

MISCELLANEOUS EQUIPMENT SYMBOLS

	ORIFICE PLATE		FILTER		FLOW STRAIGHTENING VANES
	FLANGE		MAGNETIC FLOW METER ELEMENT		AIR FILTER (HVAC)
	PIPE REDUCER		EXPANSION JOINT		MIXER
	PUMP		TRAP		PUMP, DIAPHRAGM
	FAN/BLOWER		MIX TEE		PUMP, DIAPHRAGM OPERATED
	PROPELLER OR TURBINE METER		DUPLEX STRAINER		PUMP, GEAR
	STRAINER		MIXER, INLINE STATIC		PULSATION DAMPER
	DRAIN		FLOW NOZZLE		AIR SEPARATOR
	UNION		FLOAT		MIXER
	TEMPERATURE ELEMENT WITH THERMOWELL		SINGLE PORT PITOT TUBE		SITE GLASS
	SCREWED CAP		AVERAGING PITOT TUBE		COMPRESSOR ROTARY SCREEN
	FIRE HYDRANT		SLUICE GATE		FLEXIBLE HOSE
	HOSE STATION		SLIDE GATE		IN-LINE FLOW METER
	ANNUNCIATOR HORN		VARIABLE AREA FLOW INDICATOR (ROTAMETER)		INJECTOR
	GROUND		VORTEX FLOW METER		EQUIPMENT MOTOR
	COROLIUS MASS FLOWMETER		GENERATOR		WEIR
	FLOAT LEVEL ELEMENT		HEAT EXCHANGER		PUMP, ROTARY LOBE
	FLOW ELEMENT INTEGRAL WITH TRANSMITTER (MASS FLOW, ETC)		FLAME CHECK		PUMP, METERING
	SONIC FLOWMETER (DOPPLER OR TRANSIT TIME)		CALIBRATION CHAMBER		PUMP, PROGRESSIVE CAVITY
	EJECTOR		EMERGENCY EYE WASH AND SHOWER		BAR SCREEN, MECHANICAL
	FILTER		BOILER		DIFFUSER HEADER
	SILENCER		RECEIVER OR PRESSURE VESSEL		ENGINE
	GRINDER		TANK, DOUBLE WALLED		
	STOP LOG		TANK		
	LEVEL CONTROL GATE		LIQUID SEPARATOR		
			PUMP, SUBMERSIBLE		
			PUMP, VERTICAL		

VALVES

VALVE BODIES		CONTROL VALVES	
	NORMALLY OPEN GATE VALVE		ROTARY BALL VALVE
	NORMALLY CLOSED GATE VALVE		CYLINDER-ACTUATED SINGLE-ACTING
	NORMALLY OPEN GLOBE VALVE		CYLINDER-ACTUATED DOUBLE-ACTING
	NORMALLY CLOSED GLOBE VALVE		PRESSURE-REDUCING REGULATOR, SELF-CONTAINED
	NORMALLY OPEN BALL VALVE		PRESSURE-REDUCING REGULATOR, WITH EXTERNAL PRESSURE TAP
	NORMALLY CLOSED BALL VALVE		VALVE WITH BLEED
	BUTTERFLY		AIR RELEASE VALVE
	NEEDLE		
	CHECK		
	PLUG		
	KNIFE		
	PINCH		
	BALL CHECK		
	DOUBLE LEAF CHECK		
	ANGLE		
	ANGLE AND GATE PRESSURE RELIEF VALVE		
	GATE PRESSURE RELIEF VALVE		
	IN-LINE SAFETY		
	STOP CHECK		BACKPRESSURE REGULATOR, SELF-CONTAINED
	SPRING OPERATED CHECK		BACKPRESSURE REGULATOR, WITH EXTERNAL PRESSURE TAP
	AIR ASSISTED CHECK		CONE VALVE
	COCK VALVE		THREE-WAY VALVE
	DUCKBILL VALVE		FOUR-WAY VALVE
	DIAPHRAGM VALVE		
	FLAP VALVE		
	FLOAT VALVE		
	MUD VALVE		
	QUICK CONNECT AIR HOSE COUPLING		
	TELESCOPIC VALVE		
	BLAST GATE		
	SPECTACLE BLIND (OPEN)		
	SPECTACLE BLIND (CLOSED)		
	UNCLASSIFIED WRITE TYPE OF BODY ADJACENT TO SYMBOL		
	AIR AND VACUUM RELIEF VALVE		

VALVE ACTUATORS/OPERATORS

	HAND OPERATOR		DIAPHRAGM OPERATOR WITH POSITIONER
	DIAPHRAGM OPERATOR		DIAPHRAGM OPERATOR WITH POSITIONER FAIL OPEN
	SOLENOID OPERATOR		DIAPHRAGM OPERATOR WITH POSITIONER FAIL CLOSE
	MOTOR OPERATOR		
	PNEUMATIC CYLINDER		

MISCELLANEOUS

**LINE SYMBOLS - PROCESS & INSTRUMENTATION DIAGRAMS**

	MAIN PROCESS LINES
	SECONDARY PROCESS LINES
	ALL OTHER MECHANICAL LINES
	ELECTRIC SIGNAL
	ELECTRICAL BINARY (ON/OFF) SIGNAL
	PNEUMATIC SIGNAL
	PNEUMATIC BINARY SIGNAL
	CAPILLARY TUBING
	HYDRAULIC SIGNAL
	INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
	ELECTROMAGNETIC or SONIC SIGNAL (GUIDED AND NOT GUIDED)
	TELEMETERED SIGNAL
	SUPPLY CONTRACTOR PACKAGE
	VENDOR PACKAGE
	LOCAL CONTROL PANEL/MCC

**INSTRUMENT SUPPLY OR CONNECTION TO PROCESS DESIGNATED AS FOLLOWS:**

- AS = AIR SUPPLY
- ES = ELECTRICAL SUPPLY
- GS = GAS SUPPLY
- HS = HYDRAULIC SUPPLY
- NS = NITROGEN SUPPLY
- SS = STEAM SUPPLY
- WS = WATER SUPPLY

PID STANDARDS

- DRAWINGS UTILIZE CITY OF WINNIPEG STANDARDS FOR BORDER AND TITLE BLOCK. ALL DRAWINGS ARE PRODUCED ON AUTOCAD (LATEST REV., R2000 OR LATER).
- ALL UNITS ARE IN METRIC, EXCEPT AS NOTED OTHERWISE. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS (mm).
- DRAWING CONTENT GENERALLY CONFORMS TO ANSI/ISA STANDARDS S5.1 & S5.3.
- PID'S INDICATE MAJOR PROCESS PIPING AND EQUIPMENT AND ASSOCIATED LOCAL INSTRUMENTATION, DCS AND OTHER PROCESS I/O.
- EQUIPMENT INCLUDING VESSELS, DRUMS, EXCHANGERS, HEATERS, PUMPS, COMPRESSORS, ETC. ARE ARRANGED IN SEQUENCE WITH PRINCIPLE FUNCTIONS AND FLOWS.
- ALL MAJOR EQUIPMENT INCLUDING PUMPS, COMPRESSORS, TANKS, ETC. ARE LABELLED AS TO FUNCTION WITH DESIGN SIZES AND RATINGS.
- ALL PROCESS LINES ARE LABELLED ACCORDING TO FUNCTION AND SIZE UTILIZING SYSTEM CODES DEFINED HEREIN.
- EACH SYSTEM INTERCONNECTION POINT BETWEEN DRAWINGS IS LABELLED WITH A SOURCE DRAWING NUMBER OR DESTINATION DRAWING NUMBER. ARROWS ON PROCESS PIPING INDICATE DIRECTION OF FLOW BETWEEN DRAWINGS.

MISCELLANEOUS SYMBOLS

	WATER LEVEL SYMBOL
	ELECTRICAL HEAT TRACING
	FLOW DIRECTION ARROWS
	WALL
	GRADE

<p><b>Certificate of Authorization</b> Earth Tech Canada Inc. No. 730 Expiry: April 30, 2006</p>	B.M. ELEV.	<p>Frederickson Cooper ARCHITECTS</p>	<p>A Tyco International Ltd. Company</p>	ENGINEER'S SEAL	<p><b>THE CITY OF WINNIPEG</b> WATER AND WASTE DEPARTMENT ENGINEERING DIVISION</p>			
				DESIGNED BY: SWT		CHECKED BY: SWT	ORIGINAL SIGNED BY: S.R. BILEVICIUS	
				DRAWN BY: LAE		APPROVED BY: AHL	2006/03/29	
				SCALE: NONE		RELEASED FOR CONSTRUCTION BY: R. SOROKOWSKI	CONSULTANT DRAWING NO. WM-P0002	
	NO. REVISIONS	DATE	DATE	2005/12/21	DATE	2006/03/29	<p>WATER TREATMENT PLANT GENERAL PLANT SERVICES MECHANICAL AND ELECTRICAL</p>	CITY FILE NUMBER
							<p>CONSTRUCTION STANDARDS PROCESS AND INSTRUMENTATION SYMBOLS</p>	SHEET OF
							<p>CITY DRAWING NUMBER 1-0601M-D-P0002-001-000</p>	