City of Winnipeg Upgrades to the McPhillips and Tache Pumping Stations Tender Opportunity 1070-2019

# **APPENDIX A**

**Electrical Test forms** 

Ĩ	INSPECTION FORM	Page
Winnipèg	MOLDED CASE CIRCUIT BREAKER, < 1000V	ID:

Page 1 of 2

oject	Facility:	Project Name:						
Pro	Area :	Bid Opportunity:						
	Location:	Panelboard/MCC:	Cell #:					

ata							
Ō	Manufacturer:			Туре:		Serial #:	
2	Rated Voltage:	V	Frame Size:		А	Trip Unit:	
В	Interrupting Rating:	k	A	Comments:			

/ uc	Breaker Identification Tag Insta	lled:	☐ Yes	🗌 No	Visual Signs of Overhea	ating:	🗌 Yes	🗌 No
	Cleanliness (As Found):	Good 🗌	Acceptable	Poor	Cables Supported Appr	opriately:	🗌 Yes	🗌 No
Inspection eaning	Connections:	Good 🗌	Acceptable	Poor	Electro/Mechanical Interlock:	□ N/A □ Good □	Acceptable	Poor
Ca	Ground Connection:	Good 🗌	Acceptable	Poor	Exercise Circuit Breake	er:	🗌 Yes	
Visu	Door Mechanical:	Good	Acceptable	Poor	Other:			
	Comments:							

	Trip Unit Rating: A	Trip Unit Ty	pe: 🗌 None 🗌	e:									
Settings	Breaker Setting (As Left)		Range	Setpoint	Delay	l <sup>2</sup> T							
	Long Time	🗌 Fixed 🔲 Adj.	-	X A = A	sec	🗌 On 🔲 Off							
Breaker	Short Time	🗌 Fixed 🔲 Adj.	-	X A = A	sec	🗌 On 🔲 Off							
Bre	Instantaneous	🗌 Fixed 🔲 Adj.	-	X A = A	N/A								
	Ground Fault	🗌 Fixed 🔲 Adj.	-	А	sec	🗌 On 🔲 Off							

	Perform in:	sulation res	istanc	ce measure	ements for brea	kers >= 250A	l, or as specif	fied.				
Test	Temperatu	Iro.	°C	Source:	Disconnec	ted 🗌 Co	nnected (Sou	rce Isolated)	Approval is required, prior to leaving			
	remperatu	ire.	· ·	Load:	Disconnec	ted 🗌 Co	cables connected during the test.					
tanc	Test Voltage (VDC)					ce (MΩ)	·					
Resistance		Phase	To G	ND (Break	er Closed)	Phase To	Phase (Brea	ker Closed)	Line to Load (Breaker Open)			
_		Α		В	С	A-B B-C A-C			Α	В	С	
atio												
Insulation	Test Sumr	Test Summary  Test Passed   Test Inconclusive. Further Investigation Required.										
_	Comments	:										

Contact sistance	Perform contact measurements				
		А	В	С	Test Summary
Conta	Resistance (μΩ)				Test Passed
° Å	Comments:		Further Investigation Required.		

## INSPECTION FORM MOLDED CASE CIRCUIT BREAKER, < 1000V

Page 2 of 2

ID:

<u>s</u>	Returned to Service:	☐ Yes	🗌 No	Comments:
Final nalys	Monitoring / Further Inspection Required:	🗌 Yes	🗌 No	
A	Repair / Replacement Required:	🗌 Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

v	Vinnipeg					ECTION FORM CABLE < 1000V					1 of 1	
	Facility:				Project	Jama:				Cable ID		
Project	Area :				Project I Bid Opp							
<u> </u>	Alea .				ый Орр							
	Source:			Dest. / I			_oad:					
ø	Manufact	urer:		Туре	):	<b>.</b>			Conductor: Copper Aluminum			
Cable Data	No. of Conducto	rs:	Size:		AWG MCM	Lengt	ו:		m ☐ Mea □ Jack	sured et Markings	Previous Data	
Cat	Rated Vo		Operatino Voltage:	g	V	Date I	nstalle	ed:				
	Installatio	n: Cable Tra	iy [	] EMT ] Steel Conc	luit 🗌	] Alum. C ] PVC Co			Direct Burie		other:	
	Physical I	Damage on Expose	ed Ends:	☐ Yes	🗌 No	Cable lo	dentific	cation T	ag Installed:		🗌 Yes 🗌 No	
Visual Inspection	Visual Sig	ns of Overheating	:	🗌 Yes	🗌 No	Cable S	uppor	ted App	propriately:		🗌 Yes 🔲 No	
N V	Bend Radius Acceptable:					Comme	nts:					
	Test Preparatio	Source:		urce Isolated	Disco	est. / Loa onnected lected wit		d Isolate	is ree		of City's Representative to leaving cables g the test.	
Insulation Resistance Test	Cable Te	mperature:	mperature C	orrection F	actor for 2	20°C:		Ground a reading.	all conducto	rs not under test for each		
tance	Test			Ins	ulation Re	sistance	(MΩ)		Test	Summary		
Resis	Voltage		A-G	ND B	-GND	C-GI	ID	N-C		est Passed		
ation	v	Reading							F		isive stigation Required.	
Insula	v	Corrected to 20°	С						ТПт	est Failed		
_	Utilize 10	00VDC Test Voltag	ge for 600	V rated cabl	es, 500VD	C for cab	es rate	ed <= 3	300V.			
	Comment	S:										
6)	Note: Tor	que check required	l for all ca	ables. Conn	ection Res	stance Te	est req	uired fo	or cables 4/0 A	WG or larg	er.	
stance	Те	ermination		Connectio	on Resista	ince (μΩ)	- As	Left		То	rque Check	
Resis			A		В	С		I	N			
Connection Resistance		Source									ОК	
onne	D	est. / Load									ОК	
ပ	Comment	s:										
	Cable Re	turned to Service:		□ Ye	s 🗌 No	Comm	ents:					
Final Analysis	Monitorin	 s □ No										
Ana		Replacement Requi										
		Company		Name			Sign	ature			Date (yyyy/mm/dd)	
Perfor	med By	Sompany		Naille			Sign	ature				
Check	-											

Form CBL-LV Rev 00, Created by SNC-Lavalin Inc. M:\113099\4ENG\47ELE\RA - Misc Reports & Forms\Forms\F-CBL-LV.doc

				PECTION				Page 1 of 1			
V	Vinnipèg	CO	NTROL POV		NSFORM	ER, 600V		ID:			
Project	Facility:			Project N	Name:						
Pro	Area :			Bid Opp	Bid Opportunity:						
ta	Location:				Pri. V Ratin	′oltage g:		Sec. Voltage Rating:			
PT Data	Manufacture	r:			Pri. F	use Size:		Sec. Fuse Size:			
<u>م</u>	Size:		Т	ype:			Other:				
	Physical Da	nage:	☐ Yes	🗌 No	Defective	Connections/Wiring	:	🗌 Yes 🗌 No			
Visual Inspection	Visual Signs	of Overheating:	🗌 Yes	🗌 No	Grounding Contact:	and Shorting Conn	ections	Provide 🗌 Yes 🗌 No			
Vis Inspe	Verify Groun	d Connection:	🗌 Yes	🗌 No	Verify With	drawal Mechanism	Functio	on: 🗌 Yes 🗌 No			
	Fuse Sizes I	Match Drawings:	☐ Yes	🗌 No	Comments						
Insulation Resistance Test	Test Preparat		ected ed with Source Voltage	Insulation	Resistance IΩ)						
ר Res	Prima	ry To GND	1000 VDC			Test Summary					
latio	Second	lary To GND	500 VDC			Test Inconclusi		Required.			
lnsu	Primary	To Secondary	1000 VDC			Test Failed					
	Comments:										
s	Returned to	Service:	☐ Yes	🗌 No	Comments	::					
Final Analysis	Monitoring / Required:	Further Inspection	🗌 Yes	🗌 No							
A	Repair / Rep	lacement Required:	🗌 Yes	🗌 No	]						
	Co	ompany	Name		S	ignature		Date (yyyy/mm/dd)			
Perfor	med By										
Check	ed By										
Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.											

										_				Page	1 of 1	
V									KINEI	۲				ID:		
Project	Facility:						Project Name:									
Pro	Area :						Bid Opp	Bid Opportunity:								
	Location:					Curre	ent Ratio: : A Voltage Clas					s: V				
CT Data	Manufact	urer:			Model	Model No.: Type: 🗌 Bar 🗌 Windo				Window	(Solid)	Split	Core			
о С	Burden R	ating:			BIL:	kV Accuracy Class:										
5	Physical	Damage	:			Yes	🗌 No	No Clean and Inspect Insulators:					☐ Yes	🗌 No		
Visual Inspection	Visual Sig	gns of Ov	verheat	ing:		Yes	🗌 No	Verify Connections are Correct:					🗌 No			
/ Ins	Adequate	e Mountir	ng Supp	oort:		Yes	🗌 No	Commer	nts:							
Insulation Resistance Test	Test Preparation: Source: Disconnected Connected with Source: Isolated Test Voltage						Cable Dest. / Load: Note: Approv Disconnected is required, pr Connected with Load Isolated					rior to le Iring the	eaving cab e test.			
stanc	-	Test		Voltag	e		Insul	ation Res B	istanc	;e (ML	2) C		Tempera			
Resi	Primary To GND 1000			V		<u> </u>				П Т		Test	est Passed			
ation	Secondary To GND 500		/								 Furt		usive estigation	Required.		
Insul	Primary To Secondary 1000		1000 \	V								Test	Falled			
	Comments	:								<b>I</b>						
	Note: Atta	ch suppo	ortina da	ata and satu	uration (	curve.										
ation							Ph	ase						Test Summary		
tion, Saturation y Tests				Α	В			C							Test Passed	
tion, Sat / Tests	Calculated	d Ratio												Fur	ther Inves	
xcitat olarity	Measured	l Ratio												□ Test		
Turns Ratio, Excitati and Polarity	Exciting C (mA															
ns Ra a	Polarity C	Correct	🗆 Ye	s 🗌 No		Yes	🗌 No	🗌 Yes		٩o	🗌 Yes		No			
Tur	CT Satur Test Perfo		🗆 Ye	s 🗌 No		Yes	🗌 No	☐ Yes		١o	🗌 Yes		No			
ú	CT Returned to Service:					Yes	□ No	Commer	nts:							
Final Analysis	Monitorin Required		er Insp	ection	□ `	Yes	🗌 No	]								
A I	Repair / Replacement Required: Yes						🗌 No									
<u> </u>	Company Name								Signa	ature				Dat	<b>te</b> (yyyy/m	nm/dd)
Perfor	Performed By															· · · - · /
	ed By															
NISTER	<b>T</b> I			the check i									a handa			

	U <sup>i</sup>						FORM				Page 1 of 2		
	Vinni	peg			DIGI	TAL M	ETER				ID:		
Project	Fac	ility:			F	Project N	lame:						
Pro	Area	a :			E	Bid Oppo	ortunity:						
a e	Loca	ation:				Cell #:							
Meter Data	Mar	ufacturer:				Model:							
2	Cover Gasket: Good Accepta							er Gl	ass:			Acceptable Deor	
Visual		eneral Conc			ood 🗌 Acceptable								
iv vi		eanliness (a	as found	d) 🗌 Go	ood 🗌 Acceptable	e 🗌 Poo			aned:	/es			
	Connections (as found) Good Acceptable Poor Connections Torqued: Yes												
it er	Hanufacturer: Model:												
Test Meter	Cali	Calibration Date: Meter calibration must be within one year, unless otherwise specified.							rwise specified.				
		Nominal	Test		Calibrated Mete	er					_		
		Value (V)		Value Phase Measurement		IVIATO	er Under To (V)	est	Difference (V)		Error (%)	(See Specs)	
												□ Yes □ No	
	age	0										🗌 Yes 🗌 No	
	Voltage											🗌 Yes 🔲 No	
												🗌 Yes 🔲 No	
												🗌 Yes 🗌 No	
												🗌 Yes 🗌 No	
Accuracy		Nominal Valu (V)	е	Phase	Calibrated Mete Measurement (A)	Moto	er Under To (A)	est	Difference (A)		Error (%)	Acceptable (See Specs)	
Ă				А								🗌 Yes 🗌 No	
	ent	0		В								🗌 Yes 🔲 No	
	Current			С								🗌 Yes 🗌 No	
				А								🗌 Yes 🗌 No	
				В								🗌 Yes 🗌 No	
				С								🗌 Yes 🗌 No	
		surements				As-Left			check both boxes				
	Unit	Calibration	Adjuste	ed: C			on was adj alibration.	uste	d, complete two fo	rms, o	ne for as-fou	und, the other for as-	

## INSPECTION FORM DIGITAL METER

ID:

l sis	Returned to Service:	🗌 Yes	🗌 No	Comments:
Final nalysi	Monitoring / Further Inspection Required:	☐ Yes	🗌 No	
٩	Repair / Replacement Required:	🗌 Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	Winnipeg			INSPE							Page	1 of 1	
	winnipe	g		EMERGE	NCY L	IGH	TIN	G			ID:		
Project	Facilit	y:			Project N	Name	:						
Pro	Area				Bid Opp	ortuni	ity:						
					E. I.F.							O'marrit II	
Jnit	Locati				Fed From:					Circuit #:			
Battery Unit Data		acturer			Model: Se					al No:			
Batt	Input	/oltage	: V AC	Input Current:		A	C	Output V	-	V D		attage:	W
	Qty of	Interna	I Lamps:	Internal Lamp Wa	attage:		W		Type of Ir	nternal Lam	ps:		
ω v	Quant	ity:		Manufacturer:	turer: Model:								
Remote Fixtures	Input	/oltage	V DC	Input Current:	Δ	Ą		Qty of	Lamps per	Fixture:			
Ϋ́Ε	Lamp	Wattag	e: W	Type of Lamps:	Wire Size:				AWG				
			<b>—</b>										
) 'u	n Ide		on Tag Installed:	☐ Ye					perly Aime				□ No
Visual	Vis	Visual signs of Moisture: Yo				No	Cor	nection	IS:			eptable 🗌 Poo	
Visual Inspection /	<del>ပ</del> ီ Cle	able 🗌 F	Poor	Gro	und Co	nnection:	Good 🗌		eptable 🗌 Poo	r			
		nments	:										
	Equipm	ent Ten	nperature:	Ĉ						Test Sum	mary		
sting	Test Re	sults								Test Pa			
Battery Testing	Stated I	)esian '	Time (From Drawing	s): Mi	in					Further	conclus r Investi	gation Required	d.
atter			ps Turn Off:	Mi						🗌 Test Fa	ailed		
	Comme	nts:											
	D.:					Com	mer	nts:					
al /sis		ed to Se		Yes [		0011	mei						
Final Analysis		-	spection Required:		] No								
	Repair / Replacement Required:				] No								
		Со	mpany	Name				Signat	ture			Date (yyyy/m	ım/dd)
Perfo	rmed B	y											
Checl	ked By												

# INSPECTION FORM FUSED DISCONNECT SWITCH, 600V

Project	Facility:				Project Name	):					
Pro	Area :				Bid Opportun	ity:					
Disconnect Data	Manufacturer:				Model:						
Disco Di	Rated Voltage:	V	Current R	ating:	А	Interrupting Rating: A					
					1						
Fuse Data	Manufacturer:				Туре: Са			Cat. #:			
Fu Da	Rated Voltage: V Current Ratin			rrent Rating	g: A	: A Holder:					
	I										
5	Identification Tag Installed:					Visual Signs	of Overhea	ating:		Yes 🗌 N	D
aninç	Cleanliness (As Fo	able 🗌 Poor	Support Insul	ators:		Good Acc	eptable 🗌 P	oor			
/ Cle	Connections:	Accepta	able 🗌 Poor Blade Condition:					eptable 🗌 P	oor		
Visual Inspection / Cleaning	Ground Connectior	ו:	Good [	Accepta	able 🗌 Poor	Verify Blade I Operation:	Mechanica	l	Good Acc	eptable 🗌 P	oor
al Inspe	Door Mechanical:	Accepta	able 🗌 Poor	Fuse Holder Contact Integ	Support an Irity:	d	Good Acc	eptable 🗌 P	oor		
Visua	Fit Plumb & Square	9:			] Yes 🗌 No	Unit Cleaned	: 🗌 Ye	s	Unit Lubricated:	🗌 Yes	
	Cables Supported	Appropriatel	y:		] Yes 🗌 No	Other:					
0		Resist (As	ance (μΩ) s Left)			Test Sumn	nary				
blade	Α	I	В		С	□ Test Passed □ Test Inconclusive					
Switchblade Resistance							Investigati	on Requ	ired.		
	Comments:					1					
e		Resist (As	ance (μΩ) s Left)			Test Sumn	nary				
Fuse Resistance	Α	I	В		C	Test Passed     Test Inconclusive					
se Re						Further	Investigati led	on Requ	lired.		
Fui	Comments:					1					

# INSPECTION FORM FUSED DISCONNECT SWITCH, 600V

ID

Test	Test Prepa		e: 🗌 Isolat nnect: 🔲 C	Discon	Note: Approval of City's Representative is required					
		Test	V	- 11	Insu	lation Resistanc	e (MΩ)	Ground all phases not		
sistar	Test		Voltage -		Α	В	С	under test!		
n Re	Disconneo	Disconnect Line To GND 10		00 VDC				Test Summary		
Insulation Resistance	Disconnec	Disconnect Load To GND 100						Test Inconclusive Further Investigation		
lns	Disconnect Line to Load 100			00 VDC				Required.		
	Comments	8:								
s.	Returned	Returned to Service:				] No	Comments:			
Final Analysis	Monitoring	g / Further Inspec	tion Requir	ed: 🗌 Yes	Ľ	] No				
- Ar	Repair / R	eplacement Req	uired:	🗌 Yes	Ľ	] No				
		Company		Name		Cignoture				
Perfo	rmed By	Company		name		Signature		Date (yyyy/mm/dd)		
Chec	ked By									

Q
TITE I
Winnipeg

#### **INSPECTION FORM GROUNDING/BONDING CONNECTION RESISTANCE**

Page 1 of 2

Area:

Project Facility:

Area :

Project Name:

Bid Opportunity:

	Point A	Point B	Resistance (mΩ)		Acceptable
				□ Yes □	No Inconclusive
				🗌 Yes 🔲	No
				□ Yes □	No 🗌 Inconclusive
				Yes	No 🗌 Inconclusive
				Yes	No 🗌 Inconclusive
				Yes	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				Yes	No 🗌 Inconclusive
				🗌 Yes 🛛	No 🗌 Inconclusive
ks				□ Yes □	No 🗌 Inconclusive
Resistance Checks (Ductor Test)				□ Yes □	No 🗌 Inconclusive
ance ctor T				□ Yes □	No 🗌 Inconclusive
esista (Du				🗌 Yes 🗌	No 🗌 Inconclusive
Ř				🗌 Yes 🛛	No 🔲 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				🗌 Yes 🛛	No 🗌 Inconclusive
				🗌 Yes 🛛	No 🔲 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				🗌 Yes 🔲	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				□ Yes □	No 🗌 Inconclusive
				🗌 Yes 🛛	No
	Comments:				

#### INSPECTION FORM GROUNDING/BONDING CONNECTION RESISTANCE

Page 2 of 2

ID:

	Point A	Point B	Resistance (mΩ)	Acce	eptable
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
ks				🗌 Yes 🗌 No	Inconclusive
Resistance Checks (Ductor Test)				🗌 Yes 🗌 No	Inconclusive
sistance Chec (Ductor Test)				🗌 Yes 🗌 No	Inconclusive
esista (Duo				🗌 Yes 🗌 No	Inconclusive
Ř				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
				🗌 Yes 🗌 No	Inconclusive
	Comments:			·	

.00	Monitoring / Inspection Required:	☐ Yes	🗌 No	Comments:
Final	Repair / Replacement Required:	🗌 Yes	🗌 No	
Ā				

	Company	Name	Date (yyyy/mm/dd)
Performed By			
Checked By			

TA INC.									Page 1 of 2		
v	Vinnipèg			INTELLIG	SENT OVE	R	LOAD		ID:		
Project	Facility:				Project Nam	ne:					
Pro	Area :				Bid Opportu	d Opportunity:					
_	- Location: Ce				Cell #:	all #-					
O/L Data	gata			Model:							
- ion	General Co	ndition:	Good Good	d 🗌 Acceptabl	e 🗌 Poor						
Visual Inspection	Cleanliness	Good Good	e 🗌 Poor		Unit Cleaned:						
sul >	Connection	s (as found)	Good Good	d 🗌 Acceptabl	e 🗌 Poor		Connections Torqued:	☐ Yes			
									]		
tion	Static IP Add	ress:			Subne	Subnet Mask					
Communication Settings	Gateway:				Protoc	Protocol:					
Com	MAC Address	s:			·						
Test Meter	Manufacturer:			Mode							
	Calibration Date:					Meter calibration must be within one year, unless otherwise specified.					
Type: 🗌 Internal to			to O/L	External	Exterr	External CT Ratio:					
CTs	External G	Fround CT:	🗌 Yes 🛛	] No	Grour	Ground CT Ratio:					

## INSPECTION FORM INTELLIGENT OVERLOAD

Page 2 of 2

ID:

	Verify accu	racy of Intell	igent O/L Measu	rements wi	th the use	of software via th	ne communic	ation network.	
	Nominal Test Value (A)	Phase	• • • • • • • • • • • • • • • • • • • •	Measu	rement	Difference (A)	Error (%)	Acceptable (See Specs)	
		А						🗌 Yes 🗌 No	
ent	0	В						🗌 Yes 🗌 No	
Curre		С						Yes No	
		A						□ Yes □ No	
		В						🗌 Yes 🗌 No	
		С						🗌 Yes 🗌 No	
Meas	surements Applica	able To:	As-Found	s-Left	May	check both boxes	if applicable.		
Unit Calibration Adjusted: Yes No If calibration was adjusted, complete two forms, one for as-found, the other full feature calibration.									
Returned to Service:     Yes     No       Monitoring / Further Inspection Required:     Yes     No									
		spection	□ Yes [	] No					
Repa	air / Replacement	Required:	🗌 Yes 🛛 [	] No					
	Company		Name		Sign	ature		Date (yyyy/mm/dd)	
	Unit Retu Mon Req	Nominal Test Value (A)         0         0         Measurements Application         Unit Calibration Adjust         Returned to Service:         Monitoring / Further In Required:         Repair / Replacement	Nominal Test Value (A)       Phase         0       B         0       B         0       B         0       A         0       B         0       B         0       C         A       B         0       C         0       B         0       C         0       B         0       C     <	Nominal Test Value (A)       Phase       Calibrated Meter Measurement (A)         0       A	Nominal Test Value (A)       Phase       Calibrated Meter Measurement (A)       Intellig Measurement (A)         0       A	Nominal Test Value (A)       Phase       Calibrated Meter Measurement (A)       Intelligent O/L Measurement (A)         0       A	Nominal Test Value (A)       Phase       Calibrated Meter Measurement (A)       Intelligent O/L Measurement (A)       Difference (A)         0       A	Value (A)     Phase     Measurement (A)     Measurement (A)     Difference (A)     Effor (A)       0     A	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	Ĩ				IN	SPE		FORM			Page	1 of 6	
V	Vinnipèg					Ν	ICC, 600	V			ID:		
Project	Facility:					Pr	Project Name:						
Pro	Area :					Bi	Bid Opportunity:						
	Location:										# of Ce		
ta											# 01 C	5115.	
MCC Data	Manufacturer:						Model:			Serial #:			
MCC	Rated Voltage	Voltage: V Main Bus Rating:						А	Main Bus I	Neutral Ratin	g:	А	
	Bus Conducto	or: 🗌 Copp	er 🗌	Aluminun	n C	Curre	nt Withstan	d Rating:	А				
r	Identification	Tag Installes	1.						of Overboo	ting			
	Identification <sup>-</sup>		1:		☐ Ye	s L	No	Visual Signs		ung:		☐ Yes	□ No
	Visual Signs of	of Moisture:			🗌 Ye	s [	□ No	Visual Signs	of Corona:			🗌 Yes	🗌 No
	Fuse/Breaker	Sizes Match	n Drav	vings:	🗌 Ye	s [	] No	PT and CT ra	atios match	drawings:	□ N/A	🗌 Yes	🗌 No
bu	Elevation Dra	wings Corre	ct:		🗌 Ye	s [	No	Cables Supp	orted Appro	opriately:		🗌 Yes	🗌 No
leani	Cleanliness (A	As Found):		Good 🗌		eptab	le 🗌 Poor	Insulators Co	ndition:		Good 🗌	Acceptable	e 🗌 Poor
Visual Inspection / Cleaning	Connections:			Good 🗌		eptab	le 🗌 Poor	Electro/Mech Interlock Sys			Good 🗌	Acceptable	Poor
spect	Ground Conn	ection:	[	Good	Acce	ptabl	e 🗌 Poor	Vents/Filters:			Good 🗌	Acceptable	Poor
al Ins	Doors Mecha	nical:	[	Good		ptabl	e 🗌 Poor	Exercise Acti	ve Compon	ients:		🗌 Yes	□ No
Visu	Cell Fit and A	lignment:	[	Good		ptabl	e 🗌 Poor						
	Required Clea Met:	arances are	[	Good	Acce	ptabl	e 🗌 Poor			·			
	Indicating me	chanisms:	[	Good	🗌 Acce	ptabl	e 🗌 Poor	Unit Cleaned	: 🗌 Yes	s Photogra	ph Takei	n: 🗆 N	′es
	Comments:												
													]
	Туре:	Inspe	ection	l									

	Туре:	Inspection										
er	🗌 Main Breaker	Complete appropriate	breaker inspection form	n.								
Power	Disconnect	Complete appropriate	complete appropriate disconnect inspection form.									
Incoming		Visual Inspection:										
Inco	🗌 Main Lugs	Connections Torqued:	☐ Yes									
		Connection	Α	В	С	N						
		Resistance (μΩ) As Left										

# INSPECTION FORM MCC, 600V

	Test Preparation	n: 🗍 Co	ce: sconnected onnected wi solated		Cable Dest. / Load: Disconnected Connected with L	oad Isolated	Note: Approval of City's Representative is required, prior to leaving cables connected during the test.		
Test	Temperatu	ire:	°C						
ICe	Test Voltage			on Resistanc ase To Phas	· · ·	Test Summary	1		
sista vork	(dc)	A - B	3	B - C	C - A				
	1000 V						lusive estigation Required.		
Insulation (B	Test Voltage -			on Resistanc nase To GND		Test Failed			
lns	voltage	A - GI	ND	B - GND	C - GND				
	1000 V								
	Comments	:	·						

d Resistance (Ductor Test)	Point A	Point B	Resistance (μΩ)	Test Summary □ Test Passed □ Test Inconclusive
esist	MCC GND Bus	Facility Ground Electrode		Further Investigation Required.
ound R cks (Dr	MCC GND Bus	MCC Enclosure		
Ground Checks (	MCC GND Bus	System Neutral		
	Comments:			

	Visual Inspect Requirements:	G=Good, A=Acceptable, P=Poor Comments are required for all items identified in Poor condition						
	1.	Confirm identification tag / lamacoid is installed.						
	2.	Look for visual signs of overheating.						
	3.	Inspect and torque connections.						
ers	4.	Inspect and test any electro/mechanical interlocks.						
Feeder Breakers	5.	Confirm disconnect operation.						
er B	6.	Check door mechanical condition.						
Feed	7.	Exercise circuit breaker.						
_	8.	Confirm cables are supported and routed appropriately.						
	9.	Visually assess the general condition of the installation.						
	Note:         Complete an appropriate Breaker Inspection Form for all breakers with separate adjustable Short trip settings, Ground trip settings, or > 250A frame size.							
		Continued on next page						

# INSPECTION FORM MCC, 600V

Page 3 of 6

	ID	Loc./ Cell	Frame Rating (A)	Trip Rating (A)	Manuf.	Model	from previous Trip Unit Type	Inst Setting	Visual Inspection	Cleaned	Comments
0											

	Overcurrent Protection Type:	B=Breaker (Thermal Magnetic), M=Motor Circuit Protector, F=Fuse					
	Overload Protection Type:	T=Thermal, SS=Solid State, I=Intelligent					
	Visual Inspect Requirements:	G=Good, A=Acceptable, P=Poor Comments are required for all items identified in Poor condition.					
s	1.	Confirm identification tag / lamacoid is installed.					
acto	2.	Look for visual signs of overheating.					
Contactors	3.	Inspect and torque connections.					
	4.	Inspect and test any electro/mechanical interlocks.					
Starters	5.	Confirm disconnect operation.					
	6.	Check door mechanical condition.					
Motor	7.	Exercise circuit breaker.					
	8.	Confirm cables are supported and routed appropriately.					
	9.	Visually assess the general condition of the installation.					
		nplete a Motor Starter Inspection Form for all Motor Starters Size 4 or larger, with VFDs, or with Soft ters.					

				Overcu	urrent Prof	tection	Contactor		Overload			
	ID	Loc./ Cell	Type	Rating (A)	Manuf.	Model	Size / Rating	Type	Model	Visual Insp.	Cleaned	Comments
Motor Starters / Contactors												
ntac												
/ Co												
rters												
Sta												
lotoi												
2												
	General Comments:											

# INSPECTION FORM MCC, 600V

Page 5 of 6

				Overcurrent Protection C		Contactor		Overload				
	ID	Loc./ Cell	Type	Rating (A)	Manuf.	Model	Size / Rating	Type	Model	Visual Insp.	Cleaned	Comments
ers												
Start												
<b>Motor Starters</b>												
ĕ												
	General Comments:											



## INSPECTION FORM MCC, 600V

ID:

al sis	Returned to Service:	🗌 Yes	🗌 No	Comments:
	Monitoring / Inspection Required:	🗌 Yes	🗌 No	
Ā	Repair / Replacement Required:	🗌 Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed	Ву			
Checked By	/			

٢
Winnipeg

Area :

#### **INSPECTION FORM** MOTOR STARTER, FVNR, 600V

ID:

ject	Facility:
Pro	Area :

Project Name:

Bid Opportunity:

	Load:						Starter Lo	ca	tion:							Cell #:		
	Manufacturer	r:		Ту	/pe:			Serial #					Serial #	:				
	Size: Rate			ted V	/oltage:		V Curren			t Rating: A		\ \	Control Volta	age:		V		
		□ Eu	sed D	isc	Rating:		А	Fi	use Si	ize.	А	Fus	e Mfg.					
	Circuit		JCU D	100.	rauny.				100 01	MZE. A		Model:						
Starter Data	Protection:		eaker		Rating:		А		ist.		А	Mar	ufacturer:					
ter			CP		i tating.		~	Se	etting:			Mod	lel:					
Star	Overload		ermal	ia	Class:		10 20	Sr	etting	/	А	Mar	ufacturer:					
	Protection: Electronic Intelligent			Class.		30 Jnknown	Rating:			A	Мос	lel:	l:					
	Control Power Transformer: Size:					VA	Sec. Volta	age	e:	V	Prima	y Fu	se:	A Second	dary	Fuse:	Д	١.
	Current Transformers: Phases:			es:	□ A □ B □ C		□ None		Ratio	D:			Fround ault CT:	Present     Not Pres	ent	Ratio:		
1								_										_
Motor Data	ID:	ID:					Size:		ł	kW /		F	IP	Voltage:				V
Mo Da	Full Load Amps: A			A	Service Fa	ctor:		0	ther:									
								_										
	Starter Identif	ficatior	n Tag I	nstal	led:	ו 🗆	Yes 🗌 N	٩		Visual	Signs o	of Ove	erheating:			🗌 Yes		С
bu	Cleanliness (	As Fou	und):		Good [		ceptable	] [	Poor	Suppor	t Insula	ators:		🗌 Good		Acceptable	D P	oor
al Inspection / Cleaning	Connections				Good Acceptable					Electro. Interloc		anical		I/A □ Good		Acceptable	D P	oor
tion /	Ground Conn	nection	:		Good Acceptab			] F	Poor	Contac	tor Cor	nditio	n:	🗌 Good		Acceptable	D P	oor
spect	Door Mechan	nical			Good [		ceptable		Poor	Contac	t Aligni	ment:		Good Good		Acceptable	D P	oor
al In:	Verify O/L ele	ement i	s corr	ectly	sized for		☐ Yes		] No	Exercis	e Circu	uit Br	eaker/MCF	P/Disconnect				/es

Visual the load: Cables Supported Appropriately: ☐ Yes ☐ No Unit Cleaned: 🗌 Yes Photograph Taken: 🗌 Yes Comments:

	Test	Α	В	С	Test Summary
<sup>o</sup> ole ients	Contact Resistance ( $\mu\Omega$ )				Test Passed Test Inconclusive
Contact/Pole Measurements	Disconnect / Breaker / MCP Resistance (μΩ)				Further Investigation Required.
Mea	Fuse Resistance ( $\mu\Omega$ )				
	Comments:				

# INSPECTION FORM MOTOR STARTER, FVNR, 600V

Page 2 of 2

Test	Test Preparation: Source Conta	presentative is required, ected during the test.						
	Test	Valtara		Insula	tion Resistance	e (MΩ)	Ground all phases not	
sistaı	Test	Voltage	Α		В	und		
n Re	Contactor Line To GND	1000 VDC					Test Summary	
Insulation Resistance	Contactor Load To GND	1000 VDC					Test Inconclusive Further Investigation	
lns	Contactor Line to Load	1000 VDC					Required.	
	Comments:		•					
	-			-				
ø	Returned to Service:	☐ Yes	🗌 No	Comment	s:			
Final Analysis	Monitoring / Further Inspe Required:	ction 🗌 Yes	🗌 No					
A	Repair / Replacement Rec	quired: 🗌 Yes	🗌 No	]				

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Q
Winnipeg

#### INSPECTION FORM MOTOR SOFT STARTER, 600V

Page 1 of 3

ID:

ject	Facility:
Pro	Area :

Project Name:

Bid Opportunity:

	Load:						Start	er Lo	ocation	:						Cell #:	
	Soft	Manufactu	urer:					Мо	del:				Serial #	:			
	Starter:		Rate Volta				-		V	Curre Rating		Α		Control Voltage:		V	
		Fused	Disc.	Ra	ating:	А			Fuse S	Size:	А	Fuse Mfg	<b>]</b> .				
	Circuit Protection:	□ Breake	er	_			•		Inst.			Model: Manufac	turer:				
			-	Ra	Rating:		A		Setting	g:	A	Model:					
Data	Bypass		] NEMA ] IEC		Manuf	acture	er:					Model:					
Starter Data	Contactor:		] N/A		NEMA	Size:				IEC Rat	ting:		A 🗆 A	AC-3	□ AC	-4	
Ś	Bypass			0	ass:	□ 10 □ 20			Setting	a /		Manufac	turer:				
	Overload Protection:								Rating			Model:					
	Capacitor				Manuf	facturer:					Model:						
	Contactor:		] N/A		NEMA	Size				IEC Rat	ting:		A 🗌	AC-3	3 🗌 A (	C-4	
	Control Power Transformer: Size: VA					VA	Sec. Voltage:			V	V Primary Fuse:			A Se	econdary	Fuse:	А
	Current Transformer: Ratio:						Туре:				e:						
-	ID:						Size:			kW /	kW / HP			Volt	age:		V
Motor Data	Full Load An	nps:	AS	Serv	rice Fa	ctor:		1.00 1.15	Othe	r:							
								_									
	Starter Ident		-		<u> </u>	<u>`</u>					-	of Overhe	ating:	-			
ning	Cleanliness	(As Found)	):		Good		cepta	able	Poo		ort Insu				Good L	Accepta	ble 🗌 Poor
Clea	Connections	3			Good	🗌 Ac	cepta	able	Poo	r Interle		lanicai			Good 🗌	Acceptab	le 🗌 Poor
tion /	Ground Con	nection	[		Good		cepta	ble	🗌 Poo	r Conta	actor Co	ondition:			Good 🗌	Acceptab	le 🗌 Poor
spec	Door Mecha	nical	[		Good		cepta	ble	🗌 Poo	r Conta	act Aligi	nment:			Good 🗌	Accepta	ble 🗌 Poor
sual In	Cleanliness (As Found): Good Ac Connections Good Ac Ground Connection Good Ac Door Mechanical Good Ac Verify O/L element is correctly sized for the load:							Yes	s 🗌 No	D Exerc	ise Ciro	cuit Breake	er/MCP/D	iscor	nect		☐ Yes
</th <th>Cables Supp</th> <td>ported App</td> <td>ropriately</td> <td>y:</td> <td></td> <td></td> <td></td> <td>Yes</td> <td>s 🗌 No</td> <td>o Unit (</td> <td>Cleaned</td> <td>l: 🗌 Ye</td> <td>es Pho</td> <td>togra</td> <td>ph Taker</td> <td>n: 🗆</td> <td>Yes</td>	Cables Supp	ported App	ropriately	y:				Yes	s 🗌 No	o Unit (	Cleaned	l: 🗌 Ye	es Pho	togra	ph Taker	n: 🗆	Yes
	Comments:																

Q	
Winnipeg	

## INSPECTION FORM MOTOR SOFT STARTER, 600V

Page 2 of 3

S	Test	А	В	с	Test Summary	
Contact / Pole Measurements	Bypass Contactor Contact Resistance (μΩ)				Test Passed Test Inconclusiv	
Measu	Capacitor Contactor Contact Resistance (μΩ)				Further Investig	ation Required.
ole I	Disconnect Resistance (μΩ	2)				
act / F	Main Fuse Resistance (μΩ	)				
Conti	Capacitor Fuse Resistance (	(Ωι				
-	Comments:					
			Dest. / Load: connected inected with Load	prior to		presentative is required, ected during the test.
	WARNING: DISCONNECT / TO TEST.	ALL POWER CABLES	FROM SOFT ST	ARTER MODULE	AND ALL CONTRC	DL POWER FUSES PRIOR
	Test	Voltage	In	sulation Resistar	nce (MΩ)	Ground all phases not
		U U	Α	В	С	under test!
Fest	Disconnect Line to GND	1000 VDC				
Insulation Resistance Test	Disconnect Load to GND	1000 VDC				
Resist	Disconnect Line to Load	1000 VDC				T 0
ation	Bypass Contactor Line To GND	1000 VDC				Test Summary Test Passed Test Inconclusive
Insul	Bypass Contactor Load To GND	1000 VDC				Further Investigation Required.
	Bypass Contactor Line to Load	1000 VDC				Test Failed
	Capacitor Contactor Line To GND	1000 VDC				
	Capacitor Contactor Load To GND	1000 VDC				
	Capacitor Contactor Line to Load	1000 VDC				
	Comments:					



#### INSPECTION FORM MOTOR SOFT STARTER, 600V

ID:

	Test Preparation: Run moto							
uo	Ramp Up Time		sec	Actual:	sec		Comments:	
specti	Measured Motor Current	ØA	А	ØB	А	ØC	А	
al Ins	Soft Start Motor Current	ØA	А	ØB	А	ØC	А	
Operational Inspection	Ammeter Displayed Motor Current:	А	1					
Ope	Remote (RTU/PLC/DCS) Displayed Motor Current:		А					
	Ramp Down Time	Specified:		sec	Actual:		sec	
s	Returned to Service:		🗌 Yes	🗆 No	Comments:			
Final Analysis	Monitoring / Further Inspec Required:	tion	☐ Yes	🗌 No				
▲	Repair / Replacement Req	uired:	☐ Yes	🗌 No				

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

# INSPECTION FORM AC MOTOR, LOW VOLTAGE

Page: 1 of 2

Project	Facility:			I	Project Nam	e:						
Proj	Area :				Bid Opportu	nity:						
	0:			1.1								
ŋ	Size: kW	//	HP		tage:	V		R.P.M:				
Motor Data	Manufacturer:				odel:			Serial Number:				
Moto	Frame Type:				Service Factor:			Other:				
	Cooling:	☐ Air ☐ Fan	# Cooling Fans:			Winding Material:						
	Motor Identification	n Tag Install	ed:	Yes	🗌 No	Visual Signs of O	verhea	ating:		Yes 🗌 No		
ing	Connections:		Good A	ccept	table 🗌 Po	or Air Baffles:			Good Ac	ceptable 🗌 Poor		
Clean	Paint:		Good A	ccept	table 🗌 Po	or Filter Media:		🗌 N/A	Good Ac	ceptable 🗌 Poor		
Visual Inspection / Cleaning	Cooling Fans:	□ N/	A 🗌 Good 🗌 Ad	ccept	table 🗌 Po	or Fan Controls:		🗆 N/A		ceptable 🗌 Poor		
pecti	Anchorage/Alignm	ent:	Good A	ccept	table 🗌 Po	or						
al Ins	Ground Connectio	n:	Good A	ccept	table 🗌 Po	or						
Visu	Mechanical/Electri Operation:	cal Noise D	uring	Yes	🗌 No	Lubrication Requi	·			es 🗌 No		
	Cleanliness (As Fo	Cleanliness (As Found): Good Acce				or Unit Cleaned:	🗌 Ye	es Photo	graph Taken:	☐ Yes		
	Test Winding											
		Test	Winding			Resistance (MΩ)			Dielectric	Polarization		
	Stator Winding	Test Voltage (Vdc)	Winding Temperature (°	C)	30 Sec	Resistance (MΩ) 1 min.		min. (a)	Dielectric Absorption Ratio	Polarization Index (a)		
ance	Stator Winding	Voltage	Winding Temperature (°(	C)	30 Sec			min. (a)	Absorption			
esistance	Stator Winding	Voltage (Vdc)	Winding Temperature (°( 40	C)	30 Sec			min. (a)	Absorption Ratio	Index (a)		
ion Resistance	Stator Winding	Voltage (Vdc)	Temperature (°	c)	30 Sec			min. (a)	Absorption Ratio	Index (a)		
sulation Resistance	Stator Winding	Voltage (Vdc) 500	Temperature (°	c)	30 Sec			min. (a)	Absorption Ratio -	Index (a)		
ng Insulation Resistance	Stator Winding	Voltage (Vdc) 500	Temperature (°     40	C)	30 Sec			min. (a)	Absorption Ratio -	Index (a)		
Vinding Insulation Resistance	Stator Winding	Voltage (Vdc) 500 500	Temperature (°     40		30 Sec			min. (a)	Absorption Ratio - -	Index (a)		
Winding Insulation Resistance	Notes:	Voltage (Vdc)           500           500           500	Temperature (°           40           40           40           40           40			1 min.	10		Absorption Ratio - -	Index (a)		
Winding Insulation Resistance	Notes:	Voltage (Vdc)           500           500           500           500           500           500           500           500	Temperature (°       40       40       40       40       40       and calculation of	f Pola	arization Ind		10	ors > 150 k	Absorption Ratio - -	Index (a) 		
Winding Insulation Resistance	Notes: (a) Testing to	Voltage (Vdc) 500 500 500 0 10 minutes	Temperature (°         40         40         40         40         40         5 and calculation of         Test Passed	f Pola	arization Ind	1 min.	r moto	ors > 150 k	Absorption Ratio	Index (a) 		
Wind	Notes: (a) Testing to <b>Test Summary</b>	Voltage (Vdc) 500 500 500 0 10 minutes	Temperature (°         40         40         40         40         40         sand calculation of         Test Passed         sistance (μΩ)	f Pola	arization Ind st Inconclus	1 min.	10	ors > 150 k	Absorption Ratio	Index (a) 		
Winding Winding Insulation Resistance	Notes: (a) Testing to	Voltage (Vdc) 500 500 500 0 10 minutes	Temperature (°         40         40         40         40         40         5 and calculation of         Test Passed	f Pola	arization Ind	1 min.	r moto ation R <b>Y</b> ed clusive vestiga	ors > 150 k Required.	Absorption Ratio	Index (a) 		

#### INSPECTION FORM AC MOTOR, LOW VOLTAGE

Page: 2 of 2

ID:

lation ce	Not Applicable						
	Bearing	Test Voltage	Bearing	Resistance (MΩ)			
sulat ance	Dearing	(Vdc)	Temperature (°C)	1 min.	Corrected to 40°C		
ng In esista		500					
Bearing Insula Resistanc		500					
	Test Summary	Test Passed	Test Inconclusiv	e. Further Investigation Require	red. 🗌 Test Failed		

	Not Applicable						
	Actual Winding Ter	nperature:	°C	Actual Bearing Temperature		°C	
	RTD	Resistance (Ω)	Calculated Temperature (°C)	RTD	Resistance (Ω)	Calculated Temperature (°C)	
ince							
sista							
RTD Resistance							
<u>بح</u>							
	Test Summary	Test Passed	Test Inconclusiv	e. Further Investigation Requi	red. 🗌 Test	Failed	

Note: Test connection resistance of bolted connections. Report on cable inspection sheet.

<u>is</u>	Returned to Service:	☐ Yes	□ No	Comments:
Final nalysi	Monitoring / Further Inspection Required:	☐ Yes	□ No	
A	Repair / Replacement Required:	☐ Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

O
Winnipeg

# INSPECTION FORM NON-FUSIBLE DISCONNECT SWITCH, 600V

Project	Facility:			I	Project Name:								
Pro	Area :			I	Bid Opportun	ity:							
nnect ta	Manufacturer:			Model:									
Disconnect Data	Rated Voltage: V		Current Rating:		A		Interrupting Rating				A		
						1							
b	Identification Tag In		☐ Yes	□ No	Visu	al Signs	of Overhe	eating:		🗌 Yes	□ No		
eanin	Cleanliness (As Fou	und):	Good	Accepta	able 🗌 Poor	Supp	oort Insul	ators:		Good Good	d 🗌 Acceptab	le 🗌 Poor	
0 / C	Connections:		Good C	Accepta	able 🗌 Poor	Blad	e Conditi	ion:		Good Good	d 🗌 Acceptabl	e 🗌 Poor	
Visual Inspection / Cleaning	Ground Connection	Good	Accepta	ble 🗌 Poor	Verif Ope	y Blade I ration:	Mechanic	al	Good Good	d 🗌 Acceptab	le 🗌 Poor		
l Insp	Door Mechanical:		Good	Accepta	ble 🗌 Poor	Unit	Cleaned	:		🗌 Yes			
/isual	Fit Plumb & Square	:			] Yes 🗌 No	Unit	Lubricate	ed:		🗌 Yes			
-	Cables Supported A	Appropriate	ely:		] Yes 🗌 No	Othe							
			stance (μΩ)			Те	st Sumn	nary					
lade ince	A	(/	stance (μΩ) As Left) B		С		Test Pas	ssed					
witchblade Resistance	A	(/	As Left)		C		Test Pas Test Inc Further	ssed onclusive Investiga	ition Requi	red.			
Switchblade Resistance	A Comments:	(/	As Left)		C		Test Pas Test Inc	ssed onclusive Investiga		red.			
Switchblade Resistance		(/	As Left)		C		Test Pas Test Inc Further	ssed onclusive Investiga		red.			
	Comments:	(/ Source: [	As Left)	Disco	C est. / Load: nnected ected with Lo		Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led	ntion Requi	ty's Repi	resentative is restand		
	Comments: Test Preparation:	(/ Source: [	As Left) B Isolated t: Open	Discon Conne	est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led	ntion Requi	ty's Repi		test.	
tance Test	Comments:	(/ Source: [	B Isolated	Discon Conne	est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led lote: App rior to lea	ntion Requi	ty's Repi	cted during the	ases not	
tance Test	Comments: Test Preparation:	Source: [	As Left) B Isolated t: Open		est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led lote: App rior to lea	ntion Requi	ty's Repr s connec	cted during the Ground all ph under te	ases not est!	
tance Test	Comments: Test Preparation: Test	Source: [ Disconnec	As Left) B I Isolated t: Open Voltage	Discol Conne	est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led lote: App rior to lea	ntion Requi	ty's Repr	cted during the Ground all ph under te	ases not est!	
ion Resistance Test	Comments: Test Preparation: Test Disconnect Line To 0	Source: [ Disconnec	As Left) B I Isolated t: Open Voltage	Discol Conne	est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led lote: App rior to lea	ntion Requi	ty's Repr s connec	ted during the Ground all ph under te Test Summary Test Passed Test Inconcl	ases not est!	
Insulation Resistance Test	Comments: Test Preparation: Test Disconnect Line To O Disconnect Load To	Source: [ Disconnec	As Left) B I Isolated t: Open Voltage 1000 VD 1000 VD	Discol Conne	est. / Load: nnected ected with Lo	ad Isc	Test Pas Test Inc Further Test Fai	ssed onclusive Investiga led lote: App rior to lea	ntion Requi	ty's Repr s connec	ted during the Ground all ph under te Test Summary Test Passed Test Inconcl Further Inve Required.	ases not est!	

# INSPECTION FORM NON-FUSIBLE DISCONNECT SWITCH, 600V

ID

ll sis	Returned to Service:	☐ Yes	□ No	Comments:
	Monitoring / Further Inspection Required:	☐ Yes	🗌 No	
Ā	Repair / Replacement Required:	☐ Yes	🗌 No	
	L			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	Winnipeg INS PANELBO								ON FOR					Page 1 of 2			
	Winni	peg			PA	NELB		D, L		OLT	AGE			ID:			
Project	Faci	lity:					I	Proje	ct Name:								
Pro	Area	ι:					I	Bid Opportunity:									
	Loca	ation:						Fed From:						No. of Circuits:			
	Man	ufacture	r:					Model: S						No:			
Data		d Voltag		V	Currer	nt Rating:				A		Withstar	nd Rating:		A		
oard								Phas	e, 4 Wire		Neut	tral Bonded			☐ Yes		
Panelboard Data		Single Phase       3 Phase, 3 Wire       3 Phase, 4 Wire       Neutral Bonded to Ground       Yes       No         Main Lugs															
ě.		1ain Brea		Rating:	A	Manuf	actur	er:			Ν	Model:			Inst. S	Setting:	
									ain breal	ker if		0A, or has	ong, shori	t, or g		-	
		-	-		,	_							-	5			
_	Iden	tification	Tag In:	stalled:			] Yes	s [	□ No	Visua	al Sigr	ns of Overh	eating:			☐ Yes	□ No
tion /		al signs	of Mois	ture:		Γ	] Yes	s [	□ No	Visua	al Sigr	ns of Coron	a:			☐ Yes	□ No
al Inspect Cleaning	Fuse	e/Breake	er Sizes	Match D	rawings:	[	] Yes	s [	☐ No	Cabl	es Sup	pported App	propriately	:		🗌 Yes	🗌 No
Visual Inspection / Cleaning	Clea	Cleanliness (As Found): Good Acceptable Poor Connections: Good Acceptable Poor															
Visi	Doo	Door Mechanical:          Good         Acceptable         Poor         Ground         Connection:         Good         Acceptable         Poor         Ground         Connection:         Good         Acceptable         Poor         Ground         Connection:									Poor						
	Exer	cise All	Circuit I	Breakers:		[	] Yes	s [	□ No	Com	ments	:					
		Source:									Faultomo	aant Tamparatura. °C					
	Test Prepa	ration:		Disconne Connecte			d, prio	rior to leaving cables connected					Equipment Temperature: °C Temperature Correction				
Resistance Test				Source				est.				Factor to 20°C:					
tance	Tes					ulation F d all Pha			e (MΩ) nder test	t!	Test Summary						
Resis	Volta	ige	A-GI	ND	B-G	ND		C-GND			N-GND		Test Passed     Test Inconclusive				
_		I	RDG	20°C	RDG	20°C	R	G	20°C	RI	DG	20°C	Furth			n Required.	
Insulation																	
ı	Test V	oltages:	120	)-300∨ →	500 VD0	C Test Vo	ltage			301-6	600V -	→ 1000 VD	C Test Vo	ltage			
	Comm	ients:															
						Bre	akers	s < 10	00A and	With	out In	st. Setting					
	List by	model (	of break	ker. Multi	ple break	ers of va	rying	-	acity may	T	sted p	er line.					
akers	Туре	Ма	nufacti	urer	Мос	lel Series	S	In R	terruptin ating (kA	ng A)	Po	ositions/Ci	rcuits	Not	es		
Brea	А																
Load/Feeder Breakers	В																
ad/F	C D																
Ĕ	E																
	F																

#### INSPECTION FORM PANELBOARD, LOW VOLTAGE

Page 2 of 2

ID:

				Breaker	s >= 100A	or with In	st. Setting	l				
	List each bre fault settings	ist each breaker individually. Complete separate inspection form (F-BKR-MC-LV) for breaker if >= 250A, or has long, short, or ground ault settings.										
Load/Feeder Breakers	ID	Pos.	Manufacturer	Model	Trip Rating (A)	Int. Rating (kA)	Inst. Setting	Separate Form	Notes			
· Bre												
eeder												
ad/F												
Ĕ												
	Returned to	Service		∏ Yes ∏	No Cor	nments:						
- is		OCIVICC.										
Final Talysis	Monitoring /	Inspecti	on Required:	🗌 Yes 🗌	No							

Ā	Repair / Repla	acement Required:	☐ Yes	🗌 No		
	Co	mpany	Name		Signature	Date (yyyy/mm/dd)
Perfo	rmed By					
Checl	ked By					

## INSPECTION FORM POTENTIAL TRANSFORMER, 600V

ect	Facility:			Project N	lame:									
Project	Area :					Bid Oppo	ortunit	y:						
ta	PT Location or D	Designatio	n:					Pri. Volta Rating:	ige		Sec. Ratir	Voltag ng:	je	
PT Data	Manufacturer:		Cat	talogue #	<i>t</i> :		Pri. Fuse Size:			Sec.	Sec. Fuse Size:			
₽.	Size:	V	A		Type:					Othe	er:			
	Physical Damag						Vorif	Connoo	tiono oro	Corrot			☐ Yes	
ы	Physical Damag							y Connec		Correct:	ons Provi	de		
Visual Inspection	Visual Signs of Overheating:			□ Y		] No	Cont	act:					☐ Yes	□ No
V Ins						] No			wal Mech	anism Fur	nction:		🗌 Yes	🗌 No
	Fuse Sizes Matc	res [	] No	Com	ments:									
Test	Test Preparation:	ce Isolat	ted							ntative is reduring the to				
ance	Test		Voltage			Insula	ation	Resistan			Temperature: °C			
esist					PT 1	PT 1		PT 2	F	РТ 3	Test Su			
Insulation Resistance Test	Primary To GND		1000 \								Test	Inconc		Pequired
sulat	Secondary To (		500 V								Test		esugation	tequireu.
5	Primary To Seco	ondary	1000 \	/										
	Comments:													
	Test 🔲 🛙	irce: Disconnec Connected Isolated	cted d with Sou	rce										
larity						Ph	ase						Summary	
d Po			PT 1			P	Т 2			PT 3			est Passed	usive
Turns Ratio and Po	Calculated Ratio											F	Further Inve Required.	estigation
s Rat	Measured Ratio											ТП	est Failed	
Turn	Polarity Correct Yes No [					Yes	[	] No	□ Ye	es	🗌 No			
(	Comments:													
s	PT Returned to S	Service:		∏ Y€	es [	] No	Com	ments:						
Final Analysis	Monitoring / Furt Required:	her Inspe	ction	∏ Ye	es [	] No								
٩	Repair / Replace	ement Red	quired:	∏ Y€	es [	] No								
	Comp	any		Name				Sign	ature			Da	ate (yyyy/mi	m/dd)

#### INSPECTION FORM POTENTIAL TRANSFORMER, 600V

Page 2 of 2

ID:

Performed By		
Checked By		

	٢			INSPE		ORM			Page 1 of 2		
	Winnipeg				CHGEAR, 0				ID:		
ect	Facility:				Project Name	e:					
Project	Area :		Bid Opportun	Bid Opportunity:							
Switchgear Data	Location:				No. of Cells	:					
witchg Data	Manufacturer:				Type:			Serial #:			
S	Rated Volt	age: V	Current R	lating:		A	Interrupting	g Rating:	A		
	Identification	on Tag Installed:		☐ Yes	□ No	Visual Sigr	ns of Overhea	ting:		] Yes	□ No
	Visual sigr	s of Moisture:		🗌 Yes	🗌 No	Visual Sigr	ns of Corona:		Ľ	] Yes	□ No
	Fuse/Breaker Sizes Match Drawings:				🗌 No	PT and CT	ratios match	drawings:		] Yes	□ No
aning	Elevation Drawings Correct:				□ No Cables Supported Appropriately: □ Y			] Yes	□ No		
/ Cle	Cleanlines	Cleanliness (As Found): Good Accep				Insulators	Condition:		Good 🗌 Ace	ceptabl	e 🗌 Poor
Visual Inspection / Cleaning	Connectio	าร:	Good	Accept	able 🗌 Poor	Electro/Me Interlock S		C	Good 🗌 Acc	eptable	e 🗌 Poor
Inspe	Ground Co	onnection:	Good	Accepta	eptable 🗌 Poor Vents/Filters:			Good 🗌 Acc	eptable	e 🗌 Poor	
isual	Doors Med	hanical:	Good	Accepta	able Door Exercise Active Components:			ents:		] Yes	🗌 No
>	Cell Fit and	d Alignment:	Good	Accepta	able 🗌 Poor						
	Required ( Met:	Clearances are	Good	Accepta	able 🗌 Poor						
	Indicating	mechanisms:	Good		able 🗌 Poor	Unit Clean	ed: 🗌 Yes	B Photog	graph Taken:		Yes
	Test Prepar	Conne	nnected ected with ce Isolated	Disco	est. / Load: nnected ected with Loa	ad Isolated			's Representativ		
Insulation Resistance Test	Test		Insulation Phas	Resistanc se To GNE	e (MΩ)		Temperature	: •	с		
stance	Voltage	А		В		С					
Resi	1000 V						Test Summa				
lation	Test		nsulation Phase	Resistanc e To Phas			Test Pass	nclusive	on Required.		
Insu	Voltage	A – B		B – C	A	- C	Test Faile				

1000 V Comments:

#### INSPECTION FORM SWITCHGEAR, 600V

Page 2 of 2

ID:

ance	Point A	Point B	Resistance (μΩ)	Test Summary □ Test Passed □ Test Inconclusive
Resistance	Switchgear GND Bus	Facility Ground Electrode		Further Investigation Required.
Ind R	Switchgear GND Bus	Switchgear Enclosure		
Grou	Switchgear GND Bus	System Neutral		

Comments:

	То	From		Resistance (μΩ)		Test Summary
			А	В	С	Test Passed     Test Inconclusive
						Further Investigation Required.
ance						
esista						
on Re						
Connection Resistance						
Con						-
						-
	Comments:			1	1	1

<u>s</u>	Returned to Service:	☐ Yes	🗌 No	Comments:
s al	Monitoring / Inspection Required:	🗌 Yes	🗌 No	
Ā	Repair / Replacement Required:	☐ Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	)©			-	PECTION I	-			Page	1 of 4	
V	Winnipèg SWITCHBOAR					D, 600V			ID:		
Project	Facility:				Project Name	):					
Pro	Area :	Area :				Bid Opportunity:					
	Location:	Location:							# of Cel	ls:	
Data	Manufacturer: Rated Voltage: V Main Bus Rating:				Model:			Serial #:			
SWB Data						А	Main Bus	Neutral Rating	g:	A	
0)	Bus Conducto	r: 🗌 Copper 🛛	Aluminum	Cu	rrent Withstan	d Rating:	А				
	Identification 7	Fag Installed:		🗌 Yes	□ No	Visual Signs	of Overhea	ting:		☐ Yes	□ No
	Visual Signs c	of Moisture:		🗌 Yes	□ No	Visual Signs	of Corona:			☐ Yes	□ No
	Fuse/Breaker Sizes Match Drawings:				🗌 No	PT and CT ra	atios match	drawings:		🗌 Yes	□ No
бu	Elevation Drawings Correct:			🗌 Yes	🗌 No	□ No Cables Supported Appropriately:				☐ Yes	□ No
leani	Cleanliness (A	As Found):	Good G	] Accept	able 🗌 Poor	Insulators Co	ndition:		Good 🗌	Acceptable	e 🗌 Poor
Visual Inspection / Cleaning	Connections:		Good G	] Accept	able 🗌 Poor	Electro/Mech Interlock Sys			Good 🗌 /	Acceptable	e 🗌 Poor
spect	Ground Conne	ection:	Good	Accepta	able 🗌 Poor	Vents/Filters:			Good 🗌 /	Acceptable	e 🗌 Poor
al In:	Doors Mechar	nical:	Good	Accepta	able 🗌 Poor	Exercise Acti	ve Compor	ents:		🗌 Yes	□ No
Visu	Cell Fit and Al	lignment:	Good	Accepta	able 🗌 Poor						
	Required Clea Met:	equired Clearances are Good Accep			able 🗌 Poor						
	Indicating med	chanisms:	Good	Accepta	able 🗌 Poor	Unit Cleaned	: 🗌 Ye	s Photograp	oh Taken:	רם <u>י</u>	′es
	Comments:										

	Туре:	Inspection	Inspection								
Ŀ	🗌 Main Breaker	Complete appropriate	breaker inspection forr	n.							
Power	Disconnect	Complete appropriate	Complete appropriate disconnect inspection form.								
Incoming		Visual Inspection:									
Inco	🗌 Main Lugs	Connections Torqued:	Yes								
		Connection		В	С	Ν					
		Resistance (μΩ) As Left									

#### INSPECTION FORM SWITCHBOARD, 600V

	Test Disconne Preparation: Connect Isolated		ed with Source	Cable Dest. / Load:		Note: Approval of City's Representative is required, prior to leaving cables connected during the test.	
Test	Temperature: °C						
Insulation Resistance T (Buswork)	Test Voltage (dc)	Insu	Ilation Resistar Phase To Pha		Test Summary		
		A - B	B - C	C - A	Test Pass		
n Re: Busv	1000 V					vestigation Required.	
sulatio	Test Voltage	Insu	Ilation Resistar Phase To GN	· · ·	Test Faile	3	
lns	Voltage	A - GND	B - GND	C - GND			
	1000 V						
	Comments	:		-	•		

d Resistance	Point A	Point B	Resistance (μΩ)	Test Summary □ Test Passed □ Test Inconclusive
esist	SWB GND Bus	Facility Ground Electrode		Further Investigation Required.
Ind R	SWB GND Bus	SWB Enclosure		
Ground	SWB GND Bus	System Neutral		
	Comments:			

	Visual Inspect Requirements:	G=Good, A=Acceptable, P=Poor Comments are required for all items identified in Poor condition.					
	1.	Confirm identification tag / lamacoid is installed.					
	2.	Look for visual signs of overheating.					
	3.	Inspect and torque connections.					
ers	4.	Inspect and test any electro/mechanical interlocks.					
Breakers	5.	Confirm disconnect operation.					
	6.	Check door mechanical condition.					
Feeder	7.	Exercise circuit breaker.					
	8.	Confirm cables are supported and routed appropriately.					
	9.	Visually assess the general condition of the installation.					
		plete an appropriate Breaker Inspection Form for all breakers with separate adjustable Long and trip settings, Ground trip settings, or > 250A frame size.					
		Continued on next page					

# INSPECTION FORM SWITCHBOARD, 600V

Page 3 of 4

	Continued from previous page										
	ID	Loc./ Cell	Frame Rating (A)	Trip Rating (A)	Manuf.	Model	Trip Unit Type	Inst Setting	Visual Inspection	Cleaned	Comments
ŝrs											
eake											
Feeder Breakers											
-eed											
	General Comments:										



## INSPECTION FORM SWITCHBOARD, 600V

<u>s</u>	Returned to Service:	🗌 Yes	🗌 No	Comments:
Final	Monitoring / Inspection Required:	🗌 Yes	🗌 No	
Aı	Repair / Replacement Required:	🗌 Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	Ĩ												Page	Page 1 of 2				
V							, DRY TYPE, LOW VOLTAGE							ID:	ID:			
Project	Facility:						Project Name:											
Pro	Area :						Bid Opportunity:											
				ase:										Seconda	Secondary			
	KVA:					y Voltag	e:			V	Voltage:	·	V					
Data	Manufacturer:						Тур	e:						Serial N	umber:			
Transformer Data	Primary Winding:			Secondar Winding:	У		r In	npe	edance:			%Z	Tem	p Rise:	q	C ł	K Factor:	
ansfo	Winding Material: Copper Aluminu					m												
Ē	No Load Tap	Тар		1	2	2 3			4		5						p Setting	
	Changer	Voltage														(AS	s Found):	
	Transformer Identification Tag Installed:							C	No	Visu	al Sigr	ns of C	Dverh	eating:		☐ Yes ☐ No		
ning	Bushings: Good Acc						otable		] Poor	Sup	oort In	sulato	rs:		Good	d 🗆	Acceptable	Poor
/ Clea	Paint: Good Acce						otable	Poor No Load Tap N/A Good Acceptable Poor Changer:						Poor				
ection	Fans: N/A Good Accep						otable	table						Poor				
Visual Inspection / Cleaning	Temp. Gauge:	emp. Gauge: 🛛 N/A 🗌 Good 🗌 Acce					otable	table  Poor Connections:  Good Acceptable  P					Poor					
Visual	Ground Connection:						ceptable  Poor Neutral Bonded to Ground:					A 🗌 Yes 🔲	No					
	Cleanliness (As Found):					Accep	Acceptable Door Unit Cleaned: Yes Photograph Taken:					n: 🗌 Yes						
	Operational C	onditions	/ No	tes:														
ion	Primary Voltag		H1:H		V	H2:	H2:H3: V H3:H1: V				V Meas	ured at:						
nal Inspection	Secondary Vo	ltage:	X1:	_:	V	X2:_	X2:: V X3::					V Measured at:						
nal In	Current:		Ph A	:	A	Ph I	B:			A P	n C:			A Meas	ured at:			
Operatio	Tap Setting:	p Setting:																
	Thermographi Performed:	c Inspect	tion	☐ Yes	2	Attach separa		rt	Results	s: [	] No Is ] Potei			d dentified.				
۵											R	esista	ance	(MΩ)			Dielectric	
stanc		Windi	ng		1	Test Voltage (Vdc)		je	Resistance 30 sec			60 sec.			Absorption Ra 60s/30s	atio		
Insulation Resistance	Primary to Gr	ound, Se	econd	lary Guar	ded											+		
llatio	Secondary to	Ground,	Prim	ary Guar	ded													
Insu	Primary to Se	econdary,	, Gro	und Guar	ded											+		

## INSPECTION FORM TRANSFORMER, DRY TYPE, LOW VOLTAGE

ID:

s	Returned to Service:	🗌 Yes	🗌 No	Comments:
Final Jalysis	Monitoring / Further Inspection Required:	🗌 Yes	🗌 No	
A	Repair / Replacement Required:	🗌 Yes	🗌 No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				