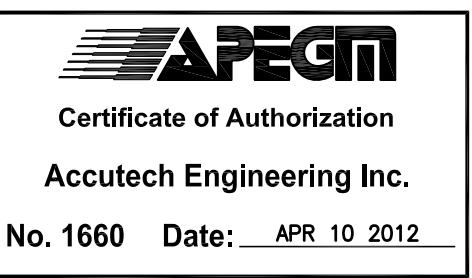


**MECHANICAL SPECIFICATIONS:**

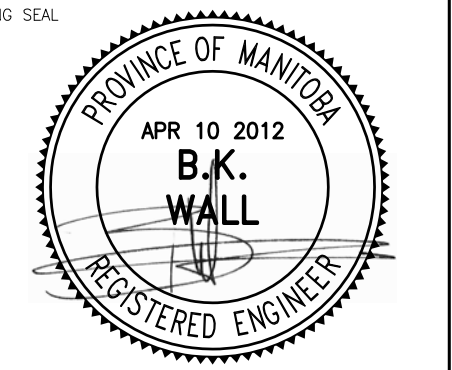
1. SCOPE – PROVIDE A FULLY FUNCTIONAL UV LIGHT DISINFECTION SYSTEM FOR THE PAN AM POOL FACILITY, TWO SWIMMING TANKS AS SHOWN. THE WORK INCLUDES, BUT NOT LIMITED TO:
  - 1.1. PIPING CHANGES AND ADDITIONS TO FACILITATE THE INSTALLATION OF UV LIGHTING SYSTEMS FOR THE MAIN TANK AND THE LAP POOL.
  - 1.2. PROVISION OF THE UV LIGHTING SYSTEMS AND ASSOCIATED CONTROL PANELS.
  - 1.3. TESTING, ADJUSTING AND BALANCING FOR A FULLY FUNCTIONAL SYSTEM.
2. SHOP DRAWINGS – SUBMIT THREE PAPER COPIES AND ONE ELECTRONIC COPY FOR ALL COMPONENTS SUPPLIED IN THIS PROJECT. ALL SHOP DRAWINGS TO BE REVIEWED BY THE CONTRACTOR PRIOR TO SUBMISSION.
3. GENERAL REQUIREMENTS
  - 3.1. APPLICABLE CODES AND STANDARDS
    - a) NATIONAL BUILDING CODE OF CANADA
  - 3.2. INSTALL ALL COMPONENTS PARALLEL AND PERPENDICULAR TO BUILDING LINES.
  - 3.3. PROTECT ALL COMPONENTS PRIOR TO INSTALLATION. SEAL ALL OPEN ENDS OF PIPING AND ACCESSORIES TO PREVENT DIRT AND FOREIGN MATERIAL FROM ENTERING SYSTEM.
  - 3.4. COMPLY WITH ALL CITY OF WINNIPEG SAFETY STANDARDS. COMPLETE WORK IN ACCORDANCE WITH GOVERNMENT OF MANITOBA WORKPLACE SAFETY LEGISLATION
  - 3.5. AIR VENTS – PROVIDE AT ALL HIGH POINTS IN THE SYSTEM. DRAIN VALVES – PROVIDE AT ALL LOW POINTS. USE 1" DIA. SCHEDULE 80 PVC BALL VALVES, SOCKET CONNECTIONS. PROVIDE PLUG ON THE END OF THE VALVE; DO NOT LEAVE AN OPEN VALVE END.
4. THERMOMETERS AND PRESSURE GAUGES – PROVIDE GAUGES AS SHOWN ON THE DESIGN DRAWINGS. USE MINIMUM 6" DIAMETER PRESSURE GAUGES AND TEMPERATURE GAUGES. GAUGES TO OPERATE NEAR THE MIDPOINT OF SPAN. CALIBRATE ALL GAUGES PRIOR TO INSTALLATION. WETTED MATERIAL – TYPE 316 STAINLESS STEEL. USE LIQUID FILLED BOURBON STYLE PRESSURE GAUGES AND BI-METAL TEMPERATURE GAUGES. ACCURACY TO WITHIN ONE SCALE DIVISION.
5. PIPING
  - 5.1. SCOPE – PROVIDE ALL NECESSARY PIPING TO CONNECT THE UV LIGHTING DISINFECTION SYSTEM IN LINE WITH THE EXISTING POOL WATER FLOW. THE UV LIGHT MUST BE INSTALLED IN LINE WITH THE WATER FLOW; ALL POOL WATER MUST FLOW THROUGH THE UV LIGHT. THE LIQUID CHLORINE INJECTION AND CO2 INJECTION MUST BE DOWNSTREAM OF THE UV LIGHT.
    - a) THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL DIMENSIONS FOR PIPING SPOOL PIECES WITH SITE DIMENSIONS PRIOR TO ORDERING AND FABRICATION OF ALL COMPONENTS. SUBMIT SHOP DRAWINGS FOR ALL FABRICATED COMPONENTS.
  - 5.2. POOL WATER PIPING MATERIAL
    - a) USE SCHEDULE 80 PVC PIPE AND FITTINGS TO ASTM D1784.
    - b) ALL MATERIAL TO BE UV RESISTANT, TYPE 1 GRADE 1 PVC.
    - c) FITTINGS LARGER THAN 10" – FABRICATED PVC FITTINGS REINFORCED WITH FIBERGLASS.
    - d) FLANGES – ANSI 150 DRILL PATTERNS.
    - e) GASKETS – AS NOTED ON THE DESIGN DRAWINGS
    - f) FASTENERS FOR FLANGES – USE TYPE 316 STAINLESS STEEL FASTENERS, SIZE AND QUANTITY BASED ON FLANGE DIMENSIONS. FASTENERS TO ANSI B16.2.1 AND B16.2.2.
    - g) VALVES – TYPE, SIZE AND QUANTITY AS SHOWN ON THE DESIGN DRAWINGS. ALL BUTTERFLY VALVES ARE TO BE HIGH PERFORMANCE TYPE, ALL STAINLESS STEEL CONSTRUCTION. ALL VALVES PROVIDED ARE TO BE LUG BODY DESIGN.
    - h) SOLVENT – AS RECOMMENDED BY MANUFACTURER. SOLVENTS TO BE LOW VOC. TO ASTM D2235.
  - 5.3. DOMESTIC WATER PIPING
    - a) USE TYPE L COPPER WITH THROUGH COPPER FITTINGS, CSA APPROVED.
    - b) SOLDER – USE 95/5 TIN-ANTIMONY SOLDER FOR ALL FITTINGS.
    - c) PROVIDE NEW BRASS BODY BALL VALVES FOR ISOLATION. TYPE 316 STAINLESS STEEL BALL, ONE PIECE VALVE, WITH TEFLON SEATS AND SEALS.
  - 5.4. TYPE 316 STAINLESS STEEL PIPE AND FLANGES
    - a) SCHEDULE 10 SEAMLESS PIPE TO ASME/ANSI B36.10 AND B36.19.
    - b) FLANGES – CLASS 150 RAISED FACE FLANGES. DRILL AND TAP FLANGES FOR PRESSURE GAUGES AS NOTED ON DESIGN DRAWINGS.
    - c) JOINTS – WELDED. ALL WELDING TO CSA B51 AND COMPLETED BY CERTIFIED WELDER. USE TOOLS DEDICATED TO STAINLESS STEEL.
  - 5.5. EXECUTION
    - a) INSTALL ALL PIPING PERPENDICULAR AND PARALLEL TO BUILDING LINES.
    - b) PROVIDE ALL NECESSARY PIPE HANGERS, IN ACCORDANCE PIPE MANUFACTURER'S REQUIREMENTS FOR PIPE SIZE AND CONTENTS. CONSIDER PUMP/PIPING SYSTEM START-UP WITH HANGER DESIGN.
    - c) INSTALL PIPING IN ACCORDANCE WITH PIPING MANUFACTURER'S RECOMMENDATIONS AND THE UV DISINFECTION UNIT MANUFACTURER'S RECOMMENDATIONS.
    - d) PRESSURE TEST ALL PIPING FOR MINIMUM TWO HOURS AT 1.5 TIMES OPERATING PRESSURE WITH WATER PRIOR TO ENERGIZING. CITY OF WINNIPEG PROJECT MANAGER OR THEIR REPRESENTATIVE ARE TO WITNESS THE PRESSURE TEST.
6. UV DISINFECTION UNIT
  - 6.1. SCOPE – PROVIDE ONE UV DISINFECTION UNIT FOR THE MAIN POOL AND ONE UV DISINFECTION UNIT FOR THE LAP POOL. EACH UV UNIT IS TO BE SUPPLIED WITH A CONTROL PANEL. ACCEPTABLE MANUFACTURER – ETS UV TECHNOLOGY, ALTERNATES WILL NOT BE CONSIDERED.
  - 6.2. EQUIPMENT SELECTION – THE MANUFACTURER IS TO CONFIRM THE SIZING OF THE UV UNITS SELECTED.
    - a) THE MAIN POOL DESIGN WATER FLOW IS 3,400 USGPM. USE SIZE ECF-433-14
    - b) THE LAP POOL DESIGN WATER FLOW IS 1,850 USGPM. USE SIZE ECF-230-10
    - c) INCOMING POWER – 575 VOLTS, 3-PHASE, 60-HZ.
  - 6.3. GENERAL
    - a) CODE – ALL COMPONENTS TO BE CSA APPROVED AND SUITABLE FOR INSTALLATION IN A SWIMMING POOL MECHANICAL ROOM.
    - b) WARRANTY – MANUFACTURER TO WARRANTY ULTRAVIOLET CHAMBER AND SPECTRA CONTROL PANEL FOR A PERIOD OF 5 YEARS EXCLUDING LAMPS, QUARTZ AND SEALS. MEDIUM PRESSURE ULTRAVIOLET BULBS SHALL BE WARRANTED FOR A PERIOD OF 4,000 HOURS.
  - 6.4. ULTRAVIOLET DISINFECTION EQUIPMENT: SHALL OPERATE WITHIN THE UVC ELECTROMAGNETIC SPECTRUM EMITTING WAVELENGTHS IN THE RANGE OF 200NM TO 400NM. THIS REQUIRED WAVELENGTH WILL PROVIDE CONSTANT DISINFECTION/INACTIVATION OF BACTERIA, ALGAE, MOLDS, VIRUSES AND DESTRUCTION OF MONOCHLORAMINES, TRICHLORAMINES, AND DICHLORAMINES. ULTRAVIOLET LAMP/CHAMBER AND SPECTRA CONTROL PANEL BY ENGINEERED TREATMENT SYSTEMS (TELEPHONE 920-885-4628, FAX 920-885-4386
- 6.5. THE UV SYSTEM SHALL HAVE ACSA LISTING, BE NSF-50 2010 CERTIFIED INCLUDING SECTION 13 AND 3RD PARTY VALIDATED TO THE USEPA UVGM 2006 GUIDELINES.
  - a) EQUIPMENT GENERAL DESCRIPTION
    - (i). THE ULTRAVIOLET SYSTEM SHALL BE PROVIDED IN A COMPLETE PACKAGE TO INCLUDE: 316L STAINLESS STEEL CHAMBER, SPECTRA CONTROL SYSTEM LOCATED IN A NEMA 12 RATED PANEL, MEDIUM PRESSURE BULB(S) DESIGNED TO EMIT WAVELENGTHS WITHIN THE UVC ELECTROMAGNETIC SPECTRUM, STRAINER BASKET AUTOMATIC WIPER SYSTEM, AND PROJECT COMMISSIONING BY A CERTIFIED ETS ULTRAVIOLET TECHNICIAN.
    - (ii). ECOFLO II (ECF) UNITS: ULTRAVIOLET MANUFACTURER TO OFFER UNIT CAPABILITY OF A HORIZONTAL OR VERTICAL INSTALLATION APPLICATION USING STATE OF ART DESIGN AND DIRECT FLOW THROUGH CHARACTERISTICS. CHAMBER AND CONTROL CABINET SHALL BE AS INDICATED ON THE DRAWINGS. ELECTRICAL POWER SUPPLY 575 VOLT 3-PHASE.
    - b) UV CHAMBER – PRESSURE RATED FOR 100 PSI (TESTED TO 150 PSI). THE UNIT SHALL BE CONSTRUCTED OF 316L STAINLESS STEEL. ANSI CLASS 150 FLANGED CONNECTIONS.
  - 6.6. ULTRAVIOLET INTENSITY MONITOR CALIBRATED TO PROVIDE INTENSITY IN MW/CM2. MONITORS PROVIDING PERCENTAGE OF LAMP OUTPUT NOT ACCEPTABLE, WITH BUILT-IN ALARM SYSTEM TO NOTIFY OPERATOR WHEN OUTPUT LEVEL DROPS BELOW REQUIRED LEVEL OF 60 MJ/CM2 (OR OPERATOR SET DOSING LEVELS).
  - 6.7. ULTRAVIOLET TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED TO MAINTAIN SYSTEM INTEGRITY IN THE EVENT OF FLOW INTERRUPTIONS TO THE CHAMBER.
  - 6.8. ULTRAVIOLET CHAMBER SHALL COME COMPLETE WITH ANNEALED QUARTZ SLEEVE WITH "O" RING SEALS FOR WATER TIGHTNESS.
  - 6.9. CHAMBERS SHALL BE COMPLETE WITH ANSI FLANGES AND ALL PORTS OR VENTS SHALL BE THREADED NPT. THE ULTRAVIOLET CHAMBER MUST BE CAPABLE OF INSTALLATION IN THE SYSTEM SO THAT IT REMAINS FULL UNDER ALL CONDITIONS.
    - a) THE ULTRAVIOLET UNIT MUST BE COMPLETE WITH APPROPRIATE BRACKETS OR FEET FOR EASE OF INSTALLATION
  - 6.10. UV LAMPS
    - a) ULTRAVIOLET LAMP SHALL BE MEDIUM PRESSURE HIGH INTENSITY. LAMP SHALL BE DESIGNED TO EMIT CONTINUOUS ULTRAVIOLET WAVELENGTHS IN THE RANGE OF 200NM TO 400NM. LAMP MUST REMAIN UNAFFECTED BY TEMPERATURE VARIANCE OF 0 DEGREES TO 200 DEGREES FAHRENHEIT.
    - b) THE LAMP UNIT MUST PROVIDE A DOSE NOT LESS THAN 60 MJ/CM2 AT THE END OF THE LAMP BASED ON THE FULL RE-CIRCULATING FLOWRATE, NOT ON A SIDESTREAM TREATMENT.
  - 6.11. LAMP CLEANING SYSTEM
    - a) AN AUTOMATIC CLEANING SYSTEM SHALL BE PROVIDED FOR CLEANING OF QUARTZ SLEEVE AND ULTRAVIOLET MONITOR PROBE. THE SYSTEM SHALL TRAVEL THE ENTIRE LENGTH OF THE QUARTZ SLEEVE TWICE PER DESIRED CLEANING CYCLE. PRECISION MOLDED WIPER RINGS SHALL BE PROVIDED TO ENSURE THOROUGH QUARTZ TUBE CLEANING AND QUARTZ TUBE PROTECTION. WIPER CYCLE SHALL BE USER SELECTABLE AND ADJUSTABLE WITHIN A RANGE OF 15 MINUTES TO 24 HOURS DEPENDING ON ANTICIPATED APPLICATION AND DEPOSIT BUILD-UP. AT A MINIMUM THE AUTOMATIC WIPER SYSTEM SHALL HAVE THE FOLLOWING CHARACTERISTICS:
      - (i). SYSTEM SHALL UTILIZE DIRECT BELT DRIVE WITH SQUARE MACHINED PULLEYS AND SHAFTS TO PREVENT SLIPPAGE AND PIN SHEARING. SYSTEMS UTILIZING SHEAR PINS OR COMPLICATED GEAR BOXES WILL BE UNACCEPTABLE.
      - (ii). WIPER POWER SUPPLY SHALL BE 24 VOLT DC FOR IMPROVED SAFETY.
      - (iii). SYSTEM SHALL INCORPORATE DIRECT SHAFT ENCODING FOR POSITIONAL LOCATION. SYSTEMS RELYING ON EXTERNAL LIMIT SWITCHES OR INTERNALLY LOCATED MAGNETS WILL BE UNACCEPTABLE.
      - (iv). WIPER INTERVAL SHALL BE OPERATOR SELECTABLE WITH OPTIONAL OVERRIDE SWITCH.
      - (v). WIPER FAULTS ARE TO BE INDICATED ON THE CONTROL SYSTEM DISPLAY.
      - (vi). WIPER SYSTEM TO UTILIZE "INTELLIGENT OPERATION" FOR AUTOMATIC START-UP COMMISSIONING.
        - (a) RECORDS WIPER POSITION AT CHAMBER ENDS. POSITION MUST BE FIXED AND NOT DEPENDENT ON A TIMED INTERVAL OR COMPONENT STRIKING END OF CHAMBER.
        - (b) ESTABLISH A TRAVEL RUN WITHOUT SETTING LIMIT ADJUSTMENTS TO ENSURE SYSTEM INTEGRITY AND LONGEVITY
  - 6.1. CONTROL SYSTEM
    - a) CONTROL CABINET SHALL BE ENGINEERED TREATMENT SYSTEM SPECTRA MICROPROCESSOR CONTROL UNIT. (PHONE: 920-885-4386) SYSTEMS SHALL BE EPOXY COATED NEMA 12 RATED CABINET. THREE LEVELS OF OPERATION SHALL BE PROVIDED TO MEET THE NEEDS OF THE OPERATOR AND POOL ENVIRONMENT: SIMPLE CONTROL (START, STOP AND RESET), FULL PARAMETER DISPLAY, AND CUSTOMIZED OPERATOR CONFIGURATION. MODES OF OPERATION SHALL BE PASSWORD PROTECTED TO SECURE SYSTEM CRITICAL SETUP FUNCTIONS. CONTROL SYSTEM SHALL HAVE CLEARLY IDENTIFIABLE START, STOP, AND RESET CONTROL BUTTONS (SUITABLE FOR GLOVED OPERATION) WITH RUNNING AND FAULT LED INDICATORS.
    - b) TWO-LINE LED SCREEN SHALL DISPLAY A MINIMUM OF THE FOLLOWING: ULTRAVIOLET DOSE (DERIVED FROM FLOW AND INTENSITY INPUTS), ULTRAVIOLET INTENSITY (AS A % AND MW/CM2), LAMP CURRENT, FLOW RATE (ACCEPTS SIGNAL FROM OPTIONAL FLOW METER – DISPLAYED AS GALLONS PER MINUTE), CHAMBER TEMPERATURE (DISPLAYED AS DEG. F.), OPERATION HOUR METER, SYSTEM SPARES LISTING, LAMP FAULT, LOW ULTRAVIOLET & TEMPERATURE ALARM, GROUND FAULT TRIP, WIPER FAULT. ALL ALARM FUNCTIONS SHALL HAVE SIMPLE TEXT MESSAGE DISPLAY TO ASSIST IN FAULT FINDING.
    - c) CONTROL SYSTEM SHALL HAVE A MINIMUM OF THE FOLLOWING SYSTEM INTERFACE CONTROL: REMOTE OPERATION, PROCESS INTERRUPT FEATURES (FROM VALVES, FLOW METERS), LOW UV DOSE (CONFIGURABLE TO SHUTDOWN OR ALARM ONLY), FLOW METER INPUT, AUTO-RESTRIKE, HALF TO FULL POWER ULTRAVIOLET SETTING WITH 24 HOUR/7 DAY SETTABLE TIMER.
    - d) CONTROL SYSTEM SHALL HAVE BUILT IN DATA-LOGGING CAPABILITIES TO RECORD THE FOLLOWING INFORMATION: ULTRAVIOLET INTENSITY REQUIRED, ULTRAVIOLET INTENSITY MEASURED, LAMP CURRENT, CHAMBER TEMPERATURE, FLOW RATE (IF FLOW METER IS CONNECTED), TIME AND DATE STAMP, ALL ALARMS GENERATED
    - e) CABLE REQUIREMENTS – ETS IS TO SUPPLY THE CABLES REQUIRED BETWEEN THE CONTROL PANEL AND THE UV LIGHT. THE CONTRACTOR IS TO MEASURE ON SITE THE CABLE RUN DISTANCE BETWEEN THE CONTROL PANELS AND THE UV LIGHT. ORDER THE CABLES FROM THE FACTORY TO THE REQUIRED DISTANCE. NOTE THAT THE CABLES CANNOT BE SPLICED IN THE FIELD. ALL CABLES ARE TO BE CSA APPROVED. ALL WIRING METHODS IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATION.
  - 6.1. INSTALLATION AND COMMISSIONING
    - a) INSTALL IN ACCORDANCE WITH CONTRACT DOCUMENTS AND MANUFACTURER'S INSTRUCTIONS.
    - b) COMMISSIONING
      - (i). ULTRAVIOLET CHAMBER AND CONTROL PANEL SHALL BE COMMISSIONED BY A QUALIFIED FACTORY TRAINED TECHNICIAN TO INSTITUTE THE FIVE YEAR WARRANTY.
      - (ii). A SERVICE AGREEMENT FROM A QUALIFIED FACTORY CERTIFIED DISTRIBUTOR SHALL BE PROVIDED TO INITIATE AND MAINTAIN THE FIVE YEAR WARRANTY.
      - (iii). FINAL ELECTRICAL AND CONTROL CABLING WILL BE CONNECTED FROM THE SPECTRA CONTROL CABINET TO THE ULTRAVIOLET DISINFECTION CHAMBER DURING THE COMMISSIONING PROCESS.
      - (iv). DAILY OPERATION AND SIMPLE MAINTENANCE INSTRUCTIONS SHALL BE PROVIDED DURING THE COMMISSIONING PROCESS.



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**CITY OF WINNIPEG**  
**PAN AM POOL UV PIPING**

**MECHANICAL SPECIFICATIONS**

DRAWN BY	CHECKED BY	DATE	SHEET NO.
VCV	BKW	APR 10 2012	<b>M103</b>
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