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Quality Control Procedure

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QC PROCEDURE FOR HOT & COLD INSULATION

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Prepared by:	R.GENTURALEZ			
Checked by:				
Reviewed by:				
Approved by:				
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QUALITY ASSURANCE / QUALITY CONTROL PROGRAM

POLICY



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The policy of akio KUNO & partners INSULATION Co. Ltd. is to ensure that its projects when completed shall comply with the contract specification, drawings, industrial standards, local regulations and good construction practices.

In the application of this policy, a continuous program of construction quality control is followed.

The inspection and quality control operation will produce appropriate records and all operations will be subjected to the internal audit of the QA/QC at a periodic time in a Project to ensure proper implementation by site personnel.

Contractor's inspection and quality control program can be supplemented to satisfy contractual regulation or to encompass new materials and techniques but may not be unilaterally waived. Quality Control Engineer as inspector assigned to the project will have full responsibility, over quality assurance and quality control.

The Project will be manned with experience Quality Control Engineer as Inspectors. Each specialized in one or more construction categories such as Insulation works, Refractory, Fireproofing, etc.

For sub - contractors they shall be required to work, meeting all the obligations and requirement of our approved QA / QC program.

1.0 CONSTRUCTION PHASE

GENERAL GOALS AND OBJECTIVES

Based on experience gained on many completed projects, our management considers the following points for the project to maintain its reputation as a reliable contractor.

Qualified and motivated manpower
Dependable construction equipment

Required personnel will be selected on the basis of skill and experience. Suitable candidates will first undergo physical and mental examination.

Those passing the examination will be informed about the project, its scope, schedule of work and living condition in the area of the assignment.

For a number of trades, additional training will be organized to ensure adequate skill to pass special tests and be certified as may be required for welders, heavy truck drivers, equipment operators, scaffolders, etc.



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The construction equipment section will receive instruction to make the equipment required for the project ready for inspection by the maintenance engineer assigned to the project. Inspection for special requirements on equipment is issued so that it will be acceptable for operation on the particular project.

Our management considers that establishing and maintaining an effective construction quality control program is a cascading responsibility starting with the Construction Manager and progressing through staff to and including the job foreman.

In order to assure adequacy and uniformity of the quality control program, a quality controller is assigned for each project to establish, monitor and coordinate the quality control activities.

The technical guidance in all matters pertaining to quality control is received by the site manager via the approved technical submittal from CLIENT throughout the construction period.

IMPLEMENTATION

Before the start of the construction project a quality control engineer is assigned, he will be responsible for administering all quality control activities and documentation in accordance with the special requirements of the project.

The QA/QC (Quality Controller) to be assigned to this job is the same as the Supervisor, his resume together with the QA/QC department Organization chart is always included in the document submittals to clients.

The first duty of the quality control engineer will be to study the contract documents assisted by others. He will outline the criteria for the developments of the detailed control requirements. This will involve the preparation of procedures and instruction for each construction activity, selection of recording and reporting forms, obtaining required industrial standard and specifications etc.

All Quality Control personnel will be responsible for the quality of the work under their areas of control. They will act as inspectors for the CONTRACTOR and should report deficiencies through the proper channels. They will also act as liaison between the contractor and the CLIENT in



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matters pertaining to quality control, inspection and testing, and generate the required documentation to satisfy the contractual requirements.

For a particular job, capable inspectors will also work with the QA/QC engineer. They will keep on monitoring with the QA/QC supervisor how the work is being done, whether the workers are following the right procedures for a certain job.

The QA/QC engineer will also check with all supervisory personnel including foreman for all disciplines the procedures of work for each activity prior to its start.

He will also review the pattern of work and establish reporting forms, which will enable him to verify if the requirement was met. Such forms could include status and progress as well.

2.0 Job Engineering Record and Information

Construction generates information. The record of which is important for checking purposes or simply because of its inherent engineering value. Such details must record and maintain a suitable and consistent manner. Sample reporting and test forms are always attached (see corresponding form attachments).

- 2.1.0 The field supervisor's daily record notebook and QC inspectors daily activity report or job diary are important documents that must be maintained in accordance with good inspection practice.
- 2.1.1 Record of surface preparation before installation of insulation and jacketing must be kept and maintained.
- 2.1.2 Record of correct insulation material usage on piping and equipment must be kept and maintained.
- 2.1.3 Record of jacketing final appearance on equipment and piping shall be kept and maintained and form a part of the permanent record.
- 2.1.4 Hydro test result, other tests and inspection report are also part of the record.



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2.1.5 Special report or studies must be included in the construction generating engineering records, if necessary.

It is the quality controller's responsibility to maintain these records in a professional manner and consult with main office.

Information is the lifeblood of the construction, the progress of the job depends on it. The field construction supervisor is responsible in keeping it flowing and directing the flow where it is required.

3.0 DOCUMENT CONTROL

The task of engineering information control simply is to systematically and efficiently receive records and distribute the engineering information to the points it is to be used and ensure that the user has the latest information available. The user, of course, is the individual craftsman or craft foreman, the engineer and the superintendent. The QA/QC shall verify that they have the proper drawings and specifications for the file.

3.1 The construction drawings are received in one of the two ways or a combination of two.

3.1.0 They may be received in the form of blue prints (in the agreed upon number of copies) or

3.2.0 They may be received in the form of hard copies A2 or A3 sizes.

The construction drawings are received in the field with the following data

Project Identification

Drawing identification (title & number)

Revision Number and date of receipt

Distribution

Drawing Transmittal are kept on file in chronological order

The master file of copies of Construction drawings is maintained on the same system as well as the engineering drawing. The drawing is grouped in numerical order on plan holders identified by prime cost code account numbers. The holders are placed on wall mounted racks or free standing racks. Construction specification are normally issued to the field in an agreed upon number. As in the case of construction drawing, construction specification is distributed to the craft supervisor with responsibility for the work covered by the specification. The engineer's file copy or field office



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copies are filed in loose leaf notebooks, which have the advantage of easy access for reference and provided protection against loss.

4.0 MAJOR FACILITIES FOR QUALITY CONTROL

Personnel and construction equipment are major factors in performing works.

The project site is equipped with the right facilities for quality control. Although the main aspects are identical for each project, detail may differ depending on CLIENT, engineering and applicable industrial standards.

Testing equipment or facilities and procedures shall be done in conformity with CLIENT standard and specifications at the manufacturer's facilities or an independent testing laboratory. Mill certificates for foreign origin materials shall be provided accordingly.

Contract documents are carefully screened to make sure that correct procedures and instructions are prepared and issued and that the project site is equipped with test and inspection facilities as required by the applicable standards.

4.2 Test Procedures

Quality check on all materials approved

All materials that are being used or to be used will be subjected for inspection by the QA/QC Engineer, witnessed by Client's representative.

4.2.1 Testing and Inspection

Testing will be carried out on all finished product and materials at the manufacturer's facilities or be done by an independent laboratory. Mill certificates on all the foreign origin materials shall be provided as necessary.

4.2.2 Routine and Frequency Inspection

This will be made to ensure that the material continues to comply with the project specifications as well as the method of construction.



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4.2.3 Reporting all tests performed (Company representative to receive reports.)

Test and all inspections will be reported to the engineer or his representative. The technicians inspectors and QA/QC supervisor will do such test and inspection reports.

4.2.4 Record Keeping

All testing related inspection and quality control operation would be recorded appropriately for future references. They should be easily available to the QA/QC Supervisor. Submittal receiver will be assigned to maintain and keep all the records.

4.3 Failure of Test (Company representative to receive reports)

Any failure or deviation in the quality of materials will be reported to the Engineer so that retest or investigation will be made. This will be done by completing an inspection form and arrange for a joint inspection. Corrective action must be done and discussed whether it can still comply with the job and material specifications. If the material or work was found to be acceptable and satisfactory, it must be cleared and approved first by the Company representative prior to proceeding to the next phase of work or prior to using and installing the material. If the material or work proves to be poor quality, it will be removed and replaced with the approved materials.

5.0 QUALITY CONTROL ACTIVITIES

General

Below are brief generalized activities, some of which may have been done prior to commencing the project.

- Training / Testing of Craftsman
- Preparation of procedures and job instructions
- Construction equipment maintenance / materials control
- Checking and verifying contracts documents
- Selection of recording and reporting forms
- Maintain work quality protect from damage and final cleaning on completed work



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QA/QC Activities and Responsibilities

The following are detailed activities necessary to ensure the quality and compliance of the installation with contractual requirements.

Parts of these activities may be performed by the owner or others on behalf of the owner, whereby contractor provides only supporting personnel and facilities. Most of it is, however, done as routine matter by the contractor's inspectors and supervisors. Records and reports on the result of the test and inspection are made and kept as history records for future reference (Sample of reporting. Test and inspection forms are shown and attached see corresponding attachments).

5.1 Material Receiving and Storage

Material shall be inspected by the material controller upon arrival at site. Any deviations from applicable standards shall be duly noted and informed to the QA/QC in - charge. Any material not conforming to applicable standards shall be rejected and brought outside the jobsite premises. Materials which conform to standards shall be properly stored in an orderly manner at the storage warehouse or it can be stored in an open storage yard properly stacked in pallets and covered with tarpaulin canvass or vinyl sheet.

5.2 Surface Cleaning

The surfaces to be insulated i.e. equipment and piping, shall be thoroughly cleaned and must be free of rust, slag, etc. Touch up paint shall be done on damaged surfaces before insulation works could commence. Release notice for hydro test completion shall be issued to the insulation contractor before the start of any insulation works.

5.2 Installation of Insulation

Insulation materials shall be applied on Equipment and Piping after Proper surface cleanliness has been checked by the QC inspector and witnessed by client's representative. The supervisor or foreman in charge should ensure that the correct material is applied as per the appropriate standard. Fastening materials shall also be as per standard and in correct dimension vis a vis the distance or pitch.

5.3 Installation of Weatherproofing



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Weatherproofing or jacketing shall be applied on the insulation materials for protection against the adverse effect of the environment. correct type of material shall be used. Proper overlap shall be observed and correct positioning of the metal cladding joints, so that there shall be no water or moisture penetration. Any possible source of moisture entrance such as supports, etc., shall be applied with metal flashing and caulked with sealant properly. Final appearance shall be taken into consideration whereby workmanship is of the best quality.

5.3.1 Field Quality Control

Surface Cleaning

- Receive release notice
- Clean surface properly with rags, wire brush, etc.
- Check surface for cleanliness

Installation of Insulation

- Inspect materials as per standard
- Check insulation thickness
- Verify fastening accessories as per dimension

Installation of Weatherproofing

- Inspect materials as per standard
- Verify fastening accessories as per dimension
- Check proper caulking
- Check final appearance

6.0 DEVIATIONS

It shall be the responsibility of the project manager, QA/QC department along with the company representative or their designed technical personnel to review and approved or disapproved any requested revisions, designed changes or materials changes.

When such revisions were not approved, they will be considered as deviation



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RECEIVING INSPECTION

When deviation is determined during receiving inspection, the QA/QC department along with company representative shall notify the construction supervisory personnel to obtain corrective actions.

In case corrective action cannot be obtained the QA/QC department and construction supervisory personnel shall notify the project manager. Items facility to confirm to the requirements shall not be utilized without the quality controller's written approval.

CONSTRUCTION INSPECTION

Where a deviation is located during construction operation, this must be logged and then cleared by the company representative if the corrective action done is acceptable.

In case immediate corrective action cannot be obtained the quality controller shall record the deviation for appropriate follow-up at a later date.

If correction to such deviations does not require changes to the design documents, they shall be accomplished under the direction of the quality controller or his designate as follows

- a) Re-work to original specification in accordance with approval re-work instruction or
- b) Scrap and replace with acceptable material. In case immediate corrective action is needed and it cannot be obtained from the responsible supervisor, the quality controller shall stop the work or take other appropriate immediate action.

When the work required by the deviation disposition has been completed, the quality controller shall re-inspect the work and if acceptable, records and file the acceptance with the deviation procedure in accepting and rejecting activity in a flow chart format is herewith attached.

7.0 PROCUREMENT PHASE

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The responsible for establishing the inspection & documentation procedures in receiving handling and storage of materials and equipment received at the site is a joint effort between the materials department and quality control group.

The field materials controller has a responsible for receipt storage issuance of all materials and equipment at the construction site and the quality controller has the responsibility for inspecting the materials and equipment as necessary not only during delivery on site but also at the source of purchase and during fabrication.

For sub-contractor, their responsibility regarding receiving handling and keeping materials will be exactly in accordance with the approved procurement plan of the contractor.

7.1 GOALS AND OBJECTIVES

The purpose of the QA/QC procurement plan are briefly discussed below:

7.1.1 To ensure that all materials purchased or arranged for the project complies with the specification and the standards of the requirements.

1.2 That all materials must have CLIENT approval prior to ordering and using. This is done by accomplishing a submittal which specify the technical data of the materials and also includes catalogs and brochure if necessary.

8.0 IMPLEMENTATION

The purpose of this section is an collaborating of acceptable site practice being utilized in the basic receiving procedures so as to ensure the integrity of all materials and equipment required for the project.

The requirements of these procedures are also implemented by the project quality controller.

The Project Controller shall:

- a) Provide facility and personnel necessary to check for visible damage and properly place all materials, equipment or components part to a designated storage area.



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- b) Assure proper identification of item listed on purchase documents, receiving papers etc. with the assistance of material controller
- c) Instruct receiving personnel to refuse acceptance of delivery of materials which are obviously in damage and no longer satisfactory for use.
- d) Identify and records damage at the time of off loading and notify the quality controller.

Generate and maintain records and documents

9.0. RECORD CONTROL

The QA/QC department must see to it that the following records and documents in receiving inspecting and rejecting materials must be kept and file accordingly.

- 9.1 Purchase order log – To be accomplished and file by the materials receiver. A copy is to be furnished also to the inspector, which will use a reference whenever inspection is to be carried out.
- 9.2 Material receiving reports – The QA/QC department must have a copy of this report where in they can verify the delivered items if they conform to the specified ones.
- 9.3 Damage materials report – To be accomplished as soon as damage materials are verified.
- 9.4 Material inspection test report – To be accomplished by the inspector. Note that the QA/QC supervisor is present during the inspection.
- 9.5 Spare parts list – These are normally attached to the equipment, during delivery and must be kept and file as these will be turned over to CLIENT upon mechanical completion.
- 9.6 Operation and maintenance manual or procedures normally attached to the equipment during delivery and must be kept as these will be turned over to the CLIENT upon mechanical completion.



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- 9.7 Protect drawing and specification – complete set of this must be maintained by the QA/QC department as reference during verification of delivered items. Whether it conforms and complies with the construction drawing and specification.
- 9.8 A copy of materials submittal approval must also be furnished to the receiving personnel for the purpose of verifying the delivered items.

10.0. QA/QC ACTIVITIES

10.1 VENDORS INSPECTION

The QA/QC activities will be carried out by the Contractor at the Vendor's plants. Depending upon the nature of the work and the stages at which inspection have to be carried out. The contractor will assign its vendor inspectors (off site QA/QC) who will conduct all necessary inspection as instructed by the QA/QC Manager or required by the company representative. To ensure that the material or equipment is manufactured in the same designed dimension quality as specified in the specification and as approved by the CLIENT. The Inspector shall perform the inspection of the materials and equipment on fabrication at the factory and immediately upon delivery to verify any damage during the transporting.

The inspector shall report the results of inspection to the CLIENT in accordance with the inspection list and if necessary a joint inspection with the CLIENT will be performed.

OFFSITE CORRECTION AND REPAIR REQUIREMENT

If incorrect materials or equipment are found, the inspector shall:

Report to the QA/QC Manager and or to the CLIENT and arrange for a joint inspection so as corrective action can be discussed.

Request the vendor to prepare and propose corrective action procedures and submit it to the Project Manager. QA/QC Manager and CLIENT for their review and approval. Inspector shall then advise the vendor of required remedial action and perform the QC activities accordingly.



10.2 ACCEPTANCE / REJECTION PROCEDURES

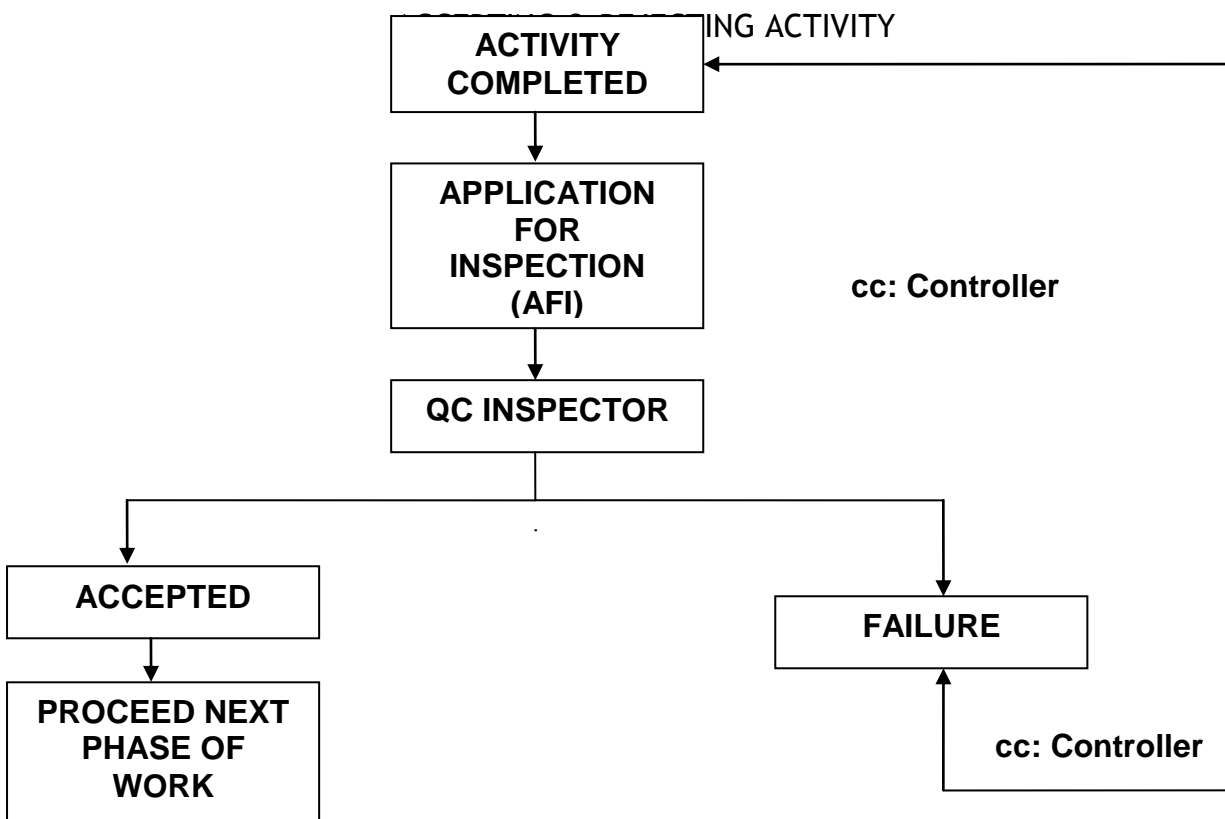
As discussed earlier in this procurement phase program, receiving and keeping the materials is the prime duty of the material controller. However, for the quality assurance of the delivered items, the Quality Control Department schedules the inspection of all materials being delivered and received on site. This will be done in the presence of the QA/QC Supervisor himself or any member of his group.

Those materials which are found to be good and satisfactory will be

transported directly to site to use. Delivered items which do not require immediate installation will be stored properly until use.

If materials are found to be poor quality, these will go outside directly to surplus storage area. For materials which need corrective action a repeat inspection and acceptance procedure will be performed upon accomplishing the recommended corrective actions? (Flow Diagram of Activities in accepting and rejecting materials is attached).

FLOW DIAGRAM FOR ACTIVITY





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