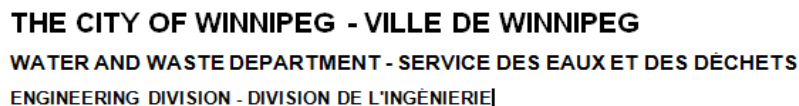


APPROVED PRODUCTS FOR UNDERGROUND USE WITHIN THE CITY OF WINNIPEG





This document is owned and maintained by the Design and Construction Branch of the Engineering Services Division. For questions, comments or revisions please contact the Design and Specification Engineer.

LIST OF APPROVED PRODUCTS

The City of Winnipeg is committed to ensuring that the citizens of Winnipeg are supplied with goods and materials which adhere to the highest national and international material standards as well as ensuring the maximum long-term value to the City's municipal water and wastewater infrastructure. In order to accomplish these goals the Water & Waste Department has developed and maintains a set of written product specifications. As such any product which is to be installed or used on any City municipal water and wastewater system must meet or exceed these specifications and be listed in the current edition of this document.

For detailed specifications relating to construction and installation please refer to The City of Winnipeg – Standard Construction Specifications for Underground Use.

Products Approval Process

As a component of the Water & Waste Department, the **Design and Construction Branch** is directly responsible for the review and approval of all municipal water and wastewater infrastructure products. In order to be incorporated into the Approved Products List applicants must submit all of the information and requirements listed in the *Guidelines for Product Approval* to the **Design and Construction Branch, Design and Specification Engineer**. Once the **Design and Specification Engineer** has received the necessary information, the product and documentation will be reviewed to ensure compliance with the City's specifications. Following completion of this review, all information and recommendations will be submitted to the **Design and Construction Branch Head** and then to the Underground Materials Review Committee for consideration.

Materials Testing

If a product is submitted for approval which does not meet the present City of Winnipeg Specifications but does present a technological improvement it may require independent laboratory testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the **Water and Waste Department**.

Innovative Products

In the spirit of ensuring the long-term value to the City's municipal water and wastewater infrastructure and encouraging innovation the City will consider granting Temporary Product Approval for products which do not meet our current specifications provided that the product present a technological improvement. In order to be considered for Temporary Product Approval status the City requires that a certified Professional Engineer (P.Eng) assume responsibility in ensuring that the product is thoroughly reviewed and that all information be provided to the Water & Waste Department, **Design and Construction Branch**. Temporary Product Approval status will only be granted on a project by project basis and wide spread approval will not be granted until the product has been proven to provide a benefit to the City. The issuing of temporary approval as well as the duration and type of testing required will be at the sole discretion of the Water and Waste Department.



THE CITY OF WINNIPEG - VILLE DE WINNIPEG

WATER AND WASTE DEPARTMENT - SERVICE DES EAUX ET DES DÉCHETS

ENGINEERING DIVISION - DIVISION DE L'INGÉNIERIE

Approval or Rejection

Following the review by the Underground Materials Review Committee and provided no further information is requested, the **Design and Construction Branch Head** or his designate will review the decision of the committee and all associated materials. Subsequent to this review the City will notify the applicant in writing, outlining its findings and decision.

The City's decision is final however applications will be re-assessed if further information is provided or if the reason for rejection has been rectified. If at any time an approved product fails to perform as specified it will be removed from the Product Approvals List and only reinstated once corrective action has been taken which will meet the requirements and approval of the Water and Waste Department.

All inquiries; questions and / or requests for product approval must be made to the **Design and Construction Branch**.

City of Winnipeg, Water & Waste Department
Engineering Division, **Design and Construction Branch**
Design and Specification Engineer
110-1199 Pacific Avenue
Winnipeg, Manitoba R3E 3S8

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GUIDELINES FOR PRODUCT APPROVAL

In order to obtain Approved Product Status of any given product for use in the City of Winnipeg, the applicant must supply at least the following to the **Design and Construction Branch**:

- A completed Product Approval Application Form
- A completed Affidavit of Compliance signed by a Company Signing Officer
- Applicable third party certification, or a recognized quality assurance system including a corrective action plan.
- Literature about the product including installation instructions
- Shop drawings
- A product sample*

Please contact the **Design and Specification Engineer** prior to shipping any product samples.

Submission of the above noted items will not necessarily assure that Approval for use in the City of Winnipeg will be granted.

*Please contact the City of Winnipeg representative prior to supplying / shipping product samples.



THE CITY OF WINNIPEG - VILLE DE WINNIPEG

WATER AND WASTE DEPARTMENT - SERVICE DES EAUX ET DES DÉCHETS

ENGINEERING DIVISION - DIVISION DE L'INGÉNIERIE

PRODUCT APPROVAL APPLICATION FORM

General Information and Instructions

1. Information submitted on this form will enable the City of Winnipeg - Water & Waste Department to assess the product identified.
2. This form must be completed in full in order to be considered for product approval. A completed application shall consist of the following:
 - A completed Product Approval Application Form,
 - A completed Affidavit of Compliance signed by a Company Signing Officer,
 - Applicable third party certification or a recognized quality assurance system including a corrective action plan,
 - Literature about the product including installation and maintenance instructions,
 - Shop drawings,
 - Product sample(s)*.
3. The Application, including all relevant information must be sent to:

City of Winnipeg, Water & Waste Department
Engineering Division, **Design and Construction Branch**
110-1199 Pacific Avenue
Winnipeg, Manitoba, Canada, R3E 3S8
Attn: Ryan Lucky, P.Eng.

1.City of Winnipeg**

City Specification

City Specification Number

City Specification Date

2.Company Profile

Name

Type of Business

Address

City/Town

Province/State

Postal/Zip Code

Country

- ☐ Manufacturer
- ☐ Supplier
- ☐ Representative
- ☐ Other (Specify)

Contact Person

Telephone Number

Title

Fax Number

Email

Company Web Site

Signature

Date

* Please contact the City of Winnipeg representative at (204) 986-7638 prior to supplying / shipping product samples.

** The City of Winnipeg Standard Construction Specifications for Underground Works can be found at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>



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3. Product Description (Attach product literature, detailed specifications and technical data)

Product Name		Model No.	Product Category <input type="checkbox"/> Water Systems <input type="checkbox"/> Wastewater Systems <input type="checkbox"/> Stormwater system <input type="checkbox"/> Specialty Equipment
Manufacturer Name		Location of Plant/Foundry	
Year Introduced	Number of Years Available	Samples Available For (Check All Applicable) <input type="checkbox"/> Viewing <input type="checkbox"/> Demonstration <input type="checkbox"/> Testing	
Product Description			

4. Product Application/Function and Special Features:

End Use Function
Features
Special Features

5. Current Approvals

Municipality	Contact Person	Phone Number
1.		
2.		
3.		

6. Compliance With Industry Standards (Must attach Proof of Certification)

Standard	Section No.	Standard	Section No.	Standard	Section No.
<input type="checkbox"/> AWWA		<input type="checkbox"/> ASTM		<input type="checkbox"/> AASHTO	
<input type="checkbox"/> OCPA		<input type="checkbox"/> WH		<input type="checkbox"/> IAPMO	
<input type="checkbox"/> NSF		<input type="checkbox"/> FM		<input type="checkbox"/> Other	
<input type="checkbox"/> CSA		<input type="checkbox"/> UL		<input type="checkbox"/> Other	

7. Temporary Product Approval Application (If applicable)

Project Title	Project File No.	Developer
Project Location	Engineering Consultant	Consultant Address
Project Description		



Vendor Name:	Vendor Location (City):	Contact Person:	Phone Number:
1.			
2.			
3.			
4.			
5.			

1.
2.
3.

<input type="checkbox"/> Full Approved	Date	<input type="checkbox"/> Temporary Approval	Date
<input type="checkbox"/> Granted	<input type="checkbox"/> Denied	<input type="checkbox"/> Granted	<input type="checkbox"/> Denied

[illegible]



AFFIDAVIT OF COMPLIANCE

I, _____ of _____
(Company Signing Officer) (Company Name)

do hereby make oath and certify that _____
(Company Name)

is carrying on business as a manufacturer of _____
(Product Name)

in the City/Town of _____
(City/Town, Province/State)

and that _____ furnished for use in the City
(Product)

of Winnipeg shall comply with all the requirements contained within the City of
Winnipeg Standard Specification for _____
(Product Name)

Specification number _____ dated _____
(City of Winnipeg Specification Number) (City of Winnipeg Specification Date)

Signed _____, at _____
(Month/Day/Year) (City/Town, Province/State)

(Signature of Signing Officer of Company)

(Signature of Witness)

(Printed Name and Title)

(Printed Name)

PRODUCTS LISTS



WATER PRODUCTS

STANDARD NUMBER	STANDARD NAME				
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS	
CoW-WM-01	POLYVINYLCHLORIDE (PVC) WATER MAIN PIPING				
	Ipex Inc.	Blue Brute	150mm through 300mm	Pipe 350mm and above may be used however it must be designed and approved by a Professional Engineer.	
	NEXT Polymers	NEXT AQUALOC	150mm through 300mm		
	Northern Pipe Products Inc.		150mm through 300mm		
	Westlake Pipe & Fittings		150mm through 300mm		
CoW-WM-02	FABRICATED POLYVINYL CHLORIDE (PVC) WATER MAIN FITTINGS				
	Galaxy Plastics		150mm through 300mm	Fittings 350mm and above may be used however it must be designed and approved by a Professional Engineer.	
	Ipex Inc.	Blue Brute	150mm through 300mm		
	Westlake Pipe & Fittings		150mm through 300mm		
CoW-WM-03	INJECTION MOULDED POLYVINYLCHLORIDE (PVC) WATER MAIN FITTINGS				
	Galaxy Plastics		150mm through 300mm	Fittings 350mm and above may be used however it must be designed and approved by a Professional Engineer.	
	Ipex Inc.	Blue Brute	150mm through 300mm		
	Westlake Pipe & Fittings (HARCO)		150mm through 300mm		
CoW-WM-04	GRAY AND DUCTILE IRON WATER MAIN FITTINGS				
	Sigma Corporation	Tyton Joint	150mm through 300mm	Fittings 350mm and above may be used however it must be designed and approved by a Professional Engineer.	
	Terminal City Iron Works (ACS) Inc	TC Tyton Fittings	150mm through 300mm		
CoW-WM-05	CAST IRON RESILIENT-SEATED GATE VALVES WITH NON-RISING STEMS				
	American AVK Co.	Series 45	150mm through 300mm		Cast iron only on valves 300mm in size and under. DI may be used provided it meets AWWA C509 minimum CI wall thickness.
	Clow Canada / Clow Valve Co.	2640	150mm through 300mm		
	Mueller Canada / Mueller Co.	2362 Series	150mm through 300mm		
CoW-WM-06	DUCTILE IRON RESILIENT-SEATED GATE VALVES WITH NON-RISING STEMS				
	American AVK Co.	Series 55	450mm through 600mm	Minimum wall thickness must be greater than the maximum wall thickness of a 150mm CI (AWWA C509) valve.	
	Clow Canada / Clow Valve Co.	2638	350mm through 1400mm		
	Mueller Canada / Mueller Co.	2361 Series	350mm through 1200mm		
CoW-WM-07	DRY-BARREL FIRE HYDRANTS				
	Clow Canada / Clow Valve Co.	M67B - Brigadier		McAvity	
	Clow Canada / Clow Valve Co.	M67B - Heritage		McAvity	
	Clow Canada / Clow Valve Co.	D67M		Concord – Premiere	
	Mueller Canada / Mueller Co.	Century		Canada Valve	
	Mueller Canada / Mueller Co.	Centurion			
	Mueller Canada / Mueller Co.	Modern Centurion			
	Mueller Canada / Mueller Co.	Super Centurion			
	Mueller Canada / Mueller Co.	B-50-B-24		Darling	
	American AVK Co.	Series 2780			

WATER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-WM-08	DUCTILE IRON WATER MAIN COUPLINGS			
	Ford Meter Box Co.	FC1	150mm through 600mm	Straight Coupling
	Ford Meter Box Co.	FC2A	150mm through 600mm	Transition Coupling
	Ford Meter Box Co.	FRC	150mm through 300mm	Reducing Coupling
	Ford Meter Box Co.	FC2W-WIN	150mm through 300mm	Wide Range Coupling
	George Fischer	Multi/Joint 3000 Plus - 3007	150mm through 600mm	Wide Range Restraint Coupling
	George Fischer	Multi/Joint 3000 Plus - 3107	150mm through 600mm	Reducing Restraint Coupling
	Mueller Canada	Maxi-Range	150mm through 300mm	Wide Range Coupling
	Robar Industries	1506	150mm through 600mm	Straight and Transition
	Robar Industries	1696-2B	150mm through 300mm	Wide Range Coupling
	Robar Industries	1506R	150mm through 600mm	Reducing Coupling
	Romac Industries	XR501	150mm through 300mm	Wide Range Coupling
	Romac Industries	501	150mm through 600mm	Straight and Transition
	Romac Industries	Aplpha	150mm through 300mm	Wide Range Coupling
	Romac Industries	Aplpha EC	150mm through 300mm	End Cap / Plug
	Romac Industries	Aplpha FC	150mm through 300mm	Flanged Coupling
	Romac Industries	Macro HP	150mm through 400mm	Wide Range Coupling
	Romac Industries	RC501	150mm through 600mm	Reducing Coupling
	Smith-Blair Inc.	Quantum 462	150mm through 300mm	Wide Range Coupling
	Smith-Blair Inc.	Omni 441	150mm through 400mm	Straight and Transition
	Smith-Blair Inc.	Omni R441	150mm through 400mm	Reducing Coupling
	Smith-Blair Inc.	Omni 482	150mm through 300mm	End Cap / Plug
CoW-WM-09	STAINLESS STEEL FULL-ENCIRCLEMENT REPAIR AND CONNECTION CLAMPS			
	Canada Pipeline Accessories	CR-1		One Section Repair Sleeve
	Canada Pipeline Accessories	CR-2		Two Section Repair Sleeve
	Canada Pipeline Accessories	CR-3		Three Section Repair Sleeve
	Clow Canada / Clow Valve Co.	Concord D76R		Repair Sleeve
	Ford Meter Box Co.	FS1		One Section Repair Sleeve
	Ford Meter Box Co.	FS2		Two Section Repair Sleeve
	Ford Meter Box Co.	FS3		Three Section Repair Sleeve
	Ford Meter Box Co.	FAST		Taping Sleeve
	Kraus Industries Ltd.	EZ-Max Plus 4000		Repair Sleeve
	Mueller Canada / Mueller Co.	H304		Taping Sleeve
	Robar Industries	5616		One Section Repair Sleeve
	Robar Industries	5626		Two Section Repair Sleeve
	Robar Industries	5636		Three Section Repair Sleeve
	Robar Industries	6606		Taping Sleeve
	Romac Industries Ltd.	SS1		One Section Repair Sleeve
	Romac Industries Ltd.	SS2		Two Section Repair Sleeve
	Romac Industries Ltd.	SS3		Three Section Repair Sleeve
	Romac Industries Ltd.	SST		Taping Sleeve
	Smith-Blair Inc.	663	150mm through 300mm	Taping Sleeve
CoW-WM-10	GALVANIC ZINC ANODES			
	Bren Technologies			Standard galvanic zinc anode weights used in the City of Winnipeg shall be
	Canada Metal			10.9 Kg and 45 Kg.
	Canada Metal (Eastern) Ltd.			
	Canada Metal (Pacific) Ltd.			
	Corrosion Services Ltd			
	Corrpro Companies, Inc.			
	Exothermal Industries			
	Interprovincial Corrosion Control Co.			
	Integrity Anode Corp			

WATER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-WM-11	GRAY AND DUCTILE IRON MUNICIPAL CASTINGS			
AP-001	Titan Foundry Ltd.	Type D		Valve Box
	Titan Foundry Ltd.			Old Style Valve Box Extension
AP-004	Titan Foundry Ltd.			Service Box Top
AP-004	Titan Foundry Ltd.	6910FP		Service Box Top with Ground Flange
AP-003	Titan Foundry Ltd.	FVS	900mm through 3650mm	Water Main Valve Stem Extension
AP-005	Waggoner Industrial Products	WIPL001		Hydrant Marker
AP-002	W.D. Industrial Group	VBS-1	900mm through 3650mm	Water Main Valve Stem Extension
	W.D. Industrial Group	WD-9		Old Style Valve Box Extension
AP-005	W.D. Industrial Group	WD-27		Hydrant Marker
AP-001	W.D. Industrial Group	WD-39		Valve Box Cover
AP-001	W.D. Industrial Group	WD-46		Valve Box
AP-001	W.D. Industrial Group	WD-46-PI		Valve Box
AP-001	W.D. Industrial Group	WD-774		Valve Box Extension
AP-002	W.D. Industrial Group	WD-775		Valve Box Extension
AP-004	W.D. Industrial Group	WD-11-W		Service Box Top
AP-001	Karoh Castings	KR001		Valve Box
AP-002	Karoh Castings	KR002		Valve Box Extension
AP-003	Karoh Castings	KR003	900mm through 3650mm	Water Main Valve Stem Extension
AP-004	Karoh Castings	KR004		Residential Service Box
AP-005	Karoh Castings	KR005		Hydrant Marker
AP-001	Sigma Corporation	VB946W-DI		Valve Box
AP-005	Wachs Canada Ltd.	Pretzel Hydrant Marker		
CoW-WM-12	CORROSION PROTECTION WRAPPING			
Standard Pending				
	Amcorr Products & Services	VISCOTAQ ViscoWrap ST		Low temperature petrolatum tape
	Amcorr Products & Services	VISCOTAQ ViscoPaste		Mastic
	Denso	LT		Low temperature petrolatum tape
	Denso	Paste		Primer
	Denso	Profiling Mastic		Mastic
	Petroguard	Tape LT		Low temperature petrolatum tape
	Petroguard	Standard Primer Paste		Primer
	Petroguard	Mastic		Mastic
	Petro Coating Systems Ltd (PCS)	Low Temp. Petrolatum Tape (LT)		Low temperature petrolatum tape
	Petro Coating Systems Ltd (PCS)	PP Series Primer Paste		Primer
	Petro Coating Systems Ltd (PCS)	PM Series Mastic		Mastic

WATER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-WS-01	COPPER WATER SERVICE PIPING			
	Cerro Copper Products	Type K	19mm through 50mm	
	Great Lakes Copper Inc.	Type K	19mm through 50mm	Formerly Wolverine Tube
	Mueller Industries, Inc.	Type K	19mm through 50mm	Formerly Halstead Metal Products
CoW-WS-02	CROSS-LINKED POLYETHYLENE (PEXa) WATER SERVICE PIPING			
	Rehau Industries	Municipex	19mm through 50mm	
CoW-WS-03	BRASS SERVICE VALVES AND FITTINGS			
	A.Y. McDonald Mfg. Co.	74701BQ	19mm through 50mm	Corporation Stop
	A.Y. McDonald Mfg. Co.	74701BQA	19mm through 50mm	Corporation Stop (Anode)
	A.Y. McDonald Mfg. Co.	76100Q	19mm through 50mm	Curb Stop
	A.Y. McDonald Mfg. Co.	74758Q	19mm through 50mm	Coupling
	Cambridge Brass	301NL-A3H3 to A7H7	19mm through 50mm	Corporation Stop
	Cambridge Brass	301NL-A3HE3 to A7HE7	19mm through 50mm	Corporation Stop (Anode)
	Cambridge Brass	202NL-H3H3 to H7H7	19mm through 50mm	Curb Stop
	Cambridge Brass	202NL-H3HE3 to H7HE8	19mm through 50mm	Curb Stop (Anode)
	Cambridge Brass	119NL-H3H3 to H7H7	19mm through 50mm	Coupling
	Ford Meter Box Co.	FB1000-3-Q-NL to FB1000-7-Q-NL	19mm through 50mm	Corporation Stop
	Ford Meter Box Co.	B44-333-Q-NL to B44-777-Q-NL	19mm through 50mm	Curb Stop
	Ford Meter Box Co.	C44-33-Q-NL to L44-77-Q-NL	19mm through 50mm	Coupling
	Mueller Canada / Mueller Co.	B-25008N	19mm through 50mm	Corporation Stop
	Mueller Canada / Mueller Co.	B-25209N	19mm through 50mm	Curb Stop
	Mueller Canada / Mueller Co.	H-15403N	19mm through 50mm	Coupling
CoW-WS-04	BRASS SERVICE SADDLE			
	Ford Meter Box Co.	S90-607	150mm	
	Ford Meter Box Co.	S90-807	200mm	
	Ford Meter Box Co.	S90-1007	250mm	
	Ford Meter Box Co.	S90-1207	300mm	
	Ford Meter Box Co.	BBAA	19mm through 38mm	Reducer Bushing
	Mueller Canada / Mueller Co.	H-13491	150mm	
	Mueller Canada / Mueller Co.	H-13492	200mm	
	Mueller Canada / Mueller Co.	H-13493	250mm	
	Mueller Canada / Mueller Co.	H-13494	300mm	
	Mueller Canada / Mueller Co.	H-10036	19mm through 38mm	Reducer Bushing
	Romac Industries Ltd.	202B	150mm through 300mm	
	Cambridge Brass	8413NL	150mm through 300mm	Integral Saddle
CoW-WS-05	RESIDENTIAL SERVICE BOX			
AP-004	Titan Foundry Ltd.	TF-CoW-B1	19mm through 25mm	CI or DI base
AP-004	Titan Foundry Ltd.	TF-CoW-B2	38mm through 50mm	CI or DI base
AP-004	Titan Foundry Ltd.	SSRWC	450mm through 2400mm	Stainless Steel Rod
AP-004	W.D. Industrial Group	SB-20-CW	19mm through 25mm	Poly base
AP-004	W.D. Industrial Group	SB-21-CW	38mm through 50mm	Poly base
AP-004	W.D. Industrial Group	WD-120	450mm through 2400mm	Stainless Steel Rod

WATER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-WS-06	BRASS ELECTRICAL CABLE ATTACHMENTS			
Standard Pending				
	Raychem Canada Ltd.	Duraseal Heat Shrink Butt Applicators		Splice Applicator
	Burndy Incorporated	C-11D	19mm through 25mm	Cast Bronze Ground Clamp
	Burndy Incorporated	C-22D	38mm through 50mm	Cast Bronze Ground Clamp
	Burndy Incorporated	various	19mm through 50mm	U Bolt Ground Clamp
	Thomas & Bretts (Blackburn)	JD	19mm through 25mm	Cast Bronze Ground Clamp
	Thomas & Bretts (Blackburn)	J2D	38mm through 50mm	Cast Bronze Ground Clamp
	Thomas & Bretts (Blackburn)	3902BU	19mm through 25mm	U Bolt Ground Clamp
	Thomas & Bretts (Blackburn)	3903BU	38mm through 50mm	U Bolt Ground Clamp
	Deblo Industries	various	19mm through 50mm	Cast Bronze Ground Clamp
	Deblo Industries	various	19mm through 50mm	U Bolt Ground Clamp

SEWER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-SM-01	POLYVINYLCHLORIDE (PVC) SEWER MAIN PIPING			
	GPK Products Inc		250mm	Cul-De-Sac pipe - 7" bend
	Ipex Inc.	Ring-Tite / Enviro-Tite / Ecolo-Tube	250mm	Cul-De-Sac - 11 ¼" and 7 ½" bends
	Ipex Inc.	Ring-Tite / Enviro-Tite / Ecolo-Tube	150mm through 900mm	SDR 35 Pipe
	NEXT Polymers	NEXT DURALOC	150mm through 450mm	SDR 35 Pipe
	NEXT Polymers	NEXT DURALOC	150mm	Cul-De-Sac pipe - 11 ¼", 22 ½", and 45"
	Northern Pipe		150mm through 675mm	SDR 35 Pipe
	Westlake Pipe & Fittings	Gasketed Sewer Pipe	150mm through 900mm	SDR 35 Pipe
	Westlake Pipe & Fittings	Gasketed Sewer Pipe	250mm	Cul-De-Sac - 11 ¼" and 7" bends
CoW-SM-02	POLYVINYLCHLORIDE (PVC) PROFILE SEWER MAIN PIPING			
	Ipex Inc.	Ultra-Rib	200mm through 600mm	Circumferential open profile
	Ipex Inc.	Perma-Loc	675mm through 900mm	Spiral open profile
	Ipex Inc.	Ultra-X2	750mm and 900mm	Dual wall profile
	Westlake Pipe & Fittings	KOR-FLO	300mm through 900mm	Dual wall profile
CoW-SM-03	REINFORCED CIRCULAR CONCRETE SEWER MAIN PIPING			
	Heidelberg Materials		300mm through 1050mm	Bell and Spigot Pipe
	Heidelberg Materials		300mm through 3000mm	Straight Wall Pipe
	Lafarge Construction Materials Inc.		300mm through 900mm	Bell and Spigot Pipe
	Lafarge Construction Materials Inc.		300mm through 2700mm	Straight Wall Pipe
	Lafarge Construction Materials Inc.		1050mm through 3000mm	Straight Wall Pipe
	Lafarge Construction Materials Inc.		900mm through 1800mm	Jacking Pipe
CoW-SM-04	NON-REINFORCED CIRCULAR CONCRETE SEWER MAIN PIPING			
	Heidelberg Materials		300mm through 600mm	Bell and Spigot Pipe
	Lafarge Construction Materials Inc.		300mm through 600mm	Bell and Spigot Pipe
CoW-SM-05	HIGH DENSITY POLYETHYLENE (HDPE) SEWER MAIN PIPING			
Standard Pending	PRODUCT IN EVALUATION AND TESTING PHASE - NO APPROVED PRODUCTS			
CoW-SM-06	CORRUGATED STEEL (CSP) OUTFALL PIPING			
Standard Pending				
	Armtec Ltd.	Hel-Cor	150mm through 2000mm	68mmx13mm Corrugations
	Armtec Ltd.	Hel-Cor	1200mm through 3600mm	125mmx25mm Corrugations
	Canada Culvert	STEELCOR	300mm through 3300mm	68mmx13mm Corrugations
	Canada Culvert	STEELCOR	1200mm through 4300mm	125mmx25mm Corrugations
CoW-SM-07	OUTFALL HEADWALL AND SAFETY COMPONENTS			
Standard Pending	NO APPROVED PRODUCTS			
CoW-SM-08	INJECTION MOULDED POLYVINYLCHLORIDE (PVC) SEWER MAIN FITTINGS			
	Galaxy Plastics Ltd.		150mm through 300mm	
	GPK Products Inc.		150mm through 900mm	
	Ipex Inc.	Ring-Tite	150mm through 200mm	
	Pro-Line Fittings Inc.		150mm through 450mm	
	Westlake Pipe & Fittings	Gasketed Sewer Fittings	150mm through 300mm	Plastic Trends
CoW-SM-09	FABRICATED POLYVINYLCHLORIDE (PVC) SEWER MAIN FITTINGS			
	Galaxy Plastics Ltd.		250mm through 600mm	
	GPK Products Inc.		150mm through 600mm	
	Ipex Inc.	Ring-Tite	250mm through 675mm	
	Pro-Line Fittings Inc.		150mm through 1200mm	
	Westlake Pipe & Fittings	Gasketed Sewer Fittings	150mm through 900mm	Plastic Trends

SEWER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-SM-10 POLYVINYLCHLORIDE (PVC) PROFILE SEWER MAIN FITTINGS				
	Galaxy Plastics Ltd.		200mm through 600mm	Circumferential
	Galaxy Plastics Ltd.		200mm through 600mm	Spiral
	Ipex Inc.	Ultra-Rib	200mm through 600mm	
	Pro-Line Fittings Inc.		200mm through 600mm	
	Westlake Pipe & Fittings		200mm through 900mm	
CoW-SM-11 POLYVINYLCHLORIDE (PVC) SEWER CONNECTION SADDLES AND STUBS				
	Galaxy Plastics Ltd.		150mm through 900mm	Strap on Saddle Tee and Wye
	Galaxy Plastics Ltd.		150mm through 1050mm	Sanded Stub
	GPK Products Inc.		150mm	Strap on Saddle Tee and Wye
	GPK Products Inc.		150mm through 900mm	Sanded Stub
	Ipex Inc.	Ring-Tite Universal	150mm through 200mm	Tap Sewer Tee
	Ipex Inc.	Ring-Tite	150mm	Strap on Saddle Tee and Wye
	Ipex Inc.	Ring-Tite	150mm through 675mm	Sanded Stub
	Pro-Line Fittings Inc.		150mm through 500mm	Strap on Saddle Tee and Wye
	Pro-Line Fittings Inc.		150mm through 600mm	Sanded Stub
	Westlake Pipe & Fittings		150mm through 400mm	Strap on Saddle Tee and Wye
	Westlake Pipe & Fittings		150mm through 300mm	Sanded Stub
CoW-SM-12 FLEXIBLE LATERAL SEWER AND MANHOLE CONNECTIONS				
	Fernco Co.	Predco Fast-Fit Sewer Tap Saddle	150mm	Tap Saddle
	Fernco Co.	Flexible Tap Saddles	150mm (TST-6 & TSW-6)	Strap on Saddle Tee and Wye
	Fernco Co.	QwikSeal	150mm and 200mm	Tap Saddle
	Hamilton Kent	Tylox® WallKore HKT	150mm and 375mm	Concrete Pipe and Manholes
	Inserta Fittings Co. (ADS)	Inserta Tee	150mm through 750mm	Tap Sewer Tee
	Inserta Fittings Co. (ADS)	Inserta Wye	150mm	Tap Sewer Wye
	Ipex Inc.	Inserta Tee	150mm through 300mm	Tap Sewer Tee
	Pro-Line Fittings Inc.	Inserta Tee	150mm through 300mm	Tap Sewer Tee
	Westlake Pipe & Fittings	Inserta Tee	150mm through 450mm	Tap Sewer Tee
	Trelleborg Pipe Seals Milford	Kor-N-Tee	150mm through 300mm	Concrete Pipe
	Trelleborg Pipe Seals Milford	Kor-N-Seal	150mm through 1300mm	Concrete Pipe and Manholes
CoW-SM-13 FLEXIBLE TRANSITION SEWER COUPLINGS				
	Dallas Specialty & Mfg Co.		150mm through 675mm	
	Fernco Connectors, Ltd.	5000 Series "RC" Couplings	150mm through 675mm	
	Mission Rubber Co.	Flex-Seal	150mm through 675mm	
	Fernco Connectors, Ltd.	Hulk Coupling	150mm through 300mm	
CoW-SM-14 PRE-CAST CONCRETE MANHOLES, CATCH BASINS AND COMPONENTS				
SD-010, SD-010D, SD-011, SD-023, SD-024, SD-025	Heidelberg Materials		750mm through 1200mm	Bases, Barrels and Riser Rings
	Lafarge Construction Materials Inc.		750mm through 1200mm	Bases, Barrels and Riser Rings
	Lafarge Construction Materials Inc.		19mm	Ladder Rungs
	Mecon Industries		19mm	Ladder Rungs
	MSU Mississauga Ltd.		19mm	Ladder Rungs

SEWER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-SM-15	POLYVINYLCHLORIDE (PVC) CATCH BASINS AND COMPONENTS			
Standard Pending	NO APPROVED PRODUCTS			
CoW-SM-16	MANHOLE AND CATCH BASIN JOINT GASKETS			
	Concrete Sealants Inc.	ConSeal CS-102		
	Concrete Sealants Inc.	ConSeal CS-231		
	Hamilton Kent	Tylox SuperSeal, Model 165	1200mm	
	Heidelberg Materials	Kent Seal #2		
	Lafarge Construction Materials	Rub'r Nek		Butyl-Nek® Joint Sealant BN109
	Strata Tech, Inc.	ST-504		Vari-Gel Injection Resin
	Strata Tech, Inc.	ST-591		Activated Oakum
	Trelleborg Pipe Seals Milford	NPC Self-Lube Gasket		
	Trelleborg Pipe Seals Milford	Bidco C-56 Sealant		
	Press-Seal Corporation	RFS (Reduced Friction Seal)		
CoW-SM-17	MANHOLE AND CATCH BASIN EXTERNAL CASINGS			
	CCI Pipeline Systems	WrapidSeal		
	Concrete Sealants Inc.	ConSeal CS-212		
	Cretex	Cretex Wrap		
	SSI Sealing Systems Inc.	Infi-Shield Gator Wrap		
	SSI Sealing Systems Inc.	Flex-Seal		
	Trelleborg Pipe Seals Milford	External Joint Wrap		
CoW-SM-18	GRAY AND DUCTILE IRON MUNICIPAL CASTINGS			
AP-015	Sigma Corporation	FG-21091		Mountable Curb Cover
AP-016	Sigma Corporation	FG-21092		Mountable Curb Frame
AP-011, AP-012	Sigma Corporation	FG-2108		Barrier Curb Frame, Cover and Inlet
AP-006, AP-007, AP-008	Sigma Corporation	MH-2104		Manhole Frame and Cover
AP-010	Sigma Corporation	MH-2104-15	38mm	Riser Rings
AP-010	Sigma Corporation	MH-2104-02	51mm	Riser Rings
AP-010	Sigma Corporation	MH-2104-25	64mm	Riser Rings
AP-010	Sigma Corporation	MH-2104-03	76mm	Riser Rings
AP-018, AP-019	Sigma Corporation	FG-2122		Modified Barrier Curb Frame and Cover
AP-006	Sigma Corporation	MH-21042-6	150mm	Manhole Frame
	Titan Foundry	TF-48	1475mm	Frame and Covers
AP-006, AP-007, AP-008	Titan Foundry	TF-101-3	76mm	Manhole Frame and Cover
AP-006, AP-007, AP-008	Titan Foundry	TF-101-6	150mm	Manhole Frame and Cover
AP-006, AP-007, AP-008	Titan Foundry	TF-101-9	230mm	Manhole Frame and Cover
AP-009	Titan Foundry	TF-101-GBEE		Beehive Cover
AP-021	Titan Foundry	TF-101-FB		Integrated Side Inlet Frame and Cover
AP-010	Titan Foundry	TF-101-38	38mm	Riser Rings
AP-010	Titan Foundry	TF-101-51	51mm	Riser Rings
AP-010	Titan Foundry	TF-101-64	64mm	Riser Rings
AP-010	Titan Foundry	TF-101-76	76mm	Riser Rings
AP-015, AP-016	Titan Foundry	TF-102		Mountable Curb Frame and Cover
AP-017	Titan Foundry	TF-102-GP		Mountable Curb Paving Cover
AP-011, AP-012	Titan Foundry	TF-103		Barrier Curb Frame, Cover and Inlet

SEWER PRODUCTS

STANDARD NUMBER	STANDARD NAME			
DRAWING NUMBER	MANUFACTURER	MODEL	SIZE	COMMENTS
CoW-SM-18 GRAY AND DUCTILE IRON MUNICIPAL CASTINGS				
AP-013, AP-014	Titan Foundry	TF-103-R		Barrier Curb Riser and Cover
AP-020	Titan Foundry	TF-108		Curb Inlet Box Cover
AP-018, AP-019	Titan Foundry	TF-122		Modified Barrier Curb Frame and Cover
AP-010	W.D. Industrial Group	WD-5	38mm	Riser Rings
AP-010	W.D. Industrial Group	WD-6	51mm	Riser Rings
AP-010	W.D. Industrial Group	WD-7	64mm	Riser Rings
AP-010	W.D. Industrial Group	WD-8	76mm	Riser Rings
AP-020	W.D. Industrial Group	WD-40		Curb Inlet Box Cover
AP-006	W.D. Industrial Group	WD-50-F		Manhole Frame
AP-008	W.D. Industrial Group	WD-50-G		Grated Manhole Cover
AP-007	W.D. Industrial Group	WD-50-S		Solid Manhole Cover
AP-015	W.D. Industrial Group	WD-55-F		Mountable Curb Frame
AP-016	W.D. Industrial Group	WD-55-I		Mountable Curb Cover
AP-011	W.D. Industrial Group	WD-59		Barrier Curb Frame
AP-011	W.D. Industrial Group	WD-59-CI		Barrier Curb Inlet
AP-012	W.D. Industrial Group	WD-59-GI		Barrier Curb Cover
AP-018, AP-019	W.D. Industrial Group	WD-216		Modified Barrier Curb Frame and Cover
AP-006	Karoh Castings	KR006		Manhole Frame
AP-007	Karoh Castings	KR007		Solid Manhole Cover
AP-008	Karoh Castings	KR008		Grated Manhole Cover
AP-010	Karoh Castings	KR010	38mm	Riser Rings
AP-011	Karoh Castings	KR011		Barrier Curb Inlet
AP-012	Karoh Castings	KR012		Barrier Curb Cover
AP-013	Karoh Castings	KR013		Barrier Curb Riser Frame
AP-014	Karoh Castings	KR014		Barrier Curb Riser Cover
AP-015	Karoh Castings	KR015		Mountable Curb Frame
AP-016	Karoh Castings	KR016		Mountable Curb Cover
AP-017	Karoh Castings	KR017		Mountable Curb Paving Cover
AP-018	Karoh Castings	KR018		Modified Barrier Curb Frame
AP-019	Karoh Castings	KR019		Modified Barrier Curb Cover
AP-020	Karoh Castings	KR020		Curb Inlet Box Cover
CoW-SM-19 COMPOSITE MUNICIPAL FRAMES AND COVERS				
Standard Pending - Composite frames and covers are not to be installed within pavement				
AP-007	W.D. Industrial Group	WD50SC		Solid Manhole Cover
AP-008	W.D. Industrial Group	WD50GC		Grated Manhole Cover
AP-006	W.D. Industrial Group	WD50FC		Manhole Frame
CoW-SM-20 CATCH BASIN HOODS				
Standard Pending				
	W.D. Industrial Group	BA112		
	State Industries Ltd.			

WATER PRODUCTS STANDARDS





STANDARD FOR
POLYVINYLCHLORIDE (PVC) WATER MAIN PIPING
STANDARD NO. CoW-WM-01

1. SCOPE

This standard applies to polyvinylchloride (PVC) water main piping approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements that applies to polyvinylchloride (PVC) water main piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard applies to polyvinylchloride (PVC) water main piping in diameters 150mm (6") through 300 mm (12") approved for use in the City of Winnipeg.

All materials must conform to the requirements of AWWA C900, CSA B137.3, NSF 14 and NSF 61.

All PVC water main pipe shall have a dimension ratio of 18 (DR18) with cast iron pipe equivalent outside diameters (CIOD) and shall have a pressure class of 1620 kPa (235psi).

All PVC water main pipe shall be blue in colour.

2.2 Standard Lengths

Standard laying lengths in the City of Winnipeg are 3.0m (10 feet) and 6.1m (20 feet), plus or minus 25mm (1").

3. MATERIALS

3.1 PVC

All PVC pipe shall be manufactured from Type I, Grade I, Polyvinyl Chloride (PVC) material with a Cell Classification of 12454-B as per ASTM D1784. Additionally all PVC pipe shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

Basic pipe materials shall be made from either:

1. virgin resin and meet the physical and chemical properties as defined in ASTM D1784 in accordance with AWWA C900, or
2. clean reworked PVC materials provided the materials are from the same manufacturer and comply with the requirements of ASTM D1784 in accordance with AWWA C900.

3.2 Gaskets and Lubricants

All gaskets intended for use with PVC pipe shall meet the requirements of AWWA C900, ASTM D3139 and CSA B137.3 for flexible joints of plastic pressure pipe. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally, the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All Gaskets shall be factory installed in the bell end of the pipe in accordance to AWWA C900. In areas of potential hydrocarbon contamination, Nitrile gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used for the assembly of PVC pipe shall be made of a non-toxic, water soluble material approved by the National Sanitation Foundation (NSF) to Standard 14 and 61 and shall be assembled in accordance with AWWA C900.

4. DESIGN

4.1 Dimension Ratio

The PVC pipe supplied to the City of Winnipeg shall conform to the dimension ratio (DR) of 18 as specified in AWWA C900-07, sec. 4.3.2.2(a).

4.2 Wall Thickness

The PVC pipe supplied to the City of Winnipeg shall have a minimum wall thickness as per CSA B137.3-09, Table 6 conforming to the dimensional ratio (DR) of 18.

Pipe Size (mm)	Min. Wall Thickness (mm)	Max. Wall Thickness (mm)
150	9.72	10.90
200	12.80	14.20
250	15.70	17.50
300	18.60	20.90

4.3 Pipe Joint Deflection

The PVC pipe supplied to the City of Winnipeg shall be designed to accommodate a pipe joint deflection of up to 3° for pipe diameters of 150mm to 250mm and 2.5° for pipe diameters of 300mm.

Pipe Size (mm)	Max. Deflection	Pipe Length (m)	Max. Offset (mm)
150	3°	6.1	314
150	3°	3.0	157
200	3°	6.1	314
200	3°	3.0	157
250	3°	6.1	314
250	3°	3.0	157
300	2.5°	6.1	297
300	2.5°	3.0	148

4.4 Elastomeric Gasket

All PVC pipe supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477 as specified in AWWA C900.

All elastomeric gaskets shall meet the performance requirements specified in ASTM D3139 in accordance with the requirements of AWWA C900.

5. MARKING

5.1 Pipe Markings

All PVC pipe supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C900. All PVC pipe shall be marked with the following identifications:

- nominal size and date code
- DR18
- Manufacturers' name or trademark
- AWWA standard number
- CSA standard number
- Certification agency trademark/seal

Additionally, the pipe shall bear certification seals or markings of the following agencies:

1. NSF (National Sanitation Foundation) to Standard 14 for Plastics Piping System Components and related materials.
2. NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

3. CSA (Canadian Standards Association) to Standard CAN3-B137.3-M86. Refer to Section 6.1 of CAN3-B137.3-M86 for marking requirements.
4. FM (Factory Mutual Research) to Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service - Class No. 1612 - April 1999. Refer to Section 3.4 of aforementioned standard for required markings.
5. UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada) for Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.

Required markings for PVC pipe supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe in accordance with AWWA C900.

5.2 Gasket Markings

Gaskets shall be marked with at least the following:

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 PVC Pipe

The PVC piping supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability as specified in AWWA C900.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of PVC C900 piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Hydrostatic proof testing shall be conducted on all pipes in accordance with AWWA C900.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

Pipe shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All PVC pipe should be stored in such a way as to mitigate ultraviolet light exposure.

The ends of each pipe shall be protected with an approved covering to reduce the possibility of foreign contaminants entering the pipe.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PVC pipe approved for use in the City of Winnipeg.

All PVC pipe should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All PVC pipe shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that Polyvinyl Chloride (PVC) piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C900 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing Polyvinyl Chloride (PVC) piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing Polyvinyl Chloride (PVC) piping for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D2837

Standard test method for obtaining hydrostatic design basis for thermoplastic pipe materials or pressure design basis for thermoplastic pipe products

ASTM D3139

Standard specification for joints for plastic pressure pipes using flexible elastomeric seals

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

AWWA C900

Polyvinyl Chloride (PVC) Pipe and Fabricated Pipe Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

NSF (National Sanitation Foundation)

Standard 14 for Plastics Piping System Components and Related Materials. Standard 61 for Drinking Water System Components - Health Effects

CSA (Canadian Standards Association)

Standard CAN3- B137.3-M90. Rigid Poly (vinyl chloride) (PVC) Pipe for Pressure Applications : Plumbing Products and Materials

FM (Factory Mutual Research)

Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service – Class No. 1612-April 1999.

UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada)

Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.



STANDARD FOR
FABRICATED POLYVINYL CHLORIDE (PVC)
WATER MAIN FITTINGS
STANDARD NO. CoW-WM-02

1. SCOPE

This standard shall apply to fabricated polyvinylchloride (PVC) water main fittings approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to fabricated PVC water main fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to fabricated PVC water main fittings in diameters 150mm (6") and larger approved for use in the City of Winnipeg.

All fabricated PVC water main fittings shall provide either;

- a division of flow (tees and crosses),
- an axial change in direction (bends),
- a reduction in pipe size (reducers), or

All materials shall conform to the requirements of AWWA C900, NSF 14 and NSF 61.

All fabricated PVC water main fittings shall have a dimension ratio of 18 (DR18) with cast iron pipe equivalent outside diameters (CIOD) and shall have a pressure class of 1620 kPa (235psi).

All fabricated PVC water main fittings shall be blue in colour.

3. MATERIALS

3.1 PVC

All fabricated PVC water main fittings shall be manufactured from Type I, Grade I, Polyvinyl Chloride (PVC) material with a Cell Classification of 12454-B as per

ASTM D1784. Additionally all fabricated PVC water main fittings shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

Basic fitting materials shall be made from virgin resin and meets the physical and chemical properties as defined in ASTM D1784 in accordance with AWWA C907.

Clean reworked PVC materials may be used provided the materials are from the same manufacturer and comply with the requirements of ASTM D1784 in accordance with AWWA C907.

3.2 Gaskets and Lubricants

All gaskets intended for use with fabricated PVC water main fittings shall meet the requirements of AWWA C907, ASTM D3139 and CSA B137.2 for flexible joints of plastic pressure pipe. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All Gaskets shall be factory installed in the bell end of the fitting in accordance with AWWA C907. In areas of potential hydrocarbon contamination Nitrile gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used for the assembly of fabricated PVC water main fittings shall be made of an approved non-toxic, water soluble material approved by the National Sanitation Foundation (NSF) to Standard 14 and 61 and shall be assembled in accordance with AWWA C907.

3.3 Overwrap Reinforcement and Resin

Fabricated fittings shall be overwrapped with fiberglass-reinforced-polyester and conform to the requirements of AWWA C900 and CSA B137.3. There shall be no overwrap reinforcement on the bells of the fittings, to facilitate and provide no hindrance in the use of mechanical joint restraint. If bends are one continuous piece of pipe, manufactured by bending the pipe, overwrapping shall not be required.

Resin shall be commercial grade unsaturated polyester resin and be compatible with the fiberglass reinforcing.

4. DESIGN

4.1 Dimension Ratio

The fabricated PVC water main fittings supplied to the City of Winnipeg shall conform to the dimension ratio (DR) of 18 as specified in AWWA C907.

4.2 Wall Thickness

The fabricated PVC water main fittings supplied to the City of Winnipeg shall have a minimum wall thickness as per AWWA C907, Figure 1 through 18 and Tables 1 through 18.

4.3 Elastomeric Gasket

All fabricated PVC water main fittings supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477 as specified in AWWA C907.

All elastomeric gaskets shall meet the performance requirements specified in ASTM D3139 in accordance with the requirements of AWWA C907.

5. MARKING

5.1 Fittings Markings

All fabricated PVC water main fittings supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C907. All fabricated PVC water main fittings shall be marked with the following identifications:

- nominal size including branch sizes
- deflection angle of bends
- pressure class / DR18
- Date code
- Manufacturers' name or trademark
- AWWA C907
- Certification agency trademark/seal

Additionally, the fittings shall bear certification seals or markings of the following agencies:

1. NSF (National Sanitation Foundation) to Standard 14 for Plastics Piping System Components and related materials.
2. NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.
3. CSA (Canadian Standards Association) to Standard CAN/CSA-B137.3-M86. Refer to Section 6.1 for marking requirements.
4. FM (Factory Mutual Research) to Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service - Class No. 1612 - April 1999. Refer to Section 3.4 of aforementioned standard for required markings.
5. UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada) for Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.

Required marking for fabricated PVC water main fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe in accordance with AWWA C907.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Fabricated PVC Water Main Fittings

The fabricated PVC water main fittings supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability as specified in AWWA C907.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of fabricated PVC water main fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years as described in AWWA C907.

7. PACKAGING

Fittings shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All fabricated PVC water main fittings should be stored in such a way as to mitigate ultraviolet light exposure.

The ends of each fitting shall be protected with an approved covering to reduce the possibility of foreign contaminants entering the fitting.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the fabricated PVC water main fittings approved for use in the City of Winnipeg.

All fabricated PVC water main fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All fabricated PVC water main fittings shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that fabricated PVC water main fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C907 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing fabricated PVC water main fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing fabricated PVC water main fittings for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D2837

Standard test method for obtaining hydrostatic design basis for thermoplastic pipe materials or pressure design basis for thermoplastic pipe products

ASTM D3139

Standard specification for joints for plastic pressure pipes using flexible elastomeric seals

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

AWWA C900

Polyvinyl Chloride (PVC) Pipe and Fabricated Pipe Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

AWWA C907

Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

NSF (National Sanitation Foundation)

Standard 14 for Plastics Piping System Components and Related Materials.

Standard 61 for Drinking Water System Components - Health Effects

CSA (Canadian Standards Association)

Standard CAN/CSA-B137.3 Rigid Poly (vinyl chloride) (PVC) Pipe for Pressure Applications : Plumbing Products and Materials

Standard CAN/CSA-B137.2 PVC Injection-Moulded Gasketed Fittings for Pressure Applications



STANDARD FOR
INJECTION MOULDED
POLYVINYLCHLORIDE (PVC) WATER MAIN FITTINGS
STANDARD NO. CoW-WM-03

1. SCOPE

This standard shall apply to injection moulded polyvinylchloride (PVC) water main fittings approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to injection moulded PVC water main fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to injection moulded PVC water main fittings in diameters 150mm (6") and larger approved for use in the City of Winnipeg.

All injection moulded PVC water main fittings shall provide either;

- a restoration of flow (repairs),
- a distribution of flow (tapping),
- a division of flow (tees and crosses),
- an axial change in direction (bends),
- a reduction in pipe size (reducers), or
- a stoppage of flow (plugs and caps).

All materials shall conform to the requirements of AWWA C907, NSF 14 and NSF 61.

All injection moulded PVC water main fittings shall have a dimension ratio of 18 (DR18) with cast iron pipe equivalent outside diameters (CIOD) and shall have a pressure class of 1620 kPa (235psi).

All injection moulded PVC water main fittings shall be blue in colour.

3. MATERIALS

3.1 PVC

All injection moulded PVC water main fittings shall be manufactured from Type I, Grade I, Polyvinyl Chloride (PVC) material with a Cell Classification of 12454-B as per ASTM D1784. Additionally all injection moulded PVC water main fittings

shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

Basic fitting materials shall be made from virgin resin and meets the physical and chemical properties as defined in ASTM D1784 in accordance with AWWA C907.

Clean reworked PVC materials may be used provided the materials are from the same manufacturer and comply with the requirements of ASTM D1784 in accordance with AWWA C907.

3.2 Gaskets and Lubricants

All gaskets intended for use with injection moulded PVC water main fittings shall meet the requirements of AWWA C907, ASTM D3139 and CSA B137.2 for flexible joints of plastic pressure pipe. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All Gaskets shall be factory installed in the bell end of the fitting in accordance with AWWA C907. In areas of potential hydrocarbon contamination Nitrile gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used for the assembly of injection moulded PVC water main fittings shall be made of an approved non-toxic, water soluble material approved by the National Sanitation Foundation (NSF) to Standard 14 and 61 and shall be assembled in accordance with AWWA C907.

4. DESIGN

4.1 Dimension Ratio

The injection moulded PVC water main fittings supplied to the City of Winnipeg shall conform to the dimension ratio (DR) of 18 as specified in AWWA C907.

4.2 Wall Thickness

The injection moulded PVC water main fittings supplied to the City of Winnipeg shall have a minimum wall thickness as per AWWA C907, Figure 1 through 18 and Tables 1 through 18.

4.3 Elastomeric Gasket

All injection moulded PVC water main fittings supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477 as specified in AWWA C907.

All elastomeric gaskets shall meet the performance requirements specified in ASTM D3139 in accordance with the requirements of AWWA C907.

5. MARKING

5.1 Fittings Markings

All injection moulded PVC water main fittings supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C907. All injection moulded PVC water main fittings shall be marked with the following identifications:

- nominal size including branch sizes
- deflection angle of bends
- pressure class / DR18
- Date code
- Manufacturers' name or trademark
- AWWA C907
- Certification agency trademark/seal

Additionally, the fittings shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 14 for Plastics Piping System Components and related materials.
- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.
- CSA (Canadian Standards Association) to Standard CAN/CSA-B137.3-M86. Refer to Section 6.1 for marking requirements.
- FM (Factory Mutual Research) to Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service - Class No. 1612 - April 1999. Refer to Section 3.4 of aforementioned standard for required markings.
- UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada) for Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.

Required marking for injection moulded PVC water main fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe in accordance with AWWA C907.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Injection Moulded PVC Water main Fittings

The injection moulded PVC water main fittings supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability as specified in AWWA C907.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of injection moulded PVC water main fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years as described in AWWA C907.

7. PACKAGING

Fittings shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All injection moulded PVC water main fittings should be stored in such a way as to mitigate ultraviolet light exposure.

The ends of each fitting shall be protected with an approved covering to reduce the possibility of foreign contaminants entering the fitting.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the injection moulded PVC water main fittings approved for use in the City of Winnipeg.

All injection moulded PVC water main fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All injection moulded PVC water main fittings shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that injection moulded PVC water main fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C907 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing injection moulded PVC water main fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing injection moulded PVC water main fittings for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D2837

Standard test method for obtaining hydrostatic design basis for thermoplastic pipe materials or pressure design basis for thermoplastic pipe products

ASTM D3139

Standard specification for joints for plastic pressure pipes using flexible elastomeric seals

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

AWWA C900

Polyvinyl Chloride (PVC) Pipe and Fabricated Pipe Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

AWWA C907

Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

NSF (National Sanitation Foundation)

Standard 14 for Plastics Piping System Components and Related Materials.

Standard 61 for Drinking Water System Components - Health Effects

CSA (Canadian Standards Association)

Standard CAN/CSA-B137.3 Rigid Poly (vinyl chloride) (PVC) Pipe for Pressure Applications : Plumbing Products and Materials

Standard CAN/CSA-B137.2 PVC Injection-Moulded Gasketed Fittings for Pressure Applications

FM (Factory Mutual Research)

Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service – Class No. 1612-April 1999.

UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada)

Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.



STANDARD FOR
GRAY AND DUCTILE IRON WATER MAIN FITTINGS
STANDARD NO. CoW-WM-04

1. SCOPE

This standard shall apply to all main line gray and ductile iron water main fittings for use with PVC water main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to gray and ductile iron water main fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all main line gray and ductile iron water main fittings for use with PVC water main piping in nominal diameters 150mm (6") through to 500mm (20").

All main line iron fittings shall provide either;

- a division of flow (tees and crosses),
- an axial change in direction (bends),
- a reduction in pipe size (reducers), or
- a stoppage of flow (plugs and caps).

Main line iron water main fittings approved for use in the City of Winnipeg shall conform to AWWA C110, National Sanitation Foundation (NSF) 61 and the requirements of this standard.

3. MATERIALS

3.1 Gray Iron

Material for gray iron water main fittings shall conform to ASTM A48 class 30B as a minimum and ASTM A48 class 35B where specified in AWWA C110.

3.2 Ductile Iron

Material for ductile iron water main fittings shall conform to ASTM A536, grade 70-50-05 as a minimum.

3.3 Gaskets

The gasket material shall also meet and/or exceed the requirements of AWWA C111 for elastomeric seals. Additionally the manufacturer shall provide

complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

In areas of potential hydrocarbon contamination Nitrile gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used for the assembly shall be made of an approved non-toxic, water soluble material approved by the NSF to Standard 61.

3.4 Coatings and Linings

The interior and exterior of each water main fitting shall receive a fusion-bonded epoxy coating meeting or exceeding the requirements of AWWA C116 or an equal approved by The City of Winnipeg.

Minimum dry film thickness for the fusion-bonded epoxy shall be determined by the method described in AWWA C116.

The coating shall conform to the health requirements of NSF 61 and be certified by NSF International, Underwriters Laboratories Inc., Underwriters' Laboratories of Canada, or another third party certification body acceptable to the City of Winnipeg.

4. DESIGN

4.1 Dimensions

All gray and ductile iron water main fittings shall conform to the dimensional requirements of AWWA C110 for nominal sizes 150mm (6") through to 500mm (20"). The dimensions cited shall have a tolerance conforming to AWWA C110.

4.2 Gasketed Push-On Joints

Gray and ductile iron water main fittings shall incorporate gasketed push-on joints as defined in AWWA C111. The push-on joint dimensions shall conform to AWWA C111, and shall accommodate AWWA C900 or AWWA C905 CIOD PVC water pipe for all combinations of joint and gasket tolerances. Gasketed push-on joints for gray or ductile iron water main fittings shall conform to the performance requirements of AWWA C111.

4.3 Lugs for Restraining Devices

Each push-on joint shall have lugs molded on the outside of the bell, suitable for the installation of a joint restraint device. Joints shall have the number of lugs indicated in the chart below and be cast on the bell in accordance with Drawing No. FIT-1

Pipe Size (mm)	Pipe Size (in)	No. Lugs
150	6	2
200	8	2
250	10	2
300	12	2
350	14	6
400	16	6
450	18	8
500	20	8

4.4 Pressure Rating

All gray iron water main fittings 150mm (6") through to 300mm (12") in size shall be rated for a 250 psi (1725 kPa) working pressure.

All gray iron water main fittings 350mm (14") through to 500mm (20") in size shall be rated for a 150 psi (1035 kPa) working pressure.

All ductile iron water main fittings shall be rated for a 350 psi (2413 kPa) working pressure.

5. MARKING

5.1 Fitting Markings

All gray and ductile iron water main fittings supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C110. All gray and ductile iron water main fittings shall be marked with the following identifications:

- Nominal size including branch sizes
- Pressure rating
- Deflection angle of bends
- Manufacturers' name or trademark
- Country of origin
- AWWA C110

Additionally, the fittings shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for ductile iron water main fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting in accordance with AWWA C110.

5.2 Gasket Markings

Each gasket shall bear markings in accordance with AWWA C111.

- Nominal diameter
- Mold number
- Manufacturers' name or trademark
- Country of origin
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gaskets have been substitute with Nitrile gaskets the gaskets shall bear all the markings mentioned above as well as the name of the material.

6. WORKMANSHIP AND FINISH

6.1 Fittings Body

All gray and ductile iron water main fittings shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair serviceability.

The joint surfaces shall be free of any injurious defects that may cause leakage. The fittings shall be as uniform as commercially practical in all physical properties.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of gray and ductile iron water main fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;

- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All gray or ductile iron water main fittings shall be packaged so as to prevent damage during shipping and handling.

The gaskets for gray or ductile iron water main fittings shall be packaged separately in opaque containers and stored indoors.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the gray and ductile iron water main fittings approved for use in the City of Winnipeg.

All gray and ductile iron water main fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the gray and ductile iron water main fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C1100 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing gray and ductile iron water main fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing gray and ductile iron water main fittings for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

AWWA C110

Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids

AWWA C111

Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

AWWA C116

Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service

AWWA C900

Polyvinyl Chloride (PVC) Pipe and Fabricated Pipe Fittings, 4 in. Through 12 in. (100mm Through 300mm), for Water Distribution.

CSA (Canadian Standards Association)

Standard CAN3-Z299.3 - Quality Assurance Program - Category 3

FM (Factory Mutual Research)

Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service – Class No. 1612-April 1999.

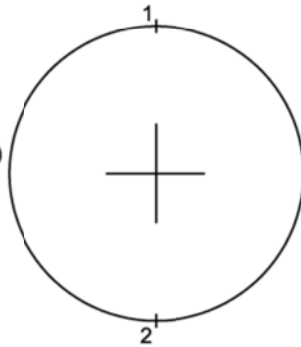
NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects

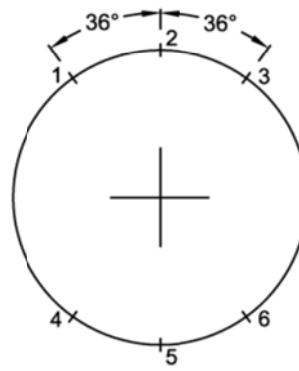
UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada)

Polyvinyl Chloride Pipe and Fittings for Underground Fire Service Systems.

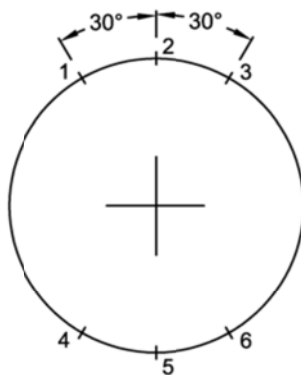
150mm (6"), 200mm (8"),
250mm (10") & 300mm (12")
FITTINGS
2 LUGS



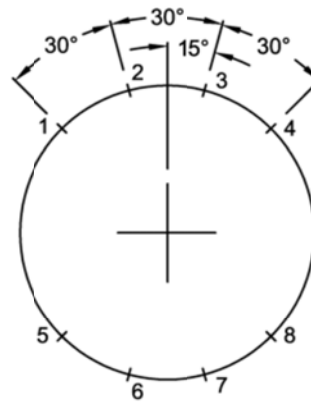
350mm (14") FITTINGS
6 LUGS



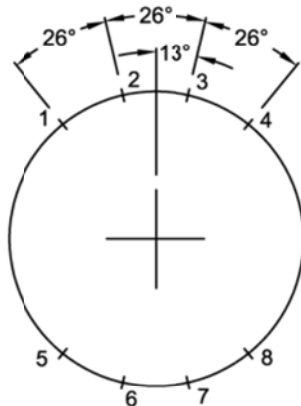
400mm (16") FITTINGS
6 LUGS



450mm (18") FITTINGS
8 LUGS



500mm (20") FITTINGS
8 LUGS



NOTE: LUGS ARE TO BE ALONG THE HORIZONTAL PLANE WHEN THE FITTING IS IN SERVICE

NOTE: ALL ANGULAR DIMENSIONS ARE TO THE CENTER LINE OF THE LUGS

The City Of Winnipeg **Water & Waste Department**

NUMBER OF LUGS
REQUIRED FOR CI & DI
WATERMAIN FITTINGS

Designed By:

Drawn By:

DB

Scale:

N.T.S.

Checked By:

Date:

December 2003

Drawing No.

Approved:

FIT-1



STANDARD FOR
CAST IRON RESILIENT-SEATED GATE VALVES
WITH NON-RISING STEMS
STANDARD NO. CoW-WM-05

1. SCOPE

This standard shall apply to all Cast Iron (CI) Resilient Seated Gate Valves (RSGVs) with non-rising stems (NRS) for use with water main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to the CI RSGVs purchased by the City.

2. Requirements

2.1. General

This standard shall apply to all CI RSGVs for use with water main piping in nominal diameters 150mm (6") through to 300mm (12").

All CI RSGVs shall;

- provide a full port flow path that passes completely through the valve with a minimum inside diameter equal to the nominal size of the water main. The port shall be unobstructed and there shall not be any reduction in the port diameter when the valve is in the completely open position,
- be capable of operating satisfactorily with flows in either direction and shall provide zero leakage past the seat when in the completely closed position,
- be suitable for direct burial with frequent operation as well as for long periods of inactivity without impairment to the operation of the valve.

All CI RSGVs approved for use in the City of Winnipeg shall conform to AWWA C509, the National Sanitation Foundation (NSF) 61 and the requirements of this standard.

3. MATERIALS

3.1. Cast Iron

All components manufactured from cast iron (CI) shall conform to ASTM A126, class B as a minimum.

3.2. Ductile Iron

All components manufactured from ductile iron (DI) shall conform to ASTM A536, grade 64-45-12 as a minimum.

3.3. Stainless Steel

All components manufactured from stainless steel (SS) shall conform to ASTM A582, type 316 as a minimum. Additionally all SS bolts and nuts shall be manufactured to ASTM F593 and F594 respectively.

3.4. Copper Alloys

All components manufactured from copper alloys shall conform to the following;

- Manganese bronze, UNS C76700 as per ASTM B283 or better.
- Red Brass, UNS C83600 as per ASTM B62.
- Any brass components which come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520, C89833 or C89836 with a maximum lead content of .25% by weight and conform to the NSF/ANSI Standard 61 and NSF/ANSI Standard 372 requirements for low lead brass.

All copper alloy components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.5. O-Rings, Gaskets and Seals

The O-rings, gaskets and seals shall be made from either styrene-butadiene-rubber (SBR), Buna N nitrile rubber (NBR) or EPDM rubber compound.

Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All gaskets, seals and O-rings which come in contact with potable water must meet the requirements of NSF/ANSI Standard 61 as a minimum.

3.6. Coatings and Linings

The interior and exterior of each CI RSGV shall receive a fusion-bonded epoxy coating meeting or exceeding the requirements of AWWA C550 or an equal approved by The City of Winnipeg.

Minimum dry film thickness for the fusion-bonded epoxy shall be determined by the method described in AWWA C550.

The coating shall conform to the health requirements of NSF 61 and be certified by NSF International, Underwriters Laboratories Inc., Underwriters' Laboratories

of Canada, or another third party certification body acceptable to the City of Winnipeg.

3.7. Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

All CI RSGVs shall be fabricated with non-rising stems and shall operate as per SD-008, Location Map for Watermain Valve Closing Direction, of the City of Winnipeg Standard Construction Specifications.

In the open position all CI RSGV shall provide a smooth and unobstructed waterway at least equal to the nominal diameter of the valve. In the close position all CI RSGV shall be designed to hold a minimum 1724 KPa (250 psi) test pressure with no visible signs of leakage.

All CI RSGV shall be designed in such a way that there is no sediment accumulating sections within the valve.

Unless specified otherwise all CI RSGV shall have push on type joints compatible with the class and category of pipe to which it is intended to connect with.

4.1 Stuffing Box, Bonnet and Body

The stuffing box, bonnet and body of the RSGV shall be manufactured of cast iron (CI) as per Section 3 of this standard.

The stuffing box, bonnet and body of the RSGV may be manufactured of ductile iron (DI) as per Section 3 of this standard provided they meet the minimum wall thickness requirements as specified in AWWA C509.

The cross-section of the body and bonnet of all RSGV must meet the minimum wall thickness requirements as specified in AWWA C509 for valves 150mm through to 300mm.

The interior and exterior surfaces of the stuffing box, bonnet and body of the RSGV shall be fusion-bonded epoxy coated as specified in section 3.7 of this standard.

4.2 Operating Nut

The operating nut shall be manufactured of either cast iron (CI) or ductile iron (DI) as per Section 3 of this standard and SD-008.

The operating nut shall be a 50mm square nut with arrow cast into the CI or DI to indicate opening direction. The operating nut shall be attached to the stem with a recessed 316 SS bolt.

4.3 Operating Stem

The operating stem shall be non-rising and manufactured of bronze as per Section 3.4 of this standard. Stainless steel valve stems may be considered as an alternate to brass provided they meet Section 3.3 of this standard.

The operating stem shall be one piece equipped with three separate and independent O-ring grooves, each with its own O-ring to provide an independent, triple O-ring seal on the operating stem.

4.4 Wedge

The wedge shall be manufactured from either cast iron as per sec. 3.2 or ductile iron as per sec. 3.3 of this standard. The wedge when installed in the closed position shall be designed to hold a minimum 1724 KPa test pressure with no visible signs of leakage.

The wedge shall be encapsulated in either SBR, NBR or EDPM rubber and must meet the requirements of NSF/ANSI Standard 61 as a minimum.

5. MARKING

5.1 Markings

All CI RSGVs supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C509. All CI RSGVs shall be marked with the following identifications:

- Manufacturers' name or trademark,
- Manufacturing date,
- Valve size,
- Direction of opening,
- Working pressure,
- AWWA C509.

Additionally, the coupling shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for CI RSGVs supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality and operation of the fitting.

5.2 Gasket Markings

Each gasket shall bear the following markings:

- Mold number
- Manufacturers' name or trademark
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gasket have been substitute with nitrile-butadiene-rubber (NBR) gasket the gasket shall bear all the markings mentioned above as well as the name of the material.

5.3 Bolts

The head end of each bolt shall bear a recognized abbreviation or symbol representing the bolt manufacturer as well as the stainless steel grade.

6. WORKMANSHIP AND FINISH

6.1 Body and Epoxy Coating

All CI RSGVs shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair operation and serviceability.

6.2 O-Rings, Gaskets and Seals

All O-Rings, Gaskets and Seals shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of CI RSGVs for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;

- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All CI RSGVs shall be packaged so as to prevent damage during shipping and handling.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the CI RSGVs approved for use in the City of Winnipeg.

All CI RSGVs should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the CI RSGVs furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C509 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing CI RSGVs for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing CI RSGVs for use in the City of Winnipeg.

11. REFERENCES

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM A126

Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A536

Standard Specification for Ductile Iron Castings

ASTM A582

Standard Specification for Free-Machining Stainless Steel Bars

ASTM F593

Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F594

Standard Specification for Stainless Steel Nuts

AWWA C509

Resilient-Seated Gate Valves for Water Supply Service

AWWA C550

Protective Epoxy Interior Coatings for Valves and Hydrants

CSA Standard CAN3-Z299.3

Quality Assurance Program - Category 3

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects



STANDARD FOR

DUCTILE IRON RESILIENT-SEATED GATE VALVES

WITH NON-RISING STEMS

STANDARD NO. CoW-WM-06

1. SCOPE

This standard shall apply to all Ductile Iron (DI) Resilient Seated Gate Valves (RSGVs) with non-rising stems (NRS) for use with water main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to the DI RSGVs purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all DI RSGVs for use with water main piping in nominal diameters 350mm (14") through to 1400mm (54").

All DI RSGVs shall;

- provide a full port flow path that passes completely through the valve with a minimum inside diameter equal to the nominal size of the water main. The port shall be unobstructed and there shall not be any reduction in the port diameter when the valve is in the completely open position,
- be capable of operating satisfactorily with flows in either direction and shall provide zero leakage past the seat when in the completely closed position,
- be suitable for direct burial with frequent operation as well as for long periods of inactivity without impairment to the operation of the valve.

All DI RSGVs approved for use in the City of Winnipeg shall conform to AWWA C515, the National Sanitation Foundation (NSF) 61 and the requirements of this standard.

3. MATERIALS

3.1 Ductile Iron

All components manufactured from ductile iron (DI) shall conform to ASTM A536, grade 64-45-12 as a minimum

3.2 Cast Iron

All components manufactured from cast iron (CI) shall conform to ASTM A126, class B as a minimum.

3.3 Stainless Steel

All components manufactured from stainless steel (SS) shall conform to ASTM A582, type 316 as a minimum. Additionally all SS bolts and nuts shall be manufactured to ASTM F593 and F594 respectively.

3.4 Copper Alloys

All components manufactured from copper alloys shall conform to the following;

- Manganese bronze, UNS C76700 as per ASTM B283 or better.
- Red Brass, UNS C83600 as per ASTM B62.
- Any brass components which come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520, C89833 or C89836 with a maximum lead content of .25% by weight and conform to the NSF/ANSI Standard 61 and NSF/ANSI Standard 372 requirements for low lead brass.

All copper alloy components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.5 O-rings, Gaskets and Seals

The O-rings, gaskets and seals shall be made from either styrene-butadiene-rubber (SBR), Buna N nitrile rubber (NBR) or EPDM rubber compound.

Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All gaskets, seals and O-rings which come in contact with potable water must meet the requirements of NSF/ANSI Standard 61 as a minimum.

3.6 Coatings and Linings

The interior and exterior of each DI RSGV shall receive a fusion-bonded epoxy coating meeting or exceeding the requirements of AWWA C550 or an equal approved by The City of Winnipeg.

Minimum dry film thickness for the fusion-bonded epoxy shall be determined by the method described in AWWA C550.

The coating shall conform to the health requirements of NSF 61 and be certified by NSF International, Underwriters Laboratories Inc., Underwriters' Laboratories

of Canada, or another third party certification body acceptable to the City of Winnipeg.

3.7 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

All DI RSGVs shall be fabricated with non-rising stems and shall operate as per SD-008, Location Map for Watermain Valve Closing Direction, of the City of Winnipeg Standard Construction Specifications.

In the open position all DI RSGV shall provide a smooth and unobstructed waterway at least equal to the nominal diameter of the valve. In the close position all DI RSGV shall be designed to hold a minimum 1724 KPa (250 psi) test pressure with no visible signs of leakage.

All DI RSGV shall be designed in such a way that there is no sediment accumulating sections within the valve.

Unless specified otherwise all DI RSGV shall have push on type joints compatible with the class and category of pipe to which it is intended to connect with.

4.1 Stuffing Box, Bonnet and Body

The stuffing box, bonnet and body of the RSGV shall be manufactured of ductile iron (DI) as per Section 3 of this standard.

The cross-section of the body and bonnet must meet the minimum wall thickness requirements as specified in AWWA C515 for valves 350mm through to 1400mm.

The interior and exterior surfaces of the stuffing box, bonnet and body of the RSGV shall be fusion-bonded epoxy coated as specified in section 3.7 of this standard.

4.2 Operating Nut

The operating nut shall be manufactured of either cast iron (CI) or ductile iron (DI) as per Section 3 of this standard and SD-008.

The operating nut shall be a 50mm square nut with arrow cast into the CI or DI to indicate opening direction. The operating nut shall be attached to the stem with a recessed 316 SS bolt.

4.3 Operating Stem

The operating stem shall be non-rising and manufactured of bronze as per Section 3.4 of this standard. Stainless steel valve stems may be considered as an alternate to brass provided they meet Section 3.3 of this standard.

The operating stem shall be one piece equipped with three separate and independent O-ring grooves, each with its own O-ring to provide an independent, triple O-ring seal on the operating stem.

4.4 Wedge

The wedge shall be manufactured from either cast iron as per sec. 3.2 or ductile iron as per sec. 3.3 of this standard. The wedge when installed in the closed position shall be designed to hold a minimum 1724 KPa test pressure with no visible signs of leakage.

The wedge shall be encapsulated in either, SBR, NBR or EDPM rubber and must meet the requirements of NSF/ANSI Standard 61 as a minimum.

5. MARKING

5.1 Markings

All CI RSGVs supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C515. All DI RSGVs shall be marked with the following identifications:

- Manufacturers' name or trademark,
- Manufacturing date,
- Valve size,
- Direction of opening,
- Working pressure,
- AWWA C515.

Additionally, the coupling shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for DI RSGVs supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality and operation of the fitting.

Gasket Markings

Each gasket shall bear the following markings:

- Mold number
- Manufacturers' name or trademark
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gasket have been substitute with nitrile-butadiene-rubber (NBR) gasket the gasket shall bear all the markings mentioned above as well as the name of the material.

5.2 Bolts

The head end of each bolt shall bear a recognized abbreviation or symbol representing the bolt manufacturer as well as the stainless steel grade.

6. WORKMANSHIP AND FINISH

6.1 Body and Epoxy Coating

All DI RSGVs shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair operation and serviceability.

6.2 O-Rings, Gaskets and Seals

All O-Rings, Gaskets and Seals shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of DI RSGVs for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;

- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All DI RSGVs shall be packaged so as to prevent damage during shipping and handling.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the DI RSGVs approved for use in the City of Winnipeg.

All DI RSGVs should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the DI RSGVs furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C515 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing DI RSGVs for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing DI RSGVs for use in the City of Winnipeg.

11. REFERENCES

ASTM D2000
Standard Classification System for Rubber Products in Automotive Applications

ASTM A126

Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A536

Standard Specification for Ductile Iron Castings

ASTM A582

Standard Specification for Free-Machining Stainless Steel Bars

ASTM F593

Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F594

Standard Specification for Stainless Steel Nuts

AWWA C515

Reduced-Wall, Resilient-Seated Gate Valves for. Water Supply Service

AWWA C550

Protective Epoxy Interior Coatings for Valves and Hydrants

CSA Standard CAN3-Z299.3

Quality Assurance Program - Category 3

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects



STANDARD FOR
DRY-BARREL FIRE HYDRANTS
STANDARD NO. CoW-WM-07

1. SCOPE

This standard shall apply to all dry-barrel fire hydrants approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to the dry-barrel fire hydrants purchased by the City.

2. REQUIREMENTS

2.1 General

All City of Winnipeg fire hydrants shall;

- be of the compression type, post style, dry-barrel design with a centre operating stem,
- be supplied for standard bury depths of 2.5m (8') to 3.0m (10') as outlined in the City of Winnipeg Standard Construction Specifications Drawing No. SD-006.
- be of the non-draining type, where drain outlets exist as a standard factory feature the outlets shall be plugged,
- be suitable for direct burial with frequent operation as well as for long periods of inactivity without impairment to the operation of the hydrant.

All dry-barrel fire hydrants approved for use in the City of Winnipeg shall conform to AWWA C502, the Manitoba Fire Code, the National Sanitation Foundation (NSF) 14, 61 and 372 and the requirements of this standard.

3. MATERIALS

3.1 Ductile Iron

All components manufactured from ductile iron (DI) shall conform to ASTM A536, grade 64-45-12 as a minimum.

3.2 Cast Iron

All components manufactured from cast iron (CI) shall conform to ASTM A126, class B as a minimum.

3.3 Stainless Steel

All components manufactured from stainless steel (SS) shall conform to ASTM A582, type 316 as a minimum. Additionally all SS bolts and nuts shall be manufactured to ASTM F593 and F594 respectively.

3.4 Steel

All components manufactured from steel shall conform to ASTM A-576 as a minimum.

3.5 Copper Alloys

All components manufactured from copper alloys shall conform to the following;

- Manganese bronze, UNS C76700 as per ASTM B283,
- Bismuth tin bronze, UNS C89833 as per ASTM B584,
- Red brass, UNS C83600 as per ASTM B584.
- Any brass components which come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520, C89833 or C89836 with a maximum lead content of .25% by weight and conform to the NSF/ANSI Standard 61 and NSF/ANSI Standard 372 requirements for low lead brass.

All copper alloy components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.6 O-rings, Gaskets and Seals

The O-rings, gaskets and seals shall be made from either styrene-butadiene-rubber (SBR), Buna N nitrile rubber (NBR) or EPDM rubber compound.

Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All gaskets, seals and O-rings which come in contact with potable water must meet the requirements of NSF/ANSI Standard 61 as a minimum.

3.7 Coatings and Linings

All coating and linings shall meet or exceed the current requirements of AWWA C550 or be an equal approved by The City of Winnipeg.

The upper exposed section of the hydrant shall be thoroughly cleaned and painted with a prime coat of a rust inhibitive primer followed by a 10 mil DFT shop coat of heavy duty alkyd enamel paint. The paint color shall be red, similar to hexadecimal color code #ce2029, comprised of 80.78% red, 12.55% green and 16.08% blue.

Exposed exterior surfaces below the ground line shall be coated with asphalt coating as per AWWA C502.

All interior surfaces of the hydrant which may come into contact with potable water shall be coated with an epoxy coating conforming to AWWA C502 and to the health requirements of NSF/ANSI Standard 61. The coating shall be certified by NSF International, Underwriters Laboratories Inc., Underwriters' Laboratories of Canada, or another third party certification body acceptable to the City of Winnipeg.

The hydrant shoe and connecting gland shall be lined and coated with a black fusion-bonded epoxy in accordance with AWWA C116.

3.8 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

All dry-barrel fire hydrants shall be designed for a minimum working pressure of 1034 kPa (150 psi) and hydrostatically tested at a minimum 2068 kPa (300 psi) or twice the rated working pressure, whichever is greater and to the methods described in AWWA C502.

All dry-barrel fire hydrants shall be fabricated to operate so that during operation a clockwise (left hand) rotation shall close the valve and counterclockwise (right hand) rotation shall open the valve.

All dry-barrel fire hydrants shall be designed in such a way so that in the event of damage to the hydrant the valve will remain closed and there shall be no visible signs of leakage. Additionally the upper section of the body and stem shall be designed with break-away features which will minimize the damage to the hydrant as well as prevent damaged sections of the hydrant from dropping into the lower barrel where they could impact valve performance.

All dry-barrel fire hydrants shall have an internal lubrication system which shall work automatically each time the hydrant is operated. The lubrication system shall be sealed from contact with potable water and external contamination. For filling purposes the lubrication system should be accessible externally with minimal dismantling of the hydrant.

All dry-barrel fire hydrants shall be designed in such a way that there is no sediment accumulating sections within the valve.

Unless otherwise specified all dry-barrel fire hydrants shall have push on type joints compatible with the class and category of pipe to which it is intended to connect with.

4.1 Bonnet, Body and Standpipe

The bonnet, body and standpipe of the dry-barrel fire hydrants shall be manufactured of cast iron (CI) as per Section 3 of this standard.

The exterior surfaces of the bonnet and body shall be painted with red heavy duty alkyd enamel paint as specified in section 3.7 of this standard.

4.2 Operating Nut

The operating nut shall be manufactured of brass as per Section 3 of this standard. All fire hydrant operating nuts and portcap-nuts shall be pentagonal in shape and operate counter clockwise to open, having dimensions in accordance with the following:

- diameter of circumscribed circle shall be 37.31mm (1 15/32"); and
- height of the nut shall measure not less than 20.64mm (13/16").

4.3 Operating Stem

The operating stem shall be non-rising and manufactured from steel as per sec 3.4 of this standard. The operating stem shall consist of two pieces 32mm in diameter and shall be connected by a SS break-away safety coupling with an integral internal stop which will minimize the impact to the valve performance in the event of damage.

All components of the stem couplings shall be manufactured of SS as per sec 3.3 of this standard.

4.4 Outlet Nozzles and Caps

All dry-barrel fire hydrants shall be supplied with two 65 mm (2 ½") diameter outlet nozzles and one 100 mm (4") diameter pumper nozzle. All outlet nozzles shall be produced with the Higby cut and have male threads conforming to the

thread requirements of the Manitoba Fires Prevention and Emergency Response Act (C.C.S.M. c. F80), Fire Hose Regulation. All hose nozzles shall be manufactured from brass as per sec. 3.4 of this standard.

Outlet nozzle caps shall have female threads conforming to the thread requirements of the Manitoba Fires Prevention and Emergency Response Act (C.C.S.M. c. F80), Fire Hose Regulation. All outlet nozzles caps shall be manufactured from either DI as per sec. 3.1 or CI as per sec. 3.2 of this standard.

5. MARKING

5.1 Markings

All dry-barrel fire hydrants supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C502. All hydrants shall be marked with the following identifications:

- Manufacturers' name or trademark,
- Hydrant model,
- Manufacturing year,
- Direction of opening,
- Working pressure,
- AWWA C502.

Additionally, the hydrant shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for hydrants supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality and operation of the hydrant.

5.2 Gasket Markings

Each gasket shall bear the following markings:

- Mold number
- Manufacturers' name or trademark
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gasket have been substitute with nitrile-butadiene-rubber (NBR) gasket the gasket shall bear all the markings mentioned above as well as the name of the material.

5.3 Bolts

The head end of each bolt shall bear a recognized abbreviation or symbol representing the bolt manufacturer as well as the stainless steel grade.

6. WORKMANSHIP AND FINISH

6.1 Body and Coatings

All dry-barrel fire hydrants shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair operation and serviceability.

6.2 O-Rings, Gaskets and Seals

All O-Rings, Gaskets and Seals shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of all dry-barrel fire hydrants supplied for use in the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All dry-barrel fire hydrants shall be packaged so as to prevent damage during shipping and handling.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the dry-barrel fire hydrants approved for use in the City of Winnipeg.

All dry-barrel fire hydrants should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the dry-barrel fire hydrants furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C502 and NSF 61.

All dry-barrel fire hydrants supplied for use in the City of Winnipeg must be certified by Underwriter's Laboratories (UL) and approved by Factory Mutual Global (FM).

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing dry-barrel fire hydrants for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing dry-barrel fire hydrants for use in the City of Winnipeg.

11. REFERENCES

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM A126

Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A536
Standard Specification for Ductile Iron Castings

ASTM A582
Standard Specification for Free-Machining Stainless Steel Bars

ASTM F593
Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F594
Standard Specification for Stainless Steel Nuts

AWWA C502
Dry-Barrel Fire Hydrants

AWWA C550
Protective Epoxy Interior Coatings for Valves and Hydrants

CSA Standard CAN3-Z299.3
Quality Assurance Program - Category 3

NSF (National Sanitation Foundation)
Standard 61 for Drinking Water System Components - Health Effects



STANDARD FOR
DUCTILE IRON WATER MAIN COUPLINGS
STANDARD NO. CoW-WM-08

1. SCOPE

This standard shall apply to all main line ductile iron water main couplings for use with water main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to the ductile iron water main couplings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all main line ductile iron water main couplings for use with water main piping in nominal diameters 150mm (6") through to 400mm (16").

All main line iron couplings shall provide either;

- a connection of similar pipe materials,
- a connection of dissimilar pipe materials (transition), or
- a reduction in pipe size (reducers).

All ductile iron water main couplings approved for use in the City of Winnipeg shall conform to AWWA C219, National Sanitation Foundation (NSF) 61 and the requirements of this standard.

3. MATERIALS

3.1 Ductile Iron

The coupling sleeve and end rings shall be manufactured from ductile iron conforming to ASTM A536, grade 65-45-12 as a minimum.

3.2 Gaskets and Insulating Boot

The gasket material shall also meet and/or exceed the requirements of AWWA C111 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

In areas of potential hydrocarbon contamination nitrile-butadiene-rubber (NBR) gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used for the assembly shall be made of an approved non-toxic, water soluble material approved by the NSF to Standard 61.

3.3 Coatings and Linings

The interior and exterior of each water main fitting shall receive a fusion-bonded epoxy coating meeting or exceeding the requirements of AWWA C116 or an equal approved by The City of Winnipeg.

Minimum dry film thickness for the fusion-bonded epoxy shall be determined by the method described in AWWA C116.

The coating shall conform to the health requirements of NSF 61 and be certified by NSF International, Underwriters Laboratories Inc., Underwriters' Laboratories of Canada, or another third party certification body acceptable to the City of Winnipeg.

3.4 Bolts and Nuts

Both the bolts and nuts shall be made of alloy 304 stainless steel conditions CW or SH conforming to the requirements of ASTM F593 and shall be 16mm (5/8") National Coarse Roll Thread (NC) track head.

Thread lubricant or anti-seize coating for threaded fasteners shall be a dry molybdenum disulfide based or polytetrafluoroethylene (PTFE) based compound.

3.5 Washers

The stainless steel nuts shall be isolated from metallic contact with the end ring through the use of di-electric isolation washers. Washers shall be made from thermoset plastic and shall have both high resistance to dynamic and static wear and have very low creep characteristics.

A 304 stainless steel washer shall be used between the nut and plastic washer to protect the plastic washer from being damaged during tightening.

3.6 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

Couplings shall be designed to hold a 1034 KPa (150 psi) test pressure without visible signs of leaking via compression of the elastomeric gaskets.

Couplings shall accommodate up to four degrees (4°) of pipe misalignment, regardless of pipe material.

All end rings shall be designed to restrain bolt heads from turning during tightening of nuts.

4.1 Wide Range couplings

The wide range coupling shall provide a range encompassing steel pipe size outside diameter (OD) through Class 200 asbestos cement pipe, rough barrel outside diameter (OD) for the same nominal pipe diameter.

4.2 Minimum Sleeve Length and Bolt Assemblies

4.2.1 Main Line Couplings

Nominal Pipe Diameter (mm)	Minimum Sleeve Length (mm)	Minimum No. of Bolts
150	125	4
200	125	4
250	150	6
300	150	6
350	150	6
400	150	6

4.2.2 Wide Range Couplings

Nominal Pipe Diameter (mm)	Minimum Sleeve Length (mm)	Minimum No. of Bolts
150	125	4
200	125	4
250	150	6
300	150	6
350	150	6
400	150	6

5. MARKING

5.1 Markings

All ductile iron water main couplings supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C219. All ductile iron water main couplings shall be marked with the following identifications:

- Nominal size
- OD ranges
- Pressure rating
- Manufacturers' name or trademark
- Country of origin
- AWWA C219

Additionally, the coupling shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for ductile iron water main couplings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting in accordance with AWWA C219.

5.2 Gasket Markings

Each gasket shall bear markings in accordance with AWWA C111.

- Nominal size
- OD range
- Mold number
- Manufacturers' name or trademark
- Country of origin
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gaskets have been substitute with Nitrile gaskets the gaskets shall bear all the markings mentioned above as well as the name of the material.

5.3 Bolts

The head end of each bolt shall bear a recognized abbreviation or symbol representing the bolt manufacturer as well as the stainless steel grade.

6. WORKMANSHIP AND FINISH

6.1 Couplings Body

All ductile iron water main couplings shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of ductile iron water main couplings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All ductile iron water main couplings shall be packaged so as to prevent damage during shipping and handling.

The gaskets for ductile iron water main couplings shall be packaged separately in opaque containers and stored indoors.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the ductile iron water main couplings approved for use in the City of Winnipeg.

All ductile iron water main couplings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

Couplings shall not require special equipment or tools for installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the ductile iron water main couplings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C219 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing ductile iron water main couplings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing ductile iron water main couplings for use in the City of Winnipeg.

11. REFERENCES

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

AWWA C111

Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Couplings

AWWA C116

Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service

AWWA C219

Bolted, Sleeve-Type Couplings for Plain-End Pipe

CSA (Canadian Standards Association)

Standard CAN3-Z299.3 - Quality Assurance Program - Category 3

FM (Factory Mutual Research)

Standard for Polyvinyl Chloride (PVC) Pipe and Couplings for Underground Fire Protection Service – Class No. 1612-April 1999.

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects

UL (Underwriters' Laboratories) or ULC (Underwriters' Laboratories of Canada)

Polyvinyl Chloride Pipe and Couplings for Underground Fire Service Systems.



STANDARD FOR
STAINLESS STEEL FULL-ENCIRCLEMENT REPAIR
AND CONNECTION CLAMPS
STANDARD NO. CoW-WM-09

1. SCOPE

This standard shall apply to all stainless steel (SS) full-encirclement repair and connection clamps for use with water main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and or supplemental technical requirements to apply to the SS repair and connection clamps purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all SS repair and connection clamps for use with water main piping in nominal diameters 150mm (6") through to 400mm (16").

All SS repair and connection clamps shall provide either;

- a repair of holes, longitudinal splits or circumferential cracks,
- a branch connection, or
- a service connection.

All SS repair and connection clamps approved for use in the City of Winnipeg shall conform to AWWA C223 or AWWA C230 as required, the National Sanitation Foundation (NSF) 61 and the requirements of this standard.

3. MATERIALS

3.1 Stainless Steel

All shells, sidebars, lifter bars, lugs, threaded fasteners and gasket armor shall be manufactured from stainless steel conforming to ASTM A240, type 304 or 304L as a minimum. Additionally all stainless steel components and welded joints shall be fully passivated for increased corrosion resistance.

3.2 Gaskets and Lubricants

The gasket material shall meet and/or exceed the requirements of AWWA C223 or AWWA C230 as required for styrene-butadiene-rubber (SBR) gaskets. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

In areas of potential hydrocarbon contamination nitrile-butadiene-rubber (NBR) gaskets maybe used as a substitute for the standard styrene-butadiene-rubber (SBR) gaskets.

All lubricants used shall be made of a non-toxic, water soluble material approved by the National Sanitation Foundation (NSF) to Standards 14 and 61.

3.3 Bolts, Nuts and washers

The bolts, nuts and washers shall be made of 304 stainless steel, conditions cold worked (CW) or strain-hardened (SH) conforming to the requirements of ASTM F593 and ASTM F594 as required and shall have a 16mm (5/8") National Coarse Roll Thread (NC) track head.

Thread lubricant of anti-seize coating for threaded fasteners shall be a dry molybdenum disulfide based or polytetrafluoroethylene (PTFE) based compound.

3.4 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

Clamps shall be designed to hold a minimum 1034 KPa (150 psi) test pressure without visible signs of leaking via compression of the elastomeric gaskets.

Joints between sections of shell shall be designed to allow engaging and disengaging without complete removal of nuts from studs.

All welds shall be either gas tungsten arc welding (GTAW) or gas metal arc welding (GMAW) and shall be fully passivated for increased corrosion resistance.

Studs shall be secured to sidebars.

Gaskets shall be of the overlapping taper type and shall be secured to the shell. Gaskets shall not be spliced or assembled from component pieces except that a bevel joint may be made where the gasket is secured to the shell for no less than 50mm (2 ") to either side of the joint.

Gasket armor shall be provided at each joint between sections of shell. Gasket armor shall be inset and secured to the gasket so as to provide a smooth, flush surface.

The clamp shall be designed so as not to create electrical continuity between the clamp and the water main.

4.1 Tapped Outlets

Threaded outlets shall be provided, when specified, with internal threads to accommodate 19mm to 50mm corporation stops in accordance with AWWA C800 (CC).

4.2 Tapping Sleeves

A branch connection with integral flat-faced flange shall be provided, when specified whose port is perpendicular to and centered on the axis of the water mains.

A 19mm (3/4") test plug for pressure testing shall be provided.

The tapping sleeve shall be designed so as not to create electrical continuity between the flange and the tapping valve when an isolating flange kit is used.

4.3 Minimum Material Width

4.2.1 Repair Clamps

Clamp Component	Minimum Thickness (inches)	Minimum Thickness (mm)
Shell	0.035	0.889
Side bar	0.120	3.048
Lift bar	0.060	1.524
Lugs	0.125	3.175
Gasket armour	0.050	1.270

4.3.2 Tapping Sleeves

Clamp Component	Minimum Thickness (inches)	Minimum Thickness (mm)
Upper shell	0.100	2.540
Lower shell	0.062	1.575
Side bar	0.120	3.018
Lift bar	0.075	1.905
Lugs	0.125	3.175
Gasket armour	0.050	1.270
Connection	0.100	2.540
Flange (150 – 250mm)	0.688	17.475
Flange (300mm plus)	0.812	20.625

5. MARKING

5.1 Markings

All SS repair and connection clamps supplied for use within the City of Winnipeg shall bear markings in accordance with AWWA C223 and AWWA C230. All SS repair and connection clamps shall be marked with the following identifications:

- Manufacturers' name or trademark,
- Pipe O.D. or range,
- Size of outlet (if applicable),
- Direction of rotation (if applicable),
- Production year.

Additionally, the coupling shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for SS repair and connection clamps supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Gasket Markings

Each gasket shall bear the following markings:

- Mold number
- Manufacturers' name or trademark
- Manufacturing date

Where the standard styrene-butadiene-rubber (SBR) gaskets have been substitute with nitrile-butadiene-rubber (NBR) gaskets the gaskets shall bear all the markings mentioned above as well as the name of the material.

5.3 Bolts

The head end of each bolt shall bear a recognized abbreviation or symbol representing the bolt manufacturer as well as the stainless steel grade.

6. WORKMANSHIP AND FINISH

6.1 Couplings Body

All SS repair and connection clamps shall be homogenous throughout, and be free from any visible cracks, voids, inclusions, blisters, or other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.3 Quality Control Requirements

Manufacturers of SS repair and connection clamps for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;

- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

7. PACKAGING

All SS repair and connection clamps shall be packaged so as to prevent damage during shipping and handling.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the SS repair and connection clamps approved for use in the City of Winnipeg.

All SS repair and connection clamps should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

Clamps shall not require special equipment or tools for installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the SS repair and connection clamps furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of AWWA C223 or AWWA C230 as required and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing SS repair and connection clamps for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing SS repair and connection clamps for use in the City of Winnipeg.

11. REFERENCES

ASTM A240

Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM F593

Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F594

Standard Specification for Stainless Steel Nuts

AWWA C223

Fabricated Steel and Stainless Steel Tapping Sleeves

AWWA C230

Stainless-Steel Full-Encirclement Repair and Service Connection Clamps

AWWA C800

Underground Service Line Valves & Fittings

CSA Standard CAN3-Z299.3

Quality Assurance Program - Category 3

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects



STANDARD FOR
GALVANIC ZINC ANODES
STANDARD NO. CoW-WM-10

1. SCOPE

This standard applies to all galvanic zinc anodes approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the galvanic zinc anodes purchased by the City.

2. REQUIREMENTS

2.1 General

All galvanic zinc anodes shall conform to the requirements of ASTM B418 as a minimum.

2.2 Products

The galvanic zinc anodes shall be comprised of an insulated electrical copper lead wire, Type II Zinc casting, a cardboard tube, and low resistivity backfill. References to the weight of the zinc anode shall be understood to mean the weight of the zinc bar in the packaged anode.

3. MATERIALS

3.1. Zinc

All zinc components shall be manufactured of zinc conforming to the following composition as specified in ASTM B418, Type II.

Aluminium	0.005%	maximum
Cadmium	0.003%	maximum
Iron	0.004%	maximum
Lead	0.003%	maximum
Copper	0.002%	maximum
Zinc	Reminder	

All zinc components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.2. Lead Wire

The anode lead wire shall consist of a No. 10 American Wire Gauge (AWG) standard (7 strand) copper wire with white TWU minus 40EC insulation conforming to CAS Spec. C22.2 No. 75 or a #8 RWU 90 strand copper cable with blue insulation at least 3.0 metres (length extending beyond zinc casting).

3.3. Backfill

All galvanic zinc anodes shall be comprised of a low resistivity (45 ohm/cm maximum) gypsum/bentonite backfill with the following nominal composition:

Ground Hydrated Gypsum	75-77%
Powdered Wyoming Bentonite	15-20%
Anhydrous Sodium Sulphate	5-8%

The backfill shall have a grain size so that 100% is capable of passing through a #20 mesh screen and a #100 mesh screen will retain 50%.

The backfill shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.4. Permeable Tube

All galvanic zinc anodes shall be packaged in a sturdy water permeable cardboard tube having a minimum wall thickness of 2.3 mm. The diameter and length of the tube shall suit the dimensions of the zinc casting plus backfill with a minimum 25 mm between any surface of the zinc and the tube (including the tube ends).

The tube shall be provided with plastic caps at both ends and devices to hold the anode in the centre of the tube. The tube shall have sufficient strength to permit normal shipping and handling without failure.

3.5. Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. Design

The galvanic zinc anodes shall be manufactured of the materials as per section 3.0 of this standard.

The backfill shall be firmly packaged around the anode by means of adequate vibration. Backfill material shall be of sufficient quantity to cover all zinc anode surfaces to a minimum thickness of 25 mm.

The standard galvanic zinc anode weights for the City of Winnipeg shall be 10.9 Kg (25 lbs.) and 45 Kg (100 lbs.). The length of this size of anode shall be approximately 1200 mm for the 10 Kg anode, and 710 mm for the 42 Kg anode (lengths +/- 100 mm).

All galvanic zinc anodes approved for use in the City of Winnipeg shall be suitable for use on cast iron (CI) and ductile iron (DI) water main pipe of nominal sizes of 150mm and larger.

5. Marking

All galvanic zinc anodes supplied for use within the City of Winnipeg shall bear the following markings:

- manufacturer's name and/or recognized trademark,
- pattern or part number,
- location of manufacture
- type of anode (Zinc: Type II to ASTM B418-88),
- zinc weight,
- date of manufacture,
- lot number ,
- other specific casting identification information.

Required marking for the galvanic zinc anodes supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality or serviceability of the anode.

6. WORKMANSHIP AND FINISH

The galvanic zinc anodes supplied for use within the City of Winnipeg shall be free of cracks and tears, be homogeneous throughout and free of voids and other imperfections that may impair serviceability.

6.1 Quality Control Requirements

Manufacturers of zinc anodes for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;

- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

The galvanic zinc anodes shall be packaged, stored and handled in such a way as to prevent damage and other defect which may impact serviceability.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the galvanic zinc anodes approved for use in the City of Winnipeg.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating galvanic zinc anodes furnished for use in the City of Winnipeg comply with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer must apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing galvanic zinc anodes for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing galvanic zinc anodes for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

ASTM B6

Specification for Zinc

ASTM B418

Standard Specification for Cast and Wrought Galvanic Zinc Anodes

ASTM B949

Specification for General Requirements for Zinc and Zinc Alloy Products

ASTM E536

Test Methods for Chemical Analysis of Zinc and Zinc Alloys



STANDARD FOR
GRAY AND DUCTILE IRON MUNICIPAL CASTINGS

STANDARD NO.

CoW-WM-11

AND

CoW-SM-18

1. SCOPE

This standard applies to all gray and ductile iron municipal castings approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the gray and ductile iron municipal castings purchased by the City.

2. REQUIREMENTS

2.1 General

All gray iron materials shall conform to the requirements of CSA B70.1-03 and ASTM A48, Class 30 as a minimum.

All ductile iron materials shall conform to the requirements of CSA B70.1-03 and ASTM A536, grade 65-45-12 as a minimum.

2.2 Products

This standard applies to the following municipal castings approved for used in the City of Winnipeg.

- AP-001 – Watermain Valve Box
- AP-002 – Valve Box Extension
- AP-005 – Fire Hydrant Marker
- AP-006 – Manhole Frame
- AP-007 – Solid Manhole Cover
- AP-008 – Grated Manhole Cover
- AP-009 – Beehive Manhole Cover
- AP-010 – Manhole Riser Frame
- AP-011 – Barrier Curb Frame
- AP-012 – Barrier Curb Cover
- AP-013 – Barrier Curb Riser Frame
- AP-014 – Barrier Curb Riser Cover
- AP-015 – Mountable Curb Frame
- AP-016 – Mountable Curb Cover
- AP-017 – Mountable Curb Paving Cover
- AP-018 – Modified Barrier Curb Frame
- AP-019 – Modified Barrier Curb Cover
- AP-020 – Curb Inlet Box Cover
- AP-021 – Integrated Side Inlet and Cover

3. MATERIALS

3.1 Gray Iron

All gray iron materials shall conform to the requirements of ASTM A48, Class 30 or better with a Ultimate Tensile Strength (UTS) of 206.8427 MPa (30,000 p.s.i.). All material testing shall be conducted on an independently cast test bar sample as specified in ASTM A48. All gray iron shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and minimum design load.

Basic resources shall be made from virgin or recycled materials and meets the physical and chemical properties as defined in ASTM A48 for Class 30 gray iron.

3.2 Ductile Iron

All ductile iron materials shall conform to the requirements of ASTM A536, grade 65-45-12 with a Ultimate Tensile Strength (UTS) of 448.1592 MPa (65,000 p.s.i.) and a yield strength of 310.2641 MPa (45,000 p.s.i). All testing shall be conducted on an independently cast test bar sample as required by ASTM A536. All ductile iron shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and minimum design load.

Basic resources shall be made from virgin or recycled materials and meets the physical and chemical properties as defined in ASTM A356 for Class 65-45-12 ductile iron.

3.3 Finish

Municipal castings may be coated or uncoated. All municipal castings that are coated shall be finished with a black rust protection coating. The coating must be able to withstand exposure to temperatures up of 60°C without physical or chemical alteration and shall not become brittle or chip off at temperatures below 0°C.

The coating shall be applied evenly with a minimum thickness of 15 mils (0.35mm) and shall not be used to conceal visible cracks, voids, inclusions or other injurious defects.

4. DESIGN

4.1 Municipal Castings

All similar styled municipal castings shall be manufactured to allow for interchangeability between manufacturers.

4.2 Dimensional Tolerances

The municipal gray and ductile iron municipal castings approved for use in the City of Winnipeg shall conform to the dimensions and tolerances as specified in the individual drawings listed in Section 2.2 of this standard.

4.3 Minimum Design Load

The municipal gray and ductile iron castings installed or used on local streets, collector streets, arterial streets and expressways as defined in the City of Winnipeg – Transportation Standards Manual shall meet the proof load testing requirements of H-20.

4.4 Seating Surfaces

The seating surfaces of the municipal gray and ductile iron castings supplied for use within the City of Winnipeg shall be either machined or ground level to produce a balanced fit to prevent rocking and uneven wear.

5. MARKING

5.1 Markings

The municipal gray and ductile iron castings supplied for use within the City of Winnipeg shall bear the following markings as per CAN/CSA 70.1-03:

- Manufacturers' name or trademark,
- Country of origin,
- Date of manufacture,
- Product code or part number.

6. WORKMANSHIP AND FINISH

6.1 Municipal Castings

The municipal gray and ductile iron castings supplied for use within the City of Winnipeg shall be homogeneous throughout, of even grain and free of cracks, voids and other imperfections that may impair serviceability.

The gray and ductile iron components shall be free of burrs and sharp edges. Coated components shall be free of burrs and sharp edges prior to application of the black rust protection coating.

6.1 Quality Control Requirements

Manufacturers of municipal gray and ductile iron castings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review prior to issue of product approval. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;

- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

The municipal gray and ductile iron castings shall be packaged, stored and handled in such a way as to prevent damage and other defect which may impact serviceability.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the municipal gray and ductile iron castings approved for use in the City of Winnipeg.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating municipal gray and ductile iron castings furnished for use in the City of Winnipeg comply with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer must apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing municipal gray and ductile iron castings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing municipal gray and ductile iron castings for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

AASHTO M 306

Standard Specification for Drainage, Sewer, Utility, and Related Castings

ASTM D48

Standard specification for Gray Iron Castings

ASTM D536

Standard specification for Ductile Iron Castings

CSA (Canadian Standards Association)

Standard CAN/CSA-B70.1-03. Frames and Covers for Maintenance Holes and Catchbasins.

CSA (Canadian Standards Association)

Standard CAN3-Z299.3 Quality Assurance Program Standards



STANDARD FOR
CORROSION PROTECTION WRAPPING
STANDARD NO. CoW-WM-12

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WATER SERVICE PRODUCTS STANDARDS





STANDARD FOR
COPPER WATER SERVICE PIPING
STANDARD NO. CoW-WS-01

1. SCOPE

This standard shall apply to copper water service piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to copper water service piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all copper water service piping approved for use in the City of Winnipeg.

All copper water service pipe shall be Type K annealed soft temper pipe conforming to UNS C12200 and shall meet the requirements of ASTM B88 and NSF 61.

2.2 Standard Diameters

Standard piping diameters used in the City of Winnipeg shall be 19mm (3/4") through 51mm (2").

3. MATERIALS

3.1 Copper

All copper water service piping shall be manufactured from Type K seamless water pipe as per ASTM B88.

All copper water service pipe shall be made from UNS C12200 and meets the physical and chemical properties as defined in ASTM B88. The chemical composition of UNS C12200 is shown in the following table.

Element	Content (%)
Copper (Cu)	99.90
Phosphorus (P)	0.02

Additionally all copper water service pipe shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, expansion, hydrostatic pressure, flattening and eddy-current testing.

4. DESIGN

4.1 Pipe Dimensions

The copper water service pipe supplied to the City of Winnipeg shall conform to the following dimensions as specified in ASTM B88.

Nominal or Standard Size		Outside Diameter (O.D.)		Inside Diameter (I.D.)		Minimum Wall Thickness	
mm	in.	mm	in.	mm	in.	mm	in.
19	3/4	22.225	0.875	18.923	0.745	1.651	0.065
25	1	28.575	1.125	25.273	0.995	1.651	0.065
38	1 1/2	41.275	1.625	37.617	1.481	1.829	0.072
51	2	53.975	2.125	49.759	1.959	2.108	0.083

5. MARKING

5.1 Piping Markings

All copper water service piping supplied for use within the City of Winnipeg shall bear markings in accordance with ASTM B88. All copper water service pipe shall be marked with the following identifications:

- Nominal size
- Manufacturers' name or trademark
- ASTM B88
- Type K
- Certification agency trademark/seal

Additionally, the pipe shall bear certification seals or markings of the following agencies:

1. NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for copper water service pipe supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

6. WORKMANSHIP AND FINISH

6.1 Copper Water Service Pipe

The copper water service piping supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability as specified in ASTM B88.

6.1 Quality Control Requirements

Manufacturers of copper water service piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years and shall be made available to the City of Winnipeg upon request.

7. PACKAGING

Pipe shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

The ends of each pipe shall be protected with an approved covering to reduce the possibility of foreign contaminants entering the pipe.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the copper water service piping approved for use in the City of Winnipeg.

All copper water service piping should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that copper water service piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of ASTM B88 and NSF 61.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing copper water service piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing copper water service piping for use in the City of Winnipeg.

11. REFERENCES

ASTM B88

Standard Classification for Seamless Copper Water Tube

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects



STANDARD FOR
CROSS-LINKED POLYETHYLENE (PEXa)
WATER SERVICE PIPING
STANDARD NO. CoW-WS-02

1. SCOPE

This standard shall apply to crosslinked polyethylene (PEXa) water service piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to PEXa water service piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all PEXa water service piping approved for use in the City of Winnipeg.

All PEXa shall conform to AWWA C904 and CSA 137.5 and shall meet the requirements of ASTM F876 and NSF 61.

2.2 Standard Diameters

Standard copper tube size (CTS) piping shall be used in the City of Winnipeg with outside diameters of 19mm (3/4") through to 51mm (2") with a standard dimensional ratio (SDR) of 9.

3. MATERIALS

3.1 Cross-linked polyethylene (PEXa)

All water service piping shall be manufactured using the high-pressure peroxide method of cross-linking, commonly referred to as PEXa.

All PEXa water service pipe shall have a minimum 70% degree of cross-linking per CSA standard B137.5 and ASTM F876.

All PEXa water service pipe used in underground applications shall have a co-extruded Ultraviolet (UV) resistant blue coating made from UV-resistant high-density polyethylene. Pipe shall have minimum recommended UV exposure time of one (1) year when tested in accordance with ASTM F2657

Additionally all PEXa water service pipe shall meet the applicable quality-assurance test requirements of these standards with regard to material, degree of cross-linking, workmanship, hydrostatic pressure and health testing.

3.2 Stainless Steel (SS)

All SS components shall be manufactured to conform to ASTM A269, type 304 or 304L as a minimum.

4. DESIGN

4.1 Pipe Dimensions

The PEXa water service pipe supplied to the City of Winnipeg shall conform to the following dimensions as specified in CSA B137.5.

Nominal or Standard Size		Outside Diameter (O.D.)		Minimum Wall Thickness	
in.	mm.	in.	mm.	in.	mm.
0.75	19	0.875	22.225	0.097	2.464
1.00	25	1.125	28.575	0.125	3.175
1.50	38	1.625	41.275	0.181	4.597
2.00	50	2.125	53.975	0.236	5.994

Table 1

4.2 SS Liner

All PEXa piping shall use a rigid, seamless solid tubular stainless steel liner when connecting to all brass compression service fittings. The SS liner shall be installed to prevent collapse of the PEXa piping as the service connection is tightened and to provide support to allow the gasket in the connection to establish a reliable seal. Cold flaring of the PEXa piping shall not be considered an approved installation method.

All SS liners shall be flared at one end to ensure the insert does not creep inside the PEXa piping and rounded at the other end to reduce cutting of the piping side walls. The rounded end of the liner shall be installed into the PEXa piping first and the flare end of the liner shall be inserted so that it rests solidly against the end of the piping when installed correctly. The end of the SS liner shall not extend beyond the limits of the service fitting nut.

5. MARKING

5.1 Water Service Pipe Markings

All PEXa water service piping supplied for use within the City of Winnipeg shall bear markings in accordance with CSA B137.5. All PEXa water service pipe shall be marked with the following identifications:

- Nominal size
- Manufacturers' name or trademark
- CSA B137.5
- AWWA C904
- PEXa
- Certification agency trademark/seal

Additionally, the pipe shall bear certification seals or markings of the following agencies:

- NSF (National Sanitation Foundation) to Standard 61 for health effects related to components of a potable water system.

Required marking for PEXa water service pipe supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

6. WORKMANSHIP AND FINISH

6.1 PEXa Water Service Pipe

The PEXa water service piping supplied for use within the City of Winnipeg shall be homogeneous throughout, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability as specified in ASTM F876.

6.2 Quality Control Requirements

Manufacturers of PEXa water service piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years and shall be made available to the City of Winnipeg upon request.

7. PACKAGING

Pipe shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

Pipe shall be packaged and stored in such a way as to minimize UV exposure. All pipe must be certified to ASTM F2657 and be covered by a manufacturer's warranty allowing UV exposure to a maximum of one (1) year.

The ends of each pipe shall be protected with an approved covering to reduce the possibility of foreign contaminants entering the pipe.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PEXa water service piping approved for use in the City of Winnipeg.

All PEXa water service piping should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that PEXa water service piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and the requirements of section 6.1.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing PEXa water service piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing PEXa water service piping for use in the City of Winnipeg.

11. REFERENCES

ASTM A269
Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

ASTM F876

Standard Specification for Crosslinked Polyethylene (PEX) Tubing

ASTM F2023

Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water

ASTM F2657

Standard Test Method for Outdoor Weathering Exposure of Crosslinked Polyethylene (PEX) Tubing"

AWWA C904

Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 In. (12mm) Through 3 In. (76 mm), for Water Service

CAN/CSA-B137.5

Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications

NSF (National Sanitation Foundation)

Standard 61 for Drinking Water System Components - Health Effects

ISO 9001

Quality Management Systems

CSA Standard CAN3-Z299.3

Quality Assurance Program - Category 3



STANDARD FOR
BRASS SERVICE VALVES AND FITTINGS
STANDARD NO. CoW-WS-03

1. SCOPE

This standard applies to all brass valves and fittings approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the brass valves and fittings purchased by the City.

2. REQUIREMENTS

2.1 General

All brass valves and fittings shall conform to the requirements of AWWA C800, NSF/ANSI Standard 61 and NSF/ANSI Standard 372 as a minimum.

2.2 Products

This standard applies to but is not limited to the following brass valves and fittings approved for used in the City of Winnipeg.

- corporation stops
- service couplings
- curb stops
- meter couplings

3. MATERIALS

3.1. Brass

All brass components shall be made from either CDA/UNS Brass Alloys C89520, C89833 or C89836 as per ASTM B584 with a maximum lead content of .25% by weight and conform to the NSF/ANSI Standard 61 and NSF/ANSI Standard 372 requirements for low lead brass.

All brass shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.2. Stainless Steel

The stainless steel gripper band (sec. 4.5.1) shall be at a minimum type 410 and conform to the requirements of ASTM A240.

The stainless steel pipe liner (sec. 4.5.2) shall be at a minimum type 304 and conform to the requirements of ASTM A240.

All stainless steel shall meet the applicable quality-assurance test requirements of this standard with regard to material, workmanship and minimum design requirements.

3.3. Gaskets, Seals and O-Rings

All gaskets, seals and O-rings which come in contact with potable water must meet the requirements of NSF/ANSI Standard 61 as a minimum.

The seats that seal against the ball valve shall be made of Buna N nitrile rubber or EPDM suitable for water service with a compression set of less than 40% as determined by ASTM D395, method B, for 22 hours at 100° C (212°F).

The operating stem O-rings shall be made from Buna N nitrile rubber or EPDM rubber compound. The operating stem shall be equipped with two separate and independent O-ring grooves, each with its own O-ring to provide an independent, double O-ring seal on the operating stem.

Coupling nuts used with Copper Tube Size (CTS) potable water service piping shall contain a molded synthetic rubber sealing gasket which conforms to the requirements of ASTM D2000.

3.4. Coatings

All treaded components should be coated with a NSF/ANSI Standard 61 approved fluorocarbon coating to reduce torque during assembly and to minimize gasket distortion or movement.

All valve operating balls shall be coated with a NSF/ANSI Standard 61 approved PTFE coating such as Teflon fluorocarbon suitable for potable water.

3.5. Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 Corporation Stops

This standard applies to all 19, 25, 38 and 50 mm nominally size corporation stops designed for use with CTS potable water service piping.

All corporation stops shall have ball valves and be designed for potable water use up to a temperature of 65° C (150° F) and a pressure of 2068 kPa (300 psi). Additionally the corporation stops shall be of the “non-draining” ball type.

4.1.1 Body

The threaded connection between valve body parts shall be locked and sealed by an anaerobic thread locking and sealing compound.

4.1.2 Ball Valve

The ball valve shall provide a full round port flow path that passes completely through the valve with a minimum inside diameter of the nominal size of the curb valve. The port shall be unobstructed.

The ball shall be coated on the with a PTFE coating such as Teflon fluorocarbon suitable for potable water.

4.1.3 Stem

The valve-operating stem shall be of “blow-out proof” stem design. The valve-operating stem shall have a minimum of two O-ring top seal. This seal shall prevent ground water and contaminants from entering the valve body and act as a pressure seal when the valve is in the open position.

4.1.4 Operating Head

The head of the valve operating mechanism shall be parallel to the flow way of the valve when the valve is in the open position and perpendicular to the flow-way of the valve when the valve is in the closed position. Further the operating head shall be designed to allow for crescent wrench operation

The corporation stop shall have a full 360° of operation with 90° (1/4 turn) from the full closed position to the full open position. When in the full open position the operating head shall be aligned parallel to the flow of water. Additionally all corporation stops shall be shipped in the closed position

4.1.5 Inlet End

The inlet connections of the corporation stop shall have external threads which conform to Figure 2 and the dimensions in Table 7 of AWWA C800.

4.1.6 Coupling Nut

See section 4.5 of this standard.

For minimum pull-out values see section 4.5.3 of this standard.

4.1.7 Electrical Resistance

All corporation stop shall have a maximum electrical resistance of 0.005 ohms at any position of the ball valve. An open circuit at any position will not be accepted.

The coupling nut sealing gasket shall have cast in place a bronze spring to ensure electrical continuity and to eliminate possible cold flow or gasket creep between the pipe and the fitting.

4.2 Curb Stops

This standard applies to all 19, 25, 38 and 50 mm nominally size curb stops designed for use with CTS potable water service piping.

All curb stops shall have ball valves and be designed for potable water use up to a temperature of 65° C (150° F) and a pressure of 2068 kPa (300 psi). Additionally the curb stops shall be of the “non-draining” type.

4.2.1 Body

The threaded connection between valve body parts shall be locked and sealed by an anaerobic thread locking and sealing compound.

4.2.2 Ball Valve

The ball valve shall provide a full round port flow path that passes completely through the valve with a minimum inside diameter of the nominal size of the curb valve. The port shall be unobstructed and any reduction in the port inside diameter shall not be allowed.

The ball shall be coated on the with a PTFE coating such as Teflon fluorocarbon suitable for potable water.

4.2.3 Stem

The valve-operating stem shall be of “blow-out proof” stem design. The valve-operating stem shall have a two o-ring top seal. This seal shall prevent ground water and contaminants from entering the valve body and act as a pressure seal when the valve is in the open position.

4.2.4 Operating Head

The head of the valve operating mechanism shall be parallel to the flow way of the valve when the valve is in the open position and perpendicular to the flow-way of the valve when the valve is in the closed position.

The head shall be rectangular in shape with the following approximate dimensions:

Valve Size	Operating Head Dimensions in mm		
	Thickness	Height	Width
19	9.525	15.875	31.750
25	9.525	15.875	31.750
38	12.700	19.050	50.800
50	12.700	19.050	50.800

The curb stop shall have a 90° (1/4 turn) operation with a check stop from the full open to the full closed position.

4.2.5 Inlet and Outlet Ends

The inlet and outlet connections of the coupling shall have external threads which conform to Figure 2 and the dimensions in Table 7 of AWWA C800.

4.2.6 Coupling Nut

See section 4.5 of this standard.

For minimum pull-out values see section 4.5.3 of this standard.

4.2.7 Electrical Resistance

All curb stops shall have a maximum electrical resistance of 0.005 ohms at any position of the ball valve. An open circuit at any position will not be accepted.

The coupling nut sealing gasket shall have cast in place a bronze spring to ensure electrical continuity and to eliminate possible cold flow or gasket creep between the pipe and the fitting.

4.3 Service Couplings

This standard applies to all 19, 25, 38 and 50 mm nominally size service couplings designed for use with CTS potable water service piping.

All service couplings shall be designed for potable water use up to a temperature of 65° C (150° F) and a pressure of 2068 kPa (300 psi).

4.3.1 Body

The coupling body shall be of one piece construction and shall provide a full round flow path that passes completely through the fitting with a minimum inside diameter of the nominal size of the fitting.

4.3.2 Inlet and Outlet Ends

The inlet and outlet connections of the coupling shall have external threads which conform to Figure 2 and the dimensions in Table 7 of AWWA C800.

4.3.3 Coupling Nut

See section 4.5 of this standard.

For minimum pull-out values see section 4.5.3 of this standard.

4.3.4 Electrical Resistance

All service couplings shall have a maximum electrical resistance of 0.005 ohms, an open circuit will not be accepted.

The coupling nut sealing gasket shall have cast in place a bronze spring to ensure electrical continuity and to eliminate possible cold flow or gasket creep between the pipe and the fitting.

4.4 Meter Couplings and Flanges

All 16mm (5/8") and larger brass meter couplings and flanges shall conform to the requirements of AWWA C800 and NSF/ANSI Standard 61.

All meter couplings shall have threads which conform to Figure 7 and the dimensions in Table 10 of AWWA C800 and all flanges shall conform to Figure 8 and the dimensions in Table 11 of AWWA C800.

Additionally each coupling shall be furnished with a wire hole suitable for tamperproof connection to the water meter and an internal sealing gasket.

4.5 Couplings Nuts

All corporation stops, curb stops and fittings designed for use on CTS potable water service piping shall be supplied with a stab fit, conductive compression type coupling nuts. To ensure correct installation and maximum gasket seal all brass valve and fitting bodies shall incorporate an external stop to which the coupling nuts must be tightened (bottomed).

4.5.1 Sealing Gasket

Each coupling nut shall contain a molded synthetic rubber sealing gasket with a molded-in-place bronze spring and hardened stainless steel gripper band. When the coupling nut is tightened the stainless steel gripper ring shall be designed in such a way as are to drawn down onto the piping providing a hydraulic seal and mechanical restraint. Additionally the bronze spring shall ensure electrical continuity between the pipe and fitting as well as eliminate possible cold flow or gasket creep.

4.5.2 Pipe Liner

A stainless steel (SS) liner must be used to reinforce all plastic (non-rigid) CTS potable water service piping. The stainless liner shall be of one piece, seamless construction with beveled edges and when installed shall not project beyond the edge of the fitting nuts.

4.5.3 Pull out Strength

The joint shall be designed so as to allow for pipe stabbing without disassembly of the fitting. Once the pipe is installed the coupling nuts must be tightened (bottomed) to the fitting body for full compression with the following minimum pull-out values;

Valve Size (mm)	Minimum Pull-Out Strength (KN)	
	Copper*	Plastic**
19	4.449	1.335
25	6.673	2.225
38	8.897	4.449
50	13.345	4.449

* Type K seamless copper potable water service piping 19mm, 25mm, 38mm, and 51mm.

** Non-rigid CTS potable water service piping in 19mm, 25mm, 38mm, and 51mm with a SS pipe liner.

5. MARKING

The brass valves and fittings supplied for use within the City of Winnipeg shall bear the following markings:

- manufacturers' name or trademark,
- direction of flow if applicable,
- CTS

6. WORKMANSHIP AND FINISH

The brass valves and fittings supplied for use within the City of Winnipeg shall be free of burrs and sharp edges, be homogeneous throughout, of even grain and free of cracks, voids and other imperfections that may impair serviceability.

6.1 Quality Control Requirements

Manufacturers of brass valves and fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

The brass valves and fittings shall be packaged, stored and handled in such a way as to prevent damage and other defect which may impact serviceability. Additionally all valves shall be shipped in the closed position.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the brass valves and fittings approved for use in the City of Winnipeg.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating brass valves and fittings furnished for use in the City of Winnipeg comply with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer must apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing brass valves and fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing brass valves and fittings for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

ASTM A240

Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ASTM B62

Composition of Bronze or Ounce Metal Castings

ASTM B584

Standard specification for copper alloy sand castings for general Applications

ASTM D395

Standard test methods for rubber property - compression set

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

AWWA C800

Standard specification for Underground Service Lines Valves and Fittings

NSF/ANSI Standard 61

Drinking Water System Components - Health Effects

NSF/ANSI Standard 372

Drinking Water System Components - Lead Content



STANDARD FOR

BRASS SERVICE SADDLE

STANDARD NO. CoW-WS-04

1. SCOPE

This standard applies to all brass service saddles approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the brass service saddles purchased by the City.

2. REQUIREMENTS

2.1 General

All brass service saddles shall conform to the requirements of AWWA C800, and NSF/ANSI Standard 61 as a minimum.

2.2 Products

This standard applies to but is not limited to the following;

- Service saddle body,
- Straps,
- Bolts, nuts and washers,
- Reducer bushing.

3. MATERIALS

3.1. Brass

All brass components shall be manufactured from either Copper Alloy UNS No. C83600 (red brass, 85-5-5-5) conforming to the requirements of ASTM B62 or CDA/UNS Brass Alloys C89520, C89833 or C89836 as per ASTM B584 with a maximum lead content of .25% by weight and conform to the NSF/ANSI Standard 61 and NSF/ANSI Standard 372 requirements for low lead brass.

All brass components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.2. Silicon Bronze

All silicon bronze components shall be made Copper Alloy No. C65100 conforming to the requirements of ASTM B96 or ASTM B98.

All silicon bronze components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and design.

3.3. Gaskets and Seats

All gaskets and seats which come in contact with potable water must meet the requirements of NSF/ANSI Standard 61 as a minimum.

The gasket seats that seal against the pipe shall be made of either Buna N nitrile or EDPM rubber suitable for water service with a compression set of less than 40% as determined by ASTM D395, method B, for 22 hours at 100° C (212°F).

3.4. Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. Design

All brass service saddles approved for use in the City of Winnipeg shall be suitable for use on polyvinylchloride (PVC), cast iron (CI), ductile iron (DI) or asbestos concrete (AC) water main pipe of nominal sizes of 150mm and larger.

All brass service saddles shall be designed for use with water up to a temperature of 38°C (100°F) and a pressure of 1035 kPa (150 psi) as a minimum.

4.1 Service Saddle Body

The brass service saddle body shall be manufactured as per section 3.1 of this standard.

The body of the brass service saddle shall be manufactured so as to conform to the outside configuration of the water main.

The outer wall of the body where the corporation valve outlet is located shall be manufactured so as to facilitate bracing with a crescent wrench.

4.1.1 Outlet

The outlet shall be threaded to receive a 50mm (2") nominal size corporation valve or brass bushing with internal threads conforming to those specified in AWWA C800.

4.1.2 Gasket Housing

A channel shall be either cast or machined under the base of the threaded inlet to accommodate the gasket, thus preventing gasket slippage and resisting cold flow and distortion.

4.2 Straps

The brass service saddle strap as well as the nuts, bolts and washers shall be manufactured of silicon bronze as per section 3.2 of this standard.

The brass service saddle strap shall consist of either a single or double strap and shall provide full support around the circumference of the pipe. Single strap saddles shall have a minimum strap width of not be less than 50mm (2") at any point. Saddles with a double strap shall have a minimum of 50mm (2") total strap width. The thickness of each strap section shall not be less than 4mm (0.16") at any point.

4.3 Gasket

All gaskets shall meet the specifications set out in section 3.3 of this standard.

The integral gasket shall be confined to the gasket housing groove in accordance with section 4.1.2 of this standard and bonded in place to prevent gasket slip during and after installation and shall provide a pressure tight seal against the water main. The manufacturer shall upon request provide a complete description of the gasket seating design.

4.4 Brass Reducer Bushings

The brass reducer bushing shall be manufactured as per section 3.1 of this standard.

The exposed surface of the reducer bushing shall be manufactured so as to facilitate installation with a standard size of wrench.

Reducer bushings shall be suitable for threading into the 50mm (2") nominal size threaded outlet of the body of the service saddle as described in section 4.1.1 of this standard and shall be able to receive 19mm (3/4"), 25mm (1"), or 38mm (1 1/2") sized AWWA corporation valve external threads as specified in AWWA C800.

The reducer bushing shall be designed for use with water up to a temperature of 38°C (100°F) and a pressure of 1035 kPa (150 psi) as a minimum.

5. Marking

All markings, including any additional markings on the inside wall of the body, strap components, or bushing shall be recessed so as not to impair the serviceability of the saddle.

5.1 Service Saddle Body and Strap

The brass service saddle body and strap supplied for use within the City of Winnipeg shall bear the following markings:

- manufacturer's name and/or recognized trademark,
- pattern or part number (optional)
- outlet size,
- saddle size and/or nominal pipe size.

5.2 Reducer Bushings

Each reducer bushing supplied for use within the City of Winnipeg should bear the following markings:

- manufacturer's name and/or recognized trademark,
- pattern or part number,
- bushing outlet size,
- bushing inlet size.

6. WORKMANSHIP AND FINISH

The brass service saddles supplied for use within the City of Winnipeg shall be free of burrs and sharp edges, be homogeneous throughout, of even grain and free of cracks, voids and other imperfections that may impair serviceability.

6.1 Quality Control Requirements

Manufacturers of brass service saddles for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

The brass service saddles shall be packaged, stored and handled in such a way as to prevent damage and other defect which may impact serviceability.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the brass service saddles approved for use in the City of Winnipeg.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating brass service saddles furnished for use in the City of Winnipeg comply with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer must apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing brass service saddles for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing brass service saddles for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

ASTM B62
Composition of Bronze or Ounce Metal Castings

ASTM B96

Standard Specification for Copper-Silicon Alloy Plate, Sheet, Strip, and Rolled Bar for General Purposes and Pressure Vessels

ASTM B98

Standard Specification for Copper-Silicon Alloy Rod, Bar and Shapes

ASTM D395

Standard test methods for rubber property - compression set

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

AWWA C800

Standard specification for Underground Service Lines Service saddles

NSF/ANSI Standard 61

Drinking Water System Components - Health Effects



STANDARD FOR
RESIDENTIAL SERVICE BOX
STANDARD NO. CoW-WS-05

1. SCOPE

This standard applies to all residential service boxes approved for use in the City of Winnipeg.

This standard applies to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the residential service boxes purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all residential service boxes for use with residential curb stops in nominal sizes of 19mm ($\frac{3}{4}$ ") through to 50mm (2").

All residential service boxes shall include;

- a gray iron (CI) cap with a threaded pentagonal brass plug,
- a stainless steel (SS) telescopic upper and riser body,
- an Acrylonitrile butadiene styrene (ABS) or CI boot and cradle,
- a SS spindle and,
- a magnet to assist with locating.

All residential service boxes approved for use in the City of Winnipeg shall conform to the requirements of this standard and the City of Winnipeg Detail Drawing AP-019.

The standard bury depth of the residential service boxes approved for use in the City of Winnipeg shall be 2.1m to 2.7m (7' to 9') and 2.4m to 3.0m (8' to 10') however alternate bury depth ranges may be used under specific conditions when sanctioned by a Registered Professional Engineer (P.Eng.).

3. MATERIALS

3.1 Stainless Steel

All stainless steel (SS) components shall conform to ASTM A240, type 304 or 304L as a minimum. Additionally all stainless steel components and welded joints shall be fully passivated for increased corrosion resistance.

All SS components shall meet the applicable quality-assurance test requirements of this standard with regard to material, workmanship and design.

3.2 Acrylonitrile Butadiene Styrene

All Acrylonitrile butadiene styrene (ABS) components shall conform to ASTM D4673 as a minimum.

All ABS components shall meet the applicable quality-assurance test requirements of this standard with regard to material, workmanship and design.

3.3 Brass

All brass components shall be manufactured from Copper Alloy UNS No. C86500 (Cu 55.0-60.0 Zn 36.0-42.0 Fe 0.4-2.0 Al 0.5-1.5 Mn 0.1-1.5) as a minimum conforming to the requirements of ASTM B30.

All brass components shall meet the applicable quality-assurance test requirements of this standard with regard to material, workmanship and design.

3.4 Gray Iron

All gray iron (CI) materials shall conform to the requirements of ASTM A48, Class 30 with a Ultimate Tensile Strength (UTS) of 206.8427 MPa (30,000 p.s.i.). All testing shall be conducted on an independently cast test bar sample as required by ASTM A48. All gray iron shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and minimum design load.

Basic materials shall be made from virgin or recycled and meets the physical and chemical properties as defined in ASTM A48 for Class 30 gray iron.

3.5 Finishes

All CI caps shall be finished with a black rust protection coating. The coating must be able to withstand exposure to temperatures up of 60°C without physical or chemical alteration and shall not become brittle or chip off at temperatures below 0°C.

The black rust protection coating shall be applied evenly with a minimum thickness of 15 mils (0.35mm) and shall not be used to conceal visible cracks, voids, inclusions or other injurious defects.

All CI boots and cradles shall receive a fusion-bonded epoxy coating meeting or exceeding the requirements of AWWA C116 or an equal approved by The City of Winnipeg.

Minimum dry film thickness for the fusion-bonded epoxy shall be determined by the method described in AWWA C116.

3.6 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 Gray Iron (CI) Cap

All CI caps shall be a minimum of 100mm (4") in diameter and marked as per section 5.1 of this standard. The cap shall be threaded with a 38mm (1 1/4") National Pipe Thread Taper (NPT) to fit onto the top of the SS telescopic upper section (see section 4.5 of this standard). The cap shall also be threaded to accept a 25mm (1") pentagonal brass access plug (see section 4.2 of this standard).

All similar styled CI caps shall be manufactured to allow for interchangeability between manufacturers.

4.2 Pentagonal Brass Plug

All residential service boxes supplied for use within the City of Winnipeg shall be furnished with a removable pentagonal brass plug which shall provide access to the SS spindle to allow for the operation of the curb stop.

Each side of the pentagonal brass plug shall be 6mm (1/4") and shall have a 25mm (1") threaded lower section.

All similar styled brass plugs shall be manufactured to allow for interchangeability between manufacturers.

4.3 Bolts, Nuts and Washers

All bolts, nuts and washers shall be made of 304 stainless steel, conditions cold worked (CW) or strain-hardened (SH) conforming to the requirements of ASTM F593 and ASTM F594 as required and shall have a 9.5mm (3/8") Unified National Coarse Roll Thread (UNC) thread and shall be 3/4" in length.

4.4 Magnet

All residential service boxes approved for use in the City of Winnipeg shall include a 30lbs pull magnet as a minimum. The magnet shall be attached to the gray iron cap or to an adjustable SS or epoxy coated sleeve which shall be located immediately below the CI cap.

4.5 Telescopic upper and Riser

The telescopic upper section of the residential service box shall be manufactured of a 31.75mm (1 ¼") diameter schedule 40, type 304 SS pipe as per section 3.1 of this standard.

The riser section of the residential service box shall be manufactured of a 25.40mm (1") diameter schedule 40, type 304 SS pipe as per section 3.1 of this standard.

The range of adjustment between the telescopic upper section and the riser section shall be 610mm (24") with a minimum overlap of 152mm (6"). The telescopic upper section and the riser section shall be held in position at the desired bury depth with a SS bolt as per section 4.2 of this standard.

The length of the telescopic upper section and the riser section shall be dependent upon the standard bury depth of the residential service boxes (see section 2.1 of this standard).

4.6 Stainless Steel Spindle

All residential service boxes supplied for use within the City of Winnipeg shall be furnished with a 12.7mm (½") diameter SS spindle sized for the specific adjustment range of the service box.

All SS spindles shall be manufactured with a "W" centering bend (standard pig tail) to centre the spindle within the telescopic upper section and the riser section of the residential service box. Additionally the top of the spindle shall be flattened to fit the curb box key.

The SS spindles shall meet the requirements of section 3.1 of this standard and shall be supplied with a SS cotter pin for attachment to the curb stop operating head (*see City of Winnipeg Standard for Brass Valves and Fittings, Standard No. CoW-WM-03 for more details*).

All replacement spindles must be from a manufacturer approved under this standard.

4.7 Boot and Cradle

All residential service boxes supplied for use within the City of Winnipeg shall be manufactured of either ABS as per section 3.2 or CI as per section 3.4 of this standard.

The residential service boxes supplied for use within the City of Winnipeg shall be sized for the service. The residential service box boot shall be designed to

rest on the cradle level with the bottom of the curb stop without touching the curb stop or the service tubing.

The seating surface of the CI boot and cradle supplied for use within the City of Winnipeg shall be either machined or ground level to produce a balanced fit to prevent rocking.

5. MARKING

5.1 Markings

The CI caps supplied for use within the City of Winnipeg shall bear the following markings:

- Manufacturers' name or trademark,
- WATER.

The SS spindle shall be shall bear the following markings:

- Manufacturers' name or trademark,
- SS Type.

6. WORKMANSHIP AND FINISH

6.1 CI Castings

The CI components supplied for use within the City of Winnipeg shall be homogeneous throughout, of even grain and free of cracks, voids and other imperfections that may impair serviceability.

The CI components shall be free of burrs and sharp edges prior to application of the protective coating.

6.2 ABS Moldings

The ABS molded components supplied for use within the City of Winnipeg shall be homogeneous throughout, of even grain and free of cracks, voids and other imperfections that may impair serviceability.

6.3 Quality Control Requirements

Manufacturers of residential service boxes for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance

(Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period of no less than two (2) years and must be made available upon request by the City of Winnipeg or their representatives.

7. PACKAGING

The residential service boxes shall be packaged, stored and handled in such a way as to prevent damage and other defect which may impact serviceability.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the residential service boxes approved for use in the City of Winnipeg.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the residential service boxes furnished for use in the City of Winnipeg comply with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer must apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing residential service boxes for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing residential service boxes for use in the City of Winnipeg.

All approved manufacturers shall have local representation within the City of Winnipeg.

11. REFERENCES

ASTM B30

Standard Specification for Copper Alloys in Ingot Form

ASTM D48

Standard specification for Gray Iron Castings

ASTM D4673

Standard Classification System for Acrylonitrile-Butadiene-Styrene (ABS) Plastics and Alloys Molding and Extrusion Materials

ASTM F593

Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F594

Standard Specification for Stainless Steel Nuts

AWWA C116

Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service



STANDARD FOR
BRASS ELECTRICAL CABLE ATTACHMENTS
STANDARD NO. CoW-WS-06

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SEWER PRODUCTS STANDARDS





STANDARD FOR
POLYVINYLCHLORIDE (PVC)
SEWER MAIN PIPING
STANDARD NO. CoW-SM-01

1. SCOPE

This standard shall apply to all polyvinylchloride (PVC) sewer main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the PVC sewer main piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the PVC sewer main piping in diameters 150mm (6") and larger approved for use in the City of Winnipeg specifically;

- sewer main piping,
- sewer connection piping, and
- cul de sac sewer piping.

All materials shall conform to the requirements of CAN/CSA B182.2, ASTM D1784 and ASTM F1760. All PVC sewer main piping shall be green in colour.

3. MATERIALS

3.1 PVC

All PVC sewer main piping pipe shall be extruded from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all PVC sewer main piping shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with PVC sewer main piping shall meet the requirements of CAN/CSA B182.2. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All Gaskets shall be factory installed in the bell end of the pipe and when seated with another pipe shall form a watertight seal.

All lubricants used for the assembly of the PVC sewer main piping shall be made of a non-toxic, water soluble material compatible with the pipe and gasket materials and meet the recommendations of the manufacturer.

4. DESIGN

4.1 Dimension Ratio

The PVC sewer main piping supplied to the City of Winnipeg shall conform to the standard dimension ratio (SDR) of 35 as specified in CAN/CSA B182.2.

4.2 Wall Thickness

The PVC sewer main piping supplied to the City of Winnipeg shall have a minimum wall thickness as per CAN/CSA B182.2 in accordance with ASTM D2122.

4.3 Elastomeric Gasket

All PVC sewer main piping supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

5. MARKING

5.1 Pipe Markings

All PVC sewer main piping supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.2. All PVC sewer main piping shall be marked with the following identifications:

- Nominal size
- PVC cell classification
- Type PSM SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the PVC sewer main piping supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name

- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 PVC Sewer main piping

The PVC sewer main piping supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of PVC sewer main piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a “Corrective Action” policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Pipe shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All PVC sewer main piping should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PVC sewer main piping approved for use in the City of Winnipeg.

All PVC sewer main piping should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All PVC sewer main piping shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the PVC sewer main piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing PVC sewer main piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing PVC sewer main piping for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F1760

Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content

Standard CAN/CSA-B182.2

PVC Sewer Pipe and Fittings



STANDARD FOR
POLYVINYLCHLORIDE (PVC)
PROFILE STORM SEWER PIPING
STANDARD NO. CoW-SM-02

1. SCOPE

This standard shall apply to all polyvinylchloride (PVC) profile storm sewer piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the PVC profile storm sewer piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the PVC profile storm sewer piping in diameters 200mm (8") and larger approved for use in the City of Winnipeg specifically;

- Circumferential open profile storm sewer piping, 200mm (8") through 600mm (24") in diameter,
- Spiral open profile storm sewer piping , 675mm (27") through 1200mm (48") in diameters,
- Dual wall profile storm sewer piping, 200mm (8") through 1200mm (48") in diameters.

All materials shall conform to the requirements of CAN/CSA B 182.4 and ASTM D1784. All PVC profile storm sewer piping shall be green in colour.

3. MATERIALS

3.1 PVC

All PVC profile storm sewer piping pipe shall be extruded from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all PVC profile storm sewer piping shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with PVC profile storm sewer piping shall meet the requirements of CAN/CSA B182.4. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the

manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the PVC profile storm sewer piping shall be made of a non-toxic, water soluble material compatible with the pipe and gasket materials and meet the recommendations of the manufacturer.

4. DESIGN

4.1 Pipe Dimensions

The PVC profile storm sewer piping supplied to the City of Winnipeg shall conform to the pipe dimensions specified in ASTM D2122.

4.2 Pipe Stiffness

Pipe stiffness shall be 320 N/m/mm (kPa) and comply with CSA B182.4

4.3 Wall Thickness

The PVC profile storm sewer piping supplied to the City of Winnipeg shall have a minimum wall thickness as per CAN/CSA 182.4 in accordance with ASTM D2122.

4.4 Elastomeric Gasket

All PVC profile storm sewer piping supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

All Gaskets shall be factory installed on the spigot end of the pipe and when properly seated with another pipe shall form a soil-tight seal.

5. MARKING

5.1 Pipe Markings

All PVC profile storm sewer piping supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.4. All PVC profile storm sewer piping shall be marked with the following identifications:

- Nominal size
- PVC cell classification
- Pipe stiffness, PS320
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the PVC profile storm sewer piping supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Pipe

The PVC profile storm sewer piping supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All Gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of PVC profile storm sewer piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Pipe shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All PVC profile storm sewer piping should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PVC profile storm sewer piping approved for use in the City of Winnipeg.

All PVC profile storm sewer piping should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All PVC profile storm sewer piping shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the PVC profile storm sewer piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.4.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing PVC profile storm sewer piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing PVC profile storm sewer piping for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

Standard CAN/CSA-B182.4

Profile PVC Sewer Pipe and Fittings



STANDARD FOR
REINFORCED
CONCRETE SEWER MAIN PIPING
STANDARD NO. CoW-SM-03

1. SCOPE

This standard shall apply to all reinforced concrete sewer main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the reinforced concrete sewer main piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the reinforced concrete sewer main piping in diameters 300mm (12") and larger approved for use in the City of Winnipeg specifically;

- interceptor sewer pipe,
- land drainage sewer pipe,
- storm relief sewer pipe,
- wastewater sewer pipe,
- jacking pipe and,
- storm drains.

All materials shall conform to the requirements of CAN/CSA A257.2 and ASTM C76.

All manufacturers of reinforced concrete sewer main pipe supplied to the City of Winnipeg shall be certified under the Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program. Manufacturers must supply a copy of the certification prior to product approval and must notify the City of Winnipeg within 5 business days of any change in certification status.

3. MATERIALS

3.1 Portland Cement

All reinforced concrete sewer main pipe supplied to the City of Winnipeg shall be manufactured from Type HS/HSL (T 50) or Type V sulphate resistant Portland cement containing no more than 5% C₃A as per the requirements of CAN/CSA A3000, ASTM C150 and ASTM C1157.

Additionally all reinforced concrete sewer main piping shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Wire Re-Enforcement

All reinforced concrete sewer main pipe intended for use within the City of Winnipeg shall be reinforced with wire conforming to the requirements specified in CAN/CSA A257.2 and ASTM C76.

3.3 Gaskets

All reinforced concrete sewer pipes shall be supplied with watertight rubber joint gasket which meets the requirements of ASTM C443 and CAN/CSA A257.3.

When requested oil resistant flexible gasket may be used provided it meets the requirements of ASTM C443 and CAN/CSA A257.3.

4. DESIGN

4.1 Bell and Spigot Pipe

All reinforced concrete bell and spigot sewer pipe supplied for use within the City of Winnipeg shall meet the requirements of ASTM C76 and CAN/CSA A257.2.

4.2 Straight Wall Pipe for Jacking

All reinforced concrete straight wall sewer pipe supplied for use in pipe jacking within the City of Winnipeg shall meet the requirements of ASTM C76 and CAN/CSA A257.2. The outside of the bell end is to be fitted with a 14 gauge steel band with a width of 1.5 times the length of the bell end groove.

4.3 Gaskets

The gasket shall be a continuous ring which shall fit securely onto the spigot end of the pipe and shall form a water proof joint when inserted onto the bell end of the preceding pipe segment.

5. MARKING

5.1 Pipe Markings

All reinforced concrete sewer main piping supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA 182.2. All reinforced concrete sewer main piping shall be marked with the following identifications:

- pipe strength classification
- jacking pipe shall be marked with a "J"
- manufacturers' name or trademark
- production date including the day, month, year
- plant identification
- CSA standard number
- ASTM standard number
- OCPA Plant Prequalification seal

- any additional certification agency trademark/seal

Required marking for the reinforced concrete sewer main piping supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

5.2 Gasket Markings

Gaskets shall be marked with at least the following;

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

All reinforced concrete sewer pipes supplied for use within the City of Winnipeg shall be homogeneous throughout and shall be free from visible cracks, voids, inclusions and other injurious defects. The sealing surfaces of integral bell sockets shall be free of nicks, scratches, and other imperfections that may cause joint leakage. The plane face of the bell shall be at right angles to the centre line of the flow. The pipe shall be as uniform as commercially practical in colour, density, opacity, and other physical properties.

6.1 Quality Control Tests

The manufacturer shall conduct all quality control testing as described in ASTM C76, CAN/CSA A23 and CAN/CSA A257. In addition, the manufacturer shall conduct quality control testing as required by the OCPA and any other third party certification agents denoted in section 5.1 of this standard.

The City of Winnipeg may request at any time certified copies of all quality control tests to be supplied within 5 business days of receipt of written notice.

6.2 Quality Control Requirements

Manufacturers of reinforced concrete sewer main piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;

- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Pipe shall be stored and handled in such a way as to prevent damage such as scratches, gouges, cracking and other defects.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the reinforced concrete sewer main piping approved for use in the City of Winnipeg.

All reinforced concrete sewer main piping should be visually inspected for scratches, gouges, cracks and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the reinforced concrete sewer main piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA A257.2 and ASTM C76.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing reinforced concrete sewer main piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing reinforced concrete sewer main piping for use in the City of Winnipeg.

11. REFERENCES

ASTM C76

Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer pipe

ASTM C150

Standard Specification for Portland cement

ASTM C443

Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C1157

Standard Specification for the Performance Specification for Hydraulic Cements

CAN/CSA A23

Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete

CAN/CSA A257

Standards for Concrete Pipe and Manhole Sections (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4)

CAN/CSA A3000

Cementitious Materials Compendium (which consists of A3001, A3002, A3003, A3004 and A3005)

CAN/CSA G30

Billet-Steel Bars for Concrete Reinforcement

CAN/CSA Standard CAN3-Z299.3

Quality Assurance Program – Category 3

ISO 9001

Quality Management Systems

Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program

Precast Concrete Certification



STANDARD FOR
NON-REINFORCED
CONCRETE SEWER MAIN PIPING
STANDARD NO. CoW-SM-04

1. SCOPE

This standard shall apply to all non-reinforced concrete sewer main piping approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the non-reinforced concrete sewer main piping purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the non-reinforced concrete sewer main piping in diameters 250mm (10") to 600mm (24") approved for use in the City of Winnipeg specifically;

- land drainage sewer pipe,
- storm relief sewer pipe,
- wastewater sewer pipe and,
- drainage inlet connection pipe.

All materials shall conform to the requirements of CAN/CSA A257.1 and ASTM C14, Class 3.

All manufacturers of non-reinforced concrete sewer main pipe supplied to the City of Winnipeg shall be certified under the Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program. Manufacturers must supply a copy of the certification prior to product approval and must notify the City of Winnipeg within 5 business days of any change in certification status.

3. MATERIALS

3.1 Portland Cement

All non-reinforced concrete sewer main pipe supplied to the City of Winnipeg shall be manufactured from Type HS/HSL (T 50) or Type V sulphate resistant Portland cement containing no more than 5% C₃A as per the requirements of CAN/CSA A3000, ASTM C150 and ASTM C1157.

Additionally all non-reinforced concrete sewer main piping shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets

All non-reinforced concrete sewer pipes shall be supplied with watertight rubber joint gasket which meets the requirements of ASTM C443 and CAN/CSA A257.3.

When requested oil resistant flexible gasket may be used provided it meets the requirements of ASTM C443 and CAN/CSA A257.3.

4. DESIGN

4.1 Bell and Spigot Pipe

All non-reinforced concrete sewer pipe supplied for use within the City of Winnipeg shall meet the requirements of ASTM C14 and CAN/CSA A257.1.

4.2 Gaskets

The gasket shall be a continuous ring which shall fit securely onto the spigot end of the pipe and shall form a water proof joint when inserted onto the bell end of the preceding pipe segment.

5. MARKING

5.1 Pipe Markings

All non-reinforced concrete sewer main piping supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA A257.1. All non-reinforced concrete sewer main piping shall be marked with the following identifications:

- pipe strength classification
- manufacturers' name or trademark
- production date including the day, month, year
- plant identification
- CSA standard number
- ASTM standard number
- OCPA Plant Prequalification seal
- any additional certification agency trademark/seal

Required marking for the non-reinforced concrete sewer main piping supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the pipe.

5.2 Gasket Markings

Gaskets shall be marked with at least the following;

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

All non-reinforced concrete sewer pipes supplied for use within the City of Winnipeg shall be homogeneous throughout and shall be free from visible cracks, voids, inclusions and other injurious defects. The sealing surfaces of integral bell sockets shall be free of nicks, scratches, and other imperfections that may cause joint leakage. The plane face of the bell shall be at right angles to the centre line of the flow. The pipe shall be as uniform as commercially practical in colour, density, opacity, and other physical properties.

6.1 Quality Control Tests

The manufacturer shall conduct all quality control testing as described in ASTM C14, CAN/CSA A23 and CAN/CSA A257.1. In addition, the manufacturer shall conduct quality control testing as required by the OCPA and any other third party certification agents denoted in section 5.1 of this standard.

The City of Winnipeg may request at any time certified copies of all quality control tests to be supplied within 5 business days of receipt of written notice.

6.2 Quality Control Requirements

Manufacturers of non-reinforced concrete sewer main piping for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Pipe shall be stored and handled in such a way as to prevent damage such as scratches, gouges, cracking and other defects.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the non-reinforced concrete sewer main piping approved for use in the City of Winnipeg.

All non-reinforced concrete sewer main piping should be visually inspected for scratches, gouges, cracks and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the non-reinforced concrete sewer main piping furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA A257.1 and ASTM C14.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing non-reinforced concrete sewer main piping for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing non-reinforced concrete sewer main piping for use in the City of Winnipeg.

11. REFERENCES

ASTM C14

Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe

ASTM C150

Standard Specification for Portland cement

ASTM C443

Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C1157

Standard Specification for the Performance Specification for Hydraulic Cements

CAN/CSA A23

Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete

CAN/CSA A257

Standards for Concrete Pipe and Manhole Sections (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4)

CAN/CSA A3000

Cementitious Materials Compendium (which consists of A3001, A3002, A3003, A3004 and A3005)

CAN/CSA G30

Billet-Steel Bars for Concrete Reinforcement

CAN/CSA Standard CAN3-Z299.3

Quality Assurance Program – Category 3

ISO 9001

Quality Management Systems

Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program

Precast Concrete Certification



STANDARD FOR
HIGH DENSITY POLYETHYLENE (HDPE)
SEWER MAIN PIPING
STANDARD NO. CoW-SM-05

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STANDARD FOR

CORREGATED STEEL (CSP) OUTFALL PIPING

STANDARD NO. CoW-SM-06

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STANDARD FOR
OUTFALL HEADWALL AND SAFETY COMPONENTS
STANDARD NO. CoW-SM-07

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STANDARD FOR
INJECTION MOULDED
POLYVINYLCHLORIDE (PVC) SEWER FITTINGS
STANDARD NO. CoW-SM-08

1. SCOPE

This standard shall apply to all injection moulded polyvinylchloride (PVC) sewer fitting for 150mm to 250mm diameter for main line and lateral PVC sewer pipe approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the Injection moulded PVC sewer fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the injection moulded PVC sewer fittings in diameters 150mm (6") to 250mm (10") approved for use in the City of Winnipeg specifically;

- Tees,
- Wyes,
- Crosses,
- Bends,
- Reducers and
- Plugs

All materials shall conform to the requirements of CAN/CSA B182.2 and ASTM F679.

All injection moulded PVC sewer fittings shall be either green or white in colour.

3. MATERIALS

3.1 PVC

All injection moulded PVC sewer fittings shall be extruded from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all injection moulded PVC sewer fittings shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with injection moulded PVC sewer fittings shall meet the requirements of CAN/CSA B182.2. The gasket material shall also meet

and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the injection moulded PVC sewer fittings shall be made of a non-toxic, water soluble material compatible with the fitting and gasket materials and meet the recommendations of the manufacturer.

4. DESIGN

4.1 Fitting Dimensions

The injection moulded PVC sewer fittings supplied to the City of Winnipeg shall conform to the dimensions for SDR 35 as specified in ASTM D2122.

4.2 Fitting Stiffness

Fitting stiffness shall comply with CSA B182.2

4.3 Wall Thickness

The injection moulded PVC sewer fittings supplied to the City of Winnipeg shall have a minimum wall thickness for SDR 35 as per CAN/CSA B182.2 in accordance with ASTM D2122.

4.4 Elastomeric Gasket

All injection moulded PVC sewer fittings supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

All gaskets shall be factory installed in the bell end of the fitting and when properly seated with the spigot end of the pipe shall form a watertight seal.

5. MARKING

5.1 Fitting Markings

All injection moulded PVC sewer fittings supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.2. All injection moulded PVC sewer fittings shall be marked with the following identifications:

- Nominal size
- PVC cell classification
- PSM Type SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the injection moulded PVC sewer fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Fitting

The injection moulded PVC sewer fittings supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of injection moulded PVC sewer fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Fittings shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All injection moulded PVC sewer fittings should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the injection moulded PVC sewer fittings approved for use in the City of Winnipeg.

All injection moulded PVC sewer fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All injection moulded PVC sewer fittings shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the injection moulded PVC sewer fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing injection moulded PVC sewer fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing injection moulded PVC sewer fittings for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D3034

Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F913

Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F1336

Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings

Standard CAN/CSA B182.2

PVC Sewer Pipe and Fittings (PSM Type)



STANDARD FOR
FABRICATED POLYVINYLCHLORIDE (PVC)
SEWER FITTINGS
STANDARD NO. CoW-SM-09

1. SCOPE

This standard shall apply to all fabricated polyvinylchloride (PVC) sewer fitting 200mm in diameter and larger for use on main line PVC sewer pipe approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the fabricated PVC sewer fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the fabricated PVC sewer fittings in diameters 200mm (8") and larger approved for use in the City of Winnipeg specifically;

- Tees,
- Wyes,
- Crosses,
- Bends and
- Reducers

All materials shall conform to the requirements of CAN/CSA B182.2 and ASTM F679.

All fabricated PVC sewer fittings shall be either green or white in colour.

3. MATERIALS

3.1 PVC

All fabricated PVC sewer fittings shall be extruded from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all fabricated PVC sewer fittings shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with fabricated PVC sewer fittings shall meet the requirements of CAN/CSA B182.2. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the

manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the fabricated PVC sewer fittings shall be made of a non-toxic, water soluble material compatible with the fitting and gasket materials and meet the recommendations of the manufacturer.

4. DESIGN

4.1 Fitting Dimensions

The fabricated PVC sewer fittings supplied to the City of Winnipeg shall conform to the pipe dimensions specified in ASTM D2122 for SDR 35 fittings.

4.2 Fitting Stiffness

Fitting stiffness shall comply with CSA B182.2

4.3 Wall Thickness

The fabricated PVC sewer fittings supplied to the City of Winnipeg shall have a minimum wall thickness for SDR 35 as per CAN/CSA B182.2 in accordance with ASTM D2122.

4.4 Elastomeric Gasket

All fabricated PVC sewer fittings approved for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

All gaskets shall be factory installed in the bell end of the fitting and when properly seated with the spigot end of the pipe shall form a watertight seal.

5. MARKING

5.1 Fitting Markings

All fabricated PVC sewer fittings supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.2. All fabricated PVC sewer fittings shall be marked with the following identifications:

- Nominal size
- PVC cell classification
- PSM Type SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the fabricated PVC sewer fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Gasket Markings

Gaskets shall be marked with at least the following

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Fitting

The fabricated PVC sewer fittings supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, be of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of fabricated PVC sewer fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Fittings shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All fabricated PVC sewer fittings should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the fabricated PVC sewer fittings approved for use in the City of Winnipeg.

All fabricated PVC sewer fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All fabricated PVC sewer fittings shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the fabricated PVC sewer fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing fabricated PVC sewer fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing fabricated PVC sewer fittings for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D3034

Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F913

Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F1336

Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings

Standard CAN/CSA B182.2

PVC Sewer Pipe and Fittings (PSM Type)



STANDARD FOR
POLYVINYLCHLORIDE (PVC) PROFILE
SEWER FITTINGS
STANDARD NO. CoW-SM-10

1. SCOPE

This standard shall apply to all polyvinylchloride (PVC) profile sewer fitting 200mm in diameter and larger for use on main line PVC profile sewer pipe approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the PVC profile sewer fittings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the PVC profile sewer fittings in diameters 200mm (8") and larger approved for use in the City of Winnipeg specifically;

- Tees
- Wyes,
- Crosses
- Bends
- Reducers and
- Plugs

All materials shall conform to the requirements of CAN/CSA B182.4 and ASTM F679.

All PVC profile sewer fittings shall be either green or white in colour.

3. MATERIALS

3.1 PVC

All PVC profile sewer fittings shall be extruded from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all PVC profile sewer fittings shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with PVC profile sewer fittings shall meet the requirements of CAN/CSA B182.4. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the

manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the PVC profile sewer fittings shall be made of a non-toxic, water soluble material compatible with the fitting and gasket materials and meet the recommendations of the manufacturer.

4. DESIGN

4.1 Fitting Dimensions

The PVC profile sewer fittings supplied to the City of Winnipeg shall conform to the pipe dimensions specified in ASTM D2122.

4.2 Fitting Stiffness

Fitting stiffness shall be 320 N/m/mm (kPa) and comply with CSA B182.4

4.3 Wall Thickness

The PVC profile sewer fittings supplied to the City of Winnipeg shall have a minimum wall thickness for per CAN/CSA B182.4 in accordance with ASTM D2122.

4.4 Elastomeric Gasket

All gaskets shall be installed on the spigot end of the PVC profile storm sewer piping and when properly seated with the fitting shall form a soil-tight seal.

5. MARKING

5.1 Fitting Markings

All PVC profile sewer fittings supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.4. All PVC profile sewer fittings shall be marked with the following identifications;

- Nominal size
- PVC profile cell classification
- Pipe stiffness, PS320
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the PVC profile sewer fittings supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Gasket Markings

Gaskets shall be marked with at least the following;

- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 Fitting

The PVC profile sewer fittings supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, be of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of PVC profile sewer fittings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a “Corrective Action” policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Fittings shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All PVC profile sewer fittings should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PVC profile sewer fittings approved for use in the City of Winnipeg.

All PVC profile sewer fittings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All PVC profile sewer fittings shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the PVC profile sewer fittings furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.4.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing PVC profile sewer fittings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing PVC profile sewer fittings for use in the City of Winnipeg.

11. REFERENCES

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC profile) compounds and chlorinated poly (vinyl chloride) (CPVC profile) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D3034

Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC profile) Sewer Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC profile) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F913

Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F1336

Standard Specification for Poly (Vinyl Chloride) (PVC profile) Gasketed Sewer Fittings

Standard CAN/CSA B182.4

Profile PVC Sewer Pipe and Fittings



STANDARD FOR
POLYVINYLCHLORIDE (PVC) SEWER
CONNECTION SADDLES AND STUBS
STANDARD NO. CoW-SM-11

1. SCOPE

This standard shall apply to all strap-on gasketed polyvinylchloride (PVC) sewer connection saddles and stubs for use on 250mm and larger diameter main line sewer pipe with inlet sizes of 150mm and larger approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the PVC sewer connection saddles and stubs purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all PVC sewer connection saddles and stubs used on wastewater and storm sewer pipe with diameters 250mm (10") (300mm minimum for vitrified clay pipe) and larger approved for use in the City of Winnipeg specifically;

- Sanded Stubs
- Tees
- Wyes

All materials shall conform to the requirements of CAN/CSA B182.2 and ASTM F679 or F794.

PVC sewer connection saddles and stubs shall be used to axially join non-pressure manholes, main lines and lateral sewer pipes and/or fittings.

The maximum size of the lateral connection pipe to an existing sewer, using a PVC saddle is to be no more than two sizes smaller than the existing sewer pipe.

All PVC sewer connection saddles and stubs shall be either green or white in colour.

3. MATERIALS

3.1 PVC

All PVC sewer connection saddles and stubs shall be manufactured from a PVC compound having a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all PVC sewer connection saddles and stubs shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and extrusion quality.

3.2 Gaskets and Lubricants

All gaskets intended for use with PVC sewer connection saddles and stubs shall meet the requirements of CAN/CSA B182.2. The gasket material shall also meet and/or exceed the requirements of ASTM F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the PVC sewer connection saddles and stubs shall be made of a non-toxic, water soluble material compatible with the fitting and gasket materials and meet the recommendations of the manufacturer.

3.3 Stainless Steel Straps and Bolts

All stainless steel (SS) components shall be of type 304 SS or better, and shall containing not less than 16 % chromium and not less than 8 % nickel.

Straps shall have a minimum of welds and shall be subject to City of Winnipeg approval. The stainless steel components shall not have contact with any dissimilar metal.

3.4 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 Saddle Dimensions

The PVC sewer connection saddles supplied to the City of Winnipeg shall conform to the dimensions for SDR 35 as specified in ASTM D2122.

4.2 Saddle and Stub Stiffness

Fitting stiffness shall comply with CSA B182.2

4.3 Sanded Stubs

Sanded stubs shall be fabricated by an approved manufacturer and not field made. Sand collars shall be coated with an epoxy adhesive compatible with both the PVC and the concrete grout and coated with fine aggregate.

The installation of the sanded stub shall be such that the bell portion of the stub is adjacent and external to the wall of the manhole, and the spigot shall protrude through and into the manhole 3-inches beyond the interior of the wall of the manhole.

The sanded stub shall be bonded, anchored, and finished using an approved non-shrink grout, portland cement mortar is not acceptable.

4.4 Wall Thickness

The PVC sewer connection saddles and stubs supplied to the City of Winnipeg shall have a minimum wall thickness for SDR 35 as per CAN/CSA B182.2 in accordance with ASTM D2122.

4.5 Elastomeric Gasket

All PVC sewer connection saddles and stubs supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

All gaskets shall be factory installed in the bell end of the fitting and when properly seated with the spigot end of the pipe shall form a watertight seal.

4.6 Stainless Steel Straps and Bolts

PVC sewer connection saddles shall be either bolted directly to the host pipe or shall be held in place by SS straps

All SS straps shall have a minimum thickness of 0.280 mm and be capable of withstanding a minimum of 6.78 Nm torque. All threaded components shall be right hand National Course Roll Thread.

The bolts, nuts and washers shall be made of 304 stainless steel, conditions cold worked (CW) or strain-hardened (SH) conforming to the requirements of ASTM F593 and ASTM F594 as required. Bolts shall be 6mm (1/4") diameter with a 10mm (3/8") National Coarse Roll Thread (NC) track head.

Thread coating, thread lubricant or anti-seize coating for threaded components shall be a dry molybdenum disulphide or polytetrafluoroethylene (PTFE) based compound or alternate thread coating acceptable to the City of Winnipeg.

5. MARKING

5.1 Markings

All PVC sewer connection saddles and stubs supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B182.2. All PVC

sewer connection saddles and stubs shall be marked with the following identifications;

- Nominal size
- PVC cell classification
- PSM Type SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the PVC sewer connection saddles supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Gasket Markings

Gaskets shall be marked with at least the following;

- date code
- manufacturer name
- nominal diameter

5.3 Stainless Steel Markings

All SS straps and bolts shall be marked with the following identifications;

- Manufacturers name or trademark
- Stainless steel grade and identification
- Strap size

6. WORKMANSHIP AND FINISH

6.1 Saddles and Stubs

The PVC sewer connection saddles supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Gaskets

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of PVC sewer connection saddles for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall

include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

All PVC sewer connection saddles and stubs shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All PVC sewer connection saddles and stubs should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the PVC sewer connection saddles and stubs approved for use in the City of Winnipeg.

All PVC sewer connection saddles and stubs should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All PVC sewer connection saddles and stubs shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the PVC sewer connection saddles and stubs furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing PVC sewer connection saddles and stubs for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing PVC sewer connection saddles and stubs for use in the City of Winnipeg.

11. REFERENCES

ASTM A167

Specification for Stainless and Heat-Resistant Chromium Nickel Steel Plate, Sheet and Strip

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D3034

Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F679

Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F913

Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F1336

Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings

Standard CAN/CSA B182.2

PVC Sewer Pipe and Fittings (PSM Type)



STANDARD FOR
FLEXIBLE LATERAL SEWER AND MANHOLE CONNECTIONS
STANDARD NO. CoW-SM-12

1. SCOPE

This standard shall apply to all compression fit and flexible strap-on gasketed lateral sewer and manhole connections for use on 250mm and larger diameter main line sewer pipe with lateral sizes of 150mm and larger approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the lateral sewer and manhole connections purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all lateral sewer and manhole connections used on wastewater and storm sewer pipe with diameters 250mm (10") (300mm minimum for vitrified clay pipe) and larger approved for use in the City of Winnipeg specifically;

- Tees
- Wyes
- Manhole connections

All materials shall conform to the requirements of CAN/CSA B182.2 and ASTM C923 or F477.

Lateral sewer and manhole connections shall be used to axially join non-pressure manholes, main lines and lateral sewer pipes and/or fittings.

The maximum size of the lateral connection pipe to an existing sewer is to be no more than two sizes smaller than the existing mainline sewer pipe.

3. MATERIALS

3.1 Polyvinylchloride (PVC)

All PVC components shall have a cell classification of 12454-C or 12364-C as defined by ASTM Standard D1784. Different cell classifications may be used provided that all properties are equal to or superior to those of the specified compounds.

Additionally all PVC components shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship and extrusion quality.

3.2 Elastomeric Components

Material for the elastomeric components shall be manufactured from natural or synthetic rubber and shall conform to the requirements of CAN/CSA B602. The elastomeric material shall be compatible with the pipe materials to which it is to be in contact. The elastomeric material shall also meet and/or exceed the requirements of ASTM C923 or F477 for elastomeric seals. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

All lubricants used for the assembly of the Lateral sewer and manhole connections shall be made of a non-toxic, water soluble material compatible with the fitting and gasket materials and meet the recommendations of the manufacturer.

3.3 Stainless Steel Straps and Bolts

All stainless steel (SS) components shall be of type 304 SS or better, and shall containing not less than 16 % chromium and not less than 8 % nickel.

Straps shall have a minimum of welds and shall be subject to City of Winnipeg approval. The stainless steel components shall not have contact with any dissimilar metal.

3.4 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 General

All compression fit and flexible strap-on gasketed lateral sewer and manhole connections shall be designed in such a way as to provide a positive seal by either mechanical or compression means between the pipe or manhole and the lateral connection as specified in ASTM C923.

4.2 PVC Stubs

PVC stubs shall be fabricated from SDR35 sewer pipe supplied by an approved PVC pipe manufacturer. The PVC stub stiffness shall comply with CSA B182.2 with a minimum wall thickness for SDR 35 as per CSA B182.2 in accordance with ASTM D2122.

The installation of the PVC stub shall be such that the spigot end shall not protrude through and into the pipe beyond the interior wall of the pipe.

4.3 Elastomeric Gasket

All PVC components supplied for use within the City of Winnipeg shall be supplied with a factory installed elastomeric gaskets and shall meet the requirements of ASTM F477.

All gaskets shall be factory installed in the bell end of the fitting and when properly seated with the spigot end of the pipe shall form a watertight seal.

4.4 Stainless Steel Straps and Bolts

All lateral sewer and manhole connections shall be installed by either a compression fit into the host pipe or shall be held in place by SS straps

All SS straps shall have a minimum thickness of 0.280 mm and be capable of withstanding a minimum of 6.78 Nm torque. All threaded components shall be right hand National Course Roll Thread.

Thread coating, thread lubricant or anti-seize coating for threaded components shall be a dry molybdenum disulphide or polytetrafluoroethylene (PTFE) based compound or alternate thread coating acceptable to the City of Winnipeg.

5. MARKING

5.1 PVC Markings

All PVC components shall bear markings in accordance with CAN/CSA B182.2. All PVC components shall be marked with the following identifications;

- Nominal size
- PVC cell classification
- PSM Type SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the PVC sewer connection saddles supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the fitting.

5.2 Elastomeric Component and Gasket Markings

All Elastomeric components and gaskets shall be marked with at least the following;

- date code
- manufacturer name
- nominal diameter

5.3 Stainless Steel Markings

All SS straps shall be marked with the following identifications;

- Manufacturers name or trademark
- Stainless steel grade and identification
- Strap size

6. WORKMANSHIP AND FINISH

6.1 PVC

The PVC components supplied for use within the City of Winnipeg shall be homogeneous throughout, free of sharp edges, of even grain and free of cracks, voids, blisters, and other imperfections that may impair serviceability.

6.2 Elastomeric Components

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of lateral sewer and manhole connections for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

All lateral sewer and manhole connections shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All lateral sewer and manhole connections should be stored in such a way as to mitigate ultraviolet light exposure.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the lateral sewer and manhole connections approved for use in the City of Winnipeg.

All lateral sewer and manhole connections should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All lateral sewer and manhole connections shall be installed within thirty-six (36) months of the date of manufacture.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the lateral sewer and manhole connections furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing lateral sewer and manhole connections for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing lateral sewer and manhole connections for use in the City of Winnipeg.

11. REFERENCES

ASTM A167

Specification for Stainless and Heat-Resistant Chromium Nickel Steel Plate, Sheet and Strip

ASTM C923

Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

ASTM D1784

Standard specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

ASTM D2122

Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D3034

Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM F477

Standard specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM F679

Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

ASTM F794

Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F913

Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F1336

Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings

CAN/CSA B182.2

PVC Sewer Pipe and Fittings (PSM Type)

CAN/CSA-B602

Mechanical couplings for drain, waste, and vent pipe and sewer pipe



STANDARD FOR
FLEXIBLE TRANSITION COUPLINGS
STANDARD NO. CoW-SM-13

1. SCOPE

This standard shall apply to all flexible transition sewer couplings used on main line and lateral sewer pipe 150mm in diameter and larger approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the flexible transition sewer coupling purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the flexible transition sewer couplings used on pipe 150mm (6") and larger in diameters approved for use in the City of Winnipeg specifically;

Flexible transition couplings approved for use in the City of Winnipeg shall conform to the requirements of this standard.

Flexible sewer couplings shall be used to axially join non-pressure main line and lateral sewer pipes and/or fittings.

Flexible transition couplings shall not be used to join PVC pipe to PVC pipe.

All materials shall conform to the requirements of CAN/CSA B602.

3. MATERIALS

3.1 Elastomer

Material for the elastomeric sealing components of flexible transition couplings shall conform to the requirements of CAN/CSA B602. The elastomeric material shall be compatible with the pipe materials to which it is to be in contact.

Additionally all flexible transition sewer coupling shall meet the applicable quality-assurance test requirements of these standards with regard to material, workmanship, and quality control.

3.2 Stainless Steel

All stainless steel (SS) components shall be of type 304 SS or better, containing not less than 16 % chromium and not less than 8 % nickel. This supersedes CAN/CSA-B602.

Straps and shear rings shall contain a minimum of welds and shall be subject to City of Winnipeg approval. The stainless steel components shall not have contact with any dissimilar metal.

4. DESIGN

The flexible transition couplings shall be comprised of an elastomeric sealing component and stainless steel tension components (straps, bolts and shear rings) or alternate strap material acceptable to the City of Winnipeg.

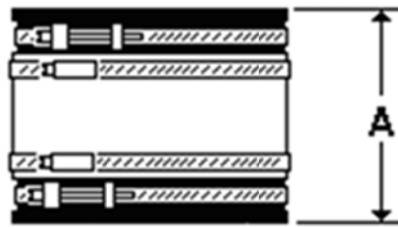


Figure 1

4.1 Elastomer

The dimensions for all flexible transition couplings approved for use in the City of Winnipeg shall be compatible with the outer diameter dimensions and tolerances of the specific material(s) and size(s) of the pipes and/or fittings to which it is designed to be joined.

The couplings shall be designed in such a way that an abrupt face or vertical surface that could potentially impede flow is not created within the pipe or fitting, and that the external diameter of the coupling does not vary. Additionally the couplings shall conform to the following design tolerance requirements;

<u>Nominal Coupling Size</u>	<u>Minimum Wall Thickness</u>	<u>Minimum Width*</u>
150 mm x 150 mm	9.5 mm	125 mm
200 mm x 200 mm	9.5 mm	150 mm
250 mm x 250 mm	9.5 mm	150 mm
300 mm x 300 mm	9.5 mm	150 mm
Over 300 mm	10.3 mm	150 mm

* - See dimension "A" in Figure 1

Figure 2

Strap and shear ring grooves shall be kept to a minimum depth. In all cases the minimum wall thickness under the strap and shear ring grooves shall be the minimum thickness indicated in section 4.1 of this standard

4.2 Stainless Steel

Straps and shear rings shall be provided for all flexible transition couplings 150mm and larger and have a minimum thickness of 0.280 mm and be capable of withstanding a minimum of 6.78 Nm torque. All threaded components shall be right hand National Course Roll Thread.

Thread coating, thread lubricant or anti-seize coating for threaded components shall be a dry molybdenum disulphide or polytetrafluoroethylene (PTFE) based compound or alternate thread coating acceptable to the City of Winnipeg.

5. MARKING

5.1 Elastomer Markings

All flexible transition sewer coupling supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA B602. All flexible transition sewer coupling shall be marked with the following identifications;

- Manufacturer's name or trademark
- Country of origin
- Product identification code;
- Nominal pipe size(s) and pipe material(s) for which the coupling is designed
- CSA, IAPMO and/or Warnock Hersey certification logo

5.2 Stainless Steel Markings

All SS straps and shear rings shall bear markings in accordance with CAN/CSA B602. All SS components shall be marked with the following identifications;

- Manufacturers name or trademark
- Country of origin
- Product identification code
- Stainless steel grade and identification
- CSA, IAPMO and/or Warnock Hersey certification logo
- Strap or shear ring size
- Shear ring shall display the nominal pipe size(s) and the pipe material(s) for which the coupling is designed *

* These markings need only appear on the shear ring if the shear ring partially or entirely obscures these same markings on the elastomer.

Required marking for the flexible transition sewer coupling supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality or integrity of the of the coupling.

6. WORKMANSHIP AND FINISH

6.1 Elastomer

The flexible transition sewer coupling supplied for use within the City of Winnipeg shall be homogeneous throughout, free from pitting, cracks, air marks, porosity, and other imperfections that may impair serviceability.

6.2 Stainless Steel

All SS components shall be shall be free of burrs and sharp edges and shall be of uniform quality consistent with good manufacturing and inspection practices and other imperfections that may impair serviceability.

6.1 Quality Control Requirements

Manufacturers of flexible transition sewer coupling for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

Couplings shall be packaged, stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

Each coupling package shall be clearly marked to provide at least the following information:

- Manufacturer's name
- Nominal pipe size(s)
- Pipe material(s)
- Manufacturer's product code number.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the flexible transition sewer coupling approved for use in the City of Winnipeg.

All flexible transition sewer coupling should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

All flexible transition sewer coupling shall be installed as per manufacture's recommendations.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the flexible transition sewer coupling furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA B602.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing flexible transition sewer coupling for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing flexible transition sewer coupling for use in the City of Winnipeg.

11. REFERENCES

ASTM A 167

Specification for Stainless and Heat-Resistant Chromium Nickel Steel Plate, Sheet and Strip

ASTM A 480M

General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM C 425

Compression Joints for Vitrified Clay Pipe and Fittings

ASTM C 1173

Flexible Transition Couplings for Underground Piping Systems

CAN/CSA B70-M91

Cast Iron Soil Pipe, Fittings and Means of Joining

CAN/CSA B602

Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe

IAPMO/UPC

Uniform Plumbing Code



STANDARD FOR
PRE-CAST CONCRETE MANHOLES,
CATCHBASINS AND COMPONENTS
STANDARD NO. CoW-SM-14

1. SCOPE

This standard shall apply to all pre-cast concrete manholes, catchbasins and components approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the pre-cast concrete manholes, catchbasins and components purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to the pre-cast concrete manholes, catchbasins and components in diameters 300mm (12") and larger approved for use in the City of Winnipeg specifically;

- grade rings,
- flat slab tops,
- conical tops,
- riser rings,
- base sections and,
- step rungs.

All materials shall conform to the requirements of CAN/CSA A257.4, ASTM C76 and ASTM C478.

All manufacturers of pre-cast concrete manholes, catchbasins and components supplied to the City of Winnipeg shall be certified under the Ontario Concrete Pipe Association's (OCPA) "Pre-qualification Requirements for Pre-cast Concrete Drainage Products" program. Manufacturers must supply a copy of the certification prior to product approval and must notify the City of Winnipeg within 5 business days of any change in certification status.

3. MATERIALS

3.1 Portland Cement

All pre-cast concrete manholes, catchbasins and components supplied to the City of Winnipeg shall be manufactured from Type HS (T 50) or Type V sulphate resistant Portland cement containing no more than 5% C₃A as per the requirements of CAN/CSA A3000, ASTM C150 and ASTM C1157.

Additionally all pre-cast concrete manholes, catchbasins and components shall meet the applicable quality-assurance test requirements of these standards with

regard to material, workmanship, burst pressure, flattening and extrusion quality.

3.2 Wire Re-Enforcement

All reinforced concrete sewer main pipe intended for use within the City of Winnipeg shall be reinforced with wire conforming to the requirements specified in CAN/CSA G30 as per CAN/CSA A257.2 and ASTM C76.

3.3 Aluminum

All aluminum step rungs shall be manufactured from materials conforming to the requirements of CSA HA Series.

4. DESIGN

4.1 Grade Rings, Tops and Risers

All pre-cast concrete manhole and grade rings, tops and risers shall be manufactured to ASTM C478 or ASTM C76 Class II.

4.2 Base Sections

All pre-cast concrete manhole and catchbasin base sections shall be manufactured to ASTM C76 Class IV.

4.3 Aluminum Step Rungs

All step rungs shall have a minimum diameter of 20mm and a minimum clear length of 300mm. The rungs shall be provided with slip-resistant surface, such as corrugated, knurled, or dimpled and shall be designed so that the foot cannot slide off the end.

Each step rung shall be capable of supporting, without deflection, and remaining solidly secured to the manhole or catchbasin wall a pull out load of 181 kg (400 lbs) and a vertical load of 363 kg (800 lbs).

Step rungs shall be arranged and spaced equally in a line so as to form a continuous ladder in the assembled manhole or catchbasin. The spacing between step rungs shall be 400mm (16") apart on centre.

The minimum toe clearance for manhole steps shall be 110mm (4 ") from the point of embedment on the wall to the outside face of the step and a minimum of 114mm (4 ½") from the centre of the manhole step to the face of the manhole or catchbasin.

4.4 Gaskets

See City of Winnipeg Specification CoW-SM-16.

5. MARKING

5.1 Markings

All pre-cast concrete manholes, catchbasins and components supplied for use within the City of Winnipeg shall bear markings in accordance with CAN/CSA 182.2. All pre-cast concrete manholes, catchbasins and components shall be marked with the following identifications:

- Nominal size
- PVC cell classification
- Type PSM SDR35
- Manufacturer's name or trademark
- Manufacturer's date mark
- CAN/CSA designation

Required marking for the pre-cast concrete manholes, catchbasins and components supplied to the City of Winnipeg shall be applied so as not to adversely affect the quality of the manholes, catchbasins or components.

6. WORKMANSHIP AND FINISH

6.1 Concrete Components

The pre-cast concrete manholes, catchbasins and components supplied for use within the City of Winnipeg shall be homogeneous throughout, of even grain and free of cracks, voids, fractures, and other imperfections that may impair serviceability.

6.2 Quality Control Requirements

Manufacturers of pre-cast concrete manholes, catchbasins and components for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;

- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

All pre-cast concrete manholes, catchbasins and components supplied to the City of Winnipeg shall be stored and handled in such a way as to prevent damage which will impact the serviceability of the product.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the pre-cast concrete manholes, catchbasins and components approved for use in the City of Winnipeg.

All pre-cast concrete manholes, catchbasins and components should be visually inspected for cracks, voids, fractures and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the pre-cast concrete manholes, catchbasins and components furnished for use in the City of Winnipeg complies with the requirements of this Standard and that of CAN/CSA-B182.2.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing pre-cast concrete manholes, catchbasins and components for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval

from the City of Winnipeg prior to furnishing pre-cast concrete manholes, catchbasins and components for use in the City of Winnipeg.

11. REFERENCES

ASTM C76

Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe

ASTM C150

Standard Specification for Portland cement

ASTM C443

Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C478

Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM C1157

Standard Specification for the Performance Specification for Hydraulic Cements

CAN/CSA A23

Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete

CAN/CSA A257

Standards for Concrete Pipe and Manhole Sections (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4)

CAN/CSA A3000

Cementitious Materials Compendium (which consists of A3001, A3002, A3003, A3004 and A3005)

CAN/CSA G30

Billet-Steel Bars for Concrete Reinforcement

CAN/CSA Standard CAN3-Z299.3

Quality Assurance Program – Category 3

CAN/CSA Standard CSA HA SERIES

CSA Standards for Aluminum and Aluminum Alloys

ISO 9001
Quality Management Systems

Ontario Concrete Pipe Association (OCPA)
Pre-qualification Requirements for Pre-cast Concrete Drainage Products



STANDARD FOR
POLYVINYLCHLORIDE (PVC) CATCH BASINS AND COMPONENTS
STANDARD NO. CoW-SM-15

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STANDARD FOR
MANHOLE AND CATCH BASIN JOINT GASKETS
STANDARD NO. CoW-SM-16

1. SCOPE

This standard shall apply to all manhole and catch basin joint gaskets approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the manhole and catch basin joint gaskets purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all joint gaskets used on wastewater and storm sewer manhole and catch basin approved for use in the City of Winnipeg.

All materials shall conform to the requirements of ASTM C443, ASTM C990 or AASHTO M198.

3. MATERIALS

3.1 Bitumen Gaskets

All bitumen gaskets shall be manufactured from bitumen (asphalt), hydrocarbon (petroleum) resins and plasticizing compounds as per ASTM C990.

3.2 Natural or Synthetic Rubber Gaskets

All natural or synthetic rubber gaskets shall be manufactured to the requirements of ASTM C443 or ASTM C990. Additionally the manufacturer shall provide complete descriptions of the materials utilized in accordance with the ASTM D2000 designation system.

3.3 lubricants

All lubricants used shall be made of a non-toxic, water soluble material compatible with the manhole, catch basin and gasket materials and meet the recommendations of the manufacturer.

3.4 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 General

All manhole and catch basin joint gaskets shall be designed to provide both adhesion and cohesion between concrete sections as well as provide a flexible, watertight joint.

Joint gaskets shall be able to withstand the compression of the joint, without cracking or rupturing and maintain a watertight seal.

5. MARKING

5.1 General

All manhole and catch basin joint gaskets shall be marked either on the gasket or on the packaging with at least the following;

- gasket type
- date code
- manufacturer name
- nominal diameter

6. WORKMANSHIP AND FINISH

6.1 General

All gaskets shall be homogeneous and free from porosity, blisters, pitting, or other imperfections that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of manhole and catch basin joint gaskets for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;

- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

All manhole and catch basin joint gaskets shall be stored and handled in such a way as to prevent damage such as scratches, gouges, discoloration and other defects.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the all manhole and catch basin joint gaskets approved for use in the City of Winnipeg.

All manhole and catch basin joint gaskets should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the manhole and catch basin joint gaskets furnished for use in the City of Winnipeg complies with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing manhole and catch basin joint gaskets for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing manhole and catch basin joint gaskets for use in the City of Winnipeg.

11. REFERENCES

AASHTO M198

Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

ASTM C443

Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C990

Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

ASTM C1619

Standard Specification for Elastomeric Seals for Joining Concrete Structures

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications



STANDARD FOR
MANHOLE AND CATCHBASIN EXTERNAL CASING
STANDARD NO. CoW-SM-17

1. SCOPE

This standard shall apply to all manhole and catch basin external casings approved for use in the City of Winnipeg.

This standard shall apply to technical requirements only. The City may impose contractual requirements and supplemental technical requirements to apply to the manhole and catch basin external casings purchased by the City.

2. REQUIREMENTS

2.1 General

This standard shall apply to all external casings used on wastewater and storm sewer manhole and catch basin approved for use in the City of Winnipeg.

All materials shall conform to the requirements of ASTM C877.

3. MATERIALS

3.1 General

All manhole and catch basin external casings shall meet or exceed the material requirements as specified by type in ASTM C877. The material types described by ASTM C877 are;

- Type I - Rubber and Mastic Bands.
- Type II - Plastic Film and Mesh Reinforced Mastic Bands.
- Type III - Chemically-Bonded Adhesive Butyl Bands

3.2 Alternate Materials

Any material that does not meet the present standard but represent a technological improvement will be considered dependent upon independent laboratory and/or field testing to ascertain its effectiveness. The duration and type of testing will be at the discretion of the City of Winnipeg.

4. DESIGN

4.1 General

All manhole and catch basin external casings shall be designed to provide adhesion to the concrete sections as well as provide a flexible, watertight seal.

External casings shall be able to withstand the compression and movement of the backfill without delamination, cracking or rupturing while maintaining a watertight seal between the manhole and catch basin joints.

5. MARKING

5.1 General

All manhole and catch basin external casings shall be marked either on the casing or on the packaging with at least the following;

- casing type
- date code
- manufacturer name

6. WORKMANSHIP AND FINISH

6.1 General

All casings shall be homogeneous and free from porosity, blisters, checking, pitting, weathering, and other imperfections or deterioration that may affect serviceability, in any cross section.

6.1 Quality Control Requirements

Manufacturers of manhole and catch basin external casings for the City of Winnipeg must maintain a quality control program that meets or exceeds the most current issue of ISO 9001 or CSA Standard CAN3-Z299.3. Consequently, a quality control manual shall be submitted to the City of Winnipeg for review upon request. In addition to the requirements of CSA Standard CAN3-Z299.3, the manual shall include a "Corrective Action" policy section for cases of nonconformance (Corrective Action shall be addressed in ISO 9001). Corrective action shall include:

- A review and analysis of detected non-conformance and a subsequent corrective action to prevent reoccurrence;
- Initiate a corrective action when notified by the customer (City of Winnipeg) of the potential or actual non-conformance;
- Prompt implementation of corrective actions that they are effective, and follow up to ensure continued effectiveness;
- A regular report to appropriate levels of management to the causes of non-conformance and corrective action taken.

Quality-control records shall be maintained for a period not less than two (2) years.

7. PACKAGING

All manhole and catch basin external casings shall be stored and handled in such a way as to prevent damage such as tears, gouges, discoloration and other defects.

All approved manufacturers shall have local representation within the City of Winnipeg.

8. INSTALLATION INSTRUCTIONS

The manufacturer shall provide clear and concise installation instructions for the all manhole and catch basin external casings approved for use in the City of Winnipeg.

All manhole and catch basin external casings should be visually inspected for scratches, gouges, discoloration and other defects prior to installation.

9. QUALITY ASSURANCE

The manufacturer shall provide an overall affidavit of compliance signed by an officer of the company stating that the manhole and catch basin external casings furnished for use in the City of Winnipeg complies with the requirements of this Standard.

10. CITY OF WINNIPEG

Notwithstanding Section 9 of this standard, the manufacturer shall apply for and be in receipt of written approval from the City of Winnipeg prior to furnishing manhole and catch basin external casings for use in the City of Winnipeg.

Where patterns are owned by a party other than the manufacturer, the party owning the pattern and the manufacturer shall jointly apply for written approval from the City of Winnipeg prior to furnishing manhole and catch basin external casings for use in the City of Winnipeg.

11. REFERENCES

ASTM C877

Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections



STANDARD FOR
GRAY AND DUCTILE IRON MUNICIPAL CASTINGS
STANDARD NO. CoW-SM-18

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SEE COW-WM-11



STANDARD FOR
COMPOSITE MUNICIPAL FRAMES AND COVERS
STANDARD NO. CoW-SM-19

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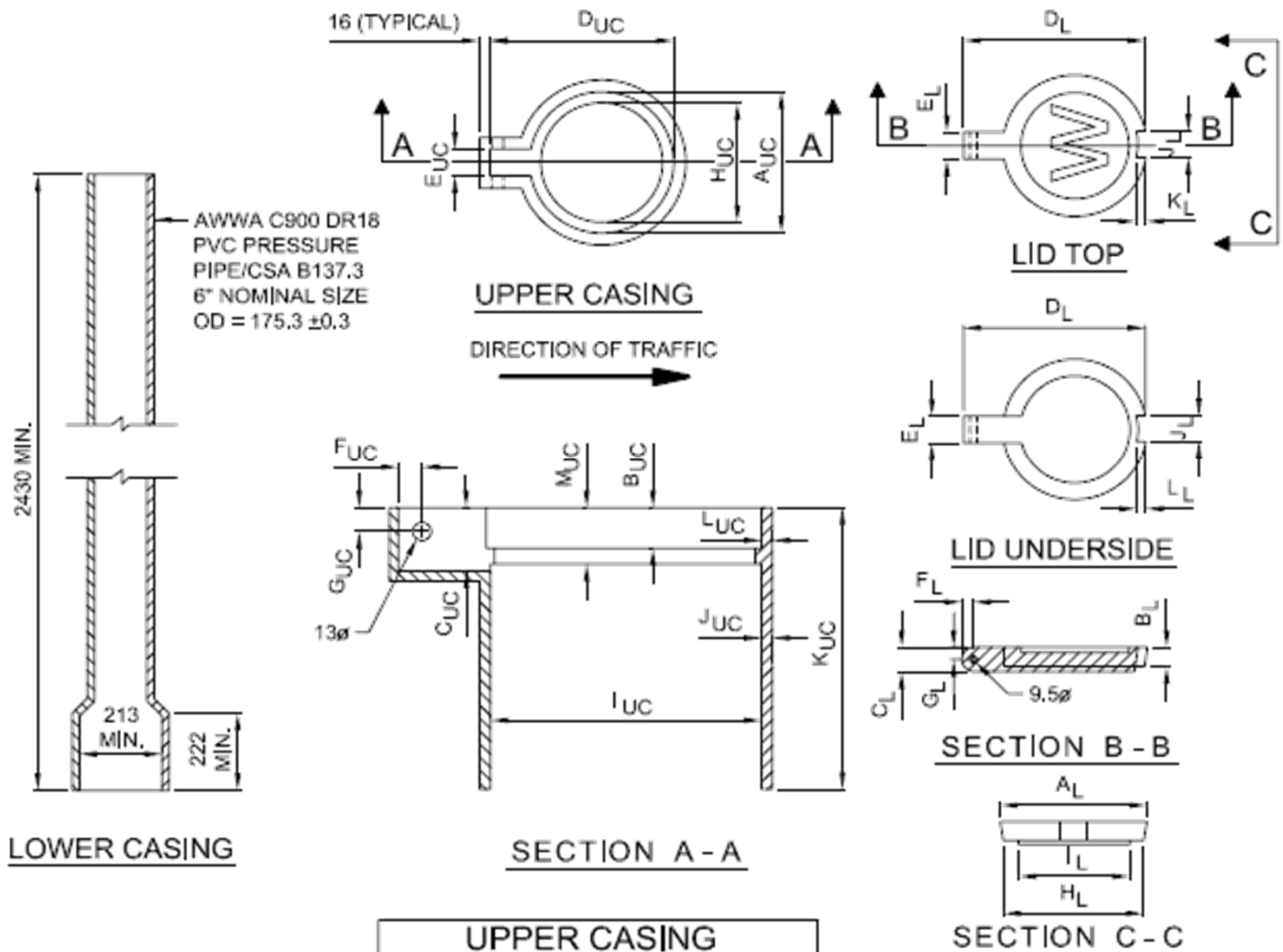


STANDARD FOR
CATCH BASIN HOODS
STANDARD NO. CoW-SM-20

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DETAIL DRAWINGS





UPPER CASING		
DIMENSION	VALUE	TOLERANCE
A _{UC}	200	±2
B _{UC}	27	±1
C _{UC}	44	±2
D _{UC}	247	±2
E _{UC}	38	±2
F _{UC}	13ø 16	±1
G _{UC}	13ø 16	±1
H _{UC}	179	±2
I _{UC}	185	MINIMUM
J _{UC}	6	MINIMUM
K _{UC}	880	MINIMUM
L _{UC}	16	MINIMUM
M _{UC}	38	±2

LID		
DIMENSION	VALUE	TOLERANCE
A _L	195	±2
B _L	25	±1
C _L	32	±2
D _L	242	±2
E _L	32	±2
F _L	9.5ø 13	±1
G _L	9.5ø 16	±1
H _L	192	MINIMUM
I _L	150	MINIMUM
J _L	38	±3
K _L	13	±3
L _L	19	MINIMUM

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2110.

**WATER MAIN VALVE
BOX**

DESIGNED BY: TEJK

DESIGN DATE:

SCALE: NTS

DRAWN BY: EN

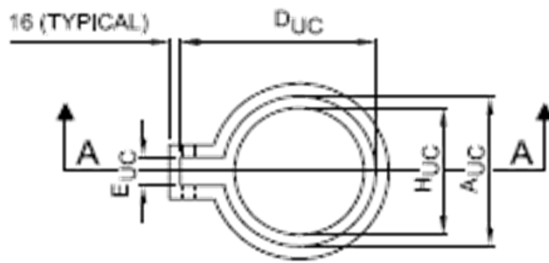
REVISION DATE: 15/02/05

DRAWING No.:

CHECKED BY: TEJK

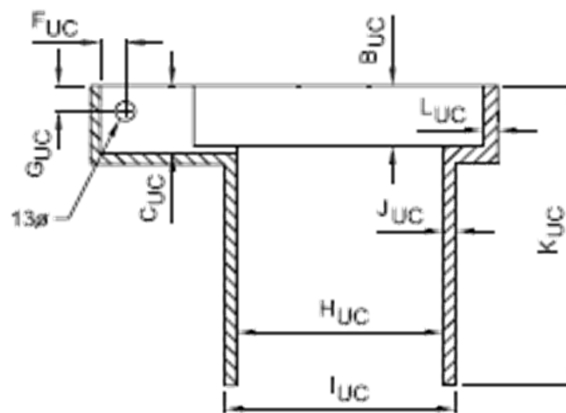
REVISION No.: 1

AP-001

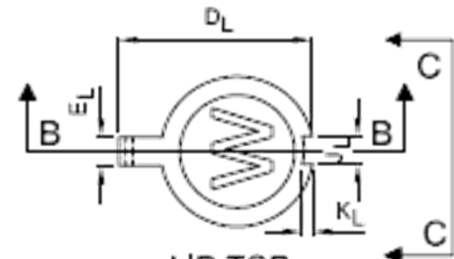


UPPER CASING

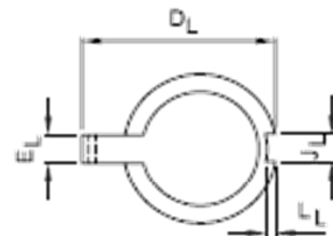
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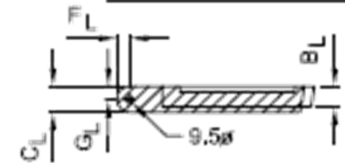
SECTION A - A



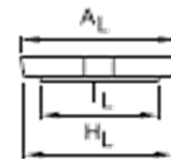
LID TOP



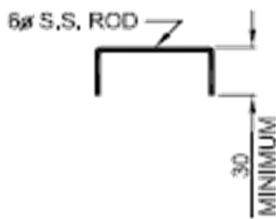
LID UNDERSIDE



SECTION B - B



SECTION C - C



HINGE PIN

UPPER CASING		
DIMENSION	VALUE	TOLERANCE
AUC	200	±2
BUC	34	±1
CUC	44	±2
DUC	247	±2
EUC	38	±2
FUC	13 ϕ 16	±1
GUC	13 ϕ 16	±1
HUC	120	MINIMUM
IUC	146	MAXIMUM
JUC	6	MINIMUM
KUC	300	MINIMUM
LUC	16	MINIMUM

LID		
DIMENSION	VALUE	TOLERANCE
AL	195	±2
BL	25	±2
CL	32	±1
DL	242	±2
EL	32	±2
FL	9.5 ϕ 13	±1
GL	9.5 ϕ 16	±1
HL	192	MINIMUM
IL	150	MINIMUM
JL	38	±3
KL	13	±3
LL	19	MINIMUM

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2110.

WATER MAIN VALVE
BOX EXTENSION

DESIGNED BY: TEJK

DESIGN DATE: 01/03/93

SCALE: NTS

DRAWN BY: EN

REVISION DATE:

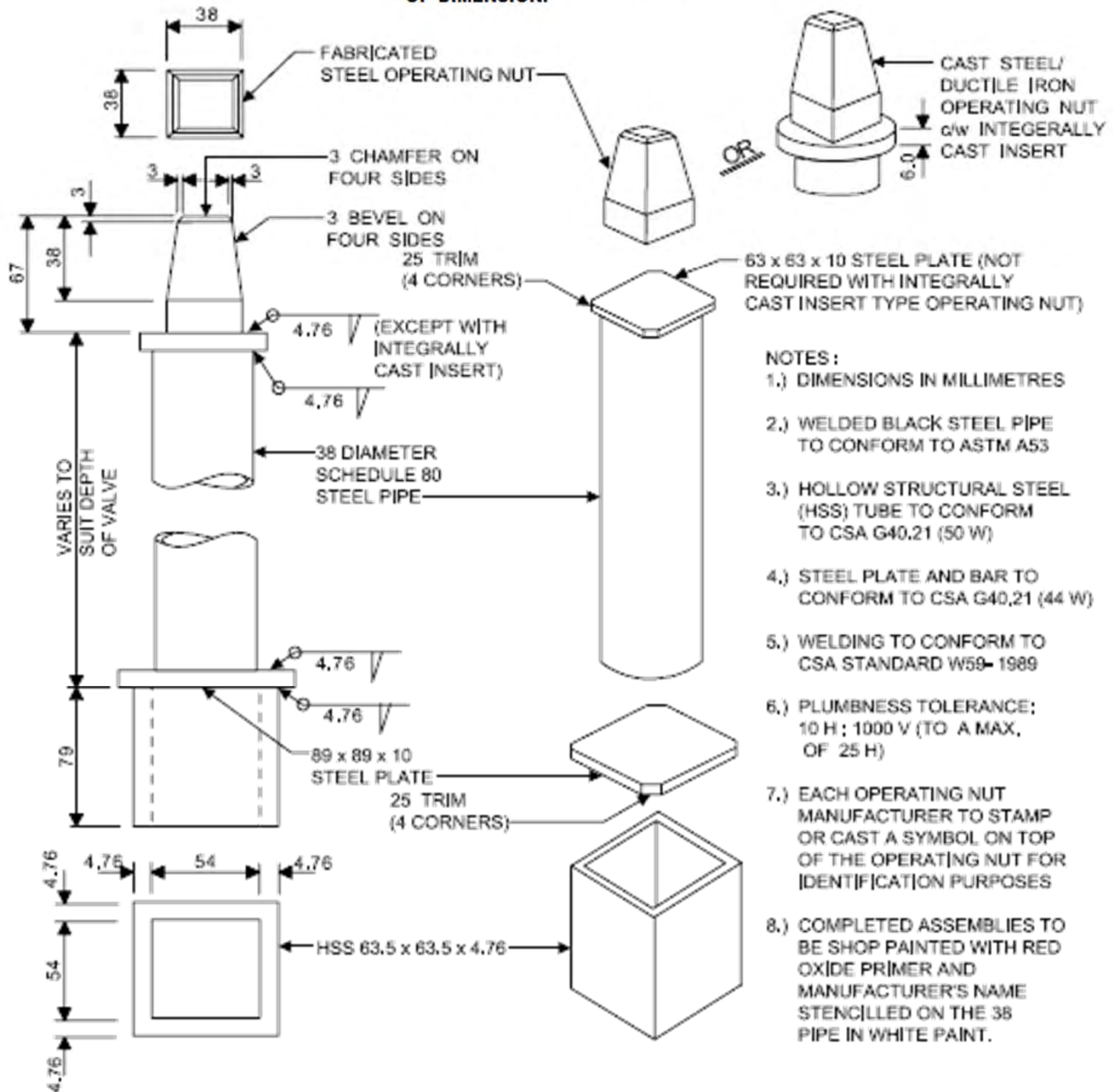
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CHECKED BY: TEJK

REVISION No.:

AP-002

- NOTES:**
 1) ALL DIMENSIONS IN MILLIMETERS,
 2) UNLESS OTHERWISE SPECIFIED
 DIMENSIONS SHALL HAVE A
 TOLERANCE OF $\pm 2\text{mm}$ AND AN
 ADDITIONAL $\pm 5\text{mm}$ PER METER
 OF DIMENSION.



CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2110.

**WATER MAIN VALVE
 STEM EXTENTION**

DESIGNED BY: RAS

DESIGN DATE: 01/09/89

SCALE: NTS

DRAWN BY: JMH

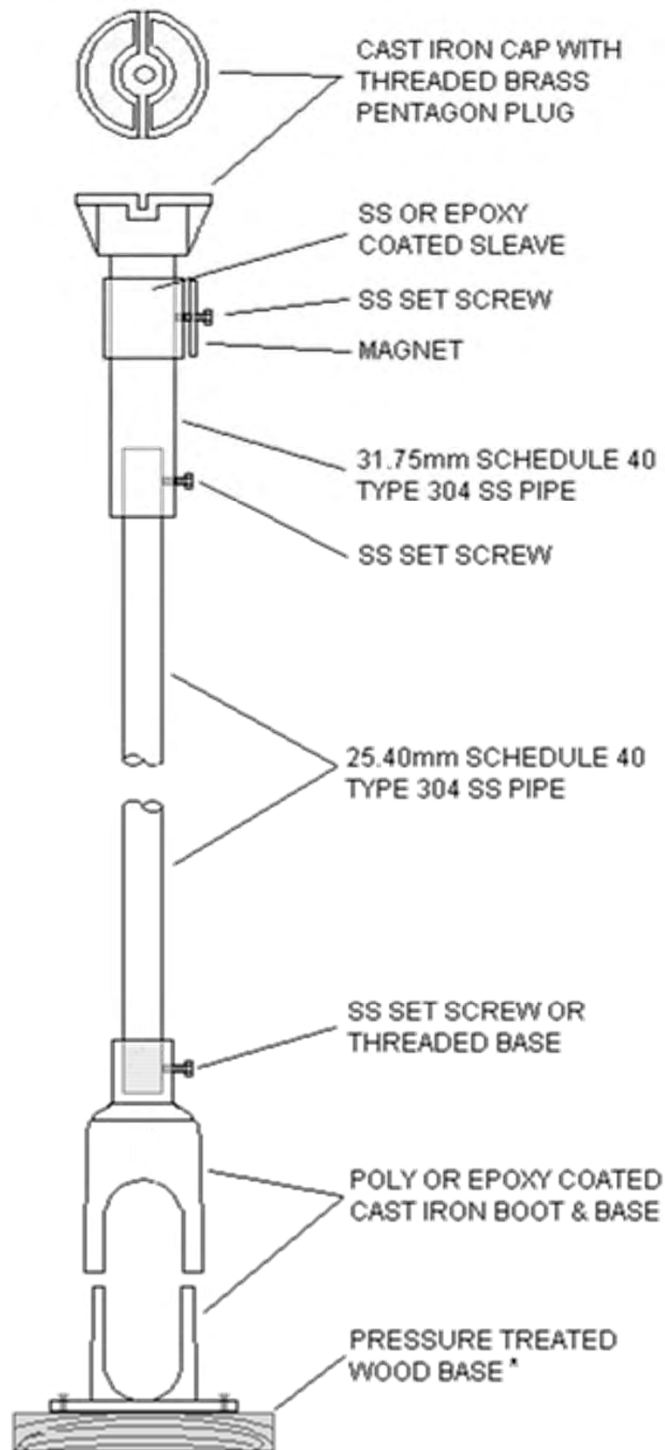
REVISION DATE: 01/02/11

DRAWING No.:

CHECKED BY: TW

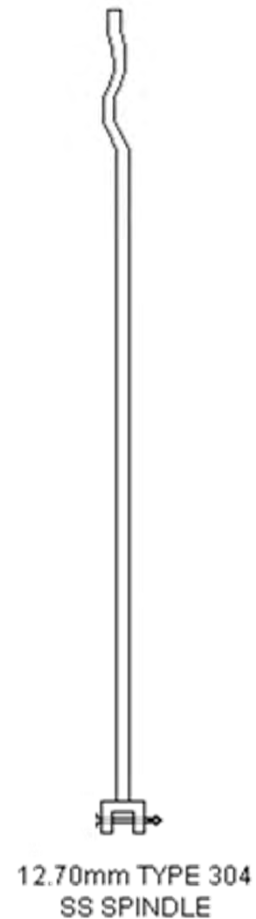
REVISION No.: 01

AP-003



NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



*pressure treated wood base to be added during installation

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For installation see City of Winnipeg Standard Construction Specifications, Underground Works, Standard Details, SD-012.

**RESIDENTIAL SERVICE
BOX**

DESIGNED BY: KG

DESIGN DATE: 02/03/09

SCALE: NTS

DRAWN BY: BAW

REVISION DATE:

DRAWING No.:

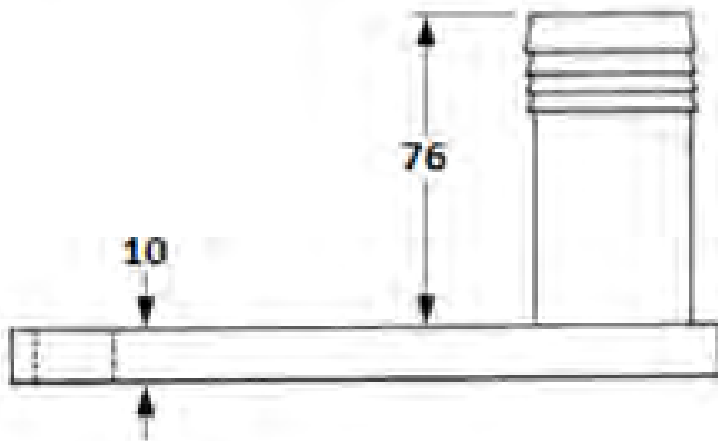
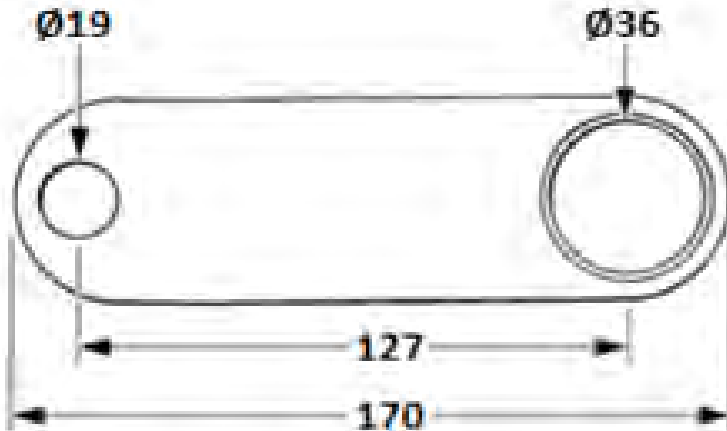
CHECKED BY: GKP

REVISION No.:

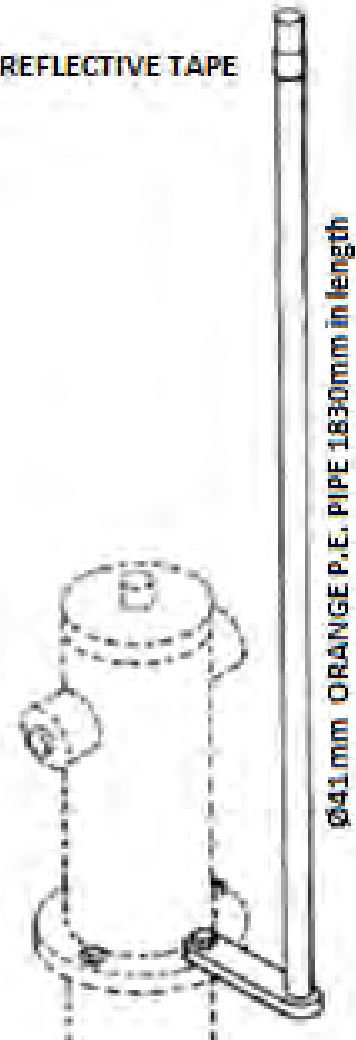
AP-004

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



REFLECTIVE TAPE



CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2110.

**FIRE HYDRANT
MARKER**

DESIGNED BY: KL

DESIGN DATE: 09/12/87

SCALE: NTS

DRAWN BY:

REVISION DATE:

DRAWING No.:

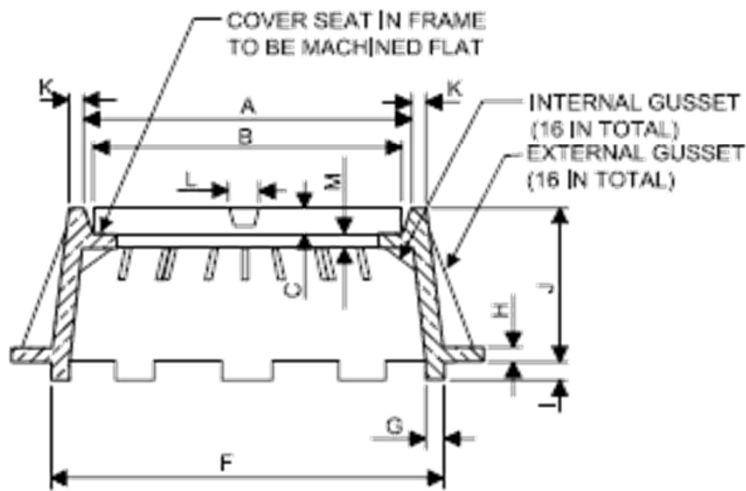
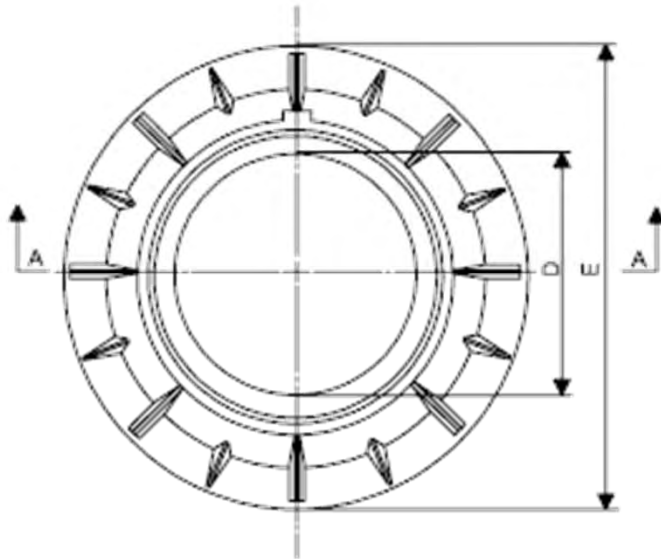
CHECKED BY:

REVISION No.:

AP-005

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



SECTION A-A

DIMENSIONS

DIMENSIONS	VALUE	TOLERANCE
A	603	± 2
B	590	± 5
C	64	± 1
D	521	± 2
E	890	± 10
F	757	± 5
G	16	± 4
H	19	± 5
I	27	± 3
J	227	± 4
K	17	± 4
L	38	± 5
M	25	± 3

CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-010, SD-010D, SD-011 and SD-025.

MANHOLE FRAME

DESIGNED BY: TEJK

DESIGN DATE:

SCALE: NTS

DRAWN BY: MDB

REVISION DATE: 05/01/11

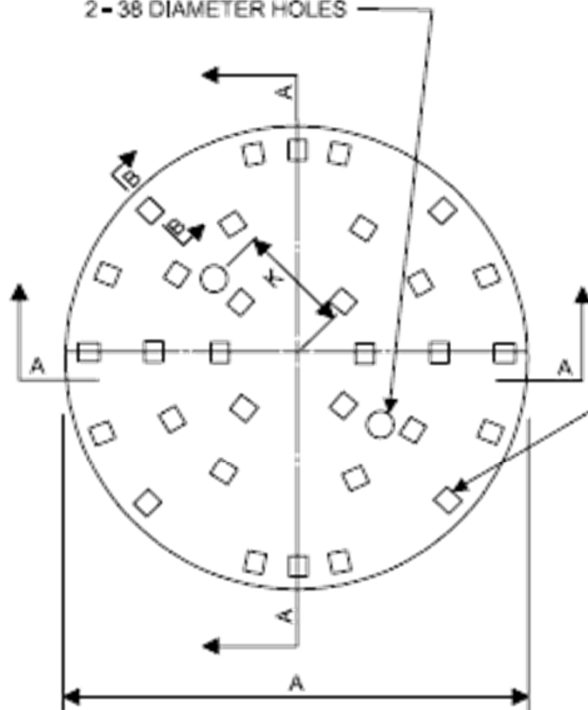
DRAWING No.:

CHECKED BY: TEJK

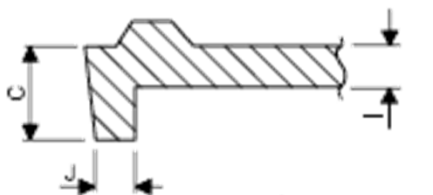
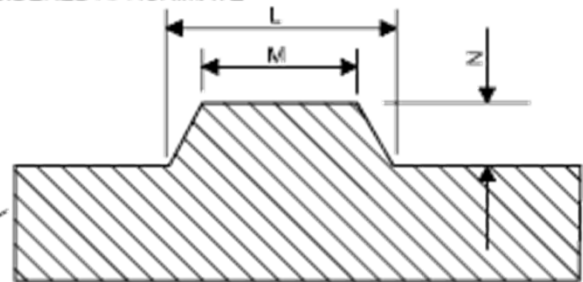
REVISION No.: 01

AP-006

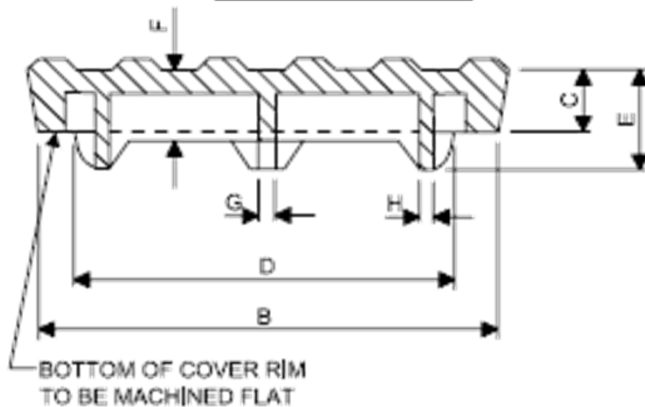
2 - 38 DIAMETER HOLES



NOTE:
COVERS SHALL HAVE A MINIMUM OF 32 CHECKERS,
LOCATIONS OF CHECKERS SHOWN ARE TO BE
CONSIDERED APPROXIMATE



SECTION B - B



SECTION A - A

DIMENSIONS

DIMENSIONS	VALUE	TOLERANCE
A	597	± 2
B	575	± 6
C	64	± 1
D	506	± 12
E	170	± 30
F	125	± 6
G	12	± 6
H	12	± 6
I	19	± 2
J	23	± 6
K	140	± 6
L	25	± 2
M	19	± 2
N	4	± 2

CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications,
Underground Works, CW2130, SD-010, SD-010D, SD-011 and SD-025.

**SOLID MANHOLE
COVER**

DESIGNED BY: TEJK

DESIGN DATE:

SCALE: NTS

DRAWN BY: MDB

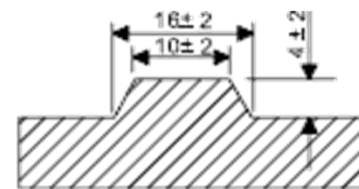
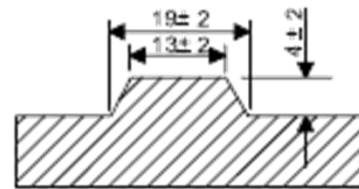
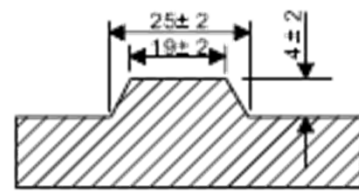
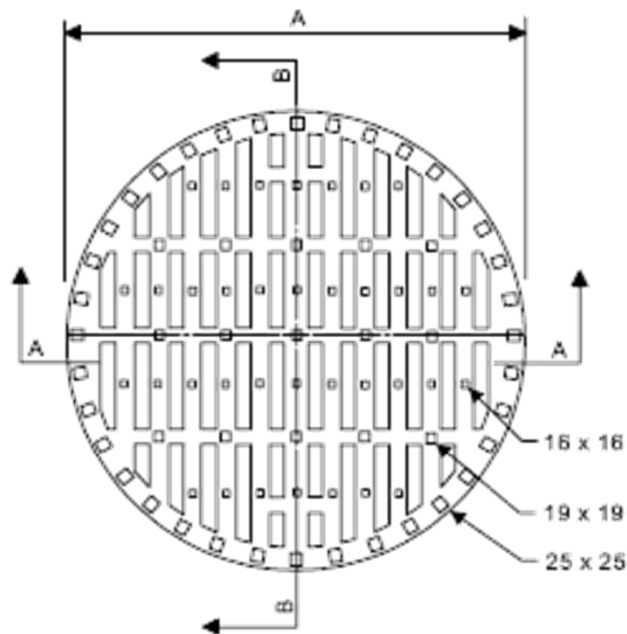
REVISION DATE: 05/01/11

DRAWING No.:

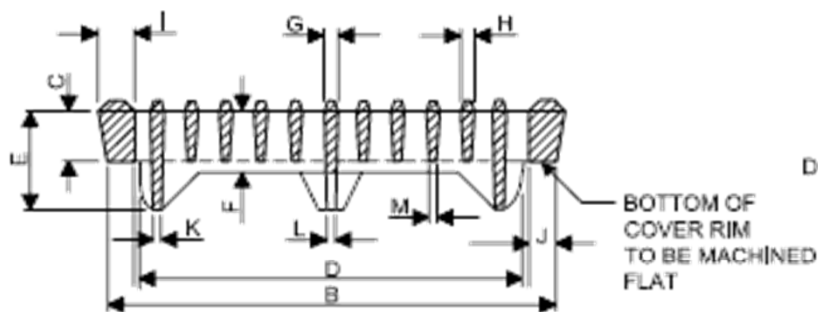
CHECKED BY: TEJK

REVISION No.: 01

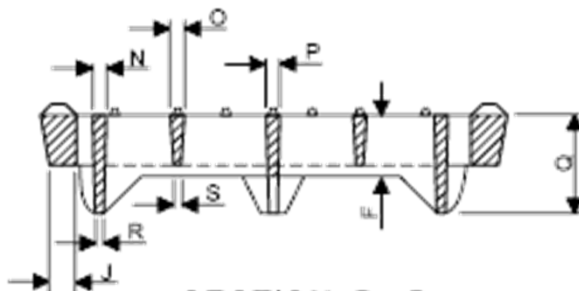
AP-007



CHECKER DETAILS



SECTION A-A



SECTION B-B

DIMENSIONS

DIMENSIONS	VALUE	TOLERANCE
A	597	±2
B	575	±6
C	64	±1
D	506	±12
E	170	±30
F	125	±6
G	25	±6
H	19	±2
I	40	±4
J	23	±6
K	12	±6
L	12	±6
M	13	±4
N	25	±6
O	25	±6
P	25	±6
Q	170	±30
R	12	±6
S	13	±4

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-010, SD-010D, SD-011 and SD-025.

GRATED MANHOLE
COVER

DESIGNED BY: TEJK

DESIGN DATE:

SCALE: NTS

DRAWN BY: MDB

REVISION DATE: 05/01/11

DRAWING No.:

CHECKED BY: TEJK

REVISION No.: 01

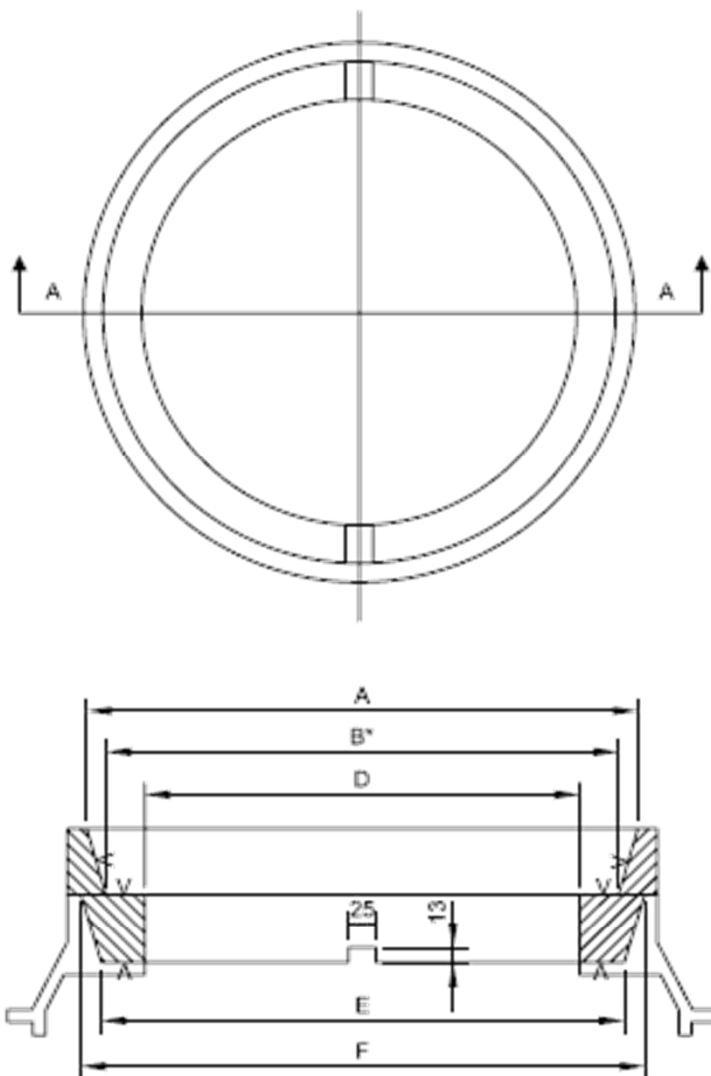
AP-008



1) ALL DIMENSIONS IN MILLIMETERS,
2) UNLESS OTHERWISE SPECIFIED
DIMENSIONS SHALL HAVE A
TOLERANCE OF $\pm 2\text{mm}$ AND AN
ADDITIONAL $\pm 5\text{mm}$ PER METER
OF DIMENSION.

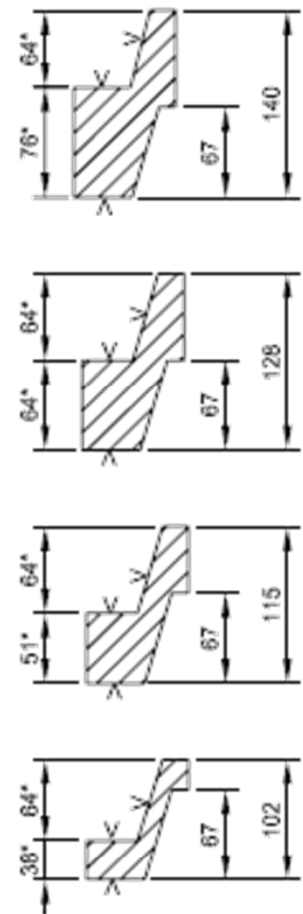


CITY OF WINNIPEG WATER AND WASTE DEPARTMENT	For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-010, SD-010D, SD-011 and SD-025.		
	DESIGNED BY: DK	DESIGN DATE: 02/15/15	SCALE: NTS
	DRAWN BY: BAW	REVISION DATE:	DRAWING No.:
	CHECKED BY: GKP	REVISION No.:	AP-009



SECTION A - A

V = MACHINED SURFACES
 * = DIMENSION TO MACHINED SURFACES
 TOLERANCES ± 1 mm
 ALL TOLERANCES ± 2 mm UNLESS
 SHOWN OTHERWISE



DIMENSIONS

DIMENSION	VALUE	TOLERANCE
A	603	
B*	584	± 1
C	17	± 4
D	521	± 4
E	583	
F	597	

CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT

For installation information see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-010, SD-010D, SD-011, SD-023, SD-024 and SD-025.

**MANHOLE RISER
 RINGS**

DESIGNED BY: TEJK

DESIGN DATE:

SCALE: NTS

DRAWN BY: EN

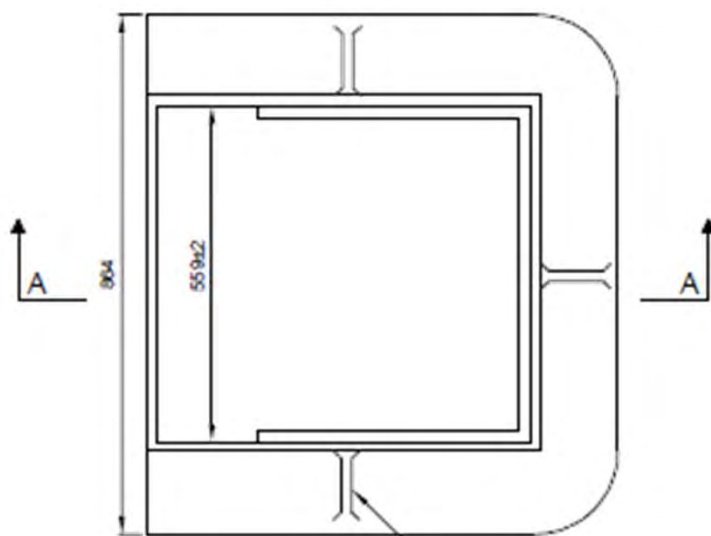
REVISION DATE: 05/01/11

DRAWING No.:

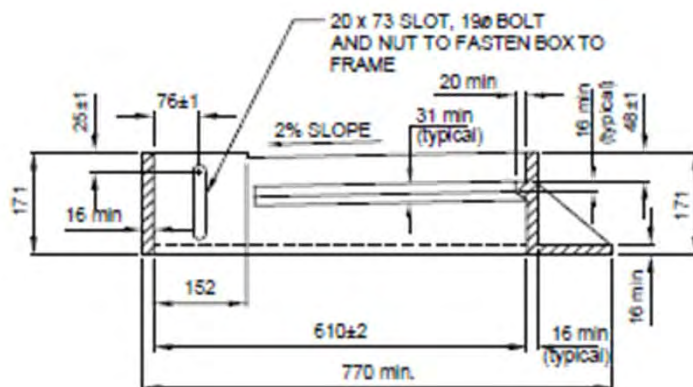
CHECKED BY: TEJK

REVISION No.: 01

AP-010

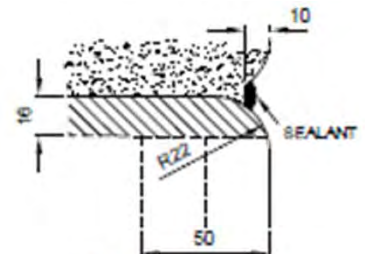


PLAN VIEW

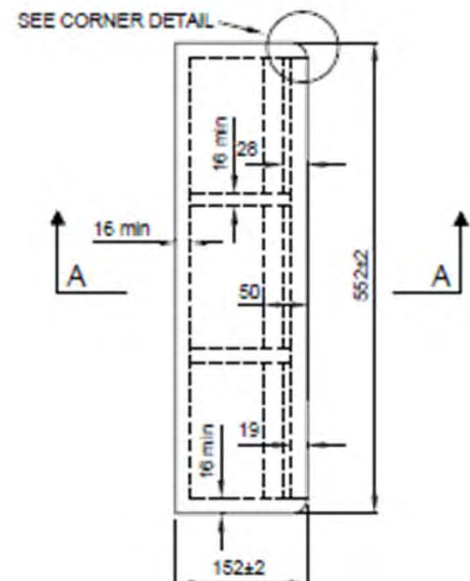


SECTION A - A

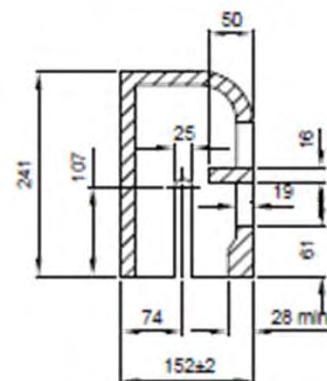
NOTES:
 1) ALL DIMENSIONS IN MILLIMETERS
 2) UNLESS OTHERWISE SPECIFIED
 DIMENSIONS SHALL HAVE A
 TOLERANCE OF ±2mm AND AN
 ADDITIONAL ±5mm PER METER
 OF DIMENSION



CORNER DETAIL



PLAN VIEW



SECTION A - A

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203A, SD-204, SD-205 and SD-206A.

BARRIER CURB
 FRAME

DESIGNED BY: TEJK

DESIGN DATE: 01/01/94

SCALE: NTS

DRAWN BY: BAW

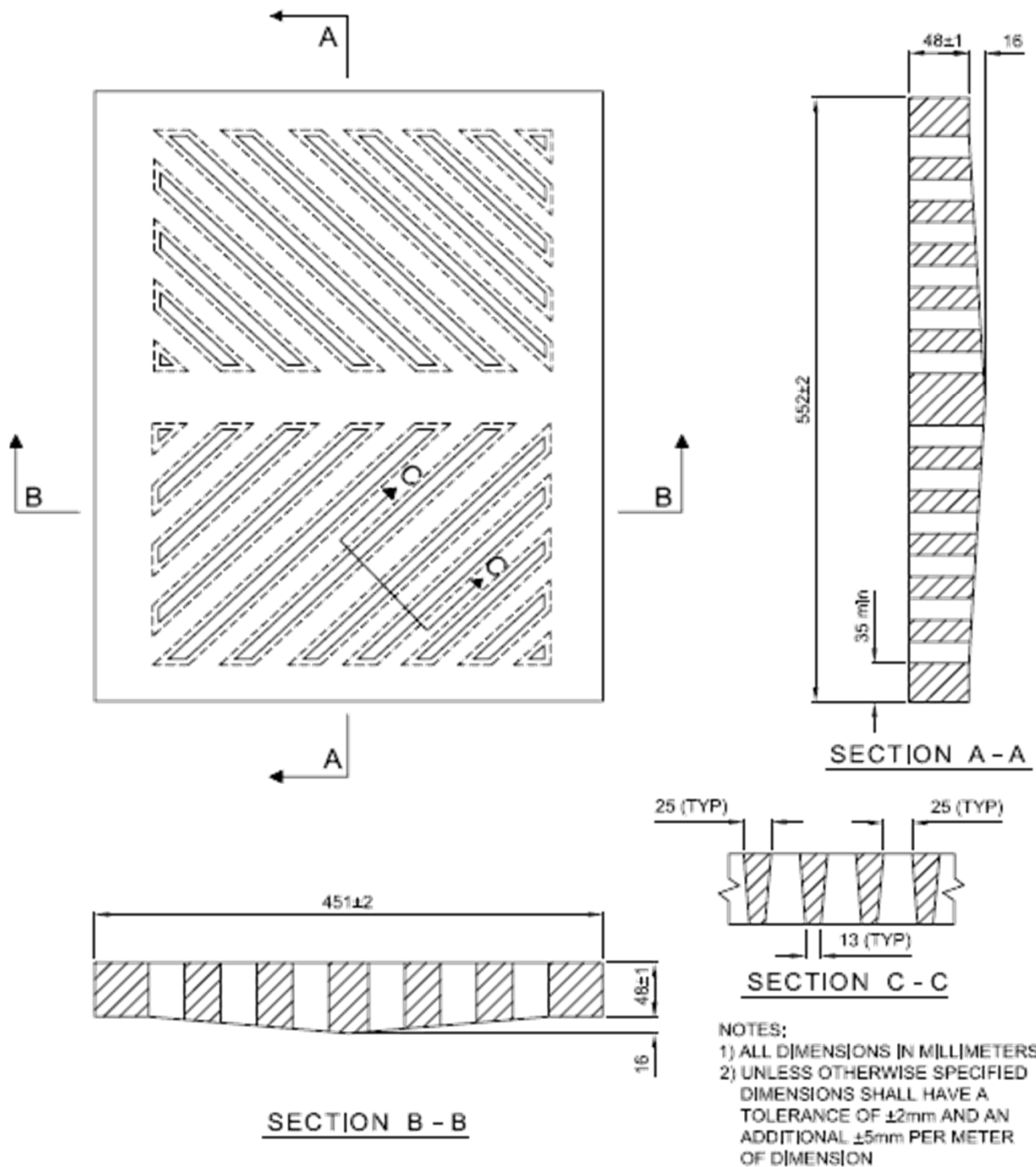
REVISION DATE: 05/12/01

DRAWING No.:

CHECKED BY: GKP

REVISION No.: 03

AP-011



CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203A, SD-204, SD-205 and SD-206A.

**BARRIER CURB
COVER**

DESIGNED BY: TEJK

DESIGN DATE: 01/01/94

SCALE: NTS

DRAWN BY: REF

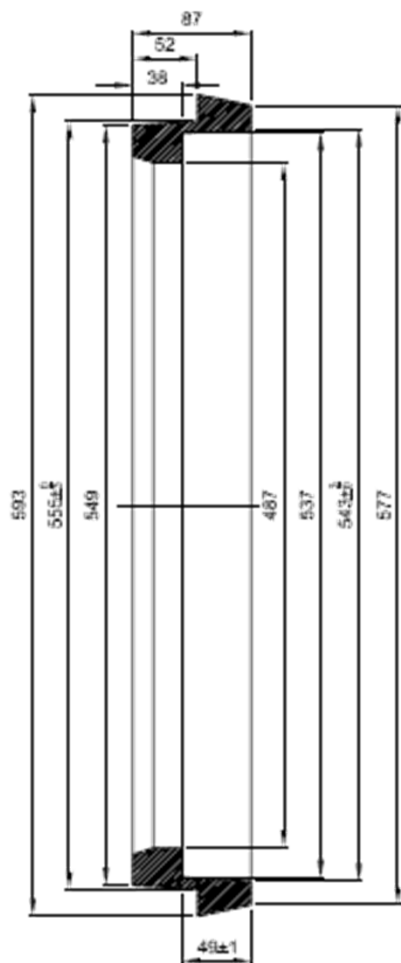
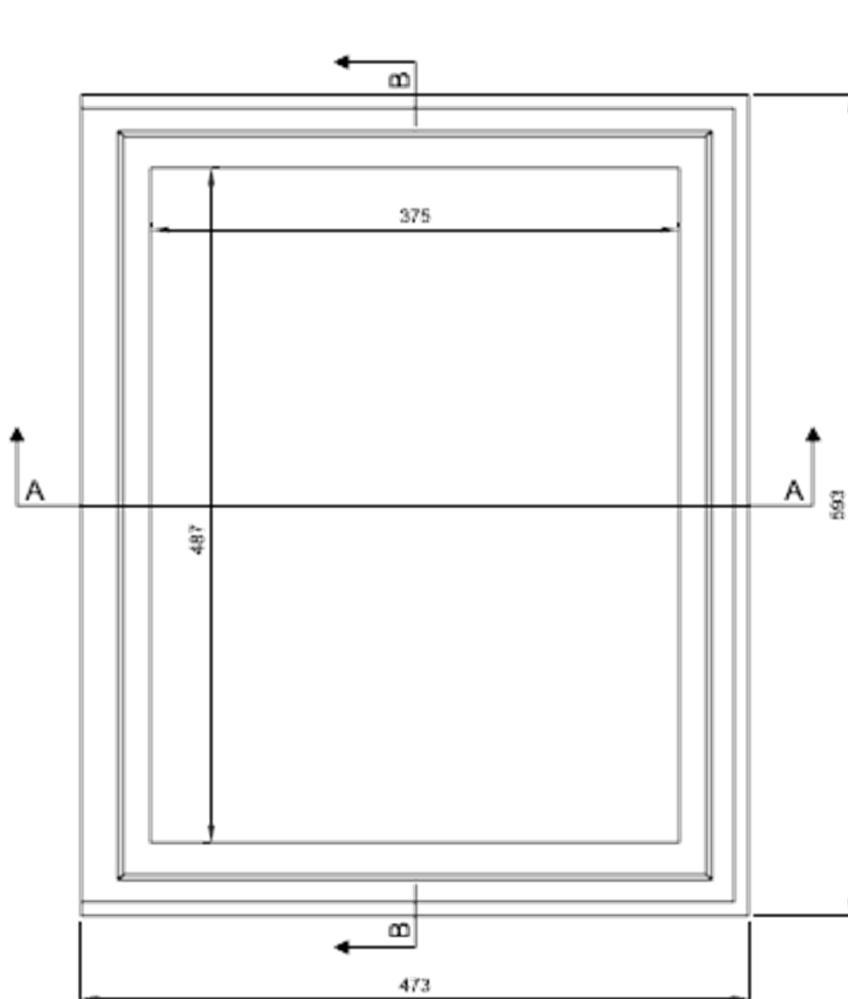
REVISION DATE:

DRAWING No.:

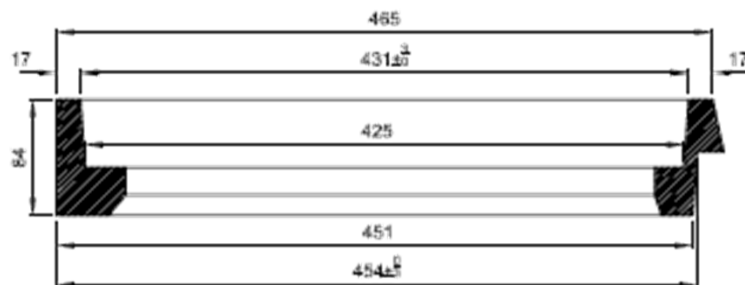
CHECKED BY: TEJK

REVISION No.:

AP-012



SECTION B - B



SECTION A - A

- NOTES:**
 1) ALL DIMENSIONS IN MILLIMETERS
 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION

CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203A, SD-204, SD-205 and SD-206A.

**BARRIER CURB RISER
 FRAME**

DESIGNED BY: DK

DESIGN DATE: 15/12/06

SCALE: NTS

DRAWN BY: BAW

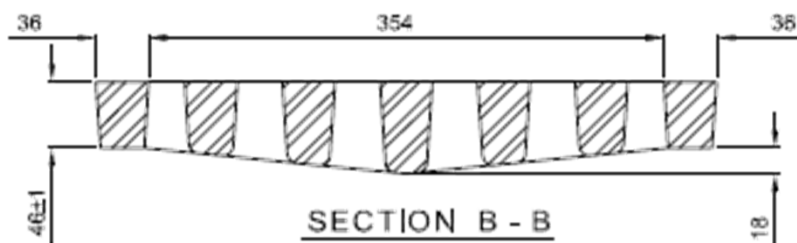
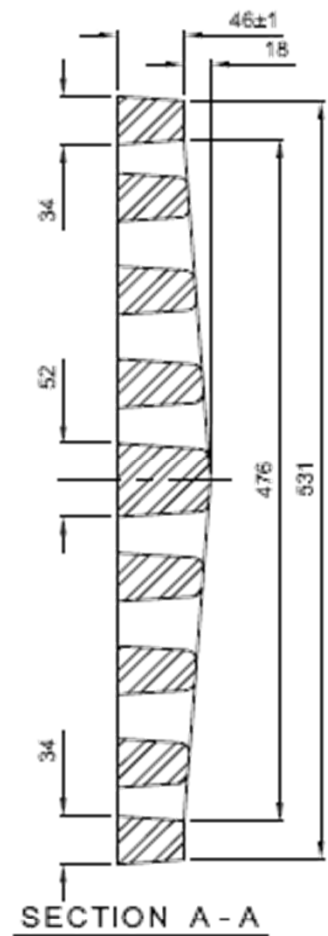
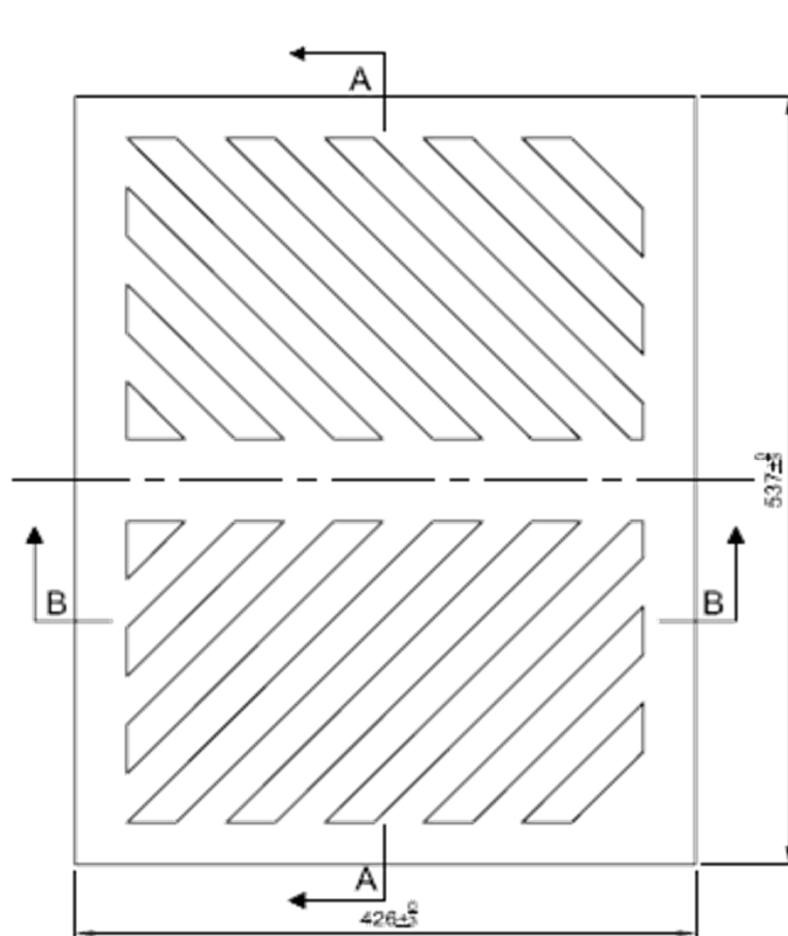
REVISION DATE:

DRAWING No.:

CHECKED BY: GKP

REVISION No.:

AP-013



NOTES:
 1) ALL DIMENSIONS IN MILLIMETERS
 2) UNLESS OTHERWISE SPECIFIED
 DIMENSIONS SHALL HAVE A TOLERANCE
 OF ±2mm AND AN ADDITIONAL ±5mm PER
 METER OF DIMENSION

CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203A, SD-204, SD-205 and SD-206A.

**BARRIER CURB RISER
 COVER**

DESIGNED BY: DK

DESIGN DATE: 15/12/06

SCALE: NTS

DRAWN BY: BAW

REVISION DATE:

DRAWING No.:

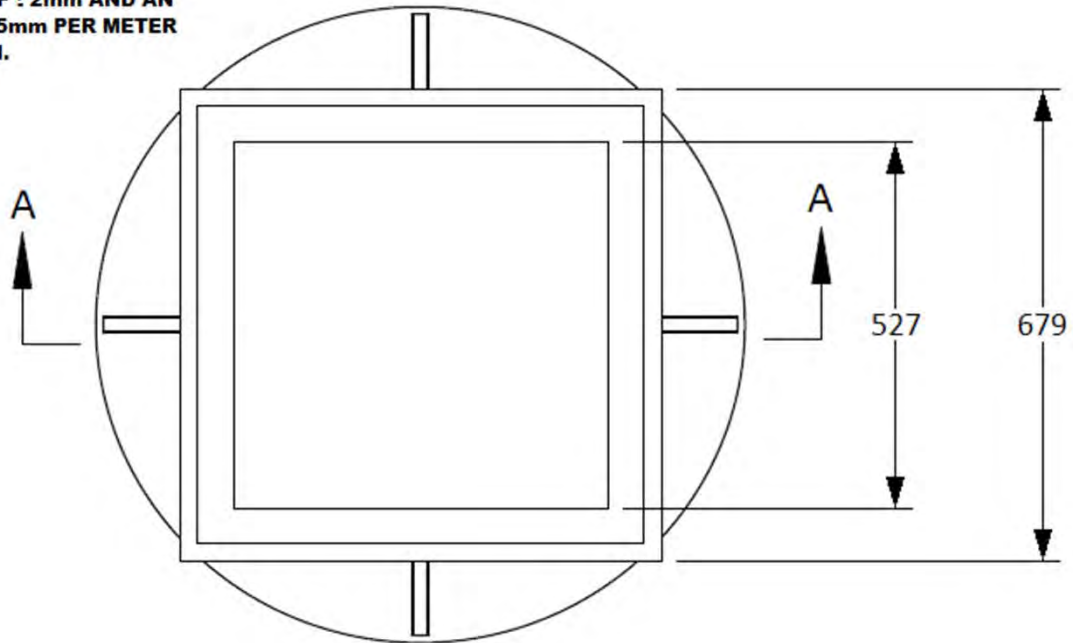
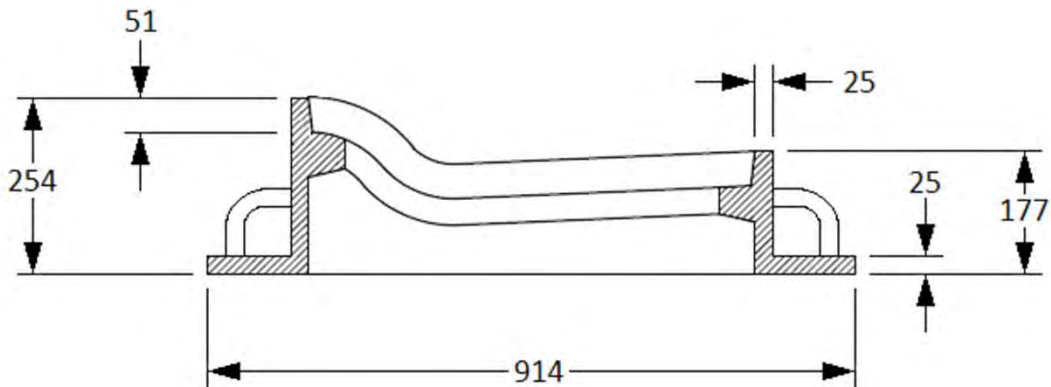
CHECKED BY: GKP

REVISION No.:

AP-014

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.

**PLAN****SECTION AA****CITY OF WINNIPEG**

WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-201.

**MOUNTABLE CURB
FRAME**

DESIGNED BY:

DESIGN DATE:

SCALE: NTS

DRAWN BY: BAW

REVISION DATE: 06/01/03

DRAWING No.:

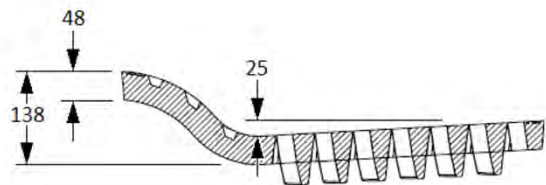
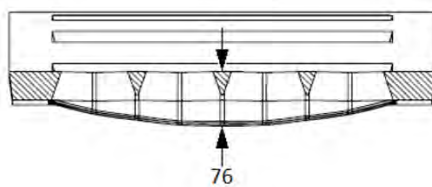
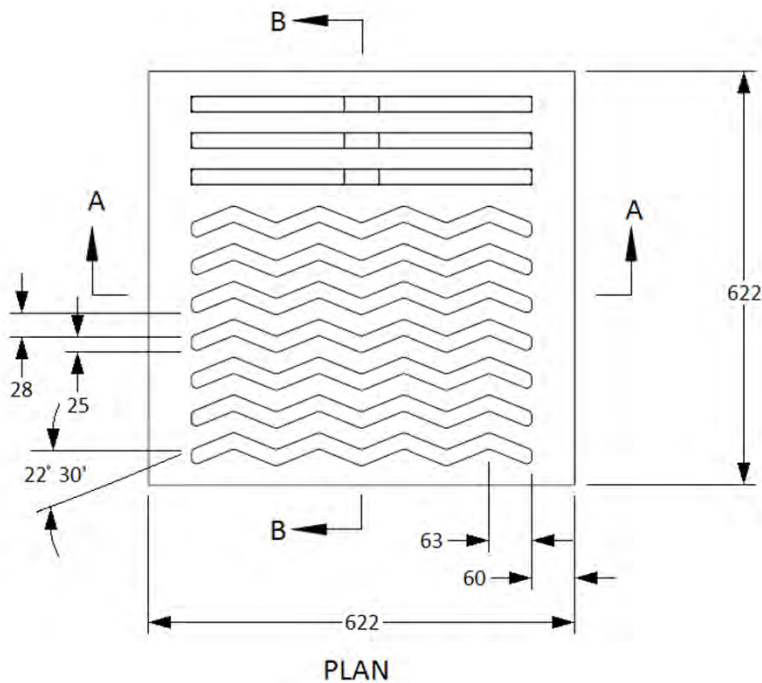
CHECKED BY: GKP

REVISION No.: 03

AP-015

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.

**CITY OF WINNIPEG**

WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-201.

**MOUNTABLE CURB
COVER**

DESIGNED BY:

DESIGN DATE:

SCALE: NTS

DRAWN BY: BAW

REVISION DATE: 02/15/15

DRAWING No.:

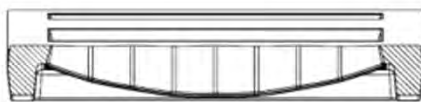
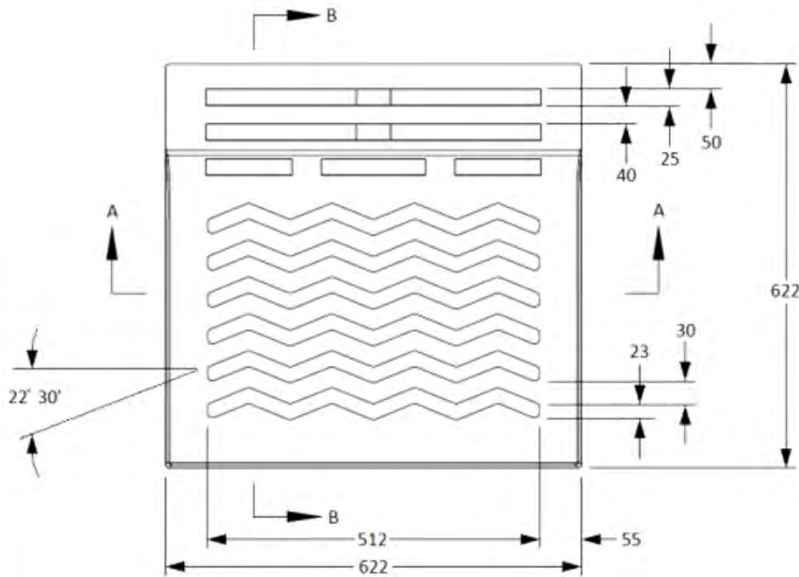
CHECKED BY:

REVISION No.: 04

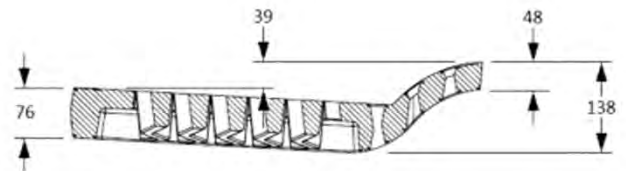
AP-016

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



SECTION AA



SECTION BB

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-201.

**MOUNTABLE CURB
PAVING COVER**

DESIGNED BY: DK

DESIGN DATE: 02/15/15

SCALE: NTS

DRAWN BY: BAW

REVISION DATE:

DRAWING No.:

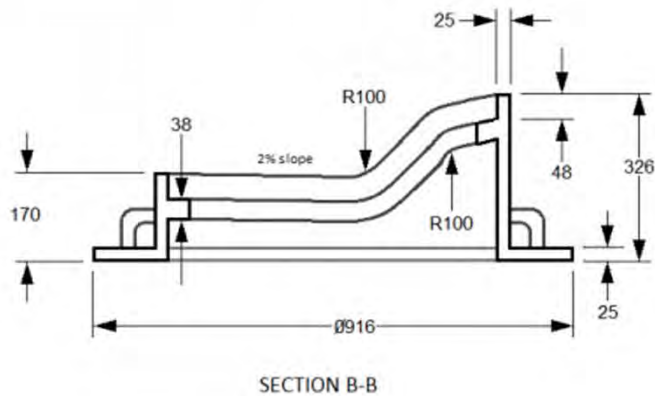
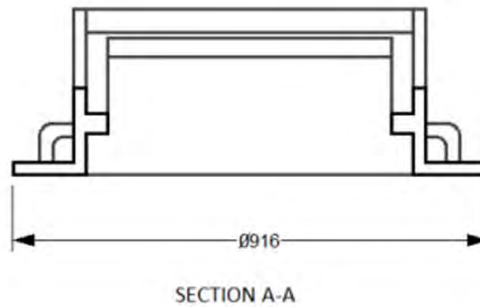
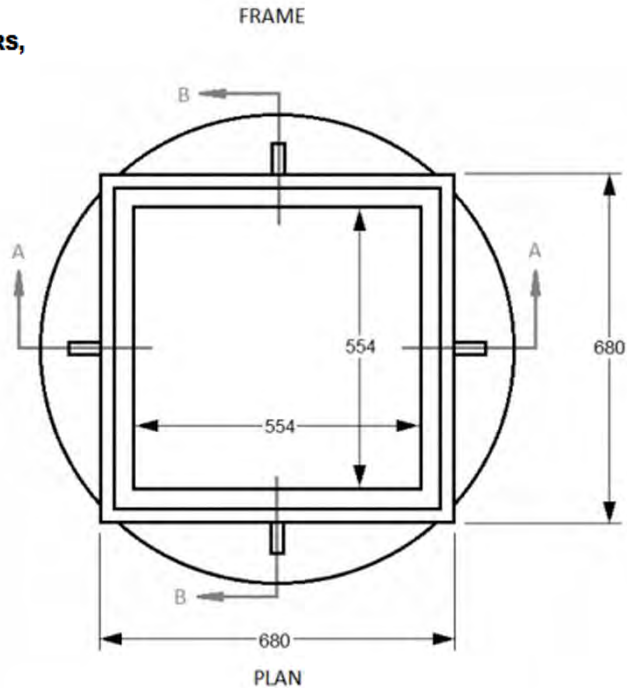
CHECKED BY:

REVISION No.:

AP-017

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203B.

**MODIFIED BARRIER
CURB FRAME**

DESIGNED BY: DK

DESIGN DATE: 02/15/15

SCALE: NTS

DRAWN BY: BAW

REVISION DATE:

DRAWING No.:

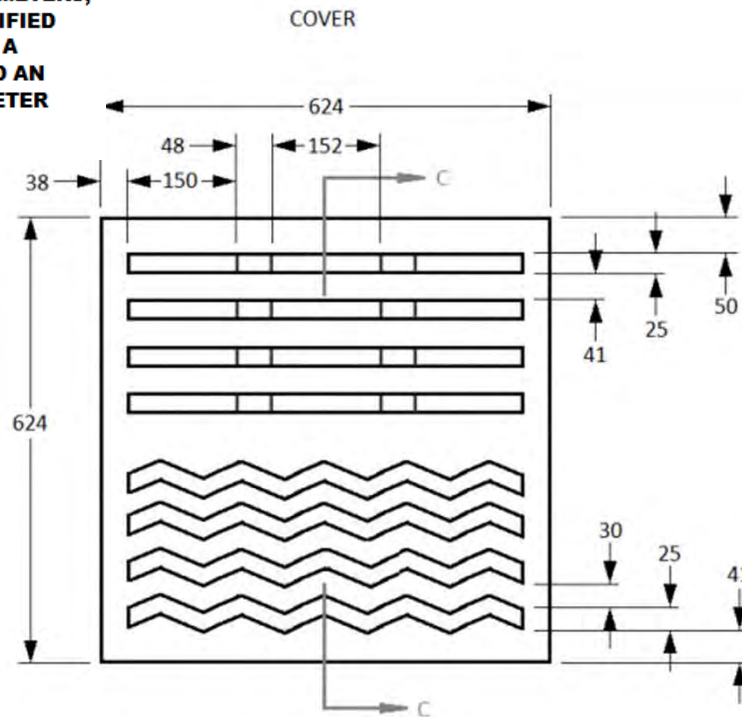
CHECKED BY:

REVISION No.:

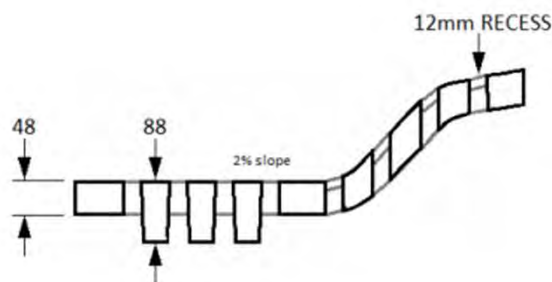
AP-018

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



FRONT VIEW



SECTION C-C

CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-023, SD-024 and Surface Works, SD-203B.

**MODIFIED BARRIER
CURB COVER**

DESIGNED BY: DK

DESIGN DATE: 02/15/15

SCALE: NTS

DRAWN BY: BAW

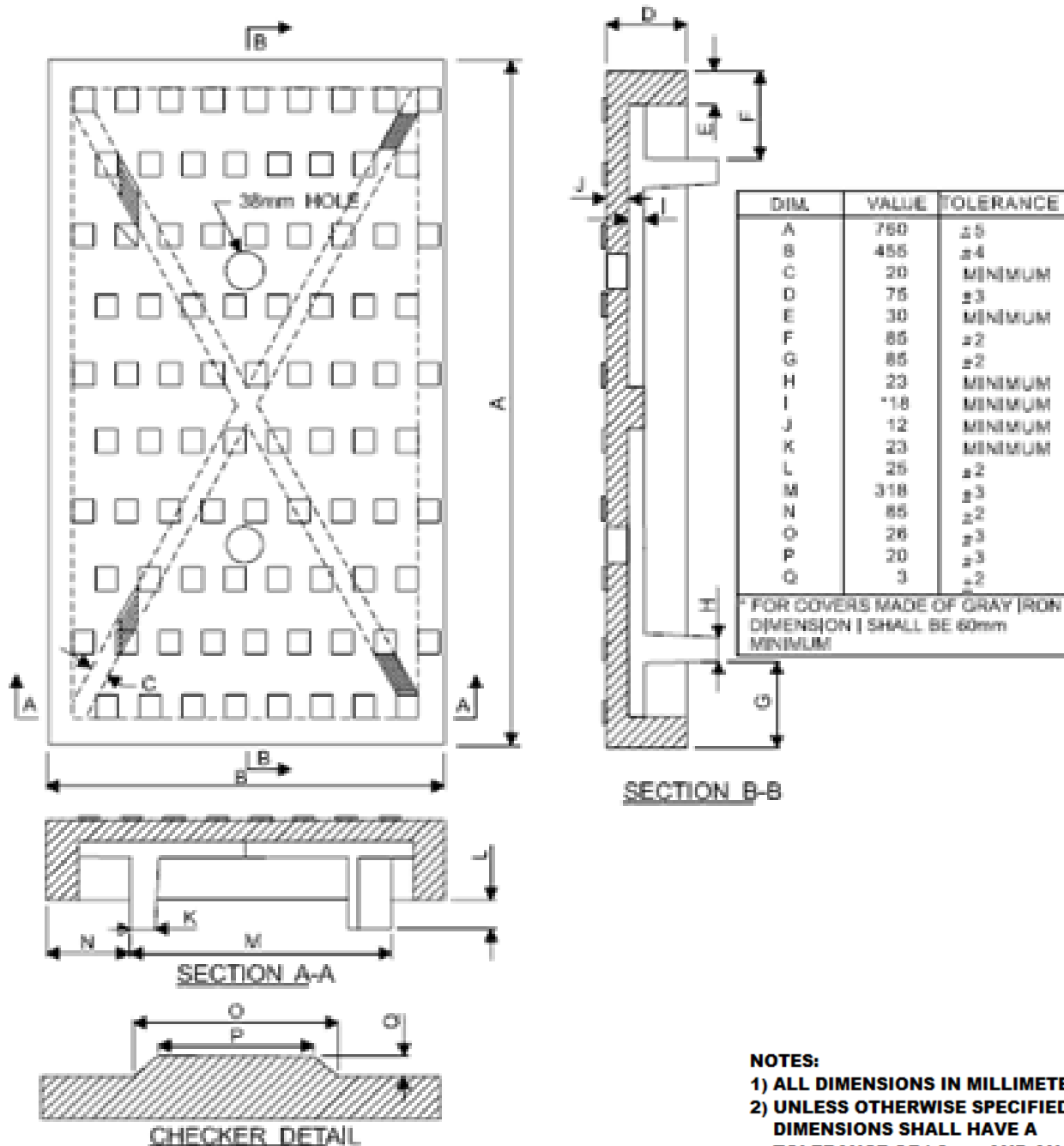
REVISION DATE:

DRAWING No.:

CHECKED BY:

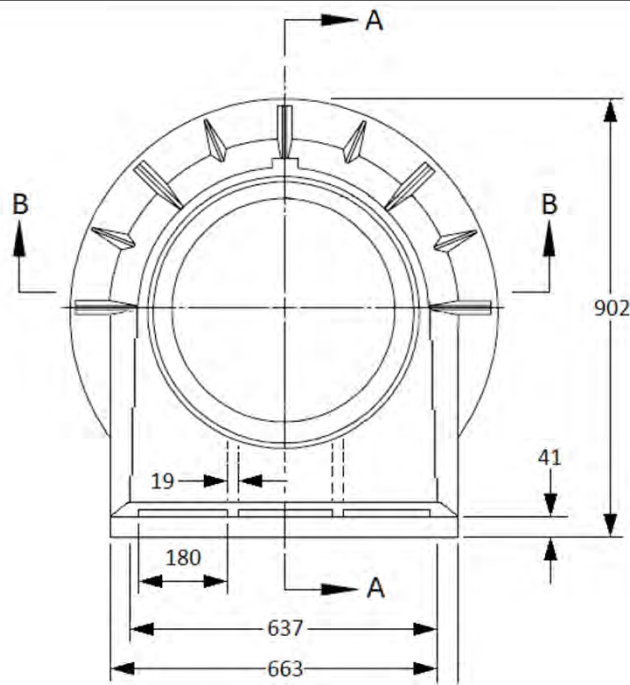
REVISION No.:

AP-019

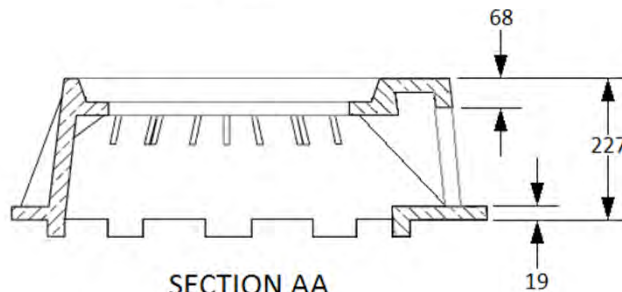


NOTES:
 1) ALL DIMENSIONS IN MILLIMETERS,
 2) UNLESS OTHERWISE SPECIFIED
 DIMENSIONS SHALL HAVE A
 TOLERANCE OF ± 2mm AND AN
 ADDITIONAL ± 5mm PER METER
 OF DIMENSION.

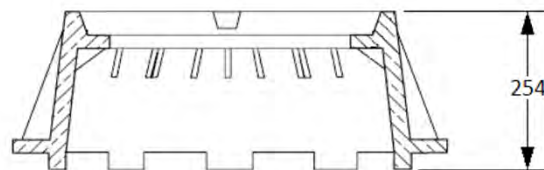
CITY OF WINNIPEG WATER AND WASTE DEPARTMENT	For curb design see City of Winnipeg Standard Construction Specifications, Surface Works, Standard Details, SD-203A, SD-204, SD-205 and SD-206A.		
	DESIGNED BY: TEJK	DESIGN DATE:	SCALE: NTS
	DRAWN BY: EN	REVISION DATE: 05/01/12	DRAWING No.:
CURB INLET BOX COVER	CHECKED BY: TEJK	REVISION No.: 01	AP-020



PLAN



SECTION AA



SECTION BB

FOR OPENING AND COVER DIMENSIONS
SEE AP-006, AP-007 AND AP-008

NOTES:
1) ALL DIMENSIONS IN MILLIMETERS,
2) UNLESS OTHERWISE SPECIFIED
DIMENSIONS SHALL HAVE A
TOLERANCE OF $\pm 2\text{mm}$ AND AN
ADDITIONAL $\pm 5\text{mm}$ PER METER
OF DIMENSION.

CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For curb design see City of Winnipeg Standard Construction Specifications, Surface Works, Standard Details, SD-203A, SD-204, SD-205 and SD-206A.

**INTEGRATED SIDE
INLET AND COVER**

DESIGNED BY: DK

DESIGN DATE: 21/10/07

SCALE: NTS

DRAWN BY: BAW

REVISION DATE:

DRAWING No.:

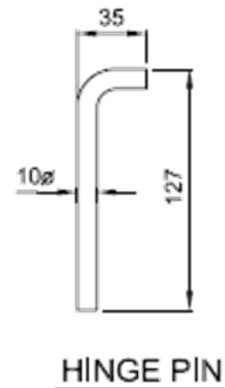
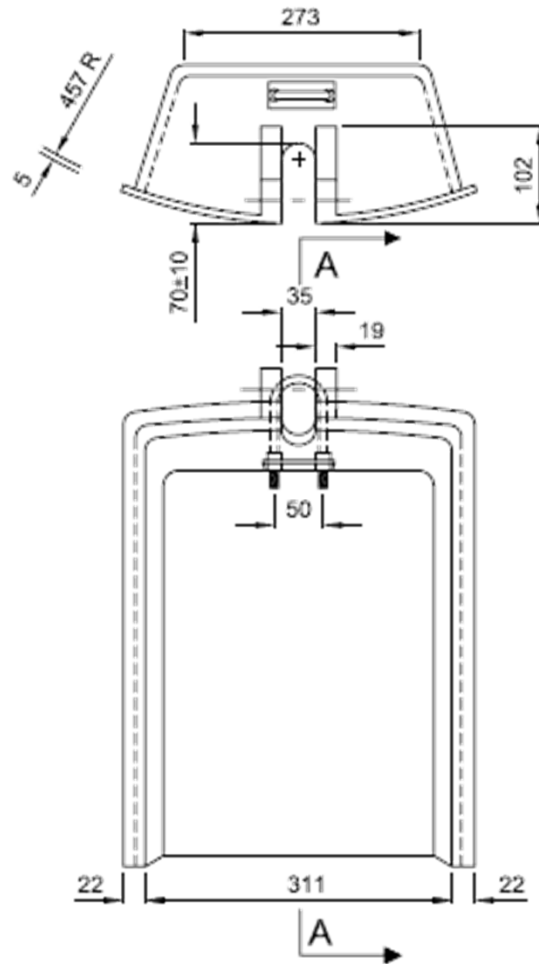
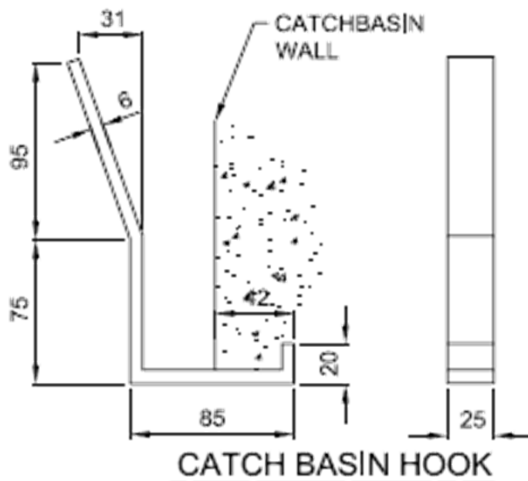
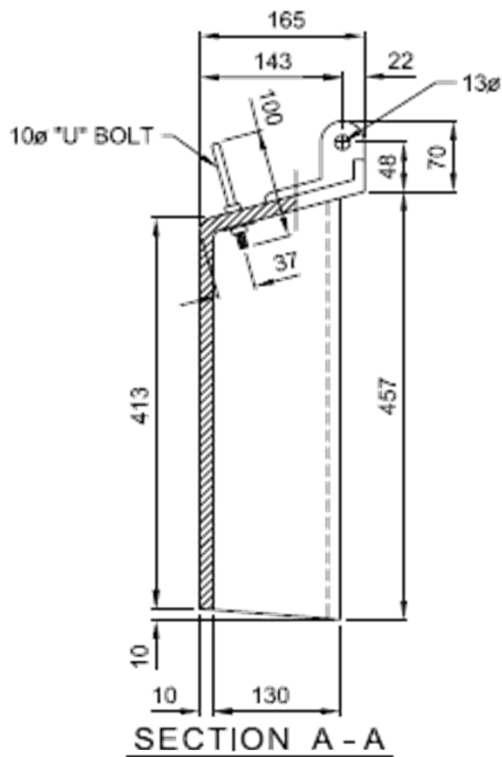
CHECKED BY: GKP

REVISION No.:

AP-021

NOTES:

- 1) ALL DIMENSIONS IN MILLIMETERS,
- 2) UNLESS OTHERWISE SPECIFIED DIMENSIONS SHALL HAVE A TOLERANCE OF $\pm 2\text{mm}$ AND AN ADDITIONAL $\pm 5\text{mm}$ PER METER OF DIMENSION.



CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

For installation instructions see City of Winnipeg Standard Construction Specifications, Underground Works, CW2130, SD-024 and SD-025.

CATCH BASIN HOOD

DESIGNED BY: JMH

DESIGN DATE:

SCALE: NTS

DRAWN BY: WKT

REVISION DATE: 05/01/11

DRAWING No.:

CHECKED BY: TEJK

REVISION No.: 01

AP-022