

**NATIONAL
STANDARD
OF
CANADA**

CAN/ULC-S676-15

**STANDARD FOR REFURBISHING OF STORAGE TANKS FOR
FLAMMABLE AND COMBUSTIBLE LIQUIDS**

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**STANDARD FOR REFURBISHING OF STORAGE TANKS FOR
FLAMMABLE AND COMBUSTIBLE LIQUIDS**

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STANDARD FOR REFURBISHING OF STORAGE TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

PREFACE

This is the First Edition of the Standard for Refurbishing of Storage Tanks for Flammable and Combustible Liquids, CAN/ULC-S676.

This Edition of the Standard has been formally approved by the ULC Standards Committees on Stationary Steel, and Nonmetallic, Storage Containers for Flammable and Combustible Liquids.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Appendix A, identified as Informative, is for information purposes only.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This First Edition National Standard of Canada is based on, and now supersedes, the First Editions of Technical Supplements ULC-S601(A), Refurbishing of Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids, ULC-S603(A), Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids, ULC-S615(A), Refurbishing of Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids, and ULC-S630(A), Refurbishing of Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids.

NOTE: The four Technical Supplements were collected into a single document and republished without alteration in 2006.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The initiation of the review of this Standard will commence within 5 years of the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.

1 SCOPE

1.1 This Standard covers the *refurbishing* of shop fabricated tanks built to nationally recognized Standards listed in Tank Eligibility Subsections 6.2 and 7.2.

NOTE: In the context of this Standard, *refurbishing* refers to *repairs* to, and a limited set of *modifications* of, tanks using materials at least equivalent to those used in the original manufacture and does not include retrofit. Refer to Standard CAN/ULC-S669, Standard for Internal Retrofit Systems for Underground Tanks for Flammable and Combustible Liquids, for requirements applicable to retrofit activities.

1.2 This Standard provides minimum requirements for the inspection, evaluation and *refurbishing* of steel and fibre reinforced plastic underground and aboveground storage tanks for *flammable liquids* and *combustible liquids*. This Standard addresses the *refurbishing* of tanks in a *refurbishing company's* facility in Part II, the *refurbishing* of tanks at their installed location in Part III, and also provides inspection criteria for the frequent *relocation* of *aboveground tanks* in Part IV.

NOTE: Refer to Appendix A for examples of flowcharts applicable to *refurbishing*.

1.3 The installation and use of *refurbished* tanks may be covered by the requirements of the *Authority Having Jurisdiction* and may include by reference, but are not limited to:

- A National Fire Code of Canada, Part 4;
- B CSA B139, Installation Code for Oil Burning Equipment; and
- C CCME PN 1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

1.4 The transport of tanks to a *refurbishing* facility is not within the Scope of this Standard.

NOTE: *Authorities Having Jurisdiction* may have requirements for the cleaning and preparation of tanks for removal from service, prior to transport to the *refurbishing* facility.

1.5 This Standard is intended for use by organizations and/or individuals who are knowledgeable and experienced in *underground tank* or *aboveground tank* fabrication, *repair*, *modification* and inspection.

NOTE: Refer to Personnel Qualifications Subsections 6.1 or 7.1, as applicable.

1.6 These requirements apply to all *repair* activities of storage tanks and integral appurtenances designed to contain *flammable liquids* or *combustible liquids*, under atmospheric pressure.

2 REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard.

Document Published by Canadian Council of Ministers of the Environment (CCME)
c/o Manitoba Statutory Publications, Lower Level,
200 Vaughan Street, Winnipeg, MB R3C 1T5
Telephone: (204) 945-4664

- CCME PN 1326 UPD 2013, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products
-

Document Published by CSA Group
5060 Spectrum Way, Mississauga, On L4W 5N6
Telephone: (800) 463-6727
www.csa.ca

- CSA B139-09 (R2014), Installation Code for Oil Burning Equipment
-

Document Published by the National Fire Protection Association (NFPA)
1 Batterymarch Park, Quincy, MA 02169-7471 U.S.A.
Telephone: (617) 770-3000
www.nfpa.org

- NFPA 326:2015, Standard for Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair
-

Codes published by the National Research Council of Canada (NRC)
Publication Sales M20, National Council of Canada, Institute for Research in Construction
Ottawa, ON K1A 0R6
Telephone: (613) 993-2463 or (800) 672-7990
www.nrc-cnrc.gc.ca

- National Fire Code of Canada, 2010
-

Documents Published by ULC Standards (prior to May, 2010, identified as Underwriters Laboratories of Canada)
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NOTE: Superseded editions of ULC Standards and Other Recognized Documents (ORDs) may be purchased from ULC Standards by first requesting a quotation from e-mail address: publications@ulc.ca.

- CAN/ULC-S601-14, Standard for Shop Fabricated Steel Aboveground Tanks for Flammable and Combustible Liquids
- CAN/ULC-S602-14, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil
- CAN/ULC-S603-14, Standard for Steel Underground Tanks for Flammable and Combustible Liquids
- CAN/ULC-S603.1-11, Standard for External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids
- CAN/ULC-S615-14, Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids

- CAN/ULC-S630-00, Standard for Shop Fabricated Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids

NOTE: CAN/ULC-S630 was superseded by CAN/ULC-S601-07, and withdrawn when the latter was published. A subsequent edition of CAN-ULC-S601 was published in 2014.

- ULC-S643-00, Standard for Shop Fabricated Steel Aboveground Utility Tanks for Flammable and Combustible Liquids

NOTE: ULC-S643 was superseded by CAN/ULC-S601-07, and withdrawn when the latter was published. A subsequent edition of CAN-ULC-S601 was published in 2014.

- CAN/ULC-S652-08, Standard for Tank Assemblies for Collection and Removal of Used Oil
- CAN/ULC-S653-06, Standard for Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids
- CAN/ULC-S655-98, Standard for Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids
- CAN/ULC-S669-14, Standard for Internal Retrofit Systems for Underground Tanks for Flammable and Combustible Liquids
- CAN/ULC-S670-14, Standard for Aboveground Nonmetallic Tanks for Fuel Oil and Other Combustible Liquids
- CAN/ULC-S677-14, Standard for Fire Tested Aboveground Tank Assemblies for Flammable and Combustible Liquids
- ULC/ORD-C80.1-12, Nonmetallic Tanks for Oil-Burner Fuels and Other Combustible Liquids

NOTE: ULC/ORD-C80.1 was superseded by CAN/ULC-S670-14, and withdrawn when the latter was published.

- ULC/ORD-C142.18-95, Rectangular Steel Aboveground Tanks For Flammable and Combustible Liquids

NOTE: ULC/ORD-C142.18 was superseded by CAN/ULC-S601-07, and withdrawn when the latter was published. A subsequent edition of CAN-ULC-S601 was published in 2014.

- ULC/ORD-C142.22-95, Vertical Steel Aboveground Tank Assemblies For Flammable and Combustible Liquids

NOTE: ULC/ORD-C142.22 was superseded by CAN/ULC-S601-07, and withdrawn when the latter was published. A subsequent edition of CAN-ULC-S601 was published in 2014.

- ULC/ORD-C142.5-92, Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids

NOTE: ULC/ORD-C142.5 was superseded by CAN/ULC-S677-14, and withdrawn when the latter was published.

3 GLOSSARY

NOTE: Terms used in this Standard that are in *italic* print are defined as follows:

3.1 *ABOVEGROUND TANK* — A storage tank with all of the storage tank volume above grade.

3.2 *ASSESSMENT* — A procedure for determining if a tank is viable for *refurbishing* or fit for service.

NOTE: This procedure includes cleaning, inspection, eligibility and evaluation in accordance with Subsections 5.1, Cleaning and Inspection, and 6.2 or 7.2, Tank Eligibility, and 6.3 or 7.3, Evaluation, as applicable.

3.3 *AUTHORITY HAVING JURISDICTION (AHJ)* — The governmental body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

3.4 *COMBUSTIBLE LIQUID* — Any liquid having a flash point at or above 37.8 °C and below 93.3 °C and as defined in the National Fire Code of Canada.

3.5 *DECOMMISSIONING* — A procedure for removing a tank from service such that it may be safely transported and/or have further procedures applied.

3.6 *FLAMMABLE LIQUID* — Any liquid having a flash point below 37.8 °C and a vapour pressure not exceeding 276 kPa (absolute) at 37.8 °C and as defined in the National Fire Code of Canada.

3.7 *MANWAY* — An opening on a tank designed to provide personnel access to the interior of the tank.

3.8 *MODIFICATION* — A procedure for alteration of a tank, compared to its original condition when manufactured, that does not result in a significant change in the *primary tank* volume.

3.9 *PRIMARY TANK* — The product storage tank or compartment.

3.10 *REFURBISH* — A procedure for restoring a tank so that it complies with or exceeds the requirements of the Standard or ORD to which it was originally constructed. *Refurbishing*, *refurbishes* and *refurbished* are associated terms.

3.11 *REFURBISHER* — A person designated by the *refurbishing company* as having the necessary training, education, and competence to perform assigned *underground tank* or *aboveground tank* cleaning, fabrication, *repair*, *modification* and/or inspection in accordance with the tank manufacturer's policy, procedures and programs.

3.12 *REFURBISHING COMPANY* — A company that *refurbishes* tanks in accordance with the requirements of this Standard.

3.13 *RELOCATION* — The installation of a tank in another location.

3.14 *REPAIR* — A procedure for remedying a defect in a tank.

3.15 *SECONDARY CONTAINMENT (CONTAINMENT)* — A construction that is external to the *primary tank* and designed to prevent the contents of the *primary tank* from leaking outside the *containment*.

3.16 *UNDERGROUND TANK* — A storage tank that, when installed, has all of the storage tank volume below grade and the tank completely surrounded by, and in intimate contact with, backfill.

PART I — GENERAL

4 GENERAL REQUIREMENTS

4.1 SAFETY CONSIDERATIONS

4.1.1 All activities, including the *assessment, decommissioning, repair, modification*, testing and marking of the tanks shall conform to the requirements of the *AHJ* and current best practice for safety. Refer to Subsection 5.1, Cleaning and Inspection.

4.2 REFURBISHING COMPANIES

4.2.1 The original manufacturer of the tank to be *refurbished*, or their authorized representative, shall act as a *refurbishing company*.

4.2.2 Alternatively, a tank manufacturer who is recognized by a third party certifier to manufacture a tank to the same Standard, or the authorized representative of the recognized tank manufacturer, may also act as a *refurbishing company*.

NOTE: In Canada, a third party certifier is an organization accredited by the Standards Council of Canada as a certification organization.

4.3 APPLICABLE TANK STANDARD OR ORD

4.3.1 Where the Standard or ORD to which a tank was originally manufactured has been superseded by another Standard or ORD, the *refurbishing company* and the tank owner shall determine which, if any, requirements of the current edition of the Standard or ORD that differ from those of the original Standard or ORD are to apply to the *refurbished* tank, so as to comply with the requirements of the *AHJ*.

4.4 REFURBISHING COMPANY'S RESPONSIBILITIES

4.4.1 A *refurbishing company* shall:

- A Be responsible for the quality of the work done;
- B Formulate a procedure for a given task and have such procedure documented;
- C Ensure that the requirements of Personnel Qualifications Subsection 6.1 or 7.1, as applicable, are met; and
- D Ensure that *refurbishers* are only assigned to perform activities for which they are qualified, in accordance with the requirements of Personnel Qualifications Subsection 6.1 or 7.1, as applicable, and applicable regulatory requirements.

NOTE: Regulatory requirements may address such issues as confined-space entry, tank cleaning, and administrative control procedures.

4.5 MODIFICATIONS

4.5.1 *Modifications* shall be limited to the addition of fittings, *manways*, ladders, and supports, or replacement of sections with new material of similar size.

4.5.2 Except as defined in Clause 4.5.3, changes to the total volume of the tank shall be limited to that resulting from *modifications* only, such as replacing heads.

4.5.3 Bulkheads may be added to the tank to create multiple compartments, in which case the bulkhead design and construction shall conform to the requirements of the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable.

4.5.4 The tank shall be modified so as to comply with the requirements of the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable.

4.5.5 All *modifications* shall be in accordance with good engineering practice.

4.6 PRODUCTION TESTING

4.6.1 After all *repairs* and/or *modifications*, the tank shall be tested according to the production testing requirements of the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable.

4.6.2 Where the original leak test required by Clause 4.6.1 is the air/soap method, and it cannot be performed due to an inability to visually inspect the exterior of the *primary tank* during the *refurbishing* process, it may be replaced by an alternate leak detection process identified in the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable, or if this is not practicable, by a method recognized by the *AHJ* and acceptable to the owner and the *refurbishing company*.

PART II — REFURBISHING AT A FACILITY

5 GENERAL REQUIREMENTS

5.1 CLEANING AND INSPECTION

5.1.1 Cleaning and inspection of *underground tanks* and *aboveground tanks* shall be performed in accordance with the applicable requirements of NFPA 326, Standard for Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair, and applicable national or Provincial construction, safety, and environmental codes and regulations.

5.1.2 Cleaning and inspection of *underground tanks* and *aboveground tanks* shall be performed in accordance with the applicable requirements for hazards related to the presence of lead.

NOTE: Safe access procedures are regulated by Workers Compensation Boards of the *AHJs*.

5.1.3 If the tank does not contain a means of access, an access hole may be cut into the tank to facilitate internal inspection.

5.1.4 The internal and external tank surfaces shall be inspected, and all defects that prevent a return of the tank to service identified and recorded.

6 STEEL TANKS

6.1 PERSONNEL QUALIFICATIONS

6.1.1 *Refurbishers* shall be knowledgeable and experienced in *underground tank* or *aboveground tank* cleaning, fabrication, *repair*, *modification* and/or inspection, as applicable to the work to be performed.

NOTE: The qualifications of *refurbishers* may be subject to the requirements and/or approval of the *AHJ*.

6.1.2 *Refurbishers* that perform inspections shall be qualified to the satisfaction of the *refurbishing company* to perform any tests or inspections that may be required to assess the condition of the existing tank surfaces and structure, so as to determine any work necessary in order to bring the tank into compliance with the requirements of the Standard or ORD to which it was originally manufactured.

6.1.3 Each *refurbishing company's* facility shall have a written welding procedure recognized by a third-party certifier and shall ensure that each *refurbisher* doing the work shall be duly trained and qualified.

NOTE: In Canada, a third-party certifier may be, but is not limited to, a professional engineer, the Canadian Welding Bureau or the *AHJ*.

6.1.4 Each *refurbishing company* shall have and maintain records of trained and qualified *refurbishers* with respect to the *refurbishing company's* written welding procedure.

6.1.5 A *refurbisher* shall only undertake *repairs* requiring welding upon any storage tank when (s)he is duly trained and qualified.

NOTE: Refer to Part III for requirements for personnel *refurbishing* tanks at the installation site.

6.2 TANK ELIGIBILITY

6.2.1 Tanks that are eligible for work according to the requirements of Part II of this Standard shall be verified as originally complying with the requirements of:

- A CAN/ULC-S601, Standard for Shop Fabricated Steel Aboveground Tanks for Flammable and Combustible Liquids ;
- B CAN/ULC-S602, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil;
- C CAN/ULC-S603, Standard for Steel Underground Tanks for Flammable and Combustible Liquids ;
- D CAN/ULC-S630, Standard for Shop Fabricated Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids
- E ULC-S643, Standard for Shop Fabricated Steel Aboveground Utility Tanks for Flammable and Combustible Liquids;
- F CAN/ULC-S652, Standard for Tank Assemblies for the Collection, Storage and Removal of Used Oil;
- G CAN/ULC-S653, Standard for Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids;
- H CAN/ULC-S655, Standard for Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids;
- I CAN/ULC-S677, Standard for Fire Tested Aboveground Tank Assemblies for Flammable and Combustible Liquids;
- J ULC/ORD-C142.18, Rectangular Steel Aboveground Tanks for Flammable and Combustible Liquids;

- K ULC/ORD-C142.22, Contained Vertical Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids ; or
- L ULC/ORD-C142.5, Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids.

6.3 EVALUATION

6.3.1 Dents in the tank deflecting the surface greater than 30° from the original surface or 35 mm in depth from the normal configuration, or of length or width greater than 0.08 times the circumference, shall require the complete replacement of the affected section (i.e., the individual shell plate and/or the tank head).

6.3.2 Pitting in excess of 3 mm, or 50 % of the original metal thickness, whichever is the lesser in depth, or reduction of thickness of metal to less than the minimum value required in the applicable tank Standard or ORD listed in Clause 6.2.1, shall require the complete replacement of the affected section (i.e., the individual shell plate and/or the tank head).

6.3.3 For vertical *aboveground tanks*, metal thickness measurements shall be taken for each individual shell plate attached to the bottom plate. Several thickness measurements shall be taken in the area of the shell that is within 300 mm of the tank bottom.

6.3.4 For concrete encased tanks, the concrete shall be evaluated.

6.3.5 An evaluation report shall be prepared, containing all observations and measured values, and identifying all defects that have been found.

NOTE: The evaluation report should include an *assessment* of compatibility of the original tank material and the material of the patch or section with respect to approved welding procedures.

6.4 REPAIRS

6.4.1 All *repairs* shall be in accordance with good engineering practice.

6.4.2 The work performed for each item listed in the evaluation report so as to meet the corresponding requirements in the applicable tank Standard or ORD listed in Clause 6.2.1 shall be identified and recorded.

6.4.3 For single wall tanks, the application of patching metal and/or the filling of pitted areas with weld metal shall not be permitted.

6.4.4 For double wall tanks, dents or pitting lesser in extent than described in Clauses 6.3.1 or 6.3.2 may be *repaired* by welding a patch over the affected area. The thickness and alloy composition of the patch shall be in accordance with the requirements of the applicable Standard or ORD listed in Clause 6.2.1.

6.4.5 For concrete encased tanks, all defects in the concrete shall be *repaired* and the *refurbished* systems shall meet the requirements of ULC/ORD-C142.5, Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids.

NOTE: ULC/ORD-C142.5 was superseded by CAN/ULC-S677-14, and withdrawn when the latter was published.

6.4.6 All welded *repairs* shall be subject to inspections by an inspector appointed by the responsible department of the *AHJ*. The level of inspection may be reduced at the discretion of the inspector depending on the consistent good quality of the welded *repair*.

6.4.7 All materials used in *repair* shall be new, i.e., not from another used tank.

6.4.8 A *repaired* tank shall conform to the requirements contained in the applicable tank Standard or ORD listed in Clause 6.2.1.

6.5 CORROSION PROTECTION

6.5.1 Where tanks are provided with corrosion protection systems conforming to CAN/ULC-S603.1, Standard for External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids, consumable components of galvanic protection systems shall be replaced, all defects in coatings, claddings or jackets shall be *repaired*, and the *refurbished* system shall meet or exceed the applicable requirements of that Standard.

6.6 INTERSTICE OF DOUBLE WALL TANKS

6.6.1 *Refurbished* double wall tanks shall be shipped to the installation site with a minimum 51 kPa vacuum drawn on the interstice. The vacuum shall register on the vacuum gauge that is supplied with the tank.

7 FIBRE REINFORCED PLASTIC TANKS

7.1 PERSONNEL QUALIFICATIONS

7.1.1 *Refurbishers* shall be knowledgeable and experienced in *underground tank* or *aboveground tank* cleaning, fabrication, *repair*, *modification* and/or inspection, as applicable to the work to be performed.

NOTE: The qualifications of *refurbishers* may be subject to the requirements and/or approval of the *AHJ*.

7.1.2 *Refurbishers* that perform inspections shall be qualified to the satisfaction of the *refurbishing company* to perform any tests or inspections that may be required to assess the condition of the existing tank surfaces and structure, so as to determine any work necessary in order to bring the tank into compliance with the requirements of the Standard or ORD to which it was originally manufactured.

7.2 TANK ELIGIBILITY

7.2.1 Tanks that are eligible for work according to the requirements of Part II of this Standard shall be verified as originally complying with the requirements of:

- A CAN/ULC-S615, Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids;
- B CAN/ULC-S670, Standard for Aboveground Nonmetallic Tanks for Fuel Oil and Other Combustible Liquids; or
- C ULC/ORD-C80.1, Nonmetallic Tanks for Oil-Burner Fuels and Other Combustible Liquids.

7.3 EVALUATION

7.3.1 All defects, including the following, shall be addressed as identified in the *refurbishing company's* procedure:

- A Vertical deflection;
- B Bottom flattening;

- C Buckles and local indentations;
- D Cracks or holes;
- E Blisters;
- F Delaminations;
- F Surface Abrasions; and
- G Wall deterioration (e.g., evidence of chemical attack).

7.3.2 An evaluation report shall be prepared, containing all observations and measured values, and identifying all defects that have been found.

NOTE: The evaluation report should include an *assessment* of compatibility of the original tank material and the material of the patch or section with respect to properly bonding to the original tank and providing compatibility with the fluid being stored.

7.4 REPAIRS

7.4.1 General

7.4.1.1 All *repairs* shall be in accordance with good engineering practice.

7.4.1.2 The work performed for each item listed in the evaluation report so as to meet the corresponding requirements in the applicable tank Standard or ORD listed in Clause 7.2.1 shall be identified and recorded.

7.4.1.3 All materials used in *repair* shall be new, i.e., not from another used tank.

7.4.1.4 A *repaired* tank shall conform to the requirements contained in the applicable tank Standard or ORD listed in Clause 7.2.1.

7.4.2 Guidelines for Tank Repairs

7.4.2.1 In making *repairs*, only resins and reinforcement shall be used that are identified in documents applicable to the *refurbishing* work using suitable materials.

7.4.2.2 The area to which the *repair* is to be made shall be clean, dry and rough sanded or otherwise properly prepared for bonding.

7.4.2.3 The *refurbishing company's* procedures for *repair* of each defect type shall address:

- A Limits on what can be *repaired* for each defect type;
- B *Repair* methods and materials for each defect type including surface preparation; and
- C Materials approved for work that are suitable for the fluid to be contained in the tank after *refurbishing*.

7.4.2.4 In cases where the tank wall is being *repaired*, *repairs* shall add sufficient material to:

- A Restore the laminate to meet or exceed its original thickness after the defects are removed; or

- B Overlay the laminate defects with material that meets or exceeds the original laminate thickness.

PART III — IN-SITU REFURBISHING ACTIVITIES (AT THE TANK INSTALLATION)

8 CLEANING AND INSPECTION

8.1 The cleaning and inspection shall conform to the requirements of Subsection 5.1, Cleaning and Inspection.

9 GENERAL REQUIREMENTS

9.1 The qualifications of personnel shall conform to the requirements of Subsection 6.1 or 7.1, Personnel Qualifications, as applicable.

9.2 Tanks that are eligible for work according to the requirements of Part III of this Standard shall be verified as originally complying with the requirements of the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable.

10 STEEL TANKS

10.1 EVALUATION

NOTE: Refer to the flowchart of Figure A1. The requirements of this Subsection apply to the flowchart steps prior to the decision point "Repairable on site?". The reference to this Part, at the flowchart step corresponding to a decision to *repair* the tank on site, is not intended to require that the cleaning, inspection and evaluation be repeated.

10.1.1 The evaluation shall conform to the requirements of Subsection 6.3, Evaluation.

10.1.2 It shall be determined whether the work may be performed at the installation site, or the tank must be transported to a *refurbishing* facility. The tank manufacturer shall be consulted for specific instructions as part of the evaluation.

10.1.3 The decision as to whether *repair* can be performed shall be mutually agreed by the manufacturer and the tank owner.

10.2 REPAIRS

10.2.1 *Repairs* shall conform to the requirements of Subsection 6.4, Repairs.

10.2.2 If the *refurbishing* procedure is to be performed outside, *refurbishing* work shall not start until the site is adequately protected from any expected precipitation.

10.2.3 The *refurbisher* shall ensure that all the correct tools, materials, and supplies are available prior to commencing work.

10.2.4 *Repairs* shall be performed in accordance with the recommendations of the tank manufacturer and shall be carried out by a *refurbisher* specifically authorized by the tank manufacturer.

10.3 EXTERNAL CORROSION PROTECTION SYSTEMS

10.3.1 *Refurbished* tanks shall meet the applicable requirements of Subsection 6.5, Corrosion Protection.

10.4 INTERSTICE OF DOUBLE WALL TANKS

10.4.1 It shall be verified that *refurbished* double wall tanks have a minimum 51 kPa vacuum drawn on the interstice. The vacuum shall register on the vacuum gauge that is supplied with the tank.

11 FIBRE REINFORCED PLASTIC TANKS

11.1 EVALUATION

NOTE: Refer to the flowchart of Figure A1. The requirements of this Subsection apply to the flowchart steps prior to the decision point "Repairable on site?". The reference to this Part, at the flowchart step corresponding to a decision to *repair* the tank on site, is not intended to require that the cleaning, inspection and evaluation be repeated.

11.1.1 The evaluation shall conform to the requirements of Subsection 7.3, Evaluation.

11.1.2 It shall be determined whether the work may be performed at the installation site, or the tank must be transported to a *refurbishing* facility. The tank manufacturer shall be consulted for specific instructions as part of the evaluation.

11.1.3 The decision as to whether *repair* can be performed shall be mutually agreed by the manufacturer and the tank owner.

11.1.4 Surface abrasions not exceeding 2 mm penetration need not be *repaired*.

11.2 REPAIRS

11.2.1 *Repairs* shall conform to the requirements of Subsection 7.4, Repairs.

11.2.2 If the *refurbishing* procedure is to be performed outside, *refurbishing* work shall not start until the site is adequately protected from any expected precipitation.

11.2.3 The *refurbisher* shall ensure that all the correct tools, materials, and supplies are available prior to commencing work.

11.2.4 *Repairs* shall be performed in accordance with the recommendations of the tank manufacturer and shall be carried out by a *refurbisher* specifically authorized by the tank manufacturer.

11.2.5 Damage, including fittings or rib damage, shall be *repaired* by the tank *refurbishing company* or by other personnel trained in such *repairs* and acceptable to the tank owner and the manufacturer.

11.2.6 The general appearance of the field work shall be neat and present a good appearance.

PART IV — RELOCATION OF STATIONARY ABOVEGROUND TANKS

12 SCOPE

12.1 The requirements of this Part apply to the practice of *relocating aboveground tanks*, conforming to Standards for stationary designs, to new sites.

NOTE: In general *AHJs* do not permit that tanks for *flammable liquids* or *combustible liquids* may be relocated unless empty and purged of vapours. These tanks are not designed for the transportation of *flammable liquids* or *combustible liquids*, nor are they intended to be transported while containing such liquids.

13 INSPECTION

13.1 External inspection shall be performed before and after each *relocation* of a tank according to the applicable requirements of Subsection 5.1, Cleaning and Inspection.

13.2 Where internal inspections are required by the *AHJ*, they shall be performed according to the applicable requirements of Subsection 5.1, Cleaning and Inspection.

14 GENERAL REQUIREMENTS

14.1 The qualifications of personnel shall conform to the requirements of Subsection 6.1 or 7.1, Personnel Qualifications, as applicable.

14.2 Tanks that are eligible for inspection according to the requirements of Part IV of this Standard shall be verified as originally complying with the requirements of the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable.

15 STEEL TANKS

15.1 EVALUATION

NOTE: Refer to the flowchart of Figure A2. The requirements of this Subsection apply to the flowchart steps prior to the decision point "Repairable on site?". The reference to this Part, at the flowchart step corresponding to a decision to *repair* the tank on site, is not intended to require that the inspection and evaluation be repeated.

15.1.1 Single wall tanks shall only be relocated without *repair* when visual inspection indicates that they are free of the following:

- A Visible leaks from, for example, pipes, fittings or weld seams; or
- B Dents in the tank deflecting the surface greater than 30° from the original surface or 35 mm in depth from the normal configuration, or of length or width greater than 0.08 times the circumference.

15.1.2 Double wall tanks shall only be relocated without *repair* when visual inspection indicates that they are free of the following:

- A Water or fuel present in the *secondary containment*;
- B Any vacuum monitor device indicating a pressure outside of the limits specified by the tank manufacturer, or any leak detection system not functional or indicating that a leak has been detected;

- C Visible leaks from, for example, pipes, fittings or weld seams; or
- D Dents in the tank deflecting the surface greater than 30° from the original surface or 35 mm in depth from the normal configuration, or of length or width greater than 0.08 times the circumference.

15.1.3 Tanks shall not exhibit visible excessive damage to any coatings on the storage tank or any integral components of the storage tank that contain, or may contain, *flammable liquids* or *combustible liquids*.

NOTE 1: This requirement is not applicable to components, such as lift lugs or skids, that are not intended to contain liquid products.

NOTE 2: Utility Tanks, described in Standard CAN/ULC-S601, Standard for Shop Fabricated Steel Aboveground Tanks for Flammable and Combustible Liquids, and formerly in ULC-S643, Standard for Shop Fabricated Steel Aboveground Utility Tanks for Flammable and Combustible Liquids, when being evaluated in accordance with the requirements of Subsection 15.1, Evaluation, need only comply with the requirements of Clause items 15.1.1 A and 15.1.2 A, B and C.

15.1.4 Where required by the *AHJ*, tanks shall also pass a leakage test.

15.2 DECISION ON RELOCATION WITH OR WITHOUT REFURBISHMENT

15.2.1 The evaluation report shall include a determination of whether the tank is to be relocated with or without *refurbishing*.

15.3 INTERSTICE OF DOUBLE WALL TANKS

15.3.1 Where a double wall tank is equipped with a monitoring system, the functioning of the system shall be confirmed, and the integrity of the interstice verified, before the tank is returned to service at the new location. Vacuum monitors shall conform to the requirements of Subsection 10.4, Interstice of Double Wall Tanks.

16 FIBRE REINFORCED PLASTIC TANKS

16.1 EVALUATION

NOTE: Refer to the flowchart of Figure A2. The requirements of this Subsection apply to the flowchart steps prior to the decision point "Repairable on site?". The reference to this Part, at the flowchart step corresponding to a decision to *repair* the tank on site, is not intended to require that the cleaning, inspection and evaluation be repeated.

16.1.1 Tanks shall only be relocated without *repair* when visual inspection indicates that any defects present, as listed in Subsection 7.3, Evaluation, do not exceed the limits identified in the *refurbishing company's* procedure.

16.1.2 Where required by the *AHJ*, tanks shall also pass a leakage test.

16.2 DECISION ON RELOCATION WITH OR WITHOUT REFURBISHMENT

16.2.1 The evaluation report shall include a determination of whether the tank is to be relocated with or without *refurbishing*.

PART V — DOCUMENTATION

17 INSTALLATION INSTRUCTIONS

17.1 The installation instructions and any other documentation required by the applicable tank Standard or ORD listed in Clause 6.2.1 or 7.2.1, as applicable, shall accompany each *refurbished* tank.

18 MARKING

18.1 The following information shall be engraved or stamped on a corrosion-resistant nameplate permanently attached to the *refurbished* tank:

- A “Tank originally complying to (original manufactured tank Standard or ORD identifier)”;
- B “Refurbished by (Name of *refurbishing company*) according to CAN/ULC-S676”;
- C Date of completion of *refurbishing* work;
- D Unique identifier for records of *refurbishing* work;
- E “Primary tank capacity, * L”; and
- F “Compartment Tank - Cap: Comp 1 * L; Comp 2 * L”, (where applicable).

*Specify Capacity.

18.2 The *refurbished* tank shall be marked with all applicable warnings in accordance with the current edition of the applicable tank Standard or ORD identified in Clause 6.2.1 or 7.2.1.

NOTE: *Refurbishing companies* should be aware that the *AHJ* may also require that the mark of the certifying agency be included on each tank.

Exception: No marking requirements are applicable to tanks that are only inspected according to the requirements of Part IV.

19 RECORDS

19.1 The evaluation report and records of the *refurbishing* activities, as applicable, shall be provided by the *refurbishing company* and maintained on record by the owner of the *refurbished* tank for 5 years, or the duration that meets the requirements of the *AHJ*, whichever is longer. When a *refurbished* tank will meet any requirements of a current Standard or ORD, as opposed to those of the Standard or ORD to which it was originally manufactured, these shall be recorded.

20 SHIPPING AND INSTALLATION

20.1 The shipping and installation requirements of the applicable tank Standard or ORD identified in Clause 6.2.1 or 7.2.1 shall apply.

Exception: No shipping and installation requirements are applicable to tanks that are refurbished in-situ according to the requirements of Part III.

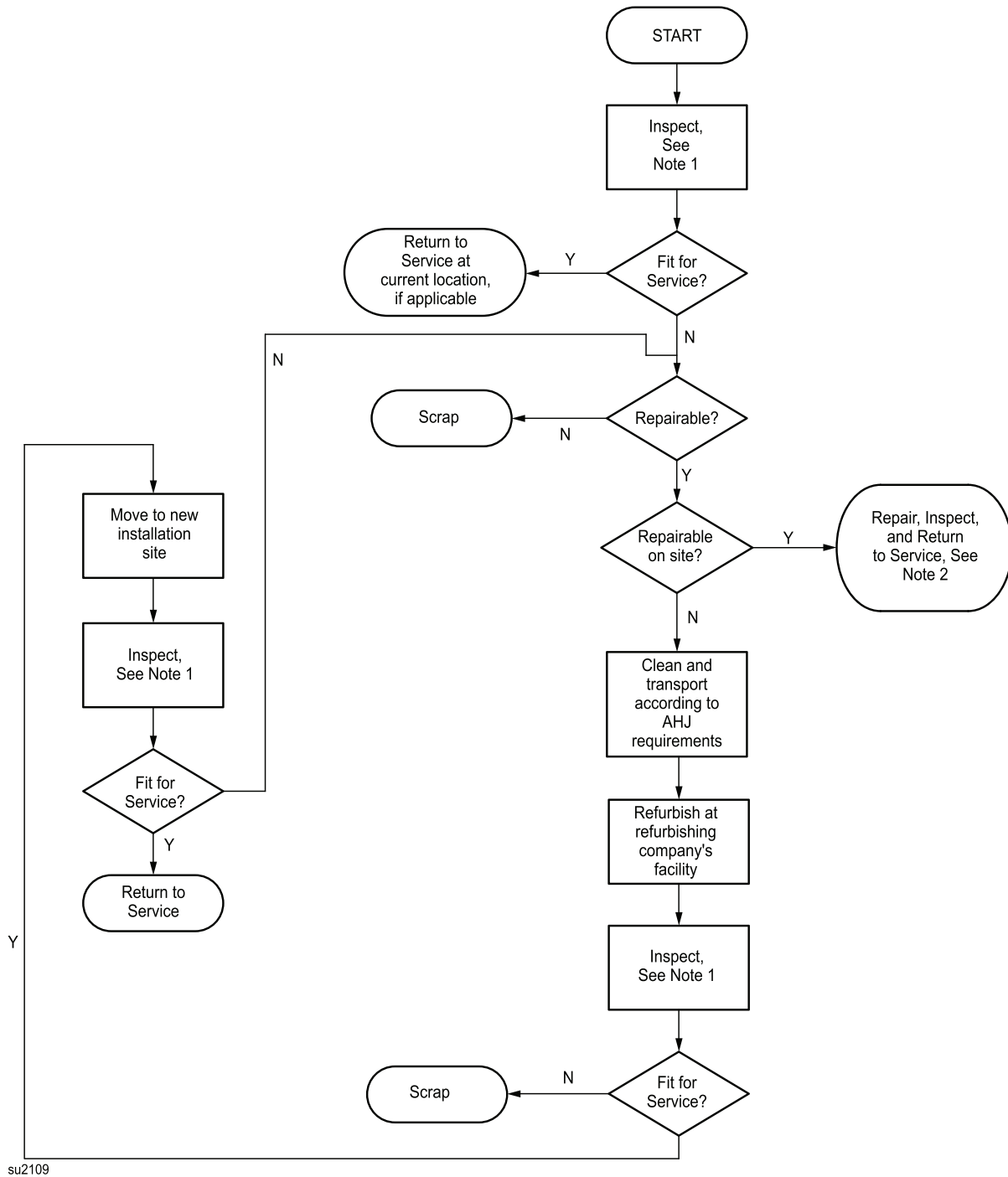
APPENDIX A – EXAMPLE FLOWCHARTS (INFORMATIVE)

(Reference: Clause 1.2 and Subsections 10.1, 11.1, 15.1 and 16.1)

A1 GENERAL

A1.1 The flowcharts shown below provide examples of the type of decision process which is to be documented in the *refurbishing company's* procedures (Figure A1) or the tank owner/operator's procedures (Figure A2).

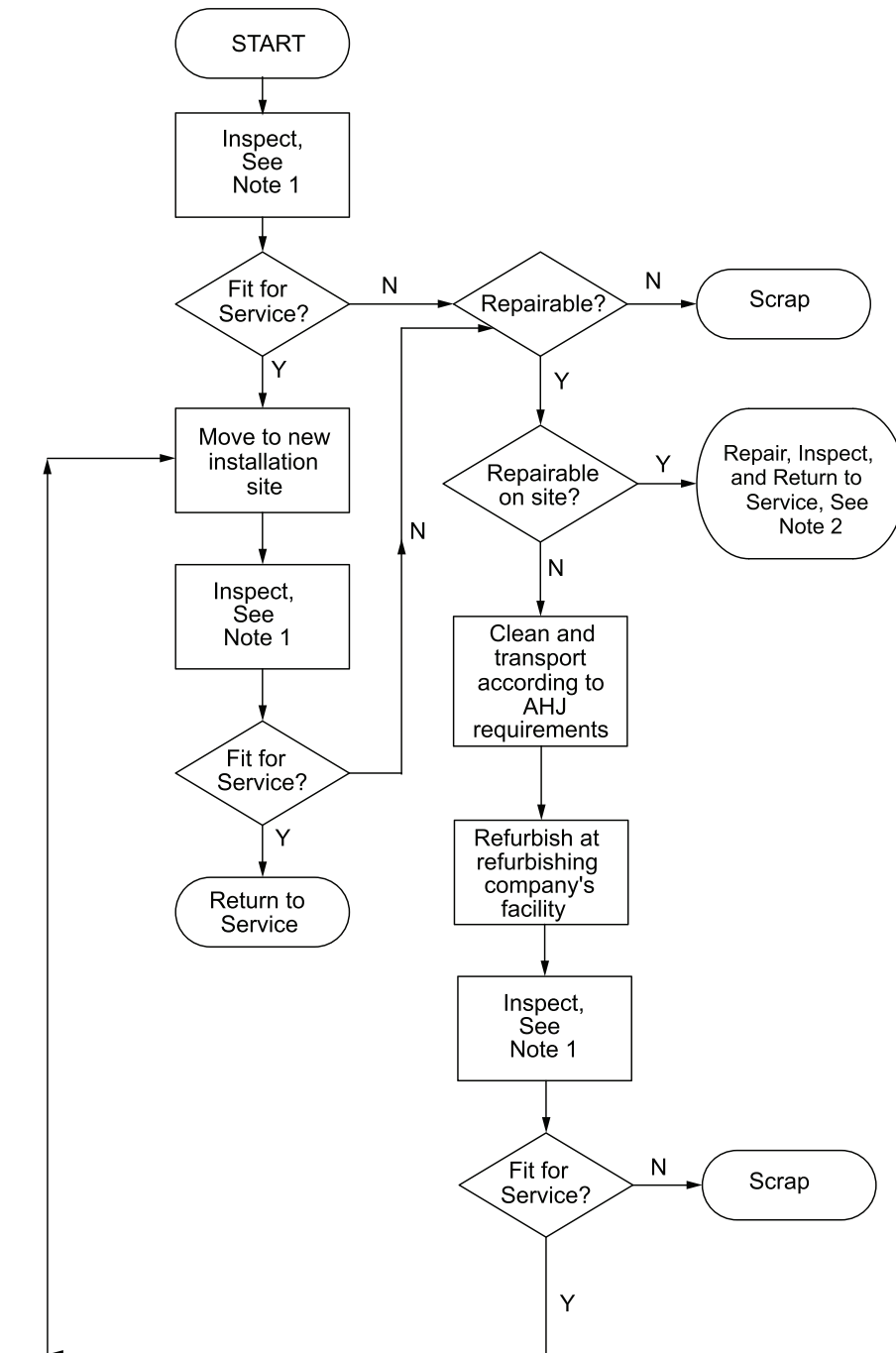
FIGURE A1 — REFURBISHMENT/MODIFICATION FLOWCHART



NOTE 1: Inspect according to the requirements of Subsection 5.1.

NOTE 2: Repair, Inspect, and Return to Service according to the requirements of Part III. See Note to Subsection 10.1 or 11.1, as applicable.

FIGURE A2 — RELOCATION WITHOUT MODIFICATION FLOWCHART



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NOTE 1: Inspect according to the requirements of Subsection 5.1.

NOTE 2: Repair, Inspect, and Return to Service according to the requirements of Part III. See Note to Subsection 15.1 or 16.1, as applicable.

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