PIP RFTF1000
Ceramic Fiber Refractory Installation Qualification, Inspection, and Testing
PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.

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Data Form
RFTF1000-F – Inspection Hold Point and Sign-Off Schedule
1. Scope

This Practice provides requirements for quality control and quality assurance for the installation of ceramic fiber refractory. Inspection methods include documentation review, in-progress installation inspection, and final inspection of the completed lining.

2. References

Applicable parts of the following Practices and industry codes and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP RFIA1000 – Refractory Anchor and Accessory Installation Details
- PIP RFSA1000 – Refractory Anchor and Accessory Specification
- PIP RFSF1000 – Ceramic Fiber Refractory Material Specification
- PIP RFSF2000 – Ceramic Fiber Refractory Installation Specification
- PIP RFTA1000 – Refractory Anchor and Accessory Installation Qualification, Inspection, and Testing

2.2 Industry Codes and Standards

- ASTM International (ASTM)

3. Definitions

With the exception of the terms listed in this section, terms used in this Practice are defined in accordance with ASTM C71. If a definition as used in this Practice differs from the one listed in the referenced documents, the modified definition is included in the following listing.

compliance data sheet: Data sheet provided by the manufacturer listing physical and chemical property values that the manufacturer certifies or guarantees will be met by each sample tested using the specified procedures in Appendix A of PIP RFSF1000.

installer: Party responsible for installing the ceramic fiber refractory lining. This includes each individual ceramic fiber installer, who is prequalified before being allowed to install ceramic fiber lining.

installer’s inspector: Installer’s authorized representative, responsible for the quality control of all materials, installations, and workmanship provided by the installer, and any of the installer’s subcontractors or vendors

owner: Party who owns the facility wherein the refractory lined equipment will be used

purchaser: Party who awards the contract to the installer. The purchaser may be the owner or the owner’s authorized agent.

purchaser’s inspector: Purchaser’s authorized representative with authority to act in the interest of, and on behalf of, the purchaser in all quality assurance matters. The inspector shall be experienced in the evaluation of ceramic fiber installation techniques and completed linings.
4. Requirements

4.1 General

4.1.1 Conflicts, Exceptions, Deviations, and Substitutions

4.1.1.1 All conflicts between the referenced documents and this Practice shall be submitted in writing to purchaser for clarification and resolution before proceeding.

4.1.1.2 All exceptions, deviations, and substitutions to the requirements specified herein and in referenced documents shall be approved by purchaser.

4.1.2 Regulations and Safety Data Sheets (SDS)

4.1.2.1 Ceramic fiber refractory materials shall be in accordance with all applicable federal, state, and local codes and regulations on storage, handling, safety, and environmental requirements.

4.1.2.2 The latest issue of the ceramic fiber refractory material manufacturer’s SDS shall be provided for each installation site and complied with during the installation of the ceramic fiber refractory.

4.1.3 Documentation

Ceramic fiber refractory material manufacturer’s product data sheets, compliance data sheets (including any job specific requirements), and the approved installation procedure in accordance with PIP RFSF2000 shall be provided for each installation site and complied with during the installation of the ceramic fiber refractory.

4.1.4 Notification

Purchaser’s inspector shall be given adequate notice (e.g., time and location) before the start of all work and prior to all hold points, so that the inspector can witness the work.

4.2 Ceramic Fiber Refractory Lining Anchors

The qualification of ceramic fiber refractory anchor welders, selection of anchors, anchor installation, anchor testing, and inspection shall be in accordance with PIP RFIA1000, PIP RFSA1000, and PIP RFTA1000.

4.3 Confirmation of Materials by Purchaser

4.3.1 Purchaser’s inspector shall confirm that the ceramic fiber refractory lining materials are in accordance with the contract documents and PIP RFSF1000. Items to be confirmed shall include material, style, geometry and dimensions of blankets, board, modules and accessories.

4.3.2 Purchaser’s inspector shall confirm that ceramic fiber materials and accessories are not damaged, contaminated, or wet. See PIP RFSF2000 for water contamination evaluation criteria.

Comment: Damage and contamination are defined as degradations of the materials that the purchaser’s inspector determines to be detrimental to the serviceability of the ceramic fiber lining. Examples of damage
include cuts, cracks, tears, compression, and missing materials. Examples of contamination include sea water, dirt, chemicals, and other foreign materials.

4.3.3 Purchaser’s inspector shall confirm that positive material identification (PMI) has been performed on module hardware and loose metallic components in accordance with PIP RFIA1000. All items shall be in accordance with the contract documents and appropriately marked.

4.4 Surface Preparation

Surface preparation for the installation of coating, ceramic fiber refractory and accessories shall be in accordance with PIP RFSF2000.

4.5 Installer Prequalification Requirement

4.5.1 Documentation shall be provided from other recently completed installations that confirms each installer’s ability to install the specific material type in a similar or same application as proposed for the subject installation. The documentation shall be provided to purchaser for review and determination of acceptance.

4.5.2 If the documentation specified in Section 4.5.1 cannot be provided, each installer shall be required to produce a mockup of the proposed installation. The mockup shall include all critical service areas as defined by purchaser’s inspector. Consideration should be taken for each ceramic fiber product, anchorage selection, and installation technique.

4.5.3 Unless Section 4.5.1 or 4.5.2 is satisfactorily completed, installation of ceramic fiber shall not be permitted by that installer.

4.5.4 The installer’s inspector shall provide documentation of their ability to inspect ceramic fiber linings. The documentation shall be provided to purchaser for review and determination of acceptance.

4.6 Installation Inspection and Testing

4.6.1 General

4.6.1.1 Installation of ceramic fiber anchors shall be in accordance with PIP RFIA1000. Inspection and testing shall be in accordance with PIP RFTA1000.

4.6.1.2 In-progress inspection of the refractory lining shall confirm that ceramic fiber materials, accessories, anchor system and layout, and lining details, including any coatings, are in accordance with the contract documents.

Comment: “In-progress” refers to continuous monitoring at regular intervals throughout the duration of the work.

4.6.1.3 Inspection of ceramic fiber refractory lining installation shall be by visual inspection in accordance with Section 4.6.3.

4.6.2 Hold Points

4.6.2.1 Inspection hold points shall be in accordance with purchaser’s PIP RFTF1000-F Inspection Hold Point and Sign-Off Schedule.
4.6.2.2 Work shall not progress until all parties listed on purchaser’s 
*PIP RFTF1000-F* have signed off at each hold point in the order as 
shown on the form.

### 4.6.3 Visual Inspection

4.6.3.1 Before ceramic fiber refractory installation, welded anchors and 
accessories shall be 100% visually examined to confirm that all welding 
is in accordance with *PIP RFIA1000*.

4.6.3.2 The layout, size and location of anchorage shall be in accordance with 
the detailed design drawings accepted by the purchaser.

4.6.3.3 By visual inspection of the in-progress ceramic fiber refractory lining 
installation, the following shall be confirmed to be in accordance with 
the lining design drawings accepted by the purchaser:

- a. Lining thickness
- b. Ceramic fiber layout
- c. Backup materials
- d. Anchor assembly
- e. Lining construction

4.6.3.4 The installed ceramic fiber refractory lining shall be confirmed to be 
within design dimensional tolerances accepted by the purchaser.

4.6.3.5 During in-progress inspection of the ceramic fiber refractory installation, 
any defects found shall be cause for work to cease. A defect is an 
imperfection that could affect the performance of the lining and is 
deemed unacceptable by the inspector. All inspection parties shall be 
notified of the defects and a report detailing type and extent of defects 
and the recommended repair procedure prepared. The detailed inspection 
report, and recommended repair procedure shall be submitted to 
purchaser for resolution.

4.6.3.6 Defects noted in the lining during the final inspection shall be brought to 
the attention of the purchaser for resolution.

### 4.7 Lining Repairs

All lining repairs shall be subjected to the same inspection as the original lining.
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**PROJECT NUMBER**

**FACILITY NAME**

**LOCATION**

**SUPPLIER:**

**REPORT DATE:** / /

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<th>HOLD POINT</th>
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<th>PURCHASER'S INSPECTOR</th>
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<td>2. INSTALLER PREQUALIFICATION</td>
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<td>3. CONFIRM MATERIALS</td>
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<td>5. SURFACE PREPARATION FOR COATING</td>
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<td>8. FINAL LINING INSPECTION</td>
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**COMMENTS:**

________________________________________________________________________

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________________________________________________________________________

INSTALLED'S INSPECTOR SIGNATURE: ____________________________ (PRINTED)

PURCHASER'S INSPECTOR SIGNATURE: ____________________________ (PRINTED)