



ABOVEGROUND STORAGE TANK INSPECTOR CERTIFICATION AND LICENSING MANUAL

Second Edition 2019



**Fiberglass Reinforced
Plastics Institute, Inc.**

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FOREWORD

This Fiberglass Reinforced Plastic Institute (“FRPI”) Aboveground Storage Tank Inspector Certification and Licensing Manual has come into existence as of this edition’s publication date out of industry need for a program providing a comprehensive, structured, repeatable, predictable and reliable practice covering education, vetting, certification and licensing for qualified Fiberglass Reinforced Plastic (“FRP”) tank inspectors. It is the first guidance document of its kind in the world to meet this need and fills a noteworthy industry void since the advent of FRP tank manufacturing in the United States of America (“USA”) around mid-1950. This collection of practices has been established to enable Industry differentiation in an independent and unbiased way between “Certified” and “Qualified” Inspectors.

This Manual is composed of five (5) Standard Practices that govern minimum requirements for inspector certification and licensing plus a knowledge base covering inspection protocols, FRP laminate identification, visual laminate imperfections, damage mechanisms plus integrity and leak testing. The first Standard Practice: SP8310 Licensed Aboveground Storage Tank Inspector Certification provides guidance for qualifying inspector expertise through establishing a given body of knowledge, defining inspection practice areas, quantifying inspector and employer credentials, certification exam procedures, certification logistics, application processes, licensing requirements plus rules for award, renewal, denial, termination, suspension and appeals processes plus other general conditions. The second Standard Practice: SP1010 Laminate Identification for Fixed Equipment in Chemical Applications provides guidance for qualifying laminate type through identification of industry standard classifications, definitions, descriptions and evidence pertaining to laminate composition including twenty-nine (29) color photo references plus a process for performing such work. The third Standard Practice: SP1020 Visual Imperfections Affecting Fixed Equipment in Chemical Applications provides guidance for qualifying twenty-nine (29) different laminate imperfections through application of existing industry standards, providing further clarification for definition, evidence and cause of imperfections including a color photo reference for each plus a process for performing such work. The forth Standard Practice: SP1030 Damage Mechanisms Affecting Fixed Equipment in Chemical Applications provides guidance for qualifying laminate damage through providing further clarification for definition of types, evidence and cause of twenty-five (25) different mechanisms including fifty-one (51) color photo references plus a process for performing such work. The fifth Standard Practice: SP1040 Integrity and Leak Testing of Fixed Equipment in Chemical Applications provides guidance for investigating and implementing appropriate testing options through providing further insight into flaw definitions, use of over twenty (20) basic inspection hand tools and descriptions of fifteen (15) inspection and test methods to be utilized. These test methods described are accompanied by advantages, disadvantages and limitations of each plus a process for performing such work.

This Manual is a “Compiled” document written and made available to industry through FRPI. It incorporates expertise contributed by the FRPI Licensed Aboveground Storage Tank Inspector Certification (“LASTIC”) Council plus other specialized works produced by subject matter experts through other industry or government organization initiatives. Collectively, this Manual contains input from an extraordinarily experienced, talented and balanced group of industry professionals, including owners (end users), inspection and testing service companies and engineering firms plus FRP consultants, manufacturers and raw material suppliers. Contributor background includes knowledge through association with American Composites Manufacturer’s Association, American

Petroleum Institute, American Society of Mechanical Engineers, American Society for Testing and Materials, American Water Works Association, Fiberglass Tank and Pipe Institute, National Association of Corrosion Engineers, Materials Technology Institute, National Board Inspection Code, Steel Tank Institute and Technical Association of the Pulp and Paper Industries plus Environmental Protection Agency and several other state regulators within the United States of America. Additionally, many contributors are licensed professional engineers practicing in the area of FRP laminate and equipment engineering plus other relevant disciplines.

FRPI is expanding the LASTIC Council that helped with development of this Manual embodying the Standard Practice for certifying and licensing FRPI 8310 Inspectors and shall provide ongoing review. In doing so, FRPI shall maintain this Council's diverse experience and balance of industry subject matter expertise. This Manual shall be escalated to a "Reviewed" industry consensus standard upon publishing the next edition. Industry and the general public are invited to contact FRPI and comment on FRP tank inspector certification process and inspection practices governed by the Standard Practices contained within the Manual. All comments will be taken into consideration by FRPI for future Manual editions. Nominations and self-nominations for membership on the FRPI LASTIC Council are also welcome.

FRPI thanks industry for contributions to this Manual, performing FRP tank inspections utilizing the guidance documents contained herein and future support resulting in sustainability of this evolving industry best practice for decades to come.

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MANUAL CONTENTS

REF #	DESCRIPTION	PDF PAGE
	MANUAL COVER	1
	Foreword	2
	Copyrights	4
	Manual Contents	5
	SECTION 1 – STANDARD PRACTICES	
	Standard Practices Introduction	8
SP8310	Licensed Aboveground Storage Tank Inspector Certification	9
	Part 1 General:	
	1.1 Purpose and Scope	
	1.2 Definitions	
	1.3 Body of Knowledge	
	Part 2 Inspection Practice Areas:	
	2.1 Inspection Procedure	
	2.2 Integrity and Leak Testing	
	2.3 Determinations	
	2.4 Reports and Record Keeping	
	Part 3 Inspector Qualifications:	
	3.1 Credentialing	
	3.2 Personal Requirements	
	3.3 Employment Requirements	
	3.4 Certification Exam	
	Part 4 Inspector Certification and Licensing:	
	4.1 Logistics	
	4.2 Application Process	
	4.3 Education Program	
	4.4 Licensing	
	4.5 Award	
	4.6 Renewal	
	4.7 Denial	
	4.8 Termination and Suspension	
	4.9 Appeals Process	
	4.10 Other General Conditions	
	Appendix A Inspection Checklist AST Installation	
	Appendix B Inspection Checklist AST In Operation	

REF #	DESCRIPTION	PDF PAGE
SP1010	Laminate Identification for Fixed Equipment in Chemical Applications	47
	Part 1 General:	
	1.1 Purpose and Scope	
	Part 2 Qualifying Laminate Identification:	
	2.1 Classifications	
	2.2 Composition	
	2.3 Visual Observations	
	Part 3 Quantifying Laminate Identification:	
	3.1 Inspection	
	3.2 Standard Practice Use	
	Part 4 References	
SP1020	Visual Imperfections Affecting Fixed Equipment in Chemical Applications	60
	Part 1 General:	
	1.1 Purpose and Scope	
	Part 2 Qualifying Visual Imperfections:	
	2.1 Laminating, Industry Standards and Laminate Performance	
	2.2 Visual and Other Observations	
	Part 3 Quantifying Visual Imperfections:	
	3.1 Inspection	
	3.2 Standard Practice Use	
	Part 4 References	
SP1030	Damage Mechanisms Affecting Fixed Equipment in Chemical Applications	83
	Part 1 General:	
	1.1 Purpose and Scope	
	Part 2 Qualifying Damage Mechanisms:	
	2.1 Normal Aging Process	
	2.2 Visual and Other Observations	
	Part 3 Quantifying Damage Mechanisms:	
	3.1 Inspection	
	3.2 Standard Practice Use	
	Part 4 References	
SP1040	Integrity and Leak Testing of Fixed Equipment in Chemical Applications	109
	Part 1 General:	
	1.1 Purpose and Scope	
	Part 2 Qualifying Integrity and Leak Testing:	
	2.1 Flaw Definitions	
	2.2 Basic Inspection Hand Tools	
	2.3 Testing Technologies	
	Part 3 Quantifying Integrity and Leak Testing:	
	3.1 Utilization	
	3.2 Standard Practice Use	
	Part 4 References	

REF #	DESCRIPTION	PDF PAGE
	SECTION 2 – RIGHTS AND RESPONSIBILITIES	
	Rights and Responsibilities Introduction	127
	Standard Terms and Conditions of Sale	128
	Code of Ethics	129
	Privacy Policy	130

Section 1 – STANDARD PRACTICES

FRPI offers five (5) standard practices within this Manual, SP8310 Licensed Aboveground Storage Tank Inspector Certification, SP1010 Laminate Identification for Fixed Equipment in Chemical Applications, SP1020 Visual Imperfections Affecting Fixed Equipment in Chemical Applications, SP1030 Damage Mechanisms Affecting Fixed Equipment in Chemical Applications and SP1040 Integrity and Leak Testing of Fixed Equipment in Chemical Applications. These Standard Practices contain a body of knowledge plus requirements for Inspector to follow in order to obtain and maintain valid FRPI certification and licensing for themselves and apply it to their individual inspection services performed on a job-by-job basis.

All of these Standard Practices are intended to be procedural specifications for providing guidance on minimum Inspector practices. There are some performance based requirements also included. These practices are not intended to replace or be substitutes for industry equipment, inspection and testing standards. Proper inspection of FRP tanks is Inspector's responsibility, where published industry standards shall be followed.

 November 14, 2019	Fiberglass Reinforced Plastics Institute, Inc. LICENSED ABOVEGROUND STORAGE TANK INSPECTOR CERTIFICATION	www.frpi.org Standard Practice 8310
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PART 1 GENERAL

1.1 PURPOSE AND SCOPE:

- A. This Standard Practice 8310 (“SP8310”) for Licensed Aboveground Storage Tank Inspector Certification (“LASTIC”) is made available by the Fiberglass Reinforced Plastics Institute (“FRPI”) plus fully supported by FRPI through unique education, examination, certification and licensing programs.
- B. FRPI SP8310 defines a uniform inspector credentialing process including practices for application to become certified, education based on industry standards, structured inspection approach, body of knowledge examination plus issuance and renewal of inspector certification. Additionally, it provides a method for a qualified inspector to arrive at Suitability for Service (“SFS”) determinations for continued tank use following inspection based on a qualitative and quantitative practice. SP8310 shall be followed when required by federal and state regulators, Owners and/or other parties as an ongoing practice governing minimum qualifications for inspectors, scope of work performed during evaluation of Fiberglass Reinforced Plastic (“FRP”) Aboveground Storage Tanks (“AST’s”) in operation and basis pertaining to SFS determinations. Such practice shall be utilized to help detect, predict and prevent AST leaks, spills and discharges that may result in:
 1. Unplanned capital investment for normal end of life replacement.
 2. Premature failure causing owner operator cost overruns.
 3. Injury and loss of life.
 4. Environmental damage to land, air, waterways and adjoining shorelines.
- C. The purpose of this Standard Practice is to:
 1. Establish minimum industry standards for achieving high quality inspection of FRP aboveground storage tanks per scope of this practice.
 2. Facilitate a method that shall:
 - a. Document requirements to be met by a tank inspector in order for them to demonstrate expertise plus obtain and sustain a valid FRPI SP8310 certification and license.
 - b. Provide an independent unbiased assessment of tank inspector’s knowledge, capabilities, and experience necessary for inspection of tanks.
 - c. Validate vetted tank inspectors have adequate expertise as quantified within this practice to effectively perform inspection of FRP AST’s and fulfill the requirements of this practice on a job-by-job basis.
 - d. Verify tank inspectors place of employment, assuring a business entity is established and reasonable resources are available to conduct AST inspections in accordance with this Standard Practice.

- e. Enable certified inspectors to present and apply the FRPI Certified mark through a licensing agreement on work performed as a symbol of inspection excellence.
 - f. Result in quality of inspection work that emulates the value of credentials earned by candidate FRPI 8310 Inspectors certified under this practice.
 - g. Be made available to all FRPI members and candidate members, where such parties are defined herein.
 - h. Support decisions pertaining to life cycle and replacement costs, setting target levels of service, determining business risk, optimizing operation and maintenance and capital investment, determining funding strategies plus building an overall asset management plan.
 - i. Provide federal and state regulators plus other industry parties with a uniform balanced means to qualify minimum tank inspector expertise, govern minimum inspection practices and achieve a high standard for quality of results obtained.
- D. AST inspection scope covered by this LASTIC practice includes:
- 1. External and internal plus in service and out of service requirements.
 - 2. Stationary and portable aboveground shop and field fabricated FRP tanks that are vertical flat bottom or elevated and horizontal tanks with dished heads after they have been placed in service, where such tanks are deemed to terminate at connections defined as face of first nozzle flange or boss pad, outer most thread on nipple or coupling and/or other such point of transition to other equipment. Pressure and temperature limitations shall be as stipulated within industry standards made a part of this Standard Practice.
 - 3. Tank foundation.
 - 4. AST's located anywhere within the world, where such tanks may be designed and manufactured in accordance with standards referenced herein that are published by industry organizations domiciled and practicing within the continental United States of America.
- E. AST inspection scope not covered by this LASTIC practice includes:
- 1. Determination for adequacy of original equipment manufacturer's design nor verification that quality assurance inspection had been satisfactorily conducted on new AST's with nonconformities resolved prior to being placed into service.
 - 2. In ground or underground tanks, double wall tanks, and flammable and combustible liquid applications.
 - 3. Internal piping and other such nonmetal or metal accrements not associated with structural aspects of AST.
 - 4. Evaluation of AST spill control, release prevention barriers, continuous release detection methods and/or other such related structures, devices or systems.
- F. Procedures specifically excluded from the scope of this Standard Practice include:
- 1. Preparation and cleaning of AST for inspection.
 - 2. Health and safety practices.
 - 3. AST determinations following integrity and leak testing that pertain to:
 - a. Repair, alteration and reconstruction.
 - b. Re-rating for operation at lower capacity.
 - c. Suitability for change in service.
 - d. Suitability for relocation.

4. Vetting FRPI 8310 Inspector expertise pertaining to concrete, coatings, linings, instrumentation and controls, piping systems, gaskets, fasteners, pressure relief devices, secondary containment materials of construction and other such non-FRP components.
 5. Qualification of FRPI 8310 Inspector's or other third party's integrity and leak testing expertise beyond that covered by this Standard Practice, where such additional testing expertise required by SP8310 is limited to verification of specific technologies utilized and years of experience.
 6. Recommendations provided by FRPI 8310 Inspector pertaining to corrective action necessitated by AST inspection performed under this Standard Practice, including repairs, alterations, reconstruction and/or replacement advice.
- G. Candidate FRPI 8310 Inspectors certified by FRPI shall have demonstrated a competency within a specific range of qualifications and body of knowledge reviewed by a balanced group of subject matter experts and determined to be relevant to this area of inspection practice. Certifications are valid for three (3) years from date of issuance and may be renewed every three (3) years thereafter as stipulated herein, where continued competence is required and verified through renewal requirements per this Standard Practice. This LASTIC is valid in any FRP AST location that recognizes and accepts or otherwise does not prohibit such certification.
- H. FRPI has made this Standard Practice, its other publications and services available for the betterment of business and safety conditions, with use of these resources and involvement in this LASTIC practice understood to be voluntary on the part of any and all stakeholders.
- I. FRPI does not "approve", "rate" or otherwise "endorse" any knowledge, experience and capability other than as is represented within FRPI Standard Practices SP8310. Furthermore, this certification shall not be interpreted to mean endorsement by FRPI of an inspector's expertise to perform work outside of the scope of this SP8310 certification for which they were contracted to provide Owner or other parties engaging their services, where such work may include but not be limited to matters pertaining to determination of tank integrity, inspection intervals and corrective action necessitated by tank inspection performed under this Standard Practice.
- J. This Standard Practice shall:
1. Be used by inspectors and employers that possess or maintain access to service providers that are technically trained and have experience in design, manufacturing, quality control, installation, operation, condition assessment, repair, alteration and/or reconstruction of FRP AST's
 2. Be a guidance document, as it does not include every detail required for FRP AST inspection. FRPI 8310 Inspector shall provide such knowhow, equipment and services to complete work they are contracted to perform. LASTIC awarded by FRPI shall not be in lieu of nor shall it be construed as altering or otherwise compromise FRPI 8310 Inspector client obligations or warranties so provided.
 3. Not preclude application of best practices and good engineering judgement exercised on behalf of a degreed or licensed professional engineer with expertise in FRP and ethically practicing their discipline during an AST inspection conducted in accordance with SP8310.

1.2 DEFINITIONS:

- A. Employed (“employed”). A FRPI 8310 Inspector is deemed employed when they can demonstrate to FRPI’s satisfaction they are full time, part time or contract employee of an employer in accordance with this Standard Practice.
- B. In Operation (“in operation”). A tank that is in service or out of service is regarded as a tank that is in operation at an Owner’s facility.
- C. In Service (“in service”). A tank that contains chemical, is coupled to a process and supporting operations that are underway is regarded as in service.
- D. Integrity Testing (“integrity testing”). Any practical means, including but not limited to testing technologies disclosed within FRPI SP1040 Integrity and Leak Testing, to determine strength or structural soundness of an AST shell and bottom or end heads to contain liquid for which it was designed to store shall be regarded as integrity testing.
- E. Laminate Degradation (“laminate degradation”) is when FRP materials used in construction of AST’s are attacked or otherwise compromised by service conditions characteristic of the application.
- F. Out of Service (“out of service”). A tank that may contain chemical, may be coupled to a process and supports operations that have ceased temporarily or permanently is regarded as out of service.
- G. Parties to this Standard Practice:
 - 1. Owner (“Owner”) is a company that has possession of and operates tanks subject to inspection and has full responsibility for tank condition. FRPI membership category for Owner representatives shall be Class A Owners/End Users.
 - 2. Engineer (“Engineer”) is a company that performs project engineering on behalf of the Owner. FRPI membership category for Engineer representatives shall be Class B Engineering Firms.
 - 3. FRP Industry Consultant (“FRP Consultant”) is an individual that primarily supplies inspection, testing, engineering, manufacturing, advice, statistics, reports, corrective action or other such consultative services to the FRP industry. FRPI membership category shall be Class C Inspectors & Consultants.
 - 4. FRP Tank Inspector (“FRP Inspector”) is an individual that provides inspection, testing, reports or other such consultative services related to FRP AST’s. FRPI membership category shall be Class C Inspectors & Consultants.
 - 5. Independent Inspection Agency (“Agency”) is a company that exclusively performs inspection and/or testing services on behalf of other parties for AST’s they do not own. FRPI membership category shall be either Class C Inspectors & Consultants or Class G Testing Services, as determined by FRPI.
 - 6. FRPI Certified SP8310 Inspector (“FRPI 8310 Inspector”) is an individual that provides inspection, testing, reports or other such consultative services related to FRP AST’s, is certified and licensed by FRPI in accordance with this Standard Practice to perform work stipulated herein and apply the FRPI certification mark plus is an active member of FRPI. FRPI membership category shall be Class C Inspectors & Consultants.

7. Intermediary (“Intermediary”) is either a Contractor (“Contractor”) or Original Equipment Manufacturer (“OEM”) company, where the Contractor performs facility construction and OEM assembles and sells a complete process system incorporating Manufacturer’s equipment. FRPI membership category shall be Class E Contractors & System Integrators.
8. Manufacturer (“Manufacturer”) is a company that manufactures laminates and fabricates equipment either directly for Owner or an Engineer or Intermediary appointed by Owner. FRPI membership category shall be Class D FRPI Certified Manufacturers, where manufacturers that are not FRPI SP9000 certified may join FRPI membership through Class C Inspectors & Consultants.
9. Fiberglass Reinforced Plastics Institute (“FRPI”) is the Non-profit membership organization with exclusive LASTIC management rights and responsibility for certifying compliance to this Standard Practice.

1.3 BODY OF KNOWLEDGE:

- A. FRPI 8310 Inspectors shall know in detail and have a thorough working understanding of and ability to effectively apply the most relevant areas of information pertaining to FRP AST laminate composition, tank construction and laminate visual imperfections to the task of inspecting AST’s in operation. Such insight shall be a cornerstone for benchmarking AST deterioration that may threaten the integrity of AST’s over their useful life, potentially leading to leaks, spills and discharges. Additional relevant working knowledge base areas identified through a detailed job analysis essential for inspector excellence include FRPI 8310 Inspector’s grasp of and ability to make sound judgements pertaining to AST damage mechanisms, integrity and leak testing, general condition assessment of related installation elements, laminate degradation rate, remaining useful life, suitability for continued service plus inspection intervals.
- B. The knowledge base required for FRPI 8310 Inspectors shall include the latest edition of FRPI Aboveground Storage Tank Inspector Certification and Licensing Manual, industry standards as referenced herein below plus FRP831 Field Inspection of Aboveground Chemical Bulk Storage Tanks course content.
- C. Industry standards provided by consensus organizations that are required for LASTIC relate to laminating, fabrication, secondary bonding, tank configuration, minimum thickness and allowable deflection rules plus related inspection and testing practices. Unless specifically addressed within this Standard Practice, information in these standards that is related to engineering calculations used to determine thicknesses or other related structural considerations is not included in knowledge base. Reference industry standards shall include latest editions of:
 1. American Petroleum Institute (“API”):
 - a. 12P - Specification for Fiberglass Reinforced Plastic Tanks
 2. American Society for Testing and Materials (“ASTM”):
 - a. C582 - Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion Resistant Equipment
 - b. D638 - Standard Test Method For Tensile Properties of Plastics
 - c. D2563 - Standard Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts
 - d. D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics By Means of a Barcol Impressor

- e. D2584 - Standard Test Method for Ignition Loss of Cured Reinforced Resins
- f. D3299 - Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
- g. D4097 - Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
- h. D5421 - Standard Specification for Contact Molded “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Flanges
- 3. American Society of Mechanical Engineers (“ASME”):
 - a. ASME RTP-1 - Reinforced Thermoset Plastic Corrosion Resistant Equipment Part 2 Materials, Part 3 Design, Part 4 Fabrication and Part 6 Inspection and Tests
- 4. American Water Works Association (“AWWA”):
 - a. D-120 - Thermosetting Fiberglass-Reinforced Plastic Tanks
- D. FRPI Aboveground Storage Tank Inspector Certification and Licensing Manual (“ASTICL Manual”), which includes Standard Practices that are required for LASTIC and pertain to the scope of this Standard Practice plus laminate identification, visual imperfections, damage mechanisms and testing of AST’s. Reference practices shall include latest editions of:
 - 1. SP8310 - Licensed Aboveground Storage Tank Inspector Certification
 - 2. SP1010 - Laminate Identification for Fixed Equipment in Chemical Applications
 - 3. SP1020 - Visual Imperfections Affecting Fixed Equipment in Chemical Applications
 - 4. SP1030 - Damage Mechanisms Affecting Fixed Equipment in Chemical Applications
 - 5. SP1040 - Integrity and Leak Testing of Fixed Equipment in Chemical Applications

PART 2 INSPECTION PRACTICE AREAS

2.1 INSPECTION PROCEDURE

- A. This Standard Practice provides both a prescriptive and performance based minimum procedure for inspection and testing of AST’s that supports specific determinations, reporting and record keeping. Procedures allow FRPI 8310 Inspector to supplement scope of inspection to suit necessary considerations not covered by this Standard Practice plus exercise good technical and commercial judgement while performing responsible inspection work.
- B. FRPI 8310 Inspector shall:
 - 1. Develop written inspection and test plan for thorough condition assessment of AST’s in accordance with this Standard Practice and incorporate requirements per Part 2 herein. Installation and In Operation inspection checklists for AST’s contained in SP8310 Appendix A and B shall be made a part of this plan. These checklists shall be used as minimum technical guidelines for scope of inspection, where such guidelines may be supplemented to include a broader scope that may be more applicable for some given situations. Inspector may develop other equal replacement checklists that may expand scope of inspection and/or details for given items provided all FRPI checklist elements are included. Checklists utilized shall be augmented by all additional requirements that may be imposed by Owner and government regulations.
 - 2. Perform AST Integrity and leak testing per Part 2.2 herein.
 - 3. Arrive at determinations per Part 2.3 herein.
 - 4. Provide reports and record keeping per Part 2.4 herein.

2.2 INTEGRITY AND LEAK TESTING:

- A. FRPI 8310 Inspector shall perform integrity and leak testing of AST and complete inspection checklists required per this Standard Practice. Testing shall be done in accordance with this Standard Practice and employ fundamental concepts and requirements published within FRPI SP1040 Integrity and Leak Testing. SP1040 includes descriptions for testing methods plus advantages, disadvantages and limitations of such methods available to an inspector. Visual inspection is classified as a test method therein. Such testing as a minimum shall include an external visual inspection plus one (1) or more other test methods named in SP1040. Internal visual inspection may be an essential method for adequate condition assessment or an alternative to other supplemental SP1040 testing methods under conditions stipulated within this Standard Practice.
- B. Visual Inspection:
1. Visual inspection shall employ fundamental concepts and requirements published within FRPI SP1010 Laminate Identification and SP1020 Visual Imperfections. These Standard Practices define laminate composition, define and illustrate anomalies of concern that may have been built in to new original equipment manufactured plus provide likely causes for visual anomalies and what they may lead to once AST's are placed in operation. Visual inspection shall also employ fundamental concepts and requirements published within FRPI SP1030 Damage Mechanisms. This Standard Practice defines and illustrates anomalies of concern, including general likely causes for these anomalies' potential presence during an inspection and what they may lead to as AST's continue in operation.
 2. Given known resin formulations, laminate sequences, molding techniques and industry quality control methods that characterize the visual surface and interlaminar appearance of FRP AST shells and bottoms in correlation with how FRP is known to deteriorate over time in given applications, internal visual inspection combined with external visual inspection may be used in lieu of other integrity testing requirements under specific circumstances as permitted by this Standard Practice. Internal combined with external visual inspection shall be allowed as an alternate for testing AST's that:
 - a. Can be demonstrated to have been designed, manufactured and certified in accordance with API Q1, ASME RTP-1 and/or FRPI SP9000/SP9100, where such practices were utilized and provided controls to manufacture well documented FRP laminates.
 - b. Are accompanied by original manufacturer documentation demonstrating:
 - 1) Appropriate laminate composition was used for service intended.
 - 2) Corrosion barrier is structural or nonstructural, where nonstructural may be regarded as a corrosion allowance.
 - c. Are elevated, supported on an intact sufficiently impervious foundation or have other means to detect bottom leakage.
 - d. Have no external insulation.
 - e. Undergo both an external and internal inspection.
 - f. Following inspection, have:
 - 1) Inner corrosion barrier sufficiently intact and protecting structural layer, where remaining composition of such protection shall be described in detail and assessed as structural or nonstructural.

- 2) No evidence of structural laminate degradation such as through wall permeation, delamination, crazes, cracks, fractures, deformation and/or temperature events that may show or otherwise suggest structural integrity of shell and/or bottom or end heads have been compromised.
 - 3) Been demonstrated by engineer that is FRP AST subject matter expert to have sufficient residual structural layer safety factor considering original equipment design, anomalies per FRPI SP1020 Visual Imperfections, laminate degradation and long term effects of aging per SP1030 Damage Mechanisms plus nature of equipment deterioration.
- C. FRPI 8310 Inspector may subcontract integrity and leak testing or utilize such relevant testing results obtained by other parties during their independent work, except for visual inspection, damage assessment and determinations required by this Standard Practice. All third parties providing test results shall demonstrate expertise with a minimum of five (5) years expertise in specific technologies utilized by FRPI 8310 Inspector in meeting the requirements of this Standard Practice. Reports from third party testing companies shall be incorporated into FRPI 8310 Inspector's report, whereby such third party written reports shall fully disclose company engaged, evidence of expertise, qualified individual performing tests, methods used, standards followed, observations, results and conclusions.

2.3 DETERMINATIONS:

- A. FRPI 8310 Inspector, upon completion of inspection and test plan development plus testing performed in accordance with this plan, shall assess AST operability based on reasonable assumption original manufacturer design was adequate. Where assumption is invalidated through testing, such assessment of operability shall still be conducted and basis of invalidation reported in accordance with this Standard Practice.
- B. Inspector assessment of operability shall incorporate the following decision processes as may be applicable under inspection and test plan per Part 2.1 B.1 herein:
1. AST History. Inspector shall determine significance of previous:
 - a. Inspection results.
 - b. Repair, alteration and reconstruction.
 - c. Re-rating for operation at lower capacity.
 - d. Change in service.
 - e. Relocation.
 2. Laminate Benchmarks. Inspector shall determine the following benchmarks for shell and bottom or dished ends and other effected areas and then complete work for other determinations required per this Standard Practice:
 - a. Prior and Current Thicknesses. Prior shall be based on original design thicknesses shown on manufacturer's drawings or may be results from previous testing. Current shall be determined per SP1040 Integrity and Leak Testing at time of inspection.
 - b. Prior and Current Modulus Test Results. Prior shall be based on original physical properties proof tested at time of AST manufacture or may be original design properties when original tested properties are unavailable, recognizing design properties may be lower than tested and calculated

Modulus Decay Rate potentially misrepresenting actual. Prior may also be results from previous testing. Current shall be determined per SP1040 Integrity and Leak Testing at time of inspection.

3. Laminate Degradation. Inspector shall determine extent of corrosion barrier and structural layer damage over time to shell and bottom or dished ends and other effected areas considering:

a. Erosion Rate:

- 1) Effects of Erosion on an AST shall be characterized and assessed starting with looking at loss of thickness over time. Simply calculating single rate of laminate thickness loss due to Erosion may be technically argued to be nearly if not impossible given all variables that come into play.
- 2) To determine deterioration rate due to this damage mechanism and take loss variables into consideration, inspector shall first calculate a theoretical Erosion Rate and then rationalize a practical rate. Practical rate shall account for causes of Erosion, AST volume cycling, time spent empty per year and deterioration that may not be linear or uniform plus any other variables that may affect Erosion Rate over lifetime of AST. If previous Prior Date tests exist and data is available, inspector shall analyze multiple periods, observe acceleration or deceleration of Erosion and factor this into a practical deterioration rate rationalized.
- 3) To determine theoretical Erosion Rate in millimeters per year based on relationship between Prior and Current Thickness over AST lifetime and between various inspection intervals, inspector shall perform the following calculation based on assumption Erosion is liner:

$$\text{EROSION RATE} = \frac{(\text{PRIOR THICKNESS} - \text{CURRENT THICKNESS}) \times 1,000}{(\text{CURRENT DATE} - \text{PRIOR DATE}) / 365}$$

Where:

EROSION RATE = Laminate thickness loss expressed in mils per year over a period of time between “Prior Date” and “Current Date”.

PRIOR THICKNESS = Value expressed in millimeters representing thickness at time of original design when AST was initially commissioned or may be thickness recorded on “Current Date” thereafter, where “Prior Thickness” shall correspond with “Prior Date” used in equation.

CURRENT THICKNESS = Value expressed in millimeters representing thickness determined per FRPI SP1040 Integrity and Leak Testing on “Current Date”, where “Current Thickness” shall correspond with “Current Date” used in equation.

CURRENT DATE = Day testing per FRPI SP1040 Integrity and Leak Testing was performed to determine “Current Thickness”, where “Current Date” shall correspond with “Current Thickness” used in equation and date is expressed as month/day/year.

PRIOR DATE = Day AST new or may be previous “Current Date” thereafter, where “Prior Date” shall corresponded with “Prior Thickness” used in

b. Modulus Decay Rate:

- 1) Effects of normal aging process on an AST shall be characterized and assessed starting with looking at loss of modulus over time, where other physical properties may be evaluated once a loss of modulus is detected or whenever may otherwise be appropriate. Damage due to Stress Corrosion Modulus Decay as defined per FRPI SP1030 Damage Mechanisms may be determined to varying levels of confidence per FRPI SP1040 Integrity and Leak Testing through Core Specimen and/or Advanced Ultrasound Evaluation. These testing technologies help quantify effects of normal aging process on AST component laminates and contribute to delineating modulus decay rates for identical applications through study of case histories. Such cases have demonstrated in certain circumstances that moduli have been allowed to decay to as low as or lower than 40-percent of new AST proof tested or theoretical design strength resulting in 4:1 safety factor compared to 10:1 for original design. Where, although risky, AST components were rationalized to be safe and reliable for timeframe to accommodate proper repair or replacement. This decline in Modulus is typically more rapid at first as laminates become saturated. It then generally levels off over time with reduced rate of decline, at which time where decay rate may be more typical for future estimates. Applications that may appear identical may not be given latent AST exposure differences in conjunction with laminate manufacturing results per FRPI SP1020 Visual Imperfections and FRPI SP1030 Damage Mechanisms. These potential differences and outcomes shall be considered when analyzing and determining modulus decay rates for what may appear to be identical applications. Other considerations when assessing Modulus Decay Rates include but may not be limited to changings in other laminate properties due to normal aging and emerging damage mechanisms plus effects of thickness loss that may have occurred due to erosion.
- 2) To determine deterioration rate due to this damage mechanism and take pertinent variables into consideration, inspector shall first calculate a theoretical decay rate and then rationalize a practical rate. Practical rate shall account for causes of Modulus Decay, AST volume cycling, time spent empty per year and decay that may not be linear or uniform plus any other variables that may affect rate of decay over lifetime of AST. If previous Prior Date tests exist and data is available, inspector shall analyze multiple periods, observe acceleration or deceleration of decay and factor this into a practical decay rate rationalized.
- 3) To determine theoretical Modulus Decay Rate in pounds per square inch per year based on relationship between Prior and Current Modulus test result over AST lifetime and between various

inspection intervals, inspector shall perform following calculation based on assumption decay is liner:

$$\text{MODULUS DECAY RATE} = \frac{\text{PRIOR MODULUS} - \text{CURRENT MODULUS}}{(\text{CURRENT DATE} - \text{PRIOR DATE}) / 365}$$

Where:

MODULUS DECAY RATE = Laminate modulus loss expressed in pounds per square inch per year over a period of time between “Prior Date” and “Current Date”.

PRIOR MODULUS = Value expressed in pounds per square inch that was determined through proof testing of new AST, used in original design when AST was new if actual tested property not known or previous “Current Modulus” test result from previous “Current Date”.

CURRENT MODULUS = Value expressed in pounds per square inch representing strength demonstrated through testing per FRPI SP1040 Core Specimen destructive testing and/or arrived at through Advanced Ultrasound Evaluation.

CURRENT DATE = Day testing per FRPI SP1040 Integrity and Leak Testing was performed to determine “Current Modulus” test result, where “Current Date” shall correspond with “Current Modulus” test result used in equation and date is expressed as month/day/year.

PRIOR DATE = Day AST new or may be previous “Current Date” thereafter, where “Prior Date” shall corresponded with “Prior Modulus” test result used in equation and date is expressed as month/day/year and may be estimated if initial commissioning not known.

c. Other Damage Rates:

- 1) Effects of laminate degradation caused by mechanisms defined in FRPI SP1030 Damage Mechanisms beyond Erosion and Modulus Decay shall be characterized and assessed starting with looking at each mechanism individually over time. Combinations of damage mechanisms shall then be evaluated, including Erosion and Modulus Decay given these rates calculated per Part 2.3 B.3.a.3 and B.3.b.3 herein are limited to individual mechanisms without consideration of any other mechanism effects.
- 2) To determine degradation rate due to each damage mechanism and take such variables into consideration as may be pertinent, inspector shall first formulate a theoretical approach for calculating Other Damage Rates based on an estimated formation rate for mechanisms identified plus assumption deterioration is liner and then rationalize practical rate. This rate shall account for causes of each mechanism, AST volume cycling, time spent empty per year and deterioration that may not be linear or uniform plus any other variables that may affect degradation over lifetime of AST. If previous Prior Date tests exist and data is available, inspector shall analyze multiple periods, observe acceleration or deceleration of degradation and factor this into practical deterioration rate rationalized.

4. Remaining Useful Life. Inspector shall determine estimated AST life remaining and trigger date for future point in time when deeper level of engineering review shall be performed by or before. This date established shall accommodate safe and reliable AST performance to best knowledge of inspector, as opposed to timeframe resulting in a run to failure and potential catastrophic event. Inspector shall incorporate AST history plus laminate benchmark and degradation determinations arrived at per Part 2.3 B.1, B.2 and B.3 herein as circumstantial evidence supporting such date defining remaining useful life. Determination shall include considerations that may exceed minimum guidelines established in accordance with this Standard Practice. Date determination shall consider remaining timeframe associated with existing damage that may perpetuate and include estimates as follows:

- a. Erosion: To determine remaining life in years based on Erosion Time (“ET”) only, perform the following calculation for AST shell, bottom or dished ends and other effected areas based on assumption erosion is liner:

$$\text{ET REMAINING} = \frac{(\text{CURRENT THICKNESS} - \text{MINIMUM THICKNESS}) \times 1000}{\text{EROSION RATE}}$$

Where:

ET REMAINING = Period of time expressed in years over which AST erodes is rationalized to provide safe reliable service in consideration of erosion progressing at same rate.

CURRENT THICKNESS = Result used as value in Erosion Rate calculation per Part 2.3 B.3.a.3 herein.

MINIMUM THICKNESS = Value in millimeters representative of original structural layer design basis or thinner layer for reassessment of AST design based on findings discovered through work per Part 2 herein, where determination of “ET Remaining” may be based on redesign providing continued safe and reliable AST performance plus ample timeframe for proper repair or replacement.

EROSION RATE = Practical amount of deterioration expressed in mils per year as rationalized by inspector per Part 2.3 B.3.a herein, which may be result of Erosion Rate calculation or as otherwise determined.

- b. Modulus Decay. To determine remaining life in years based on Modulus Decay Time (“MDT”) only, perform the following calculation for AST shell, bottom or dished ends and other effected areas based on assumption decay is liner:

$$\text{MDT REMAINING} = \frac{\text{CURRENT MODULUS} - \text{MINIMUM MODULUS}}{\text{MODULUS DECAY RATE}}$$

Where:

MDT REMAINING = Period of time expressed in years over which AST modulus is rationalized to provide safe reliable service in consideration of decay progressing at same rate.

CURRENT MODULUS = Result used as value in Modulus Decay Rate calculation per Part 2.3 B.3.b.3 herein.

MINIMUM MODULUS = Value in pounds per square inch representative of original structural layer design basis or lower strength layer for reassessment of AST design based on findings discovered through work per Part 2 herein, where determination of “MDT Remaining” may be based on redesign providing continued safe and reliable AST performance plus ample timeframe for proper repair or replacement.

MODULUS DECAY RATE = Practical amount of decay expressed in pounds per square inch per year as rationalized by inspector per Part 2.3 B.3.b herein, which may be result of Modulus Decay Rate calculation or as otherwise determined.

- c. Other Damage. To determine remaining life in years based on Other Damage Time (“ODT”) only, determine the following for AST shell, bottom or dished ends and other effected areas based on assumption damage is liner:
 - 1) Maximum amount of acceptable deterioration identified per Part 2.3 B.3.c herein and how much more of each is allowed, which may be based on AST redesign providing continued safe and reliable AST performance plus ample timeframe for proper repair or replacement.
 - 2) ODT remaining based on how much more deterioration is allowed per Part 2.3 B.4.c herein and Other Damage Rates determined per Part 2.3 B.3.c herein.
5. Suitability for Continued Service. Inspector shall determine if there is bonafide evidence substantiating any change in AST mechanical integrity since it was commissioned and/or its most recent prior inspection. If there has been no change or damage mechanisms threatening safe and reliable AST performance identified to best knowledge of inspector, then inspector shall declare AST is fit for service. When change is identified, inspector shall determine and declare suitability or unsuitability for continued service considering the following:
 - a. Results of integrity and leak testing per Part 2.2 herein.
 - b. AST history per Part 2.3 B.1 herein.
 - c. Laminate degradation rates per Part 2.3 B.3 herein.
 - d. Remaining useful life per Part 2.3 B.4 herein.
 - e. Relationship between thickness and modulus loss:
 - 1) As percentage of total effected component surface area.
 - 2) Recognizing leak detection, capture and control methods that may be in place.
 - f. Specific action requirements for circumstances identified by testing:
 - 1) Engineer that is FRP AST subject matter expert shall perform design review and contribute in writing to fitness for service determination when laminate degradation involves greater than 15-percent loss of structural layer thickness, modulus or safety factor plus structural layer is breached due to mechanical or temperature events as defined per FRPI SP1030 Damage Mechanisms.
 - 2) AST shall be removed from service, repaired or replaced using good engineering judgement before being placed back in service should a leak be discovered that compromises AST structural integrity.

6. Next Inspection Interval. Inspector shall determine when AST that has been deemed suitable for continued service shall undergo next inspection. Such interval determination shall consider the following:
- a. Goal of inspection is to detect, predict and prevent AST leaks, spills and discharges that may result in unplanned capital investment for normal end of life replacement, premature failure causing owner operator cost overruns, injury and loss of life plus environmental damage to land, air, waterways and adjoining shorelines.
 - b. Use of generally accepted industry practice for risk-based inspection planning that includes cost considerations.
 - c. Factors that define scope and frequency of AST inspection:
 - 1) Manufacturer's warrantee terms and conditions.
 - 2) Government regulations.
 - 3) Owner policies.
 - 4) Age.
 - 5) Size.
 - 6) Configuration.
 - 7) Loading.
 - 8) Current integrity and leak testing results per Part 2.2 herein.
 - 9) Evidence supporting suitability for continued service determination per Part 2.3 B.5 herein.
 - 10) Impact on level of service AST plays in operation.
 - 11) Hazardous nature of product stored.
 - 12) Proximity to personnel.
 - 13) Environmental exposure.
 - 14) Presence of spill control, release prevention barriers, continuous release detection methods and/or other such related structures, devices or systems.
 - 15) Probability and consequences of premature or end of life failure.
 - d. Testing on regular basis, where:
 - 1) Testing shall be defined as any means to measure or otherwise quantify strength retention and leakage of AST components under liquid load per FRPI SP1040 Integrity and Leak Testing.
 - 2) Regular shall be determined per Part 2.3 B.6 herein.
 - e. Specific time based minimum requirements for establishing interval:
 - 1) A formal external and internal condition assessment of AST shall be performed by FRPI 8310 Inspector in accordance with this Standard Practice for each AST in operation within six (6) months of Owner determining date of AST original commissioning is unknown or no previous formal internal or external condition assessment records per this Standard Practice exist.
 - 2) A monthly operator external inspection of general AST operability with annual review by Owner plus five (5) year formal external condition assessment by FRPI 8310 Inspector shall be performed for each AST in service or temporarily out of service. In event leak may be discovered on or before date of monthly walk by external inspection of general AST functionality, both a formal external and internal condition assessment shall be performed by FRPI 8310 Inspector. Five (5) year interval shall be determined from later of AST original commissioning or most recent formal assessment date.

- 3) A formal internal condition assessment of AST shall be performed by FRPI 8310 Inspector in accordance with this Standard Practice for AST in operation at the earlier of ten (10) years or half of AST remaining useful life as determined by FRPI 8310 Inspector on a subsequent formal external or internal assessment. Interval shall be determined from later of AST original commissioning date or most recent formal assessment date.
- 4) Formal condition assessment date for AST shall be a collaborative decision between Owner and FRPI 8310 Inspector.

2.4 REPORTS AND RECORD KEEPING:

- A. FRPI 8310 Inspector shall furnish a written inspection report to Owner or other parties engaging their services, where such documentation shall be the report of record. As a condition of this Standard Practice, such report shall be retained by all interested parties and readily available for remaining useful life of AST.
- B. Inspection report shall include as a minimum:
 1. Cover page, with report date and version number.
 2. Company and FRPI 8310 Inspector disclosure page, with:
 - a. Written Inspector statement with accompanying signature certifying their compliance with this Standard Practice plus completeness, accuracy and truthfulness of information reported is the best of their knowledge under penalty of law.
 - b. Inspector's full name and signature.
 - c. FRPI Certified mark applied to page, with adjacent unique inspector FRPI registration number.
 - d. Requirements per Part 2.4 B.2 a through c above may be satisfied or supplemented by use and inclusion of FRPI Installation and In Operations inspection checklists in report.
 3. Table of contents.
 4. References, including this Standard Practice, past AST inspection reports and any other works associated with inspection and reporting performed.
 5. Narrative summarizing inspection type, inspection and test plan carried out, significant findings plus determinations made pertaining to AST manufacturer's original design validation or invalidation, history, thickness and modulus benchmarks, laminate degradation rate, remaining useful life, suitability for continued service and next inspection interval.
 6. Detailed discussion of criteria used and copies of work performed that supports determinations presented in report narrative.
 7. Calculations that may have been performed for basis of determinations made.
 8. Completed FRPI inspection checklists as shown in Appendix A and B of this Standard Practice or equal checklists, with supplemental information.
 9. Integrity and leak testing reports in accordance with this Standard Practice, with photographs plus testing service providers and credentials identified.
 10. Drawings and/or sketches that may have been available and/or prepared.
 11. Any other documentation required that may be unique to AST.
 12. Description of AST elements not inspected or tested, with explanation as to why including what may have impeded or obstructed inspection and testing.

- C. State and federal regulations, other standards organizations and Owner may mandate other additional reporting and record keeping. It shall be Owner's responsibility to provide evidence of compliance to such other mandates.

PART 3 INSPECTOR QUALIFICATIONS

3.1 CREDENTIALING:

- A. FRPI 8310 Inspector credentials legitimacy and credibility is critical for FRPI to uphold on behalf of Inspector and industry served. In order to obtain SP8310 LASTIC credentialing, the candidate FRPI 8310 Inspector shall quantitatively and qualitatively demonstrate their expertise in applying themselves and resources needed for carrying out inspection of AST's in accordance with this Standard Practice. Such demonstration shall be provided through an application and certification exam process in accordance with criteria specified within this Standard Practice. This process includes submittal of personal and employment qualifications plus receiving FRPI approval based on such qualifications to sit for and work to pass a certification exam.

3.2 PERSONAL REQUIREMENTS:

- A. To become an FRPI 8310 Inspector, candidate shall demonstrate they have achieved a minimum amount of expertise based on a stepped class system plus possess current active experience per the following guidelines:
1. Candidate shall demonstrate one (1) of the following four (4) classes of expertise shown in table below. Experience for given class shall apply to skills developed over past five (5) years while employed in areas of design, manufacturing, quality control, installation, operation, condition assessment, repair, alteration and/or reconstruction of FRP AST's. Up to 75-percent of experience hours may be demonstrated through work performed on steel tanks as a currently active API 653 authorized inspector officially performing work under API 653 Tank Inspection, Repair, Alteration and Reconstruction standard. Formal education and corresponding experience for class determination is as follows:

CLASS	FORMAL EDUCATION	EXPERIENCE
A	Four (4) year college degree in engineering or technology field.	(400) Hours
B	Two (2) year college degree in engineering or technology field.	(800) Hours
C	High school diploma or equivalent degree.	(1,200) Hours
D	No degree or diploma.	(2,000) Hours

2. Candidate shall additionally demonstrate a minimum one (1) year current active experience with support, performance and/or supervision of FRP AST field inspection activities as they relate to this Standard Practice. Written disclosure shall account for experience throughout recent past year quantified in hours, days and months or number of AST's. Active shall mean at least 10% of inspector's time or twelve (12) FRP AST's inspected average over past year. On average as an example of activity, over the past year this activity may equate to

about two-hundred (200) hours and one-half (1/2) day per week, or one (1) tank per month. Inspection of FRP process vessels may also be submitted to meet requirements for current active experience. Only FRP AST related activities shall be permitted to demonstrate current active experience.

3. Demonstration of such personal qualifications shall be performed through a single written submittal provided during application process in accordance with this Standard Practice. Follow up supplemental information may be accepted at discretion of FRPI.
- B. The candidate FRPI 8310 Inspector shall possess personal and professional positive attributes emulating individual skills and abilities to perform work expected of them effectively, where scope and verification of such qualifications shall be responsibility of Inspector's employer, Owner and/or other parties engaging services of Inspector.
- C. The candidate FRPI 8310 Inspector shall be mentally and physically fit to perform work expected of them safely, where scope and verification of following qualifications shall be the responsibility of Inspector's employer, Owner and/or other parties engaging services of Inspector:
1. Certification by a credentialed medical practitioner ensuring a healthy Inspector performs inspections, including:
 - a. General physical relevant to National Council on Compensation Insurance workers compensation class code performed by Inspector.
 - b. Eye exam (Snellen, Jaeger or equal test) including glasses prescribed and issued when required:
 - 1) Visual acuity (both distant and near).
 - 2) Color and depth perception.
 - 3) Vertical and lateral phorias (muscle balance).
 - 4) Peripheral vision in horizontal field.
 - c. Respiratory protection against confined space related inhalation hazards:
 - 1) Pulmonary function test.
 - 2) Respirator fit testing (half and/or full face).
 - d. Drug and alcohol screening.
 2. Certification by a certified OSHA trainer or other such qualified third party ensuring Inspector enters AST's safely, including:
 - a. OSHA 29CFR1926 10 Hour Construction Safety course.
 - b. OSHA 29CFR1910.146 Permit-required Confined Spaces.
 - c. OSHA 29CFR1910.147 Control of Hazardous Energy (lockout/tagout).

3.3 EMPLOYMENT REQUIREMENTS

- A. In order to be awarded LASTIC and practice such related work, candidate FRPI 8310 Inspector shall be employed in accordance with this Standard Practice. Unemployed candidates desiring to be awarded LASTIC and practice such related work as recognized FRPI 8310 Inspector in the future may pursue and ultimately be awarded LASTIC, but such unemployed FRPI 8310 Inspector shall be employed in accordance with this Standard Practice in order to practice such related work at that later time. The candidate shall demonstrate they are a full time, part time or contract employee currently under hire by at least one (1) of the following:

1. An Agency as defined within this Standard Practice, such as a:
 - a. Commercial establishment that is exclusively in AST inspection and/or testing business, performing work on AST's and potentially other types of process equipment.
 - b. Registered or licensed insurance company underwriting AST policies.
 - c. Federal or state inspection organization.
 2. A company that is substantially in AST inspection business, such as Engineers, Manufacturers or Intermediaries as defined within this Standard Practice.
 3. An Owner of one (1) or more AST's that runs a mechanical integrity program to ensure a safe reliable chemical storage operation, where such Owner does not sell AST's as an ongoing business.
- B. The candidate FRPI 8310 Inspector shall submit sufficient evidence validating current active employment relationship, employer expertise to perform inspection services marketed, policies governing work performed, access to adequate resources plus employer is an insured legal entity and with sufficient management to oversee work required by this Standard Practice. Evidence of such employment and employer functionality shall include:
1. Letter signed by company officer or other employer authorized representative verifying FRPI 8310 Inspector's title, active employment status and start date.
 2. Company website link, catalogs, descriptive literature, relevant organization chart, equipment list and/or other such documentation that verifies disclosure requirements per this Standard Practice.
 3. Integrity and leak testing subcontractors if utilized, verifying expertise required by this Standard Practice.
 4. Minimum of five (5) years established employer expertise in lines of work disclosed as meeting the requirements of this Standard Practice.
- C. Candidate FRPI 8310 Inspector shall:
1. Demonstrate such employment qualifications through a single written submittal provided during application process in accordance with this Standard Practice.
 2. Maintain employment with one (1) or more employers in order to perform inspection for which they were contracted to provide Owner or other parties engaging their services and apply the FRPI Certified mark on inspection reports in accordance with this Standard Practice.
 3. Submit evidence of employment relationship in accordance with this practice from time to time when requested by FRPI to revalidate this element of credentialing.

3.4 CERTIFICATION EXAM:

- A. In order to obtain FRPI SP8310 LASTIC, the candidate FRPI 8310 Inspector shall sit for and pass an exam as required by this Standard Practice. Such exam shall quantitatively and qualitatively measure candidates understanding of the current body of knowledge required by this Standard Practice.
- B. Credentials are a public testament to specific individual's expertise. The quality of an exam experience is essential to the value of an FRPI 8310 Inspector certification. Measures described within this Standard Practice shall be taken to uphold and protect

the value of credentials the exam is intended to qualify as a public testament to special market expertise.

- C. Exam shall be in hard copy paper form and/or facilitated utilizing computer based secured testing services that may integrate internet services. Exam content shall be written in the English language only, where candidate FRPI 8310 Inspectors shall be individually and entirely responsible for comprehending body of knowledge and other written or spoken information pertaining to LASTIC.
- D. Exam objectives:
 - 1. Provide a platform for candidate FRPI 8310 Inspectors to demonstrate breadth and depth of their knowledge incumbent upon them as an adequately qualified FRP AST inspector.
 - 2. Raise relevant, valid, fair and legally defensible questions with sound language structure which have answers that are reasonably unambiguous, where such test questions shall have undergone subject matter expert review for technical accuracy, bias and correctness.
 - 3. Assess levels of subject matter learning, including ability to remember, understand, apply, analyze, evaluate, synthesize and conclude matters brought about through the application of this Standard Practice.
- E. Exam content, time and scoring:
 - 1. One-hundred-sixty (160) questions representing five (5) questions per hour of FRPI SP8310 education program content that is based on the body of knowledge required by this Standard Practice, where such body shall represent current industry standards, technology and methods.
 - 2. A balanced ratio of questions to most relevant knowledge base areas expected for acceptable FRPI 8310 Inspector performance, with a mix of closed and open book questions posed in two (2) separate test sessions. The majority of exam questions shall be centered around knowledge base content presented during FRPI SP8310 education program and some of these questions shall include information reviewed exclusively during such program. Closed book questions pertain to information related to everyday working knowledge, whereas open book pertains to more detailed information that may not be committed to memory but shall be easily referenced by FRPI 8310 Inspector.
 - 3. Exam day shall allow for nine (9) hours plus one (1) hour for lunch and exam re-entry, with seven (7) hours to complete exam given quantity and type of questions. Candidates shall be given four (4) hours to complete closed book questions and three (3) hours for open book. If all exam participants complete first of two (2) exam sessions early plus wish to forfeit lunch and start second session once all participants have completed the first session, then the second session may begin at the discretion of FRPI.
 - 4. A passing test score of 75%, where up to a total of three (3) attempts to pass an exam shall be allowed with fee paid for each attempt. Additional attempts shall be completed within ninety (90) days of candidate FRPI 8310 Inspector taking first exam. Exam retakes shall be at a time and place determined at the convenience of FRPI. Candidate FRPI 8310 Inspectors that do not pass exam after three (3) attempts shall wait one (1) year before starting exam process over.
 - 5. Recommended exam study guides include ASTICL Manual and all other information referenced within this Standard Practice plus handouts issued and

personal notes taken by candidate during the LASTIC education program they may have attended.

F. Exam administration:

1. Exam delivery shall be by FRPI and/or an FRPI authorized remote examination center. Remote centers shall be made available when and where FRPI determines it can best support outsourcing of exam administration, with best efforts made to provide reasonable accessibility to LASTIC credentialing opportunities.
2. Exam process shall be managed from start to finish by a live professional proctor provided by FRPI in a vetted secure exam environment, including:
 - a. Candidate FRPI 8310 Inspector's presentation of one (1) form of original valid unexpired positive photo ID containing embedded signature (i.e. driver's license, passport, national ID, military ID) upon arrival.
 - b. Digital photo taken for FRPI use to identify candidate FRPI 8310 Inspector for LASTIC related matters.
 - c. Candidate FRPI 8310 Inspector shall enter room where exam shall be conducted wearing business casual attire and equipped only with eyeglasses if necessary and unaltered body of knowledge references specifically named within this Standard Practice as allowed in during afternoon open book portion of exam. Such references shall be bound in commercially supplied order and contain no notations other than provided by publisher. The FRPI ASTICL Manual shall be an authentic and legally obtained document that bears with traceability an original unaltered copyright licensing mark on the document naming candidate FRPI 8310 Inspector.
 - d. Test center shall supply pencil, scratch paper and calculator. Pencils shall only be used for filling in exam forms when used and writing on scratch paper, whereas no writing in body of knowledge references or other areas shall be allowed.
 - e. All personal items (i.e. wallet, purse, watch, mobile phone, beeper, radio, hearing aids, camera, video recorder, tablet, laptop, music devices) shall be placed in bag with name, sealed and stored in secure area, with weather related jackets, coats, gloves and hats checked at door upon arrival.
 - f. Backpacks, briefcases, hats and other such accessory items shall not be allowed in exam center.
 - g. Exam room monitoring for participant comfort and exam security breaches throughout examination period.
 - h. Test quality evaluation by candidates at end of exam.
3. Exam security for candidate FRPI 8310 Inspectors shall include but may not be limited to:
 - a. Check-in and check-out procedure to positively identify prequalified exam participants, protect LASTIC from actions by disingenuous and/or proxy exam takers and handling exam records so they do not get detached from participant.
 - b. Utilization of unique exams to inhibit question and answer harvesting, content sharing and unfair exam taker advantage.
 - c. Proctor monitoring of candidates taking exam, such that there shall be no verbal, nonverbal, written or other such correspondence between exam participants while at exam center.

- d. Only FRPI published scheduled breaks shall be allowed, during which all materials allowed in testing area shall remain in testing area.
 - e. Monitoring of breaks and bathroom interface with exam to prevent outside interference.
 - f. Upon entering exam center, proctor shall inspect body of knowledge references in the possession of candidate for proper copyright notice on FRPI ASTICL Manual and disallowed notations. Upon exiting exam room, proctor shall collect and discard all scratch paper and inspect all body of knowledge references for disallowed notations prior to candidate departing exam room. Any body of knowledge references found to have been altered from their published state in any way shall be immediately confiscated by proctor without contest by candidate.
 - g. Security camera video recording of exam process for record purposes may be conducted.
 - h. FRPI retention of all passed and failed exam contents.
4. Exam conduct expected of candidate FRPI 8310 Inspector shall include:
- a. Candidates are permitted to ask proctor exam administration related questions publicly at the start of each of two (2) exam sessions, once in the morning and once in the afternoon, and during scheduled breaks. Such question and answer sessions shall be limited to fifteen (15) minutes or the scheduled break time, whichever is less. Answers shall be provided to best of proctor's ability in time allotted. Extent of questions shall not interfere with exam administration priorities, where each candidate shall be allowed to raise questions as time permits.
 - b. Candidates shall respect each other's exam obligations and expectations stipulated by this Standard Practice and not correspond with each other on exam day.
 - c. Any and all other questions, complaints, conflict of interest matters, escalations and other issues that may arise during exam day may be deferred to a later time by proctor in order to maintain as successful of an exam experience as possible for all parties.
 - d. FRPI reserves the right to:
 - 1) Deny candidate admittance to exam should they arrive inadequately prepared in accordance with this Standard Practice or showing signs of illness that may affect the health and wellbeing of other exam participants.
 - 2) Terminate a candidate's exam taking at any time during exam should proctor deem candidate's behavior to be threatening or disruptive to exam administration or other exam participants, unproductive or a breach in exam security.

G. Exam participation:

- 1. Only those candidate FRPI 8310 Inspectors that have successfully demonstrated their personal qualifications, signed the LASTIC license agreement, received written authorization from FRPI to participate in exam, prepaid exam fee and provide proof of preregistration upon arrival to exam center shall be permitted to sit the exam. A purchase receipt for an exam seat without the foregoing requirements met shall not be proof of preregistration.

2. Those candidates permitted to sit the exam:
 - a. Shall not be required to have previously participated in FRPI sponsored education programs.
 - b. May be currently unemployed.
3. Candidate shall:
 - a. Plan sufficient time for successful exam participation. Time of arrival shall allow at least sixty (60) minutes prior to published exam start for sufficient check in time, where exam entrance door shall be closed thirty (30) minutes prior to start. Late arrival to exam forfeits participant's exam and fee refund. It is recommended to visit or map test center location prior to exam for travel planning purposes and account for potential delays.
 - b. Arrive fully prepared to participate in exam, with no contingencies or exceptions permitted.

PART 4 INSPECTOR CERTIFICATION AND LICENSING

4.1 LOGISTICS:

- A. FRPI SP8310 LASTIC Inspector certification is an individual as opposed to a company certification. It is made available to qualified FRP Inspectors and FRP Consultants that are or shall be employed while practicing SP8310 and is intended to be portable between employers, regardless of which party paid for such certification involvement. FRPI 8310 Inspectors:
 1. May practice SP8310 related work wherever they may be hired, provided the employer meets the requirements of this Standard Practice, and they practice such work in accordance with this Standard Practice.
 2. Shall be required to directly and personally practice any and all SP8310 related work for which their FRPI Certified mark is applied, where no delegation or otherwise assigning of such work or portions thereof shall be permitted other than integrity and leak testing as allowed in accordance with this Standard Practice.
- B. This Standard Practice establishes a minimum level of candidate FRPI 8310 Inspector and employer credentialing plus condition assessment and reporting scope, with a requirement for FRPI 8310 Inspector to utilize and apply the FRPI Certified mark under a licensing agreement on works claimed to be in accordance with SP8310. The inspector may supplement this Standard Practice with their own and/or employer's works, where such additional work is not precluded by, in conflict with and/or diminishes the value of SP8310.
- C. FRPI shall be the only organization certifying compliance to SP8310 LASTIC, where FRPI shall perform an objective audit of candidate FRPI 8310 Inspector credentials, conduct a relevant education program and facilitate exam process with intent of issuing LASTIC to successful candidates in accordance with this Standard Practice.
- D. This process of LASTIC to be undergone by candidate FRPI 8310 Inspector desiring to be certified by FRPI shall include but may not be limited to the following steps:
 1. Purchase latest edition of ASTICL Manual through FRPI authorized distributor accessible via FRPI website Resource Center or distributor websites and review. The Manual shall be an authentic and legally obtained document that bears with

- traceability an original unaltered copyright licensing mark on document naming candidate FRPI 8310 Inspector.
2. Request from FRPI required forms and LASTIC license agreements following verifiable purchase of ASTICL Manual:
 - a. Application for formal written FRPI determination of candidate SP8310 Inspector meeting required personal and employment qualifications, where each qualification is addressed on separate forms.
 - b. LASTIC license agreement for candidate SP8310 Inspector review and signature plus license agreement rider made available to candidate for their employer's optional consideration once employed Inspector obtains their LASTIC.
 - c. Application for exam seat, which shall include terms and conditions of seat registration and payment.
 3. Obtain latest edition of other SP8310 body of knowledge reference materials and review.
 4. Receive FRPI required forms and LASTIC license agreements.
 5. Perform candidate FRPI 8310 Inspector self-assessment for:
 - a. Understanding of ASTICL Manual and other body of knowledge materials.
 - b. Personal and employment qualifications relative to SP8310 requirements for award of certification.
 - c. Interest in and compliance with SP8310 as FRPI 8310 Inspector, including LASTIC code of ethics.
 - d. Participation through FRPI licensing agreements.
 - e. Potential voluntary participation in making future contributions to advancement of this Standard Practice.
 6. Prepare paperwork and apply in accordance with LASTIC Part 4.2 Application Process for formal FRPI determination of candidate FRPI 8310 Inspector personal and employment qualifications, where application is sent to FRPI with all submittals required per this Standard Practice enclosed and such application is accompanied by LASTIC license agreement containing original candidate signature and application review fee.
 7. Study ASTICL Manual and other SP8310 body of knowledge reference materials in preparation for the FRPI SP8310 education program and required certification exam.
 8. Receive formal written FRPI determination and acknowledgement of candidate FRPI 8310 Inspector satisfying SP8310 personal and employment qualification requirements. Response shall be provided within approximately four (4) weeks after FRPI receipt of complete submittal, where applications received shall be processed in an order determined by FRPI to best suit administration of this Standard Practice.
 9. Attend FRPI SP8310 education program at venues offered. Space is limited and attendance shall be on a first come first served basis, which shall be based on date full payment is received. Candidate ownership of ASTICL Manual is a program prerequisite. Receive course completion certificate at conclusion of program for 100-percent attendance.
 10. Sit for FRPI required certification exam at venues offered. Space is limited and seating shall be on a first come first served basis, which shall be based on date full payment is received with priority given to education program attendees when exam may immediately follow program. When planning to sit for an exam

be sure to include sufficient time to accomplish all prior activities and requirements, with a reasonable additional time contingency included to cover any unforeseen extra work and/or delays.

11. Receive formal written FRPI determination and acknowledgement of candidate FRPI 8310 Inspector certification exam results within approximately two (2) weeks of completing exam.
12. Pay first annual LASTIC license agreement fee within thirty (30) days of candidate FRPI 8310 Inspector's notification of passing exam score, which includes free annual FRPI Class C Inspectors & Consultants membership.
13. Receive countersigned FRPI license agreement plus FRPI SP8310 LASTIC certificate and laminated photo ID badge within approximately two (2) weeks of FRPI receipt of candidate FRPI 8310 Inspector license fee payment.
14. Demonstrate employment to the satisfaction of FRPI in accordance with this Standard Practice when not previously demonstrated and accepted by FRPI.
15. Practice SP8310 LASTIC once awarded LASTIC and employed in accordance with this Standard Practice.
16. Exercise employer option to sign FRPI license agreement rider:
 - a. Submit employer signed license agreement rider to FRPI with original signature and fee for acknowledged acceptance by or after date on which candidate FRPI 8310 Inspector is deemed eligible to practice LASTIC work. Fee includes one (1) free annual FRPI membership, with category as determined by FRPI.
 - b. Receive notice of membership category and FRPI countersigned LASTIC license agreement rider as confirmation of agreement to proceed under the license.
17. Renew SP8310 LASTIC every three (3) years in accordance with this Standard Practice should FRPI 8310 Inspector desire to continue practicing LASTIC.

4.2 APPLICATION PROCESS:

- A. Candidate FRPI 8310 Inspector shall submit application to FRPI for consideration of LASTIC award. Any and all information provided shall be in English language. Applications shall be required for the following steps in achieving LASTIC:
 1. FRPI review and acceptance of qualifications for a first-time candidate FRPI 8310 Inspector, as required by this Standard Practice. Separate application forms for personal and employment qualifications review shall be provided by FRPI to candidate upon their request following FRPI verifiable purchase of an ASTICL Manual. Candidate shall submit application to FRPI with application review fee indicating class of expertise applied for under Part 3.2 A.1 herein, include LASTIC candidate license agreement containing an original signature and disclose evidence of meeting or exceeding:
 - a. Personal requirements under Part 3.2 A herein, including:
 - 1) Current Active Experience. Minimum one (1) year current active experience with support, performance and/or supervision of FRP AST field inspection activities as they relate to this Standard Practice. Written disclosure shall account for experience throughout recent past year quantified in hours, days and months or number of AST's. Active shall mean at least 10% of inspector's time or twelve (12) FRP AST's inspected average over past year. On average as an example of activity, over the past year this activity may equate to

about two-hundred (200) hours and one-half (1/2) day per week, or one (1) tank per month. Inspection of FRP process vessels may also be submitted to meet requirements for current active experience.

- 2) Education Class. Written disclosure shall be copy of diploma, degree, certificate or other such institute issued acknowledgement of accomplishment.
 - 3) Experience Class. Written disclosure shall comprise detailed description of skills developed over past ten (10) years while employed in areas of design, manufacturing, quality control, installation, operation, condition assessment, repair, alteration and/or reconstruction of FRP AST's, where each area of experience shall include a timeline associated with it and all areas in total meet or exceed requirement for class of expertise applied for.
 - 4) References shall be provided that corroborate candidate's current active time and experience class represented, where full disclosure of contact information shall be included covering scope of experience required for qualification.
- b. Employment requirements, where written disclosure shall include:
- 1) Extent of employment and employer type, under Part 3.3 A herein.
 - 2) Employment and employer functionality, under Part 3.3 B herein.
2. Candidate participation in FRPI SP8310 education program, at the discretion of candidate FRPI 8310 Inspector and/or their employer. Such application and related payment shall be made through FRPI website in the form of course registration.
 3. Candidate sitting for certification exam pertaining to award of LASTIC, as required by this Standard Practice. An application form shall be provided by FRPI to candidates upon their request following FRPI verifiable purchase of an ASTICL Manual. Candidate shall submit application to FRPI with application exam fee. Application for exam shall be for seating within six (6) months of FRPI notifying candidate FRPI 8310 Inspector of qualifications being met per SP8310, following which time candidate shall re-apply for qualifications determination with fee repayment in order to sit for exam. A separate application and fee shall apply to each of two (2) additional exams allowed per this Standard Practice should candidate be unsuccessful on preceding exam attempts, both of which exams shall also be completed within six (6) months of FRPI notifying candidate FRPI 8310 Inspector of qualifications being met.

- B. All application submittals are subject to:
1. Written acceptance by FRPI.
 2. Code of Ethics and Privacy Policy published on FRPI website.

4.3 EDUCATION PROGRAM:

- A. The candidate FRPI 8310 Inspector may participate at their discretion in an optional four (4) day course designed to provide education pertinent to carrying out candidate's duties under LASTIC. Candidate participation is highly recommended, as the majority of exam questions shall be centered around knowledge base content presented during FRPI SP8310 education program and some of these questions shall include information reviewed exclusively during such program.

- B. Course details includes:
1. Name: FRP831 Field Inspection of Aboveground Chemical Bulk Storage Tanks
 2. Content:
 - a. Subject matter shall pertain to and be proportionate to relevance of SP8310 body of knowledge stipulated herein and as represented in most recently published course syllabus.
 - b. Delivery shall span four (4) days totaling thirty-two (32) hours of live education, with some learning exercises and practice quizzes.
 3. Administration:
 - a. Delivery of program content shall be by FRPI or an FRPI authorized program delivery center only.
 - b. FRPI shall offer this education program when and where it determines it can best support activity, with best efforts made to provide reasonable accessibility to this education opportunity.

4.4 LICENSING:

- A. The candidate FRPI 8310 Inspector shall sign a FRPI license agreement authorizing inspector's use of FRPI Certified mark on FRPI SP8310 LASTIC related works and acknowledging certain rights and responsibilities associated with such use as required by license agreement. Such rights and responsibilities are nontransferable and shall only be exercised when such inspector:
1. Holds a valid FRPI SP8310 LASTIC that is in full force and effect with no restrictions.
 2. Is employed in accordance with this Standard Practice.
- B. The employer of a FRPI 8310 Inspector shall at their option sign a FRPI license agreement rider when desiring to use FRPI Certified mark on marketing materials, whereby rider authorizes employer's use of mark and acknowledges certain rights and responsibilities associated with such use as required by license agreement rider. A maximum of one (1) rider shall be required per employer, regardless of number of FRPI 8310 Inspectors employed. Rider shall be signed by company officer or authorized employer representative, where such rights and responsibilities are nontransferable and shall:
1. Only be exercised when employing an inspector holding a valid FRPI SP8310 LASTIC that is in full force and effect with no restrictions.
 2. Terminate upon discontinuation of employment relationship with FRPI 8310 Inspectors.
- C. Use of FRPI Certified mark on works includes the following:
1. FRPI 8310 Inspector's identification badge issued by FRPI.
 2. Inspection report as required by this Standard Practice:
 - a. Company and FRPI 8310 Inspector disclosure page.
 - b. FRPI Inspection Checklist.
 3. Marketing materials as allowed by:
 - a. License agreement with FRPI 8310 Inspector.
 - b. License rider agreement with employer.
- D. Candidate FRPI 8310 Inspector shall sign license agreement and submit it to FRPI with application for determination of personal and employment qualifications meeting

LASTIC requirements and yearly thereafter as per this Standard Practice. FRPI shall countersign agreement and return it to Inspector acknowledging acceptance of qualifications and rights of Inspector to practice LASTIC and yearly thereafter as per this Standard Practice.

- E. Employer shall sign license agreement rider only when desiring to use FRPI Certified mark on marketing materials and employing at least one (1) FRPI 8310 Inspector.
- F. License agreement plus any and all rider agreements with employers shall be perpetual and survive FRPI 8310 Inspector certification expiration, termination or suspension plus discontinuation of employer's relationship with inspector as per terms and conditions of such license agreements.
- G. Terms and conditions of FRPI 8310 Inspector and employer license agreements summarized here shall be subordinate to and superseded by terms and conditions of signed agreements.

4.5 AWARD:

- A. A candidate FRPI 8310 Inspector or renewing Inspector who successfully demonstrates their personal and employment qualifications plus passes certification exam when required and holds FRPI countersigned LASTIC license agreement per this Standard Practice shall be awarded FRPI SP8310 LASTIC and become an FRPI 8310 Inspector. A candidate or Inspector who successfully demonstrates their personal but not employment qualifications plus meets the other requirements in accordance with this Standard Practice shall also be awarded FRPI SP8310 LASTIC, whereby a candidate's right to practice LASTIC shall be contingent upon their successfully demonstrating employment qualifications to FRPI per SP8310.
- B. Notice of award shall be provided in writing exclusively by FRPI to candidate FRPI 8310 Inspector. LASTIC shall be valid for three (3) years from date issued. The date an Inspector is authorized by FRPI to officially be eligible to conduct inspections under this Standard Practice as a new FRPI 8310 Inspector shall be the LASTIC licensing fee payment deposit transaction date as enter by FRPI bank. This eligibility date shall be referred to as the date issued on Inspector certification related documents and shall be required to fall on or before sixty (60) days following date on which candidate FRPI SP8310 Inspector sat for exam that was passed.
- C. FRPI 8310 Inspector LASTIC is valid anywhere it is accepted and such AST's inspected are designed and manufactured in accordance with standards referenced herein that are published by industry organizations domiciled and practicing within the continental United States of America.

4.6 RENEWAL:

- A. FRPI 8310 Inspectors desiring to continue practicing SP8310 through renewal shall:
 - 1. Be in good standing with FRPI, hold a valid in force LASTIC with no past record of LASTIC denial or termination or current suspension or any appeal proceedings in process.

2. Renew prior to expiration per this Standard Practice:
 - a. LASTIC once every three (3) years from most recent date issued.
 - b. License agreement annually from most recent effective date, including reverification of employment qualifications per this Standard Practice.
- B. FRPI shall be the only organization recertifying Inspector compliance with LASTIC, where FRPI shall perform an objective audit of Inspector credentials and facilitate exam process when required with intent of issuing LASTIC renewal to successful Inspectors per this Standard Practice.
- C. Renewal is responsibility of FRPI 8310 Inspector. Any and all costs or losses incurred with renewal, including those due to lapse in renewal, shall be for Inspector's account.
- D. Logistics associated with FRPI 8310 Inspector certification renewal effort shall include but may not be limited to the following:
 1. LASTIC steps:
 - a. Maintain ongoing records for personal current active experience such that demonstration of personal qualifications is met timely at renewal.
 - b. Follow same steps under 4.1 D Logistics herein, less steps associated with requesting forms, demonstration of personal qualifications for expertise class and LASTIC licensing. The Exam step shall only be required for those Inspectors renewing that do not meet personal qualifications for current active experience requirements for renewal per this Standard Practice.
 - c. Demonstrate:
 - 1) Accomplishment of continuing FRP education requirements.
 - 2) LASTIC body of knowledge understanding requirements.
 - d. Receive application forms for personal qualifications and exam seat from FRPI ninety (90) days prior to LASTIC expiration date.
 2. License agreement renewal shall be initiated by FRPI annually, sixty (60) days prior to license expiration. License renewal shall include Inspector submittal of employment qualifications for reverification by FRPI.
- E. Application associated with FRPI 8310 Inspector certification renewal effort shall be submitted to FRPI for consideration of LASTIC award, with any and all information provided in English language. Application shall be submitted to FRPI for processing sixty (60) days prior to LASTIC expiration. Any time loss incurred due to application deficiencies may result in temporary suspension of Inspector's LASTIC. Applications shall be required for the following steps in achieving LASTIC renewal:
 1. FRPI review and acceptance of qualifications for FRPI 8310 Inspector, as required by this Standard Practice. Separate application forms for personal and employment qualifications review shall be provided by FRPI to candidate as stipulated herein. Candidate shall submit application to FRPI with application review fee, include LASTIC candidate license agreement containing an original signature and disclose evidence of meeting or exceeding:
 - a. Personal requirements, including:
 - 1) Current Active Experience. Minimum three (3) years current active experience with support, performance and/or supervision of FRP AST field inspection activities as they relate to this Standard Practice. Written disclosure shall account for experience throughout

recent past three (3) year period quantified in hours, days and months or number of AST's. Active shall mean at least 20% of Inspector's time or twenty-five (25) FRP AST's inspected average per year during three (3) year period leading up to renewal. All work experience cited shall have been performed under LASTIC license agreement per this Standard Practice, where Inspector applying for first time renewal shall be given credit including last three (3) months of experience leading up to their first issue of LASTIC. On average as an example of activity, each year this may equate to about four-hundred (400) hours and one (1) day per week or two (2) tanks per month. Experience accumulated over three (3) years shall approximate 40% internal inspections. Inspection of FRP process vessels may also be submitted to meet requirements for current active experience.

- 2) References shall be provided that corroborate candidate's current active experience represented, where full disclosure of contact information shall be included covering scope of experience required for qualification.
- b. Employment requirements if employment has changed since last reviewed and accepted by FRPI, including:
 - 1) Extent of employment and employer type, under Part 3.3 A herein.
 - 2) Employment and employer functionality, under Part 3.3 B herein.
- c. Continuing education requirements, including:
 - 1) Total of twenty-four (24) hours completed over three (3) years at FRPI or other recognized providers, where list of current providers shall be provided by FRPI upon Inspector's request.
 - 2) Written disclosure shall be copy of course completion certificates validating course, date of program and time spent, where courses may be repeated once every three (3) years or more as a refresher.
- d. LASTIC body of knowledge understanding requirements, including:
 - 1) Demonstrate understanding by providing proof of ownership for latest edition ASTICL Manual, where Manual shall be an authentic and legally obtained document that bears with traceability an original unaltered copyright licensing mark on document naming candidate FRPI 8310 Inspector.
 - 2) Once every other renewal, on a six (6) year cycle based on LASTIC date issued, FRPI 8310 Inspector satisfying current active experience requirements per Part 4.6 Renewal herein shall demonstrate body of knowledge understanding related to latest edition ASTICL Manual through participating in an online exam. Such exam shall have forty (40) questions pertaining primarily to Manual updates, with some questions covering important recurring content. Inspector will be given two (2) hours to complete exam. A passing test score shall be 80%. Requirements for exam application, scheduling, retesting, related fees and potential results or consequences shall be in accordance with requirements for renewal exam herein. Inspector renewing whose current active experience falls short of requirements in accordance with Part 4.6 Renewal herein shall demonstrate body of knowledge updates understanding through renewal exam.

2. Candidate sitting for certification exam pertaining to renewal of LASTIC, as required in accordance with Part 4.6 Renewal herein. An application form shall be provided by FRPI to candidate as stipulated by this Standard Practice. Candidate shall submit application to FRPI with application exam fee. Application for exam shall be for seating within three (3) months prior to Inspector's LASTIC expiration date but shall be no later than one (1) month prior to expiration date, following which time candidate shall re-apply for qualifications determination with fee repayment in order to sit for exam. A separate application and fee shall apply to each of two (2) additional exams allowed per this Standard Practice should candidate be unsuccessful on preceding exam attempts, both of which exams shall also be completed prior to such expiration date.
 3. All application submittals are subject to:
 - a. Written acceptance by FRPI.
 - b. Code of Ethics and Privacy Policy published on FRPI website.
- F. Exam associated with FRPI 8310 Inspector certification renewal effort shall be required when Inspector's current active experience falls short of requirements in accordance with Part 4.6 Renewal herein. To qualify for exam seat, Inspector shall additionally meet requirements in accordance with Part 3.2 Personal and Part 3.3 Employment herein. Exam requirements shall be same as Part 3.4 Certification Exam herein, except as follows:
1. A passing test score shall be 80%.
 2. Additional attempts to pass shall be completed by LASTIC expiration date.
 3. Inspectors that do not pass exam after three (3) attempts shall wait one (1) year and reapply as a new first time FRPI 8310 Inspector candidate in accordance with Part 3 Inspector Qualifications herein.
- G. Award, denial, termination, suspension, appeals process and other general conditions per this Standard Practice shall govern LASTIC renewal, except as follows:
1. FRPI 8310 Inspector renewal date on which Inspector is authorized by FRPI to officially be eligible to conduct inspections under this Standard Practice shall be date issued on most recent expiring LASTIC plus three (3) years, where expiration date shall be extended accordingly.
 2. LASTIC license agreement renewal date shall be effective date on most recent expiring agreement plus one (1) year.
 3. Both date exceptions for LASTIC and license agreement renewal above may be subject to adjustment at discretion of FRPI pending outcome of renewal circumstances and timing.

4.7 DENIAL:

- A. Candidate FRPI SP98310 Inspectors who are deemed to have not met all requirements covered within this Standard Practice shall be denied LASTIC. Grounds for denial may include any or all of the following circumstances:
1. Personal requirements not met.
 2. Employment requirements not met.
 3. Misrepresented personal and/or employment requirements.

4. Excessive errors, omissions, delays, noncompliance and/or other such situations associated with credentials provided in accordance with this Standard Practice resulting in undue FRPI certification effort, delays and/or diminished goodwill.
 5. Failed certification or recertification exam conducted per this Standard Practice.
 6. Compromised certification exam process and/or SP8310 practices.
 7. Nonpayment of SP8310 related fees within stipulated timeframe.
 8. Not completing certification steps timely.
- B. Notice of denial shall be provided in writing exclusively by FRPI to candidate FRPI 8310 Inspector.
- C. Candidate FRPI 8310 Inspector denied initial certification or renewal:
1. Shall receive written report with explanation and corrective actions required in order to position themselves for LASTIC candidacy in the future.
 2. May reapply for LASTIC as new candidate after one (1) year from date of denial.

4.8 TERMINATION AND SUSPENSION:

- A. LASTIC shall automatically and immediately terminate upon FRPI 8310 Inspector's:
1. SP8310 certification expiration date.
 2. Nonrenewal of LASTIC license agreement and/or SP8310 certification within thirty (30) days of expiration date, where such renewal has been in process but not completed.
 3. Practicing SP8310 LASTIC while proven to be:
 - a. Unemployed.
 - b. Employed by employer that has not been vetted and accepted by FRPI in accordance with this Standard Practice.
 4. Delegation or otherwise assigning of SP8310 related work or portions thereof for which their FRPI Certified mark is applied, where delegation of integrity and leak testing shall be allowed in accordance with this Standard Practice.
 5. Receipt of third claim from FRPI within a current three (3) year rolling period pertaining to Inspector's:
 - a. Deviation from inspection practice areas defined within this Standard Practice and related references while practicing LASTIC.
 - b. Quality of work pertaining to this Standard Practice that is unbecoming of a FRPI 8310 Inspector.
 - c. Excessive errors, omissions, delays, noncompliance and/or other such circumstances associated with inspector practicing LASTIC that result in undue FRPI effort, delays, diminished goodwill or other such burdens.
 - d. Violation of SP8310 code of ethics.
 6. Nonpayment of SP8310 related fees within stipulated timeframe.
 7. Breach of LASTIC license agreement.
 8. Inactive and/or unemployed status for over three (3) consecutive years.
 9. Inability to perform LASTIC related work due to incapacitation or death.
- B. FRPI reserves the right to suspend FRPI 8310 Inspector LASTIC practice privileges during a pre-termination investigation period that may lead to termination and/or in lieu of termination under extenuating circumstances. Such circumstances may include but shall not be limited to:
1. Conditions pertaining to termination herein.