

Thermal Insulation Inspector Program



Introducing the Thermal Insulation Inspector Program (TIIP)



TIIP Objective

The Thermal Insulation Inspector Program (TIIP) course is designed for those individuals seeking professional mechanical insulation system inspection certification. It will serve as a thorough introduction to those seeking knowledge and credentials or simply an enhancement of current knowledge levels as to the inspection process for mechanical insulation systems in new construction, retrofit, and/or maintenance applications.



Why Is TIIP Needed?

- There is a general consensus that the mechanical insulation knowledge base within the engineering and facility owner communities, and directly within the industry itself, is slowly dwindling to that of only basic knowledge with little actual experience.
- Individuals within engineering and design firms are spending less time monitoring field/project site practices.
- In some cases insulation “systems” are getting more complex, with more options and alternatives than ever before.



Why Is TIIP Needed?

- The shortage of experienced and qualified workers continues to be problematic.
- Construction schedules and modularization are complicating installation.
- Modularization coming from outside the United States could utilize insulation systems that are not available or acceptable in the United States.



Why Is TIIP Needed?

- Companies that specialize only in mechanical insulation are decreasing as the role of multi-service companies continues to promote advantages over singular-focused companies.
- Consequences—other than the normal expectations such as energy loss, etc.—of improper installation and lack of timely and proper maintenance of mechanical insulation systems are widely known and expensive (e.g., corrosion under insulation and mold generation, etc.)



Why Is TIIP Needed?

- Of course you have the old concern that some contractors take installation shortcuts and do not comply with specifications.

Having a TIIP will not resolve all of these concerns, but it is a simple method by which to provide engineering firms and facility owners a means to obtain knowledge of mechanical insulation and to verify they are receiving what they expect and identify potential areas of concern during initial installation or in ongoing operations.



Why Is TIIP Needed?

From a mechanical insulation industry perspective, it will raise the bar over time, which will impact all mechanical insulation contractors. Actually, it is a great addition to a contractor's QA/QC program or a good starting point to begin a QA/QC program.

It is a program that is being requested by engineering and facility owners and from within the industry. It will not be easy and not liked by all, but it is intended to benefit all who manufacture, distribute, fabricate, install, and use mechanical insulation systems.



TIIP Target Audiences

- **Code Officials** (commercial or residential market)
- **CUI—NACE and Other Education Extension**
- **Engineering/Design Firms**
- **Facility Owners and Managers**
- **General Contractors**
- **Government (Federal, State, and Local Agencies and Facilities)**
- **Independent Inspection—QC/QA Firms**
- **Mechanical Contractors**
- **Mechanical Insulation Contractors, Distributors/Fabricators, and Manufacturers**
- **Other**

While the program is designed for domestic audiences, it may be of some interest internationally.

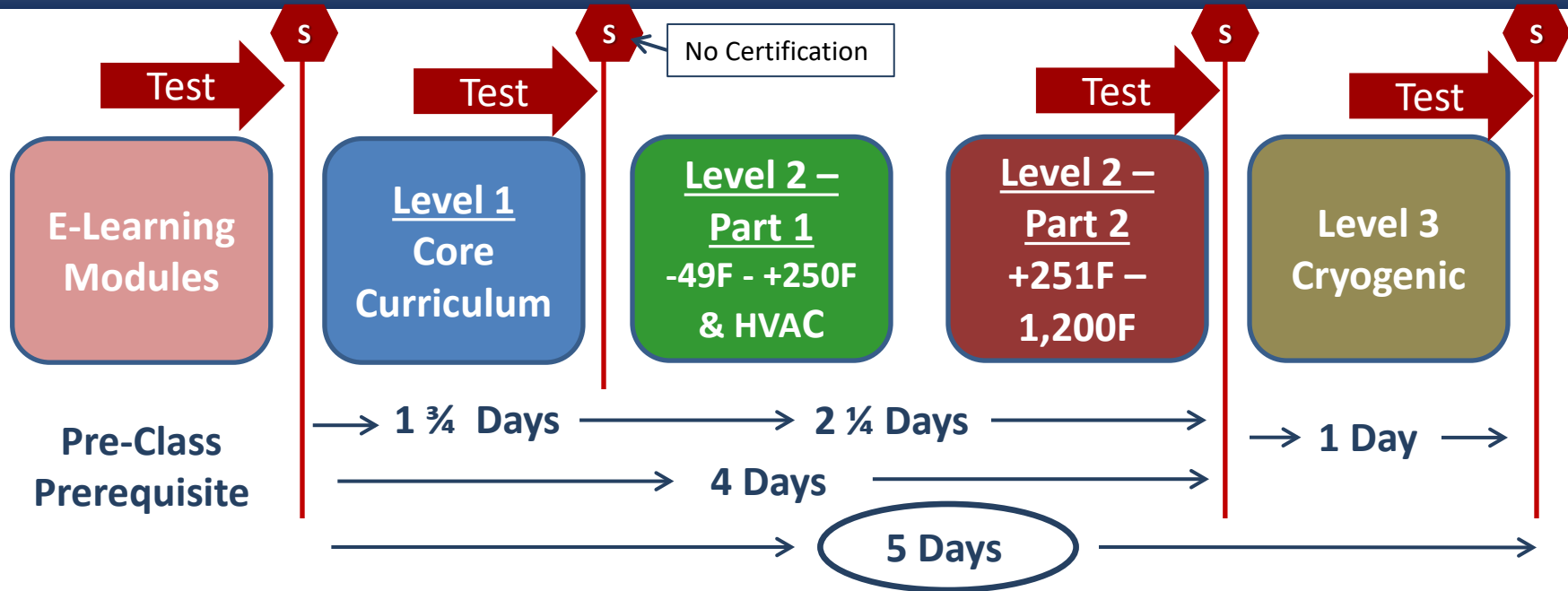


Pre-Class Prerequisite

Pre-Class Prerequisite: Exposure to and/or experience with construction activities and/or facility operations and mechanical insulation systems would have value to program participants. However, no prior training is required. Review of the Mechanical Insulation Design Guide (MIDG) and successful completion of the Mechanical Insulation Education and Awareness E-Learning Series is required for this course.

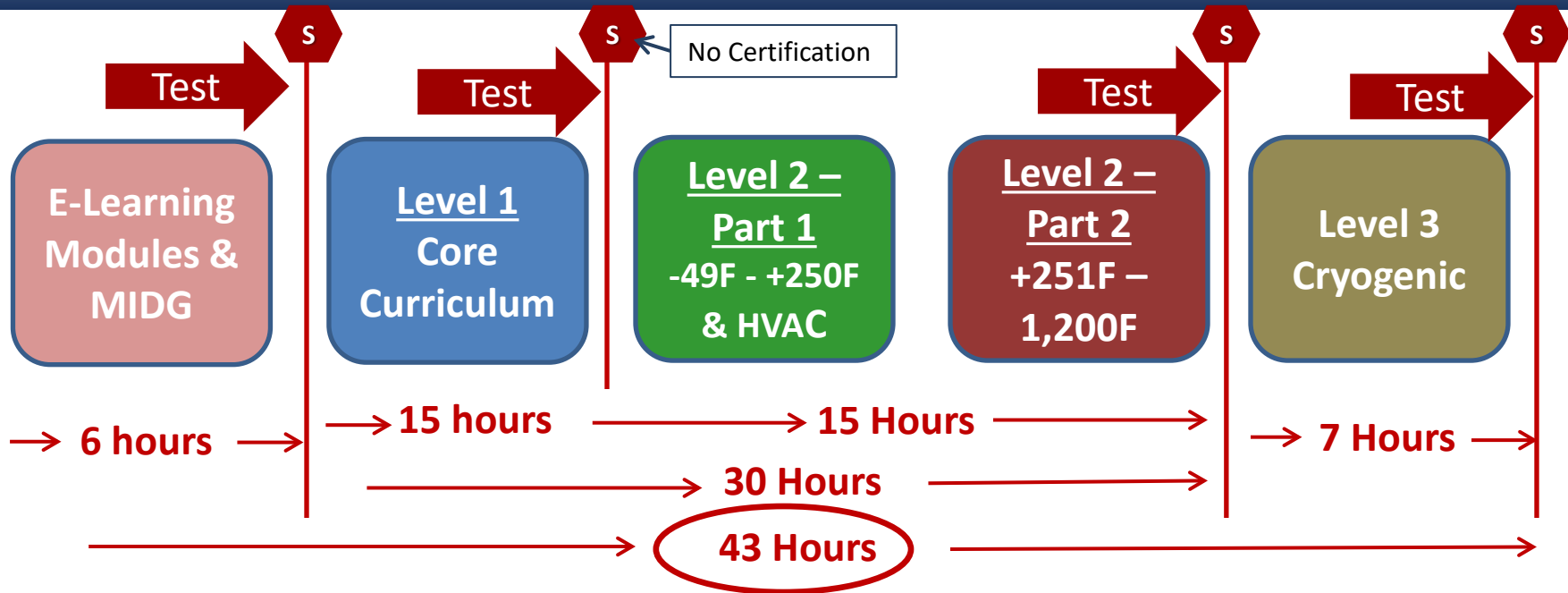


Program Overview





Program Overview





Class Overview

- Presentations, Demonstrations, Class, and Individual Exercises
- Class Notebook and Resource Information
- Pictures (Good – Bad – Ugly)
- Sketches (Exhibiting Good and Bad Occurrences)
- Installation Mockups (Installation Examples for Inspection)
- Product Samples (All Types and Variations)
- Inspection Aids (Take-aways)
- Help—“Hot Line”



E-Learning Modules

E-Learning Modules

Module 1: Series Overview & Defining Mechanical Insulation

Module 2: Benefits of Mechanical Insulation

Module 3: Mechanical Insulation Science & Technology

Module 4: Mechanical Insulation Design & Considerations

Module 5: Mechanical Insulation Maintenance

Upon completion of the modules, an electronic test is available.

The Mechanical Insulation Design Guide (MIDG) is part of the National Institute of Building Sciences' (NIBS') Whole Building Design Guide (WBDG) website (www.wbdg.org/midg)



Level 1—Overview

Level 1 Core Curriculum

- **Course Objective and Overview**
 - Objectives and course—work book overview
 - Why is the inspection of mechanical insulation systems important?
(New construction—Retrofit projects—Maintenance)
 - Glossary of terms
 - Program updates and renewal program (3 years)
 - Use of NIA & program logos, titles, and certification numbers
 - Classroom policies
 - Testing and obtaining test results



Level 1—Overview

Level 1 Core Curriculum

- The role and responsibility of a mechanical insulation inspector
 - Verify and document conformance (Inspect and report)—not to comment on specifications or offer alternatives
 - Inspector role versus liability
- The importance of a pre-inspection process conference (scope definition)
- Defining mechanical insulation and understanding the purpose of mechanical insulation systems and why that is important to the inspection process



Level 1—Overview

Level 1 Core Curriculum

- Defining mechanical insulation systems versus other insulation systems
- The basic “Core” insulation materials
 - Cellular, Fibrous, Flake, Granular, Reflective
- Why insulate?

Mechanical insulation is primarily used to limit heat gain or loss from surfaces operating at temperatures above or below ambient temperature. The theory of heat transfer is the core topic behind each insulation design objective other than noise control.



Level 1—Overview

Level 1 Core Curriculum

- **Why Insulate? (continued)**
Condensation Control, Energy Conservation, Fire Safety, Freeze Protection, Personnel Protection, Process Control, Noise Control
- **Why provide a protective covering?**
- **The basic types of protective coverings:**
Weather Barriers, Vapor Barriers, Abuse Coverings, Condensate Barriers, Appearance Coverings, Hygienic Coverings



Level 1—Overview

Level 1 Core Curriculum

- **What is the basis of inspection—what are you inspecting for and comparing to?** (Listing not all inclusive of areas to be reviewed)
 - **New Construction: What are the controlling or base line documents?**
 - **Approved product and manufacturers**
 - **Storage/handling requirements**
 - **Material selection (product compliance parameters)**
 - **Installation or application parameters (industry practices)**
 - **Contractor QA/QC program**
 - **Manufacturer recommendations**
 - **Code standards, regulatory, or similar references**



Level 1—Overview

Level 1 Core Curriculum

- **What is the basis of inspection? What are you inspecting for and comparing to?** (Listing not all inclusive of areas to be reviewed)
 - Maintenance
 - Compliance with original or most recent repair/replacement specification
 - Thermal leakage—“Hot Spots” (Heat gain or loss)
 - Protective covering and/or vapor barrier damage
 - Damaged, missing, or wet insulation
 - Penetrations to the insulation system that are not sealed
 - Corrosion under the insulation appears to be present
 - "Fish mouthing" of the outer jacketing seams



Level 1—Overview

Level 1 Core Curriculum

- **What is the basis of inspection? What are you inspecting for and comparing to?** (Listing not all inclusive of areas to be reviewed)
 - **Maintenance continued:**
 - Insulation system securements are missing or loose
 - Sagging or pulling away of the insulation system
 - Condensation, frozen, or ice in or on the insulation
 - Mildew or mold are present
 - Insulation supports are failing or not working correctly
 - Inspection ports—working condition
 - Areas subject to water infiltration



Level 1—Overview

Level 1 Core Curriculum

- **What is the basis of inspection? What are you inspecting for and comparing to?** (Listing not all inclusive of areas to be reviewed)
 - **Maintenance continued:**
 - Joint and or lap sealing concerns
 - Exposed mastic reinforcement or cracking
 - Personnel safety concerns
 - Potential fire hazard or concerns
 - Expansion or contraction joints appear to be not functioning correctly
 - General condition of the insulation system(s)



Level 1—Overview

Level 1 Core Curriculum

- **What is the basis of inspection? What are you inspecting for and comparing to?** (Listing not all inclusive of areas to be reviewed)
 - **Retrofit:**
 - Replacement or new insulation (see new construction listing)
 - “Tie-In” specification, if applicable
 - Condition of existing insulation (see maintenance listing)
 - How to read a specification and other controlling documents
 - Inspection scope and frequency—when and how often?
New Construction—Retrofit—Maintenance



Level 1—Overview

Level 1 Core Curriculum

- Safety procedures—requirements
- Reporting (To whom—frequency—clear and consistent language—location identification—risk assessment, etc.)
- Inspection tools (including overview of potential non-destruction testing tools)
- Resources available
- Summary and review
- Test



Level 2, Part 1—Overview

Level 2 –
Part 1
-49F - +250F
& HVAC

- Review of Level 2—Part 1 course objective
- Mechanical insulation system materials and applications
 - Primary piping and equipment insulation materials and securement methods including fabrication (single, multi-layer, and composite applications)
 - Primary piping and equipment insulation finish or jacketing systems and securement methods (single, multiple, or composite applications)



Level 2, Part 1—Overview

Level 2 –

Part 1

-49F - +250F

& HVAC

- Review of Level 2—Part 1 course objective
- Mechanical insulation system materials and applications
 - Primary piping and equipment insulation and

Discussion—review of what to expect when examining insulation and finishing/jacketing materials that have been in service and exposed to operating temperatures and environmental elements.



Level 2, Part 1—Overview

Level 2 –
Part 1
-49F - +250F
& HVAC

- Specialty Mechanical Insulation Applications
 - Supports, shoes, hangers, and inserts
 - Penetrations in the insulation system
 - Wall or ceiling penetrations
 - Heat tracing
 - Vapor stops
 - Inspection plugs
 - Expansion joints (hot and cold)



Level 2, Part 1—Overview

Level 2 –
Part 1
-49F - +250F
& HVAC

- HVAC (Duct) Systems—material finishes and securement methods
- Underground Insulation Systems
- Mechanical Insulation Systems—common occurrences (Examples of potential problem areas—common occurrences by core material system)



Level 2, Part 1—Overview

We need your help!

Level 2 –
Part 1
-49F - +250F
& HVAC

Who knows more about potential or common problem areas than product manufacturers? If there is a problem and it seems like you always hear about it, we would like to know. We need your help in identifying common areas. Common problems are those that you see with the installation of your products individually or products in general, or as part of overall insulation system. NO product names will be used in the course, only generic references. Accordingly, any and all information you provide will NOT be identified by your company or product name.



Level 2, Part 2—Overview

Level 2 –
Part 2
+251F –
1,200F

- Review of Level 2—Part 2 Course Objective
- Mechanical insulation system materials and applications
 - Primary piping and equipment insulation materials and securement methods, including fabrication (single, multi-layer, and composite applications)
 - Primary piping and equipment insulation finish or jacketing systems and securement methods (single, multiple, or composite applications)



Level 2, Part 2—Overview

Level 2 –
Part 2
+251F –
1,200F

- Review of Level 2—Part 2 course objective
- Mechanical insulation system materials and applications
 - Primary piping and

Discussion—review of what to expect when examining insulation and finishing/jacketing materials that have been in service and exposed to operating temperatures and environmental elements.

and securement methods (Composite applications)



Level 2, Part 2—Overview

Level 2 –
Part 2
+251F –
1,200F

- Specialty Mechanical Insulation Applications
 - Supports, shoes, hangers, and inserts
 - Penetrations in the insulation system
 - Wall or ceiling penetrations
 - Heat tracing
 - Vapor stops
 - Inspection plugs
 - Expansion joints (hot & cold)



Level 2, Part 2—Overview

We need your help!

Level 2 –
Part 2
+251F –
1,200F

- **Mechanical Insulation Systems—Common Occurrences (Examples of potential problem areas, common occurrences by core material system)**



Level 2, Parts 1 & 2—Overview

Level 2 –
Part 1
-49F - +250F
& HVAC

Level 2 –
Part 2
+251F –
1,200F

- Inspection documentation and reporting (examples and exercises)
- Inspection exercises
- Summary and review
- Testing



Level 3—Overview

Level 3 Cryogenic

- Review of Level 3 course objective
- Revisit “Why Insulate” (Core Curriculum)
- Mechanical insulation system materials and applications
 - Primary piping and equipment insulation materials and securement methods, including fabrication (multi-layer and composite applications)
 - Primary piping and equipment insulation finish or jacketing systems and securement methods (multiple and composite applications)



Level 3—Overview

We need your help!

Level 3
Cryogenic

- Specialty Mechanical Insulation Applications
 - Supports, shoes, hangers, and inserts
 - Penetrations in the insulation system
 - Vapor stops
 - Expansion joints (hot & cold)
 - Mechanical insulation systems—common occurrences (examples of potential problem areas, common occurrences by core material system)



Level 3—Overview

Level 3 Cryogenic

- Inspection during installation is vital
- Summary and review
- Testing



Program Status

Pre “Harvey” Estimate

2017: January: Concept suggested

February–July: Concept vented internally and externally

August–September: Program outline, class concept, and development cost estimate finalized

September–Fall Summit: Being presented to Board of Directors for approval

--- assuming approval is obtained ---

October–December: Class development

2018: January–March: Class development and “Mock Class” held

April: (Potentially May–June): Introduce TIIP (NIA Annual Meeting)



Program Status

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September – Fall Summit 2017: Finalize details for factors for

First Official Class—May/August 2018!

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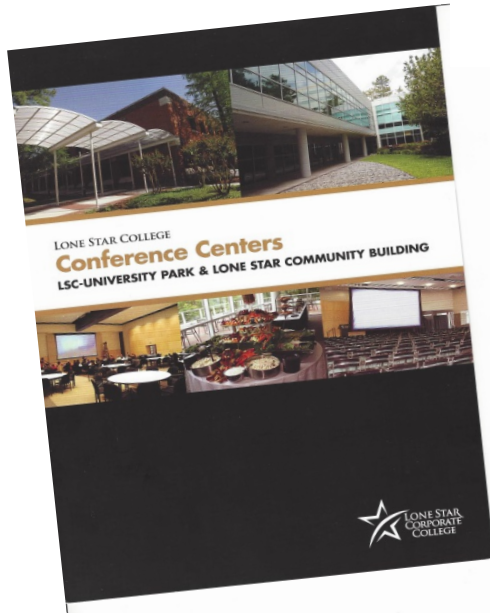
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Potential Class Location



Conference Center @ LSC-University Park
20515 State Highway 249 (at Louetta Road), Houston, TX 77070



Potential Instructors

Concept is to initially have 2–3 instructors who would be involved in the development process and the “mock class”

Independence: The instructor needs to be independent of full or part time employment with a NIA current or past or potential member.

Knowledge/Experience: The instructor must have a minimum of 10 years of experience in the mechanical insulation industry and have at a minimum general knowledge of the use, installation, and maintenance of mechanical insulation in both the commercial and industrial market segments.

Communication/Teaching Ability: Instructors must have the personality, mannerisms, and skills to effectively communicate and educate class participants on the specific subject materials.

Instructor Approval: Instructors must be vetted by the NIA staff as to their independence, knowledge/experience level, and communication/teaching abilities before being recommended for approval by the NIA Executive Committee.

Instructor Dismissal: Instructors may be removed from the approved instructor list and or dismissed at any time at the sole discretion of NIA.

Thermal Insulation Inspector Program



- Questions -
- Comments -
- Suggestions -

Thermal Insulation Inspector Program



Thank You!