|  |  |  |
| --- | --- | --- |
| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | September 30, 2009 | Review/update of the document “Related Sections” |
| 3 | April 9, 2013 | First Draft – Consolidated Comments Spec Update Project |
| 3.1 | June 17, 2013 | Finalized for Legal Review. Incorporation of new Commissioning and Computerized Maintenance Management System Data Requirements Specification cross references. |
| 4 | May 21, 2014 | Revised to incorporate Legal Services’ comments (AV) |
| 5 | July 15, 2014 | Amended to reflect changes related to commissioning specification and name change (AV) |
| 6 | September 24, 2014 | Updated, Finalized Specification – Reference eDOCS #1029461-v5 (AV) |
| 7 | February 18, 2015 | Updated standards (AV) |
| **8** | **March 2, 2015** | **Updated, Finalized Specification – Legal Reference eDOCS #5043355 v12 (AV)** |
| 9 | November 11, 2016 | Updated NFPA to 2017 new version (AV) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GEneral

## Scope of Work

### The work of this Section includes the work necessary to completely furnish and install the horizontal, insulated steel, concrete encased, aboveground fuel storage tanks.

### The work of this Section shall comply with all applicable requirements of the Technical Standards and Safety Act, 2000 and O. Reg. 213/01.

### Refer to the General Conditions of the Contract and Division 1 - General Requirements, which contain information and requirements that apply to the work specified in this Section and are mandatory for this Contract.

### The tank manufacturer shall be experienced in the design and construction of the kind of tanks specified herein, and shall have furnished tanks of a similar size for installations that have been in successful operation for a minimum of 10 years.

### All tanks provided under this Specification shall be UL listed for the intended product.

## Related Sections

### *[Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.*

### *Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.*

### *This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]*

### *[List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### *[List Sections specifying products installed but not supplied under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

#### Section 01300 – Submittals

#### Section 01425 – Computerized Maintenance Management System Data Requirements

#### Section 01640 – Manufacturer’s Services

#### Section 01810 – Equipment Testing and Facility Commissioning

#### Section 09900 – Painting and Protective Coatings

#### Section 11010 – Equipment General Requirements

#### Section 11905 – Fuel Oil Systems

#### Section 16231 – Diesel Electrical Generating Units

#### [Division 13 – SCADA and Instrumentation *- insert applicable specifications*]

## References

### Tanks and equipment shall be designed, fabricated, tested, inspected, and delivered in accordance with the latest edition of the following standards:

#### Underwriter’s Laboratories

##### UL 2085 Protected Above Ground Tanks for Flammable and Combustible Liquids

##### UL 142 Above Ground Flammable Liquids

#### Technical Standards and Safety Act (2000)

##### Technical Standards and Safety Authority (TSSA) – Fuels Safety Program

##### Technical Standards and Safety Act, 2000, Ontario Regulation 213/01 Fuel Oil

##### Ontario Regulation 217/01 Liquid Fuels

#### National Fire Protection Association (NFPA)

##### NFPA 30 Flammable and Combustible Liquids Code 2015 Edition

##### NFPA 70, National Electrical Code 2017 Edition (NEC).

##### NFPA 780 Standard for the Installation of Lightning Protection Systems, 2014 Edition

#### American Petroleum Institute

##### API STD 650: Standard for Welded Tanks for Oil Storage Tanks, edition 12

#### Occupational Health and Safety Act (Ontario).

#### Environmental Protection Agency (US), Code of Federal Regulations 40 CFR Parts 280 and 281.

#### National Fire Code of Canada 2010

#### National Electrical Manufacturers Association (NEMA), Section 3R.

#### Tanks and equipment shall meet or exceed the requirements of all local fire and safety codes.

## Submittals

### Submittals shall be made in accordance with Section 01300 - Submittals.

### Shop Drawings and Product Data:

#### Drawings showing dimensions, openings, connections, and construction details of the tank. Tank design data submitted shall include, but shall not be limited to:

##### Tank size and overall dimensions.

##### Wall steel and concrete thickness.

##### Locations and details of nozzles and tank connections.

##### Construction details plainly identifying materials of construction.

##### All other required information as detailed in the equipment information template shall be submitted in an electronic format suitable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 - Computerized Maintenance Management System Data Requirements.

#### Description of the quality assurance program to be utilized.

#### Installation details in accordance with the manufacturer’s recommendations and instructions.

#### Licensed Manufacturer’s Certificate.

### Quality Control Submittals:

#### Manufacturer’s Certificate of Compliance: Applicable NFPA requirements, Underwriters Laboratory/Underwriter Laboratory Canada (UL/ULC) requirements, Canadian federal and provincial secondary containment requirements, and Uniform Fire Code requirements.

#### Factory test results, reports, and certifications.

#### Copies of fabrication, quality control, and testing records for the actual tanks.

#### Special shipping, storage and protection, and handling instructions.

#### Manufacturer’s written/printed installation instructions.

#### Manufacturer’s Certificate of Proper Installation.

#### Manufacturer’s list of proposed spares, expendables, and test equipment.

#### Operation and Maintenance Manuals.

## Special Guarantee/Warranty

### Furnish the manufacturer's extended guarantee or warranty, with the Region named as the beneficiary, in writing. The special guarantee/warranty shall provide for correction, or at the option of the Region, removal or replacement if any material or equipment is found defective during a period of 20 years after the date of the Total Performance of the Work. The duties and obligations for the correction or removal and replacement of defective work shall be as specified in the General Conditions of the Contract.

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

### The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

### .1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

## If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.]

# PRODUCTS

## General

### [If the specification contains references to particular manufacturer’s products then the following note will be added: The use of a manufacturer’s name and model or catalogue number is solely for the purpose of establishing the standard of quality and general configuration desired. Other manufacturers’ equipment will be considered in accordance with the General Conditions.]

## Design Requirements

|  |  |  |
| --- | --- | --- |
| Number |  | Capacity in Litres (Imperial Gallons) |
|  |  |  |
|  |  |  |

### Tanks and capacity are as follows:

### Equipment Description

#### Tanks shall be completely shop fabricated, horizontal, rectangular, aboveground, protected type, with integral secondary containment.

#### Tanks shall be suitable for receiving, storing, and discharge in an exterior ambient environment with the temperature range of [  0  ] to [ 38 ] degrees Celsius (0 to 100 degrees Fahrenheit). The temperature range shall reasonably reflect extreme ranges for southern Ontario.

### Tank construction shall include the following:

#### An interior primary tank constructed of not less than 10 gauge carbon steel with continuous welds on all sides conforming to American Welding Society standards.

#### All welding shall be inspected by an independent certified welding inspector at the cost of the Contractor. The welding inspector shall provide a report and all inspection documentation to the Consultant .

#### An internal thermal insulation layer (suitable for the conditions cited in subsection 2.4.2 above) adjacent to the primary tank of not less than [     ] mm (inch) thick polystyrene.

#### An integral internal secondary containment that is a minimum of 0.76 mm (30 mil) thick high density polyethylene sheeting, fully sealed and encapsulating the primary tank. The leak monitoring tube shall be located between the primary tank and secondary containment membrane.

#### An integral exterior concrete tank encasement that protects both the primary steel tank and secondary containment, a minimum of [     ] mm ([     ] inches) thick of monolithic (without seams) 30 MPa reinforced concrete having a brownish river run gravel exposed aggregate finish. The tank enclosure shall have integral monolithic concrete support rib legs that elevate the enclosure a minimum of [     ] mm ([     ] inches) above grade.

### The primary tank shall be in accordance with:

#### Underwriters Laboratories (Canada) Standard UL 2085 (ULC 2085) and UL 142 (ULC 142).

#### API STD 650: Standard for Welded Tanks for Oil Storage Tanks.

### Fire Resistance: Tanks shall be designed and tested to provide two hour fire protection. The fire resistance of the tank shall be tested in accordance with the procedure established in UL 2085.

### Impact Protection: The tank system shall meet the requirements for ballistic, impact, and collision protection in accordance with UL 2085.

### Thermal and Corrosion Protection: The tank construction shall include thermal insulation to protect against temperature extremes and corrosion. All exposed steel shall be treated to inhibit corrosion.

### Secondary Containment with Leak Detection Access: The tank system shall include an impervious barrier to contain leaks from the primary tank. A leak detection access tube shall be located between the inner tank and secondary barrier. In the event of a leak, a positive space shall be available to permit leaked fluid to flow to the monitoring point. The leak detection system is provided under Section 11905 - Fuel Oil System. Leak detection telemetry shall be conveyed to the SCADA system with appropriate control and alarm logic programming as well as comprehensive graphics as defined in Division 13 - SCADA and Instrumentation and the Process Narratives/Process Control Narratives included in the SCADA appendices. [*Please ensure that the Process Narrative/Process Control Narratives are attached as appendix documents to the Contract]*

### Concrete Encasement: Concrete design shall include the following for long term durability: air entrainment, water reducing admixture, fiber mesh reinforcement, and steel reinforcement. The tank shall be of a concrete exterior and of a continuous and visually verifiable monolithic (seamless) pour on the top, bottom, and sides of the steel tank. The tank shall not contain any cold joints or heat sinks (heat transfer points) on the bottom and sides. The primary steel tank shall be pressurized to [     ] kPa ([     ] psi) during concrete encasement at the factory in order to pre-stress the tank and thus allow for its expansion and contraction. An exterior steel jacket covering the concrete shall not be permitted. The exterior tank color shall match the precast concrete panels as specified in Section 09900 – Painting and Protective Coating.

### Spill/Overfill Containment: Tanks shall conform to the applicable UL/ULC standards for the [     ] litre capacity spill/overfill containment sump surrounding the fill pipe. The unit shall be manufactured and mounted as an integral part of the primary tank and shall contain a valve to release spilled product back into the tank. The tank shall be double walled or shall be situated in a spill containment berm of sufficient volume to protect the environment.

### Venting: Tanks shall include a [     ] mm ([     ] inches) atmospheric vent and emergency venting in accordance with NFPA 30 2012 Edition and UL/ULC standards and shall be clearly labeled.

### Anti-Siphon: Provide a pressure relief anti-siphon device on the fuel oil supply line with a bypass and ball valve (normally closed) in the bypass line. Select an anti-siphon device for the anticipated hydrostatic head pressures.

### All piping shall be properly colour coded and labeled.

### Nozzles: Flanges shall be the manufacturer’s standard design. Equip each tank with the following at the standard locations:

#### [     ]

#### [     ]

#### [     ]

#### [     ]

## Accessories

### Identification Plate: Identify each tank with the fabricator’s name, capacity in gallons, service, vessel number, vessel name, and date of manufacture.

### Lifting Lugs: Equipment weighing more than [45] kg ([100] pounds) shall be provided with lifting lugs.

### UL Label: Include the name of the manufacturer and location of factory.

### Signage: Mark tanks on all sides with the following warning signs: “FLAMMABLE” or “COMBUSTIBLE,” “NO SMOKING,” product identification, and other signs as required by the applicable statutes and codes. Signs shall be recessed in the concrete exterior to protect the signs from damage.

### Bearing Pads: Provide continuous neoprene bearing pads of the manufacturer’s standard design under each tank foot. Pads shall be not less than [ ]mm ([     ] inches) thick, 60 Durometer, and [ ] mm ([ ] inches) wider and longer than the legs.

### Steps and Handrails: Aluminum; OHSA compliant steps and handrails shall be provided with each tank by the tank manufacturer.

# EXECUTION

## General

### Equipment provided under this Section shall meet all applicable local, federal, provincial, and OHSA requirements. The tank system, including accessories, shall be installed in strict accordance with the manufacturer’s recommendations and the applicable fire and environmental statutes and codes.

### The Contractor shall ensure that all work including work by Subcontractors shall be performed in accordance with O. Reg. 213/01 and any other required legislation under the Technical Standards and Safety Act, 2000.

### Electrical work shall be performed in accordance with the Ontario Electrical Safety Code (OESC). Tanks shall be electrically grounded in accordance with NFPA 780 2014 Edition.

## Preparation

### Prior to installation, the Contractor shall obtain the following permits from the required Ontario authorities and send a copy of the permit(s) to the Consultant and Region:

#### *[Consultant to list required permits and issuing Ontario authorities]*

## Installation

### Installation, handling, and storage of the tanks and associated monitoring systems shall be in strict accordance with the manufacturer’s written instructions. Care shall be taken not to damage the tank and accessories.

### Tanks shall be installed on a reinforced concrete base slab as indicated on the Contract Drawings. Install neoprene bearing pads under the legs of the tanks as required by the manufacturer.

## Field Quality Control

### Prior to final installation, the tanks shall be visually inspected by the manufacturer’s representative for impact damage which may have occurred during shipping, unloading, or storage. Tanks shall then be tested for leaks by pressurizing the tank with air to a minimum pressure of [     ] kPa ([     ] psi), and a maximum pressure of [     ] kPa ([     ] psi) for a minimum of four hours. While under pressure, a soap solution shall be applied at all piping connections to aid in the detection of leaks. If any drop in pressure or leaks are detected, the leaks shall be repaired in accordance with the manufacturer’s written recommendations. The Consultant will provide criteria for the maximum magnitude of pressure loss over a designated time period that is acceptable in order to pass the pressure test. The tank shall be repaired and retested by the Contractor until no leaks are detected. All testing and retesting shall be performed in accordance with the manufacturer’s written procedures. The Contractor, assisted by the manufacturer’s representative, shall perform the field testing and retesting. The Contractor shall be responsible for all costs associated with repairs and re-testing.

### Prior to startup, all installed equipment shall be inspected for proper installation as defined by the manufacturer’s recommendations and connection by means of a Functional Test by the manufacturer’s representative. Such tests shall include a leakage test with the tank full of clean fuel oil to verify that no liquid will leak from the installed tank. If any leaks are detected, the cause of the leak(s) shall be repaired in accordance with the manufacturer’s written recommendations. The tank shall be repaired and retested until no leaks are detected. The Contractor shall be responsible for any leakage, fuel transfer, clean-up, remediation activities in the event of a tank failure. All testing and retesting shall be performed in accordance with the manufacturer’s written procedures. The Contractor, assisted by the manufacturer’s representative, shall perform the functional testing.

#### The Contractor shall arrange for and pay for completely filling all fuel oil storage tanks in order to perform tank and generator testing.

#### In the event re-testing is required prior to commissioning the system, the Contractor shall be responsible for all costs associated with the re-testing which includes, but shall not be limited to, the cost of removal and replacement of fuel, repairs, replacements, and inspections.

#### Fuel in the tanks can be used to test the diesel engine generator provided under Section 16231 – Diesel Electrical Generating Units.

### Commissioning activities shall be performed in accordance with Section 01810 – Equipment Testing and Facility Commissioning.

## Manufacturer’s Field Services

### The Contractor shall ensure that the manufacturer’s authorized representative will attend at the Site to perform field services, including as necessary, installation assistance, inspection, certification of installation, testing, startup assistance, and training of the Region’s personnel.

### Provide the Manufacturer’s Certificates of Proper Installation for each tank.

### Provide training in accordance with Section 01820 – Demonstration and Training, travel time excluded. At least a portion of the required training shall be for instructing the Region’s personnel at such time as requested by Region.

### Furnish assistance, inspection, testing, startup, and certification services at such times as requested by Contractor.

### Refer to Section 01640 - Manufacturers’ Services, and Section 01810 - Equipment Testing and Facility Commissioning for additional requirements.

**END OF SECTION**