

Supplier Quality Manual

Revision History

Revision	Date	Description of Changes
1	04-18	Initial document release
2	09-18	Edited invoice section 16 to reflect new HWI AP invoice processing policy
3	03-20	Updated manual to reflect process post ERP system implementation
4	07-24	Updated branding and corporate information

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(1) About HWI, A member of Caldersys

HWI is the largest supplier of refractory products and services in the United States, with a history that spans more than 150 years. It is part of Caldersys and is the brand for the Americas region of the Group. HWI counts 25 manufacturing sites and 20 distribution centers in the Americas, as well as the largest refractory industry research facility in North America. Serving virtually every major industry that requires refractory solutions to enhance production and protect assets, HWI is consistently recognized for its talented experts, industry firsts, and intensely driven excellence.

www.thinkhwi.com

(2) Introduction & Purpose

HarbisonWalker International recognizes the significant role all our suppliers have in helping us be the first and only call to our customers. We rely on our suppliers to provide raw materials, capital equipment, finished goods, and other products and services to our locations globally. HWI's expectation is that these goods and services are delivered on time, meet the terms of HWI agreements, specifications, drawings, and the quality management requirements included in this document. The purpose of this document is to clearly communicate what HWI expects its suppliers to do to ensure that all requirements including but not limited to specifications, delivery, customer service, communication, documentation, etc. are met on a consistent basis.

(3) Scope

This document applies to all suppliers providing HWI with raw materials, products, processing, transportation, equipment, and services and specifies additional requirements and expectations of HWI. This includes suppliers sub-tier sources which are the responsibility of the supplier to confirm and monitor compliance of this document at their sub-tier source operations. These requirements

and expectations outlined herein do not supersede any agreement, specification, drawing, or other document already in place between HWI and the supplier. Questions regarding this document should be directed to the designated HWI contact.

(4) Supplier Code of Conduct & Confidentiality

Suppliers shall ensure operations are performed in a manner that is consistent with HWI's ethical, legal, environmental, and social responsibilities including but not limited to:

- Compliance with environmental, health, and safety laws in the area in which they reside including but not limited to the proper handling of hazardous materials and the proper use of personal protective equipment (PPE), and
- Evidence of corruption, bribes, or any other form of illegal activity by the supplier will not be tolerated by HWI and will result in a termination of business between the parties

Suppliers shall ensure the confidentiality of HWI information, including any intellectual property shared as a result of the working relationship between the parties.

Confidential Information and Intellectual Property

All suppliers shall comply with any and all HWI confidentiality and intellectual property provisions listed in HWI's Standard Terms and Conditions for the Purchase of Goods and Services.

Documents and other confidential information furnished by HWI to the supplier are furnished solely for the purpose of doing business with HWI. The supplier is responsible for controlling and maintaining such documents to preclude improper use, loss, and damage. The supplier shall not transmit or furnish any HWI furnished documents, or copies of such documents, to any person or entity outside the supplier's business organization, including, without limitation, third party vendors or independent contractors without the express written consent of an authorized representative for HWI. The supplier shall return to HWI and purge electronic copies of all confidential documents upon HWI's request within 30 days and provide sufficient evidence to HWI that confidential information has been destroyed.

(5) Environmental Health and Safety

Supplier shall follow all applicable regional, national, and international laws, including those in the material producing country, regarding employee safety, environmental regulations, transport laws, and packaging. This includes having a robust EH&S program to support the safety and health of its employees. Supplier materials shall also conform to US OSHA, DOT, and EPA laws for transport, reporting, and regulatory compliance.

All material packaging and labeling shall be marked with appropriate GHS warning classifications under US OSHA laws and in English language. Material or product must not pose a health or safety threat to HWI employees. Proper material handling information should be sent to HWI prior to the first delivery of product. Any changes to packaging, labeling, safety, warning classification, or the safety data sheet must be forwarded to HWI's purchasing contact.

Safety Data Sheets (SDS) must be submitted to HWI for all materials used in the creation of HWI products. They should be provided in US-GHS format, as well as other languages and country formats as requested. Suppliers are responsible for collecting these documents from their own suppliers or for the creation of their own SDS. All SDS documents must be submitted to HWI initially at msds@thinkhwi.com and anytime there is a change.

(6) Quality System Requirements

Suppliers shall maintain a Quality Management System (QMS) suitable for the materials, products, or services provided to HWI.

In order to be considered a preferred supplier for HWI, the supplier QMS shall also be certified by an accredited third-party certification body to the latest version of one or both of the following, as applicable:

- ISO 9001 and/or
- TS 16949

Evidence of third-party certification shall be provided to HWI upon request.

Non-third-party certified suppliers of raw materials, products, and fabrication processes and/or any supplier deemed critical by HWI shall provide HWI evidence of an established quality management system upon request, including:

- Completed HWI Supplier Self-Assessment (Exhibit 4)
- Quality Manual, and
- Quality Policy.

Depending on the criticality of the material, product, or service, the designated HWI Contact may allow the acceptance of other evidence of compliance in the absence of third-party certification. Examples of which include but are not limited to HWI on site audits, supplier's quality manual, and supplier self-assessments.

Additional evidence of an established quality management system including but not limited to the following shall be provided upon request:

- Listing of quality goals and objectives as defined by senior management of supplier,
- Historical and YTD performance of the goals and objectives, and
- Charts or analysis of key product characteristics data.

The supplier shall immediately communicate any significant changes to the supplier's quality management system to the designated HWI contact.

(7) Supplier Approval & Assessment

HWI requires all suppliers to be approved prior to the award of any business via purchase order or agreement. The HWI Supplier Approval & Assessment Process may include, but is not limited to:

- Information requests in which HWI requests the supplier to provide quality management system certificates, financial information, certificates of insurance, completion of self-assessment questionnaires, and documentation of quality, delivery, technology, cost, and continuous improvement objectives, On-Site visits or "Gemba" walks at the supplier location to assess and validate quality systems and process capabilities such as:
 - Product or process capability assessments to validate ability to consistently deliver products which meet HWI specifications and requirements,
 - Adequacy of the supplier's Quality Management System based on ISO9001 or TS16949 standards or the supplier's self-assessment,
 - Business and operations process to validate the supplier has the financial capital, production capacity, and other business resources needed to fulfill HWI production needs and assurance of supply,

- Continuous improvement initiatives to validate the supplier's management structure, goals, and culture to continuously make themselves better,
- Technology assessments to validate the supplier's innovation, production, testing and inspection equipment, facilities, software, and technical resources, and
- Secondary supplier control to validate the effectiveness of the supplier's management processes to ensure that products or services procured from secondary sources are provided in a way that meets HWI requirements.

Additional requirements for specific categories can be found in Section 19, Category Specific Requirements.

(8) General Requirements

HWI suppliers shall comply with the below requirements at a minimum. Additional requirements for specific categories can be found in Section 19, Category Specific Requirements.

- Customer Communications

The supplier shall communicate essential business information to HWI. Such information may pertain to contractual issues including, but not limited to:

- Product quality issues relating to design, specifications, changes and notifications,
- Non-conforming product in advance of shipment, and
- Delivery delays and/or shortages.
- Raw Material Supply Changes or manufacturing facility changes

Other elements of material information relating to changes in the supplier's business environment must be communicated immediately, including without limitation, the following:

- Acquisitions,
- Partial Sale,
- Change of control/executive management,
- Pending or anticipated litigation,
- Restructuring, and
- Bankruptcy.

The effective transmission of such information requires that all suppliers identify and register key points of contact with their HWI counterparts. The majority of the communication shall be handled through electronic documents and systems. The supplier must adopt the necessary electronic systems to manage these processes and improve communications with HWI. The Supplier shall participate in the implementation of HWI Supplier Portal if HWI deems necessary. The supplier is responsible for the validity and accuracy of the documents submitted electronically and must comply with all applicable legal requirements regarding electronic signatures.

- Compliance with contractual requirements

The supplier is responsible for compliance with all terms and conditions within an agreement between HWI and the supplier. All specifications, performance guarantees, and other documentation are applicable to the supplier when specified in the agreement and are required to be extended to all levels of the supply chain of the supplier. Unless otherwise specified in the agreement, the specifications, drawings, or document revisions on the date of order by HWI will be in effect. Neither audit, inspection, or tests made by HWI or HWI customers relieves the supplier of its responsibility to deliver acceptable products or services that conform to all HWI requirements; nor does it preclude subsequent rejection by HWI or its customers. Suppliers shall adhere to all applicable laws and regulations, including but not limited to, the Foreign Corrupt Practices Act and U.K. Bribery Act 2010.

- HWI sources of supply

The supplier shall purchase products from HWI approved sources, when specified by the contract. The use of HWI approved sources, including sources of materials, products or services, does not relieve the supplier of the responsibility for ensuring the quality of purchased materials, products, and services. The supplier shall be responsible for managing all aspects of the relationship with the approved source including without limitation:

- Quality of product or service,
- Technical performance,
- Source of materials,
- On-time delivery, and
- Extension of Credit.

- Compliance of Secondary Suppliers

The supplier is responsible for meeting all HWI requirements, including work performed by the supplier's secondary suppliers (subcontract suppliers). When the supplier uses secondary sources, to supply materials or to perform work on products or services scheduled for delivery to HWI, the supplier shall document all the applicable technical and quality requirements including but not limited to quality system requirements, regulatory requirements, key processes, certifications, and test reports as required. HWI reserves the right to audit the supplier's secondary supplier operations.

- Risk Management & Business Continuity

The supplier shall establish and maintain a risk management program to ensure ongoing supply of materials, products or services scheduled for delivery to HWI.

This shall include but not be limited to the following areas:

- Natural disasters,
- Geo-political hazards,
- Supply chain disruptions,
- Facility or system issues,
- Information loss,
- Intellectual property claims,
- Personnel concerns, and
- Equipment problems.

A copy of the supplier's risk management program shall be furnished to HWI upon request. At a minimum, the supplier should have a business continuity plan which allows for the recovery of engineering drawings, technical data, and production tooling in the event of damage or loss. This plan should also contain contingency plans to ensure HWI requirements in the event of significant interruptions, labor shortages, equipment failure and supply shortages.

- Order Acknowledgements

Supplier shall provide acknowledgement in electronic form to the HWI buyer or via the Supplier Portal. Supplier shall provide within 2 business days from order placement an order acknowledgement. All dates and quantities provided in HWI purchase orders will be understood to have been accepted by the Supplier if no objection has been received by the supplier by 2 business days.

Supplier acknowledgement should at a minimum include the Acceptance or Communication of Change of the following order elements:

- Material Specifications,
- Order Quantities,
- Price, and
- Expected Ship & Delivery Dates.

The designated HWI contact must provide communication of acceptance of any change for it to be effective.

HWI is continually expanding the use of electronic business tools to facilitate daily administrative activities using electronic commerce between HWI suppliers and customers. HWI expects that suppliers shall adopt these improvements to reduce errors and improve efficiency.

(9) Process Control

HWI suppliers shall comply with the below requirements at a minimum. Additional requirements for specific categories can be found in Section 7, Supplier Approval & Assessment.

- Work Instructions and Documented Standard Work

Suppliers shall prepare documented standard work instructions for all employees having responsibilities for the operation of processes that impact product quality. These instructions shall be current and accessible for use at the area in which the work is being executed.

- Competence and Training

Suppliers shall determine the skills and knowledge needed to perform job functions which impact product quality and delivery. Records of employee training, certifications, etc. shall be maintained.

- Monitoring and Measuring Devices

Suppliers shall determine the measurements and monitoring required and measuring equipment needed to ensure its materials or products conform to HWI specifications and best practices. At a minimum, measuring equipment shall be calibrated and verified at start up and at specified intervals consistent with the equipment manufacturer or applicable industry standard, for example ASTM.

- Statistical Process Control

Suppliers shall use, to the maximum extent practical, statistical process controls to monitor and control manufacturing processes to minimize variation in the process and monitor any changes in the process which may lead to a material non-conformance.

- Preventative Maintenance

Suppliers shall identify key process equipment and develop a preventive maintenance plan that provides resources for equipment maintenance tasks consistent with the equipment manufacturers recommended preventative maintenance plan requirements.

- Shelf Life

Suppliers shall furnish documentation with each delivery that shows the manufacture date, expiration date, lot number, and required special handling or storage requirements for materials or products that have a limited or specified shelf life. Unless otherwise specified by agreement or agreed upon in writing by the appropriate HWI contact, all shelf life limited materials or products delivered to HWI shall have a minimum of 75% of the total shelf life for the material remaining.

- Process Traceability

Suppliers shall provide traceability throughout their process from finished product through incoming raw materials. At a minimum, traceability shall extend directly to certification/test reports for product supplied. Supporting documented information shall be retained as it pertains to conducting business with HWI for a minimum of three (3) years.

- Supplier Change Requests

Suppliers shall not make changes to their material, processes, facilities, equipment, product design, or any change which may affect the performance of HWI's products without written approval from the designated HWI contact.

(10) Product Qualification

This section defines the general requirements for qualification and approval for all HWI materials, products, and services. HWI suppliers shall comply with the below requirements at a minimum. Additional requirements for specific categories can be found in Section 19, Category Specific Requirements. It is the supplier's responsibility to ensure all requirements are understood and that its manufacturing processes have the capability to consistently meet these requirements.

The supplier shall provide documentation either in advance of shipment, or at a mutually agreed upon time with the HWI designated contact that the following verifications have been completed. Suppliers are requested to provide data on Certificates of Analysis (COAs) to ensure the material is within HWI's specification. Unless otherwise specified, Suppliers are to email their COAs to both the buyer and quality manager before shipment of material can be expected. Non-conforming material is to be covered under the Non-Conforming Material Section listed below. These verifications include but are not limited to the following:

- Material, laboratory and performance test results for all products and raw materials with chemical, physical and functional performance requirements,
- Dimensional results for each product if applicable, and
- Records showing compliance to all applicable HWI requirements.

After the Supplier approval process, all new or changed materials must undergo an approval process. This process begins with a review of the HWI specification and drawings, as applicable, and a signoff by both parties. In the course of the approval process the material is tested in a laboratory and in a trial production. The products of HarbisonWalker International will be tested to ensure the suitability of the material. HWI reserves the right to decide if the material is approved or not approved for a specific application. The material approval may be limited to certain applications or to certain production sites of HarbisonWalker International.

Any Supplier changes to equipment or facility must be addressed with HWI so that it can be documented, reviewed, and approved.

(11) Non-Conforming Material

Suppliers shall cover all costs to correct nonconforming materials or products supplied to HWI which includes but is not limited to expedited freight of replacement material, HWI labor to resolve the issue, and claims to HWI customers. Nonconforming product may be returned to the supplier at supplier expense, or the supplier may be required to dispose of any suspect material or product already shipped to HWI locations or designated warehouses that comply with applicable legal requirements. Supplier shall be responsible for the costs incurred by HWI to dispose of material that HWI deems unusable. Suppliers may request HWI to dispose of non-conforming material but will be charged for the cost incurred by HWI.

- Variance Requests for Non-Conformance

Suppliers shall not knowingly ship materials or products that deviate from a specification or drawing without prior written authorization from the HWI Sourcing Manager, HWI Quality Manager, HWI Research Engineer or other HWI authorized personnel. Shipment of any non-conforming material or product will be fulfilled via HWI written approval. Additional information on requirements can be found in the supplier non-conforming material variance request form in Exhibit 3.

If requested by HWI, the supplier shall send samples of nonconforming items to HWI for evaluation. The cost of shipping, inspection, and testing to determine approval of such material or product will be charged to the supplier.

HWI approval of a variance is specific to the current occurrence for which the non-conforming material or product has been submitted. Any approval shall not to be interpreted as a permanent technical change.

Suppliers shall fully contain all materials or products suspected of being nonconforming. Any materials or products shipped to HWI that have been approved for nonconformity shall be clearly identified on the pallet, container, and other packaging and shipping documentation.

(12) Packaging and Labeling

This section defines the general requirements for packaging and labeling of all materials, products and services supplied to HWI. HWI suppliers shall comply with the below requirements at a minimum.

- Suppliers shall transport material in optimal condition, without risk of contamination or damage,
- Supplier shall adequately plan for packaging designed to prevent contamination, weather impact, or loss and to eliminate shipping damage,
- Supplier shall provide packaging that provides for sufficient density and protection from any likely damage that may occur, including protection against humidity,
- Packaging shall meet local, national and international standards for safe disposal and/or recycling,
- If material is damaged during transportation due to insufficient packaging and/or stowage, suppliers shall pay for additional costs associated with the expedited shipment of the replacement material, and/or the replacement material itself,
- Suppliers shall initiate corrective action and communicate to HWI as required if packaging problems arise,
- Suppliers shall comply with all regulatory packaging requirements,
- Suppliers shall be responsible for the cost of packaging,
- Labeling must clearly indicate country of manufacture. The use of *various* to indicate the country or manufacture is prohibited.
- Suppliers shall clearly mark each material container (Bag, Drum, Tote, etc.) with the lot number, brand, identification, HWI PRM number and container weight,
- Suppliers are required to apply barcodes to every pallet of raw material for use at HWI plants. Labels should be printed and applied at the Supplier location prior to shipping. Labels should be large enough to be scanned from forklift / fork truck, and should contain at a minimum the lot number, brand, unique pallet number, HWI PRM number, and quantity (in pounds),
- Suppliers shall agree all shipment documentation must reflect the lot number, HWI PRM number, HWI purchase order number, quantity of pieces in shipment, the number of cartons or containers in shipment, supplier's name, bill of lading number, and country of origin of the material supplied, and
- All material packaging and labeling shall be marked with the appropriate GHS warning classifications under US OSHA laws and in English.

(13) Material And Product Delivery

This section defines the general requirements for material and product delivery for all HWI materials, products, and services. HWI suppliers shall comply with the below requirements at a minimum. Additional requirements for specific categories can be found in Section 19, Category Specific Requirements.

- Suppliers that are on a delivered basis (DDP for international shipments, FOB HWI location for US Domestic Shipments) shall agree that on-time delivery is defined as the complete receipt of all material or products on the designated requested delivery date to the HWI facility, port, or designated warehouse. Supplier is to be importer of record for all international shipments.
- Suppliers that are on an ExWorks basis shall agree that on-time delivery is defined as having product ready and prepared for shipment by the requested order date.
- Suppliers shall commit to absorb additional freight costs to HWI plant or designated warehouse in the event of late delivery for issues that are the fault of supplier.
- Suppliers shall absorb additional freight costs in the event they fail to follow HWI carrier routings.
- Suppliers shall notify the appropriate HWI contact immediately if they become aware of any reason that will delay the on-time delivery of their material or product.
- Suppliers shall notify the responsible contact at HWI immediately in writing if they become aware of any change in lead times for their materials or products.
- Supplier must provide the latest version of the SDS in the language of the country where the material will be delivered, and in English language.

(14) Supplier Corrective Action

HWI may issue a request for suppliers to complete a Supplier Corrective Action Request (SCAR) when nonconforming material or products are found. When a formal reply is requested via email by the HWI Sourcing Manager the supplier is required to use the SCAR Form PUR-01_Rev02_051617 shown in Exhibit 2.

In addition to completing the SCAR, the supplier shall include answers to the following questions at a minimum:

- Why the specific non-conforming condition or incident occurred – Why Made?

- Why the non-conforming condition was not detected by the supplier's quality controls – Why Missed?
- Why the related process allowed the nonconformance to occur? and
- Why the elimination of the root cause identified will result in the elimination of the problem?

Statements from the supplier indicating that the corrective action is to alert and/or retrain an employee, and/or increase inspection, are not acceptable corrective actions without more detail being required. These responses will be considered inadequate by HWI until the underlying root cause(s) of why the supplier's policy, standard work instructions, process, and/or system allowed the problem to develop and occur in the first place.

Suppliers shall respond to a SCAR request as follows:

- Suppliers shall acknowledge receipt of SCAR notification and communicate to HWI within 24 hours
- Suppliers shall provide an update of the investigation results to HWI during the initial response period within 72 hours. This update must include the following at a minimum:
 - Confirmation that the supplier has identified all suspect material or products in process, in finished goods, in transit, and at any HWI site or designated warehouse by PO number and lot code, and
 - Additional specific containment actions needed to be taken by the supplier and/or HWI.
- Suppliers shall submit the completed SCAR indicating the actions taken/to be taken to prevent reoccurrence of the same problem, the occurrence of similar problems, and the effective date of the improvement within 20 business days. Follow up requests as well as Supplier site audits to verify that the preventative or corrective measures take to address the root cause of the SCAR may be required by HWI. If so, HWI will notify supplier of request for a site visit and work with Supplier to determine a mutually agreeable date.

(15) Supplier Performance

HWI's supplier performance management system includes but is not limited to safety, quality, delivery, inventory, cost, and people to develop an overall supplier performance rating. This rating serves as an objective measure to determine whether HWI expectations are being met by the supplier. At HWI's discretion, the designated HWI Contact will address supplier's performance during

periodic business reviews or supplier relationship management meeting with the supplier. If applicable, documented corrective action and improvement plans will be required.

HWI will assess the supply base and select certain Tier 1 suppliers to participate in our Supplier Relationship Management Program (SRM). Supplier's will be selected based on factors that include the previous year's spend and metric ton volume, on-time performance, quality records and the strategic importance of the supplier and product portfolio. Supplier's selected to participate in HWI's SRM program will be expected to jointly lead business review meetings with procurement and HWI business leaders throughout the year.

(16) Invoice Formatting

All Invoices are to be sent to: accountspayable@thinkHWI.com.

To insure timely processing of invoices:

- a) Reference HWI PO# and HWI Buyer.
- b) Invoice must be legible and in PDF format.
- c) Send only one Invoice attachment per email, and do not send multiple invoices in one PDF
- d) Be sure to indicate proper ShipTo Location on invoices where material or service was provided
- e) Do not send multiple copies of previously submitted invoices. This duplication will only inhibit our ability to provide timely payment

Payment inquiries, statements, and general correspondence must be sent directly to apinquiry@thinkHWI.com.

To receive electronic payment advice, please send requests and recipients for the remittance advice to suppliermasterdata@thinkHWI.com.

For requests to convert to electronic payment, please provide the appropriate banking information to suppliermasterdata@thinkHWI.com.

Additionally, HWI invoices require the following information at a minimum to ensure a timely payment to suppliers:

- 1) PO line item number
- 2) Invoice number
- 3) Invoice date
- 4) Invoice quantity
- 5) Unit of measure+
- 6) Description that matches HWI's purchase order description
- 7) HWI PRM number or item number
- 8) Unit price
- 9) Extended price
- 10) Price currency
- 11) The 'Remit To' address
- 12) Contact information
- 13) Ship date

(17) Insurance

At all times, suppliers shall maintain applicable insurance to cover any loss/damage to material or products. At a minimum, the supplier shall procure a certificate of insurance and provide it to HWI at the following limits prior to the sale of goods or performance of services:

- Commercial General Liability (including product liability, completed operations, contractual liability, and advertising injury) in an amount no less than \$1 million per occurrence,
- \$1 million aggregate; worker's compensation in statutorily required amounts,
- Automobile liability in an amount no less than \$1 million per occurrence,
- \$3 million aggregate; and umbrella insurance over the commercial general liability and automobile insurance in an amount not less than \$5 million, and
- \$2 million for umbrella/excess liability, each occurrence.

The supplier shall list "HarbisonWalker International, Inc." as an additional insured on all certificates.

(18) Continuous Improvement

Continuous improvement is critical to ensure HWI is meeting its customers' expectations in terms of quality, delivery, performance, and cost. All HWI suppliers shall continually strive to improve their products, processes, and systems. Suppliers shall document and execute improvement initiatives

that include but are not limited to the following areas which will be reviewed by the supplier and HWI during periodic Supplier Relationship Management meetings between the parties.

- Cost and waste reduction,
- Inventory reduction,
- Yield improvement,
- Variation reduction,
- Delivery improvement,
- Technology improvement, and
- Innovation.

(19) Category Specific Requirements

a) Raw Materials

Packaging and Labeling

Supplier shall properly pack, mark and ship goods as instructed by HWI and otherwise in accordance with applicable law and industry standards, and shall provide HWI with shipment documentation showing the Purchase Order number, Supplier's identification number for the subject goods, HWI's identification number, commonly referred to as PRM, or purchased raw material, for the subject goods (each material container (bag, drum, tote, etc.) must be clearly marked with the lot number, brand identification, and container weight), the quantity of pieces in shipment, the number of cartons or containers in shipment, supplier's name, the bill of lading number, and the country of origin.

Quality Control

- Suppliers shall provide product which fully meets HWI purchased product specifications and requirements.
- If non-conforming material must be considered, supplier is required to notify HWI in advance for review and approval as detailed in Section 11, Non-Conforming Material.
- All materials supplied are to be dry or, in cases where there is specification allowance for moisture, material must meet the specified requirement.
- All materials supplied shall be free of contaminants.
- All packaged raw materials must be free flowing and free of clumps within specified shelf life for the material.

Certificate of Analysis

Supplier shall provide a Certificate of Analysis to HWI prior to shipment. The Certificate of Analysis shall reflect the lot number of the material supplied.

Suppliers are required to ship material of a first-in-first-out basis (FIFO) lot-controlled basis. Lot and/or date coding on the product packaging must clearly enable HWI to distinguish age and order of production of material supplied.

COAs are required to be provided, preferably by electronic means, in advance of shipment or, at a minimum, with the shipment. COAs are to be (a) clearly traceable to lot code information on product supplied; and (b) must address all characteristics specified and required by HWI.

b) Resale

Packaging and Labeling

For Resale products that will be sold under HWI brand names, HWI will provide supplier with labels and packaging materials as HWI deems necessary for its purchase and resale of the products. Labeling must clearly indicate country of manufacture. The use of *various* to indicate the country or manufacture is prohibited. Supplier shall affix such labels and use such packaging materials as HWI directs. Supplier shall not affix HWI labels to or use HWI packaging for any other goods, nor shall supplier deliver to any person or entity other than HWI any products that bear HWI's name, mark, or other source-identifying characteristic, absent the expressed written consent of HWI.

Product Testing and Certificate of Analysis

Prior to shipment to HWI, supplier shall ensure the products have been tested using methods which are consistent with industry standards and provide to HWI a COA demonstrating conformance of the products to all agreed upon specifications. Upon request, suppliers must provide details on test methods or procedures used.

Technical Data Sheets and Specifications

Supplier shall provide up to date Technical Data Sheets and Specifications for all qualified products that will be sold to HWI. Supplier represents and warrants that the Technical Data Sheets and Specifications supplied with the products are true and correct in all material respects. Supplier shall notify promptly and in writing of any updates or changes to these documents.

Safety Data Sheets

Supplier represents and warrants that the Safety Data Sheets supplied with the products are true and correct in all material respects. In the event Supplier is utilizing materials from HWI, it may rely on HWI's SDS for such materials.

c) Fabricators

Labeling and Packaging

For fabricated products that will be sold under HWI brand names, HWI will provide Supplier with labels and packaging materials as HWI deems necessary for its purchase and resale of the products. Labeling must clearly indicate country of manufacture. The use of *various* to indicate the country or manufacture is prohibited. Supplier shall affix such labels and use such packaging materials as HWI directs. Supplier shall not affix HWI labels to or use HWI packaging for any other goods, nor shall supplier deliver to any person or entity other than HWI any products that bear HWI's name, mark, or other source-identifying characteristic, absent the expressed written consent of the HWI.

d) Logistics

Routing Instruction

The transportation request must be sent to the following email address:

HWI_inbound@intellitrans.com. (If needed, IntelliTrans' cell phone numbers are as follows: 972-523-1138 and 470-451-8161)

For exceptional cases, the HWI Transportation Department can be used to help with routing instruction (via <mailto:corporatetraffic@thinkHWI.com>)

Premium Freight / Expedites / Special Transport

Special transportation is defined as any transportation deviating from the agreed transportation process and corresponding transit times.

- Rush transportation
- Spot market
- Expedited transport with second driver
- Air freight

HWI's expectation is that all deliveries will be made 100% on time, in accordance with the demand for accurate quantity and quality deliverance from the supplier. The expectation is that there is no expedited freight. Cost charging due to delay or quantity / quality reasons caused by supplier will be

charged against the supplier. Expedited freight is to be organized by HWI or HWI_inbound@intellitrans.com unless otherwise agreed. In the case that HWI delegates the organization of expedited freight to the supplier, the supplier must provide all necessary details (way bill no carrier ETD/ETA, etc.) to HWI.

Documentation

The supplier shall provide the driver with the following documents:

- Transportation document (Bill of Lading /Way Bill),
- Delivery-note / Packing list,
- Customs documents if required (Certificate of origin, commercial invoice), and
- In case of LTL shipments, all transport documents (delivery note, etc.) must be attached to the handling unit. Loose transport documents will not be forwarded in the HWI LTL network and can result in a claim or penalty against the supplier. The supplier and driver are required to note any deviation on the Bill of lading, e.g., waiting hours, quantities, packaging, etc., and the Bill of Lading must be signed by the supplier and the driver.

Securing Goods

The cargo securing shall fulfil all national and/or international regulations for sending and receiving goods. The driver is responsible for securing the goods correctly for all modes of transport per FMCSA regulation 49 CFR 390.5. The driver shall close and if required, seal the trailer after the loading is finished. Note, some countries (e.g., Germany) require by law that the load securing is done partly and at a minimum is controlled by the supplier. In the case that re-securing is required, this shall be done by the driver. For certain loads, a specific load securing certificate / instruction may be applicable.

Logistics Contacts

To ensure efficient communication between suppliers and HWI, suppliers must designate key contact personnel responsible for handling logistics support, including:

- Name of contact,
- Nominated deputy, and
- Supervisor with e-mail and phone numbers.

The key contact person must have the necessary expertise to handle each issue regarding products and orders. The key contact will always be reachable during the supplier's regular local working hours. Outside of these business hours, the delegated emergency contacts must be reachable.

Exhibit 1

Packaging Specification

- 1) Crates or pallets of wood or manmade materials should be of a size and configuration that properly fit the items to be shipped. (All solid wood packaging must be ISPM 15 certified).
- 2) Items placed on or in crates or pallets must be blocked and braced, strapped, or wrapped in a manner that prevents them from falling off, coming loose or subjecting them to inclement weather conditions.
- 3) Material arriving on flatbed trailers must be covered and 100% weather protected.
- 4) Shipments traveling by common carrier (UPS, FedEx, Express Mail, etc.) should be packaged in boxes, bags, and envelopes, etc., designed to hold the specific items to be shipped (e.g., cardboard boxes with a 100 lb. burst strength are not acceptable for packages of 125 lbs. or more.). Supplier is responsible to select the best and most sensible containment option.
- 5) Material should be packed in the container in a manner that prevents it from moving or flowing against other material.
- 6) Labeling must clearly indicate country of manufacture. The use of *various* to indicate the country or manufacture is prohibited.
- 7) Multiple boxes or containers shipped by any method should be marked on the outside, such as (1 of 1) or (1 of 2), etc. if applicable.

Exhibit 2

Supplier Corrective Action Request (SCAR) Form

Form # PUR-01 Rev. 2 (05/16/17)

	SCAR# _____	Issued Date _____
	RMVR# _____	Initial Response Due By: _____
	HWI Part Number: _____	Final Response Due By: _____
	HWI PO Number _____	HWI Buyer _____
	Vendor Lot Number _____	HWI Buyer Fax: _____
	Vendor Product Name _____	HWI Buyer Email _____
Supplier	Supplier Contact Name: _____	
	Contact Phone: _____	
	Contact Email: _____	
Initial Response on: Investigation, Root Cause and Corrective Action due within 7 working days		
Unsatisfactory Condition (Completed by HWI)		
Cost Impact to HWI (Completed by HWI)		
The referenced amount does not include additional fees and costs, applicable attorney's fees, and other compensation. This amount shall not be misconstrued as a cap		
Investigation Results (Completed by Supplier)		
Root Cause (Completed by Supplier)		
Supplier Response by (Name):		Date:
Corrective Action: (Completed by Supplier)		
Expected Implementation Due Date:		Date Implemented:
Final Response on Preventive Action due within 20 working days		
Preventive Action (Completed By Supplier)		
Expected Implementation Due Date:		Date Implemented:
Supplier Response by (Name):		Date:
Inquiry / Audit Follow-Up		
Implementation Status:	Yes: XXX No: _____	Date Sent: _____
Supplier Audit Follow-up Comments:		
HWI Status / Closure Comments:		

Exhibit 3

Supplier Non-conforming material variance request (PVR type) form

PRODUCT VARIANCE REQUEST FORM

Plant Quality Assurance Department

PVR #:

Date:

Plant:

Customer:

Location:

Sales Order Number:

Salesperson:

CAS:

Application Code, Description; Technology Manager, Application Specialist:
Select Application Code

Brand:

Shape/Quantity:

Lot Codes:

Description of Requested Variance (Attach plant documentation and Test Results)

Authorized By:

Application Technology / Application Specialist / Sales

Sent to:

Application Technology Manager/Sales
Research/Application Specialist

Date Sent:

Product Variance Request Accepted

Yes

No

Customer Notified of Product Variance

Yes

No

If Customer Notified, List Name/Title

REASON FOR ACCEPTING/REJECTING PRODUCT VARIANCE:

Authorized By:

Corporate Quality Assurance

Problem Category: — A to M — — N to Z —

TO: Plant (for shipping files)

Plant QA Lab File

Corporate QA File

Internal CAR Required Yes No

DATE:

Corporate QA Management

Exhibit 4

HWI Supplier QMS Self-Assessment

HWI, A member of Caldersys, is dedicated to ensuring the quality of all incoming raw material sources that are critical to our success. As a supplier of materials critical to the quality of our refractory products, we require that you complete our quality self-assessment.

We have designed this survey to be as easy as possible to complete. If your company has an ISO 9001 or TS 16949 certified quality system, simply complete Section I below. If you are not ISO 9001 certified, you must complete the Section II self-assessment.

Please complete:

Company Name:					
Address:					
City		State		Zip	
Telephone				Fax	
Contact Name:					
Contact Title:					

Section I - Quality Management System (QMS) Certification

Are you ISO 9001 Certified? Yes _____ No _____
 Are you TS 16949 Certified? Yes _____ No _____

If you checked yes, sign and date this page, attach a copy (or copies) of your certification(s) covering each facility which manufactures and/or ships product to our family of companies, and return to the above address.

Section II - Quality System Survey

	YES	NO
Does your company have a functioning quality system?		
Is this quality system documented via a Quality Manual, Standard Operating Procedures, and/or Works Instructions?		
Do you have an individual who is responsible for the maintenance of the quality system and resolution of quality related issues?		
Are internal audits of your quality system performed and documented to facilitate continuous improvement?		
Is there a documented training program addressing employee skills requirements and quality systems? Are training records maintained?		
Do you verify customer specifications for correctness and revision levels against purchase orders?		
Do you monitor due dates of purchase orders and acknowledge changes if dates are not to be met?		
Are procedures in place to ensure that only approved suppliers are used to provide quality related raw materials and services?		
Are records maintained of acceptable vendors and their performance against purchase order requirements?		
Are all materials subject to a documented quality approval process when received?		
Are manufacturing processes documented to ensure consistent quality?		
Is there documented finished product inspection/testing program which assures customer requirements are met prior to shipment?		
Is there a documented system requiring customer notification prior to shipment of product which does not fully meet agreed to quality level?		
Does a system exist which specifies required quality records and retention/control of such records?		
Are all quality related instruments, production equipment, and test measuring equipment periodically calibrated?		
Is there a system in place ensuring correct identification, labeling and packaging of finished products?		
Are procedures in place ensuring that materials are handled and stored properly?		

Note: The answers to the questions in this survey will provide a basis for possible future quality system audits by HarbisonWalker International.

Section III – Corrective Action

For each item answered as “no”, please identify plans to correct and upgrade your quality system. Corrective action responses are to be submitted with the survey form.

Form PUR-05, Rev. 3 10/6/17