chambers, multiple valve chambers, pressure separation, and pressure reducing valve chambers will be 2400mm x 1800mm rectangular precast or poured in place 	De-Cast	N/A
				Hanson	N/A
				Con Cast	N/A
				M Con	N/A
	Auto Flushing Stations	Automatic flushing device Drawing No. <ul style="list-style-type: none"> MW7B 	N/A	<ul style="list-style-type: none"> Shall have a 50mm brass FIP inlet, leading vertically into a 50mm automatic solenoid valve that will have an internal self cleaning debris screen and shall be rated for up to 220psi. Furnished with a hand held device for programming Controller must have a minimum of 9 possible flushing cycles per day, be powered by battery, and have resin sealed electrical components Unit must have a means to remove solenoid valve, be self-draining, and non freezing All above ground components will be housed in a UV resistant locking cabinet See MW7B for drain detail 	Kupferle
Backflow Preventer	Reduced pressure backflow preventer	AWWA C511-07	N/A	Watts	#009
				Febco	825Y

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models	
Watermain Repair Clamps	Full-Circle	AWWA	<ul style="list-style-type: none"> Will be manufactured of 304 stainless steel, welded seams, completely passivated by chemical dip method 	Robar	Style 1	
				Ford	FSI	
				Cambridge Brass	Series 425	
				Clow Canada	Concord D76R – Series 100	
				Hymax	Clamp Versa	
Sacrificial Anodes	Zinc Drawing No. <ul style="list-style-type: none"> MW11 	ASTM B418-09	<ul style="list-style-type: none"> High grade Zinc of 99.9% purity Packaged in a water permeable cardboard container filled with a mixture of 20% Bentonite, 5% Sodium Sulphate, and 75% gypsum. Supplied with 3m #10-7 strand copper wire with THW insulation silver soldered to a electro-galvanized steel core extending 75% of anode length 	Corrosion Service	12lb (5.4kg) 24lb (10.8kg)	
				Cathodic Technology		
				Interprovincial Corrosion		
				Maple Agencies		
				Bren Tech.		
	Magnesium Drawing No. <ul style="list-style-type: none"> MW11 	ASTM B843-07	<ul style="list-style-type: none"> Primary magnesium metal only Packaged in a water permeable cardboard container filled with a mixture of 20% Bentonite, 5% Sodium Sulphate, and 75% gypsum. Supplied with 3m #10-7 strand copper wire with THW insulation silver soldered to a electro-galvanized steel core extending 75% of anode length 	Interprovincial Corrosion	17lb (7.71kg) 32lb (14.51kg)	
				Bren Tech.		
				Integrity Pipe Prod.		
	Zinc Anode Protecto Caps	ASTM B418	<ul style="list-style-type: none"> For use on pipe joint restrainers 	Integrity Bren	Available threaded in 16mm and 19mm	
Protective Coatings	Petroleum or Wax based	AWWA C217-09	<ul style="list-style-type: none"> Protective coatings will be applied as per the manufacturers specifications or the Waterworks Management Team Requires 3-part application consisting of paste, mastic, and tape 	Chase Protective Coatings	Longwrap petrolatum system***	
				Denso of Canada		
				Petro Coating Systems		Petro Coating System series
				Interprovincial Corrosion Control		
				Advanced Corrosion Solutions		PetroGuard series
				Pro-Line Fittings		PetroWrap series***

Product	Type	Required Accreditation	Required Markham Specifications	Manufacturers	Description/Models
			<ul style="list-style-type: none"> Protective coatings will be applied as per the manufacturers specifications or the Waterworks Management Team Wax product require only tape application 	Trenton Wax Tape	Tape only application
Tracer Wire	Stranded Copper Drawing No. MW11	None Required	<ul style="list-style-type: none"> 12 gauge with TWU insulation 	N/A	N/A
				Copperhead Industries	Copperhead Tracer Wire System***
Watermain Casing Spacers	Thermoplastic Powder Coated Steel Band Casing Spacer	ASTM D2240-05(2010)	<ul style="list-style-type: none"> Polymer Runners or equivalent Position of pipe within liner to be centered and restrained for entire length of liner Size to be determined by design engineer based on diameter of watermain and diameter of casing 	Advance Products and Systems	Series SI
Water Sampling Station		None Required	<ul style="list-style-type: none"> Sampling stations shall be 1750mm minimum bury with a 19mm FIP inlet and a unthreaded sampling port. All stations shall be enclosed in a lockable, non-removable housing. Water will flow in an all stainless steel waterway. All working parts will be stainless steel and be removable from above ground without digging. Unit must have a means of removing standing water to prevent freezing. 	Kupferle	Eclipse 88S
				Cromer Industries	Test Tap

Reference: City of Markham Engineering Standards

3.0 History of Changes

Revision	Date	Description	By
2.0	June 26, 2018	Header information and added Review Date. Moved Class number requirement from Required Accreditation column to Required Markham Specifications for watermain pipe and fitting products. Updates and revisions.	Russ S. Aaron S. Eddy W. Vincent F.
3.0	January 31, 2019	<ul style="list-style-type: none"> Manufacturer changed its company name from Rehau to NEXT Polymers AVK Series 25 no longer manufactured. Replaced by Series 45 	Vincent F.
4.0	May 30, 2019	<ul style="list-style-type: none"> Added Advanced Corrosion Solutions – PetroGuard under Protective Coatings 	Vincent F.

5.0	June 23, 2020	<ul style="list-style-type: none"> Identified Trial use products only Added new approved products: Multi Joint Fitting Restrainer 3000 series, Hymax Clamp, Grip and Versa Indicated stainless steel and epoxy coated nuts for various materials. 	Vincent F.
6.0	December 15, 2020	<ul style="list-style-type: none"> Water Service Piping up to and including 50mm (corrected from 40mm) Valves – moved the reference to McCowan valve position information to the first column Protective Coatings - Included AWWA C217-09 as the accreditation requirement Add Romac 306 and Copperhead Tracer Wire System as new trial products. 	Vincent F.
7.0	May 4, 2021	<ul style="list-style-type: none"> Add Romac 501 Style and Macro HP as two new trial products under Watermain Coupling 	Vincent F.
8.0	Jan 27, 2023	<ul style="list-style-type: none"> Trial use products included: Bionax PVCO, EZ grip joint restraint, SIP Industries C-10, C-153, Longwrap Petrolatum system 	Vincent F.