METALCRAFTS

QUALITY POLICY

Our product shall bear and exhibit a high and distinct quality, consistency and performance as measured against the Customer's expectations.

We are committed to delivering Products and Services on-time and at an optimal cost.

Delivering exceptional customer service and total customer satisfaction are our top priorities.

Customers, Suppliers and Employees are considered vital and fundamental to our business success and shall be treated fairly and with respect.

Internal manufacturing processes and procured products shall be safe in all respects.

We will strive to provide accurate and complete documentation.

We will provide an environment that motivates and provides high levels of job satisfaction.

Chief Executive

METALCRAFTS

QUALITY ASSURANCE MANUAL

CONTENTS

Quality Control Program

1. General

a) Introduction

This Quality Control Program assures that all the quality related work elements for all products, manufactured by METALCRAFTS are inspected and controlled through each phase of production.

b) Procedures

Written Quality Control procedures with specific instructions shall be applied to all .

Any flaws can be discovered through the conscientious application of these written instructions in the early stages so that corrective action can be expedited.

2. QUALITY CONTROL ORGANIZATION

2-1 General

Quality Control Department has been established for developing and maintaining the product quality through the Quality Control Program.

The detailed functions of these specific organizations are described as follows:

2-2 Quality Assurance Department

The Quality Assurance Department has two sections whose responsibilities are as follows;

2-2-1 Quality Assurance Section

(a) Establishment, maintaining and application of the in-plant standards.

(b) Reviewing the in-plant standards by comparing actual operations with the standards.

(c) Collecting and statistically analyzing the data concerning Quality Control.

(d) Necessary education and training for the people and specific personnel concerning Quality Control.

(f) Reviewing errors in design, inspection of the specific items and suspending its operation.

(g) Advising the selection of possible subcontractors from the point of view of Quality Control .

2-2-2 Quality Control Section

(a) Inspection and Test of,
(1) Raw materials, received
(2) Shop assembled items
(3) Fabricated individual members
(4) Welding
(5) Corrosion Control
(6) Purchased standard parts and other subcontracted products
(7) Painting
(8) Packing
(b) Preparation for the inspection by the Customer's inspectors and report generation.
(c) Investigation, settlement and reporting of the defects or failures which are claimed by customers.

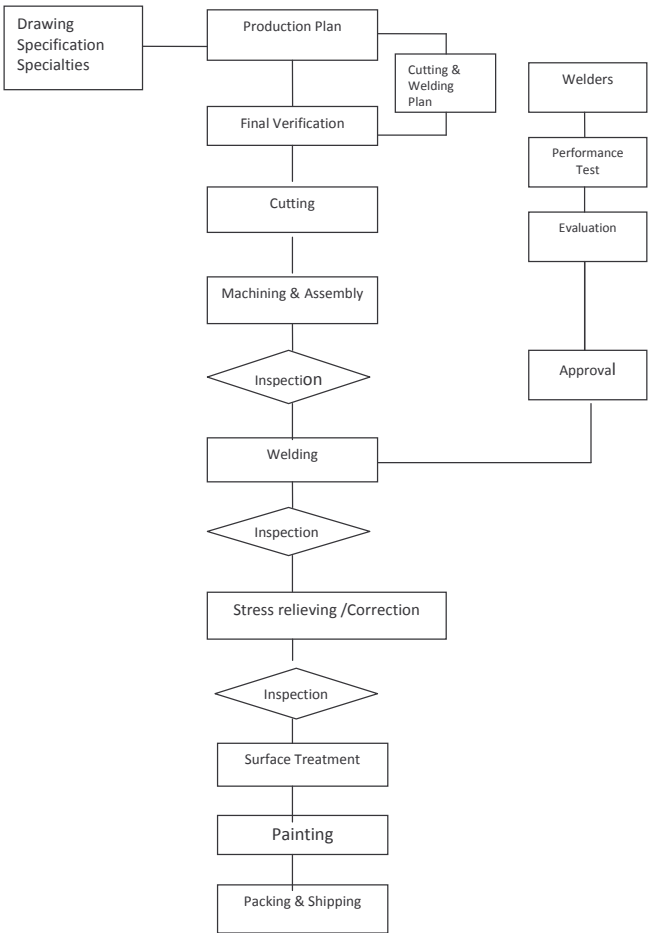
3. QUALITY PROGRAM MANAGEMENT

3-1 General

In practice, the Quality Control Department takes leading part in the quality program management, while the quality is the responsibility of each operational section. The function, responsibility and authority of the Quality Control Department are as stated in section 2-2.

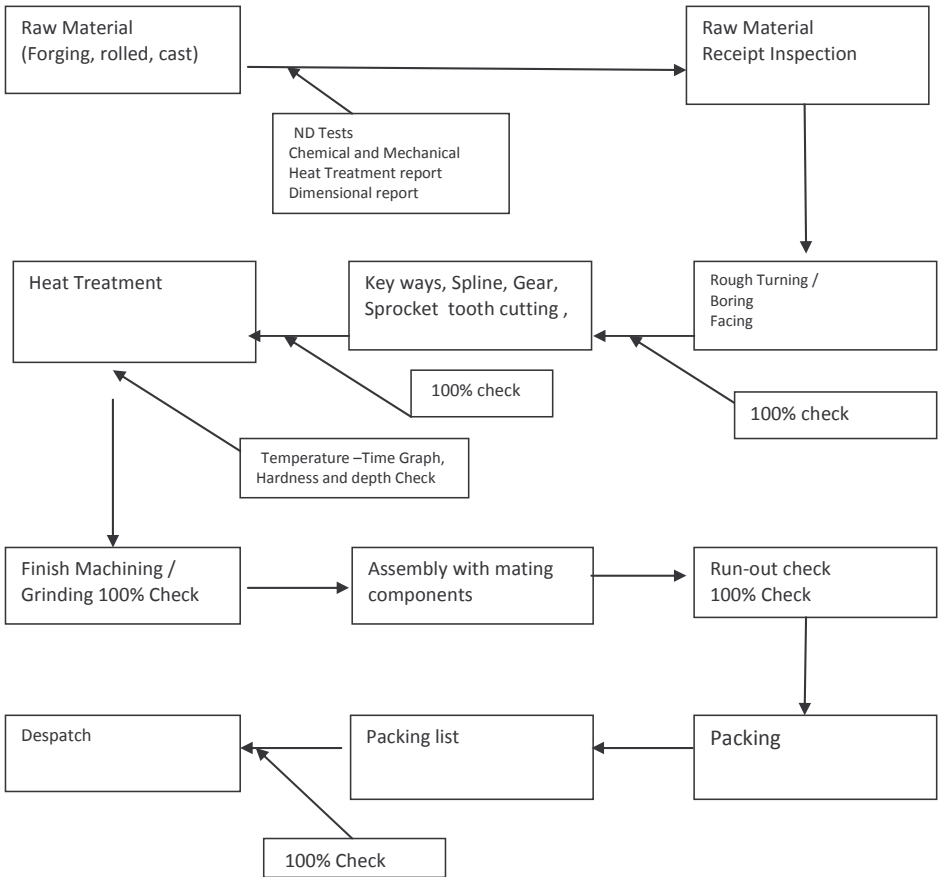
3-2-1 Flow of Quality Control

Following chart shows the standard manufacturing and Quality Control Process for Fabricated components and machined components.



Flow of Machined and Assembled Components.

Quality Control Process



4. SPECIFICATIONS, DRAWINGS AND CHANGES

4-1 General

The specifications and drawings are the most important information for the production of space frame.
The Steel Structural & Machinery has various in-plant standards to develop and maintain the uniformity and reliability of the quality of the products.
Should Customer's specifications or furnished drawings conflict with or be not covered by the in-plant standards, the matters in question are subject to review and study by the Quality Control Section, the Design Section and the Sales Department. The specific requirements are then incorporated temporarily into the in-plant standards for the particular contract only.
All the changes in design and shop drawings are distributed to the sections concerned through a sheet, NOTICE OF CHANGE IN DRAWING. The sheet is filled by the design engineer or the Drafter in charge, reviewed by the Production Planning section and the Quality Control Section and then distributed to the related operation section in the shop. The review is made to ensure that the charge will not adversely affect quality or compliance with contract requirements.
The above change control system ensures that only current documents shall by available to operating personnel and provides for initiation of documents charge.

4-2 Information Included In Technical Documents

The following information is included, when applicable, in technical documents, such as drawings, work specifications, etc. for each contract.
(a) Characteristics and design criteria necessary for material procurement, manufacturing inspection and test operation.
(b) Characteristic tolerance for all dimensions, process variables or measured attributes specified in the technical documents.
(c) Identification to which procurement, fabrication, processing, inspection and test can be related.

4-3 Specification and Change
Sales Department will receive Customer's specifications and their complete copies are deliveries to the Production Planning, Quality Control and Design Sections.
The Sales Department, the Design Section and the Quality Control Section jointly evaluate and clarify the particulars of the specification. They prepare a draft of the input specification against the Customer's specification to simplify understanding by the persons concerned.
The finalized in-plant specification with remarks by the Quality Control Section on the points to be paid attention to be delivered through the production planning Section to all the sections concerned
Should any changes in the specification be advised by the Customer, the changes are treated in the same manner as the customer's initial specification. The written change notices shall be delivered to related sections. The manager of each section who has received the notice has to return the old specification without fail to the Quality Control Section.
4-4 Drawing and Change
4-4-1 Design Drawing
The design drawings prepared by the Design Section are submitted to the Customer for approval through the Sales Department.
Upon receipt of the reviewed drawings from the Customer the Design Section checks them and reports the results to the Production Planning section and the Sales Department. In case, Customer requests any change, the Design Section shall evaluate the request and revise the drawings accordingly.
4-4-2 Shop Drawing
The basic shop drawings are prepared by the Design Section and checked by the manager of the Design Section, the Production Planning Section and the Quality Control Section for predictability, interchange-ability, and inseparability. Their submittal to and receipt from the customers are executed in a manner similar to that for the design drawing.
Should any error or discrepancies be found in the drawings during the shop assembly, the details are reported to the Design Section, the Production Section, the Quality Control Section and the Sales Department. The corrective actions to be taken are discussed among them and determined.
Then the related design and/or basic shop drawings are revised and the Sales Department shall inform the Customer.
The final drawings and any other drawings required under the contract are submitted through the Sales Department.

4-4-3 Customer Furnished Drawing
When Customer furnishes design drawings, shop drawings and other kinds of drawings, these are delivered to the Design Section through the Sales Departments and the Production Planning Section.
The results of the evaluation by the Design Section are informed to the Quality Control Section the Production Planning Section and the Sales Departments.
Any change in the furnished drawings should be advised to the Customer, the Design Section checks the changes and informs the result to the Quality Control Section, the Production Planning Section and the Sales Department.

Revised drawings are delivered to the related sections and the managers of these sections return the original drawings to the Design Section upon receipt of the revised drawings.
Should any error or discrepancies be found in the furnished drawings during the process of shop assembly and other inspection, the Quality Control Section informs the Customer of the corrective action to be taken.

4-4-4 Erection

5. CONTROL OF PURCHASE

5-1 Purchases Control System
The Materials Department is in charge of assuring that all materials, supplies and services of subcontractors conform to the quality requirements. In selecting a subcontractor, the Quality Control Section has the authority to disapprove the use of subcontractors who do not have a Quality Control System that will meet the procurement requirements. The control by the Materials Department includes the following:
(a) The order sheets to subcontractors specify all technical and quality requirements.

(b) The Quality Control Section surveys the subcontractor's plant before placing the order and checks the suppliers' Quality Control System. The Quality Control Section informs the Materials Department of these results. The Quality Control Section periodically visits and reviews each supplier who has been approved to see if he is maintaining his system.

(c) When necessary and as required by the Materials Department, the Quality Control Section will provide technical assistance and training to subcontractors to achieve required quality levels.

(d) All documents showing the compliance of the supplies by subcontractors to the quality requirements are received and fielded with the receiving note and purchase order.

5-2 Receiving Inspection
Raw materials, finished products and semi-finished products, procured from mills and subcontractors are subject to receiving inspection by the Inspection Section before acceptance. The inspection is conducted in accordance with a Test and Inspection Plan where the method of sampling, reviewing documents, etc. is specified.
When incoming materials are failed the receiving inspection, the chief of the Inspection Section will inform Quality Control section for considering degree of the defects, and their percentage. Quality Control Section shall request the Materials Departments to order the Subcontractor to take such action as complete replacement, selection of only conforming material, repair, etc. as happens may be.
Non-conforming materials shall be segregated and disposed in accordance with the relevant in-plant standards. The subcontractor shall propose and obtain approval by the Quality Control Section as to preventive means and corrective action.

6. PROCESSING AND FABRICATION CONTROL

Processing and Fabrication of Steel Structural shall be done by the Standard Specification of Fabrication prepared by METALCRAFTS .

6-1 The Fabrication Controls are managed by the Production Planning Section in the manner described below:
(a) Planning of fabrication of contracted and expedited work to ensure the optimum operation of the plant and the meeting of delivery requirements.

(b) Establishing of operation standards.
(c) Establishing workmanship standards including characteristics and allowable tolerance.
(d) Controlling non-conforming material including procedure for its identification, Segregation and disposition.
(e) Arrangement and maintenance of tooling, jigs, fixtures, templates and other equipment.
(f) Education and training of fabrication personnel to improve their technical skills and Quality Control procedures.

6-2 Process Controls

Controls are carried out to assure uniform quality for the process such as cutting, machining, welding, heat treatment, galvanizing and painting.
Welders and welding operators should be all qualified according to IS:817 or IS:7813 (Latest Edition).
All welding to be in accordance to IS:1024 or relevant (Latest Edition)
The Quality Control Section maintains certificates of the qualification records.

6-3 Processing and Fabrication Inspection

Fabrication inspection is classified as follows:
(a) In-process Inspection
(b) Shop Assembly Inspection
(c) Final Inspection

6-3-1 In-Process Inspection

Every operation section has the responsibility to transfer materials or semi-finished products, conforming to the specification, to the next section and in-process inspection of fabrication is carried out by Inspector at each fabrication step.
The inspection results are recorded in the “Internal Inspection Report”.
Dimensions & shapes are checked with templates or drawings. Should any non-conforming members or nodes be found, it is identified by white paint and segregated from the conforming members.
The non-conforming members are then repaired or replaced in accordance with the provision in the standard and/or relevant requirements given in the contract specification and repairing or replacement of the non-conforming materials is done conforming to the relative in-plant standards.

6-3-2 Shop Assembly Inspection

If necessary, shop assembly inspection will be done to assure conformity with the relevant shop drawings, correct fit and proper field erection.

6-3-3 Final Inspection

After galvanizing and/or painting, Inspection shall be carried out on all welded components by the Inspection section in regard with straightness, assorting and component identification mark before packing.
Should any non-conforming member or node be found, these are then repaired or replaced in accordance with the provision in the standard and/or relevant requirements given in the contract specification.

7. TOOLING

7-1 General

It is essential for appropriate Quality Control and efficiency to have the manufacturing facilities and equipment kept in good condition by the operators themselves and not by the maintenance personnel.
This assumption is made in establishing operation standards, training systems, qualification systems, personnel evaluation etc.
Only these who have the required level of skill are permitted to operate the facilities.
Preventive and Routine Maintenance is performed by the Maintenance Section in addition to the daily check, adjustment and control by the operator.
Preventive maintenance is defined as the maintenance to be performed in advance of the facilities or parts reaching their full life.

The operators report each month the information on the facilities through the foreman and Production Section to the Production Department for appropriate maintenance work.
The routine maintenance refers to the maintenance of electrical system, cutting, machines, welding machines, cold saw drilling machines and etc. which may require the dismantling of the facilities for examination and adjustment.
This is done by the maintenance Section and not by the operators concerned.
The maintenance section holds the list of facilities and equipment with the maintenance history of each major facility and equipment.
The maintenance Section shall keep and update the detail drawings, catalogues and other documents and information necessary for the routine maintenance.
The Material Department does such checks or adjustments, which require specific techniques or equipment, through maintenance sub-contractors with relevant companies (recommended by the Maintenance Section).

7-2 Facilities Improvement

The facilities are not only maintained but also constantly improved for the purpose of better safety and Quality Control.
Only the Maintenance Section is allowed to do improvement work. No operator is authorized to modify any facilities.

7-3 Control of facilities

All facilities are operated and controlled only by authorized personnel.
No other personnel are allowed to operate or repair them without permission.
The facilities are inspected regularly using a special checklist and the results are reported monthly to the Manager of Production Department.
In case of facilities being found out of order, its detail is recorded in the daily report sheet and reported to the Maintenance Section.
Should a defect adversely affect quality or safety, the operation is immediately suspended. Such defective facilities are market for prohibition of their use.

7-4 Control of Jigs and Fixtures

All the production jigs and fixtures shall be inspected and renewed in accordance with the relevant provisions.

8. MATERIAL IDENTIFICATION AND STATUS

8-1 Material Identification

Steel shapes, pipes, doors and necessary components are stored and fabricated so that manufacturing lot number can be identified.
Color coding will be used for the identification of steel grades and component assorts.
A Job Order Number identifies each Contract. The manufacturing lot number is stamped or marked on each material for identification.

8-2 Material Status

The Production Planning Section plans and controls all production schedules.
All information on the status of material preparation subcontracts production, process, test, inspection and shipment is reported by the relative sections to the Production Planning Section. Based on these reports, Production Planning Section will arrange the manufacture and shipment schedules and finally confirm the schedules by holding the Production Planning conference once a week with the Managers of every operation and inspection section.
In addition, for the long and midterm projects, the Production Planning Section provides production plan at intervals of two weeks.

Application for witnessing of test and inspection is made under instructions from the Production Planning Section.

9. SHIPPING AND STORAGE

9-1 General

The Packing Section together with the Inspection Section controls the quality during packing, storage and shipment.
The specification of packing, storage and shipment meeting the customer's requirements is prepared by the Sales Department and the Quality Control Section prior to starting these operations and delivered to the Packing Section.
The personnel of the Inspection Section also performs the inspections as stated in Section 6-6-3, which may be witnessed by the inspector of the customer.

9-2 Packing

All Steel Structure & Machinery components are packed in accordance with the in-plant standards, Standard Specification for packing of product, unless otherwise specified by the Customer.
In addition to checking as described in section 9-1, the following are checked:
(a) Description and appearance of component marks
(b) Description and appearance of shipping marks
(c) Description of packing list
(d) Quality of components per package
(e) Size and quality of the materials for packing
(f) Rigidity of each package

9-3 Storage

All the components are stored in such manner where the final coating is not affected by any harmful substances. The packages are handled using slings and/or forklift in a manner, which will prevent damage to final coating and the package.
Should the final coating be found damaged, repairing or replacement is performed depending on the extent of the damage and the provision of the contract specification.

9-4 Shipment / Transport

All the components are shipped only after the inspector from the Quality Control Department and/or from the Customers if necessary have released them for shipment after the satisfactory execution of specified tests and inspections.
Careful handling of the material to prevent damage to it when loading and unloading off the truck

10. MEASURING AND TEST EQUIPMENT

10-1 Measuring Equipment

Measuring equipment such as steel tape, vernier calipers, micrometers, straight and angle rules, etc. are to appropriate standards.
All of them are maintained and calibrated quarterly by the authorized personnel of the Inspection Section in accordance with the standard.
The steel tape with the accuracy certificate is established as the factory standard tape.
Only the equipment, whose accuracy has been verified by receiving periodic calibration will be listed in the measuring equipment list and shall be used in the shop.

10-2 Test Equipment

N.D.T. equipment and other test equipments are calibrated by the qualified public inspection organization within specified calibration periods.
The calibration certificate label, showing next calibration due date, should be kept on the test equipment.

11. INSPECTION AND TEST

Inspection and tests are performed so as to confirm the conformity of the product to the contract specification, drawings and quality requirements.
In case that the Customer wants to inspect and test components of the contract, an inspection and test plan is prepared for the contract by the Sales Department and the Inspection Section, and reviewed by the Quality Control Section.
The plan is then submitted to the Customer for approval.
The plan may cover the inspection and the test from the receiving inspection to the shipment including those for the subcontracted items. In planning, the detail of the customer's specification is checked with the related in-plant standards and the differences, if any are clarified.
Details of the plan with the explanation on such differences are proved in written by the Quality Control Section to the sections concerned.
The Inspection Section will generate reports based on results of the inspection and the test and submitted to the Quality Control Section and their copy with the related data is submitted to the Customer by the Quality Control Section.

12. QUALITY RECORDS AND INFORMATION FEEDBACK

12-1 Quality Records

The related sections shall report all the information of the quality of the products to the Quality Control Section.
The information includes not only the inspection and test data per contract but also the general in-plant inspection and test records, defective materials, corrective action, calibration, quality cost data etc.

12-2 Information Feedback

The quality information gathered at the Quality Control Section is fed back to design, purchases, operation and other sections concerned as well as the associated sub-contractors.
Before the feedback, the information is analyzed or arranged by the Quality Control Section statistically or by means of other Quality Control techniques.
The failure costs are periodically summed up, statistically analyzed and presented to all people of Production Department for better understanding of quality costs and improvement of quality consciousness.

13. NON-CONFORMING/ REJECTED MATERIAL

Non-conforming materials, if found, are controlled or discarded as follows.
The Quality Control Section creates the records of the non-conformance for cause analysis and feedback to the sections concerned.
(a) Incoming Materials
When incoming materials fail the receiving inspection, the Materials Department will according to the advice by the Inspection Section and the Quality Control Section, order the sub-contractor to take such action as overall replacement, selection of any conforming material, repair etc. as the case may be.
Non-conforming materials are separated and discarded in accordance with the relevant inplant standards.

(b) In-Plant Fabrication Materials
Should any non-conforming materials be found in the process of fabrication or inspection, those materials are identified by white paint or with a label and separated from other correct materials.
The non-conforming materials are then repaired or replaced in accordance with the provision in the in-plant standard and/or relevant requirements given in the customer's specification.
(c) Shipped Materials
The non-conforming materials, unacceptable to the customer are repaired or replaced according to the decision made by the customer and the Inspection Section.

14. CORRECTIVE ACTION

The following corrective actions are taken so as to prevent reoccurrence of non-conformance.
(a) Incoming materials
The Quality Control Section analyses the report on the non-conformance submitted by the Inspection Section and supplies to the sub-contractors.
After the analysis, the Quality Control Section requires the suppliers or sub-contractors to establish a preventive action, and check their actual performance.
Their Quality Control System is also subject to review by the Quality Control Section.
(b) In-Plant Fabricated Materials
The Quality Control Section analyses the cause of the non-conformance with the related sections and advises them to perform the following, where applicable.
(1) Training of operational or engineering personnel.
(2) Improving manufacturing process and procedure.
(3) Reviewing and proposing amendment to the related in-plant standard.
(c) Shipped Materials
The Quality Control Section analyses carefully with the related section the causes of non-conformance claimed by the Customer and takes the following action, where applicable
(1) Improving the Quality Control System of sub-contractors and suppliers.
(2) Improving the test and inspection plan and system
(3) Amending the in-plant standard

METALCRAFTS

QUALITY CONROL
ORGANIZATION, AUTHORITY AND RESPONSIBILITY

1 .SCOPE

This chapter defines general responsibilities & authorities at METALCRAFTS.
This shows the General Organization Plan for Quality Assurance. The details of specific and further responsibilities are defined.

CHIEF EXECUTIVE

The CE assumes total and ultimate responsibility for activities done in accordance with this Q.A. Manual. The responsibilities shall include the following as a minimum.
-To provide administrative guidance and control of METALCRAFTS personnel to ensure that policies executed.
-Direct a Management Audit to ensure that all activities comply with this plan.

MANAGER OF Q.A. DEPARTMENT

The Q.A. Manager reports to the CE and shall have total responsibility in carrying out the quality assurance system as defined in this Quality Assurance Manual.
These responsibilities shall include.
Establishment and promulgation of Q.A. System.
Preparation and issuance of Quality Assurance Manual.
Review of all Q.A. activities by the audit.
Overall control of Q.A. for the procurement items.
Execution of test and inspection on the fabricated items.
Execution of receiving inspection on the procurement items.
Total control for non-conforming items during all stages of production.
Responsible for stopping the production activity as and when any deviation from the requirements of Q.A. manual or specification requirement occurs.
Issuance of test/inspection reports & certificates.
Review of specifications and bid documents.
Approval of vendor/subcontractor
Documentation of Q.A./Q.C. Procedures.
Communication with Authorized Inspector of the customer on quality aspect.
Periodical review of Quality Assurance Manual.

MANAGER: PRODUCTION DEPARTMENT

The Manager of Production reports to the CE and shall be responsible for Planning and fabrication of Steel Structure & Machinery and is delegated following authorities.
Responsible for total control of fabrication
For issuance of operation planning cards
Total control of fabrication lines
Control of shop floor personnel
Control of in-process materials and items

Control of distribution of drawing, superseded drawings and documents with respect to fabrication/production and procurement

Preparation and issuance of fabrication flow chart

Preparation and issuance of instruction manual for fabrication and check sheet Control of electrodes during welding

Manager : Engineering and Design Manager

The Engineering and Design Manager reports to the CE and is delegated the following responsibilities.

Review and control of customer specifications, drawing and related documents

Preparation, review and approval of all design documents, shop drawings, material order lists, material specification for procurement and erection drawing.

Standardization of products and parts

Design of products and design modification

Checking of clients' drawings and material order lists when these are issued by client.

MANGER: MATERIALS /SUB-CONTRACTING

The Material Manager reports to the CE and is delegated the following responsibilities.

Preparation of inquiries and subsequently purchase order for raw material and consumable procurement

Preparation of purchase order for offside fabrication items

All purchase activities regarding equipment, instruments etc.

Purchased material release from warehouse

Purchased material control at warehouse

Maintaining up-to-date records

Maintaining the list of approved vendors/subcontractors

2. DESIGN AND ENGINEERING CONTROL

Scope

This chapter identifies the responsibilities and measures established to control design and engineering activities according to customer requirements including the proper review of drawings, specifications and the translation into fabrication/working documents for use.

Order Entry

The receipt of a contract from the customer is prepared by the Sales Manager. The Sales Department shall forward all customers' contract specifications, drawings and relative documents to the Contract Coordinator in the Sales Dept. Production Planning, Engineering and Q.A. Department Manager.

The responsible Design Engineer in the Design Staff and Q.A. Staff shall review the customers' specifications and order contract documents such as standards for adequacy and prepare their recommendations. If necessary, contract specification review meeting shall be convened to discuss the contractual requirements.

During Q.A. review, special attention shall be given or tested inspection requirement and inspection by an independent authority.

Design Drawings, Specification & Production Drawings

The Manager of Engineering & Design shall be responsible for the preparation and obtaining approval of drawings from the client or consulting engineer.

The shop drawings shall define all the requirements and data of fabrication of an item, such as identification, material specification, joint details and dimensions with necessary tolerance.

The shop drawings and design calculations shall be submitted to the customer or inspector for review and approval as required by contract agreement.

Revision control of All Design Documents

The responsible Design Engineers shall verify the appropriate revision numbers of the design documents before these documents are issued for Production/fabrication.

Above all, when the standard production drawings stored in Document Service Room are issued, the responsible Design Engineer shall show the revision numbers on the Engineering Instruction and the date of issue.

The Chief Engineer is responsible for reproducing and distributing these drawings according to the Engineering instruction to Q.A., Production Planning and Sales Departments. When any change occurs in the design documents during production, the obsolete drawings shall be superseded or the Engineer in charge shall issue a notice promptly to the responsible Design Engineer and the obsolete prints removed.

Procurement Specification

The Design & Engineering Staff shall prepare all procurement specifications for materials according to approved drawing.

All procurement specifications shall meet the applicable code, design drawings and specification requirements.

The procurement specification shall be forwarded to Q.A. Department for review & acceptance. If procurement specification is acceptable, it shall be transmitted to the Materials Department for preparation of the purchase order according to Material procurement procedure.

Any revisions in the procurement specifications shall be referred to the originator and handled as an original issue.

The procurement specification shall include but not be limited to the following

(a) Material identification requirement to the applicable standard or code i.e., shape, weight & quality, shipping & payment details.

(b) Inspection/test to be conducted by the vendor.

(c) Mill Certificate requirements.

(d) Documents required to be supplied by the vendor.

(e) Drawing and specification identification and their revisions.

3. MATERIAL PROCUREMENT CONTROL

Scope

This chapter defines the responsibilities and methods practiced during the planning, procurement and receiving of all materials, items and control of services by METALCRAFTS.

Responsibility

The Manager of Materials Department shall be responsible for procurement of all materials, items and services to be used.

Procurement of Specification
The Procurement Specifications shall be initiated for the procurement of all materials, items and services. The responsibilities for preparation of procurement specification are as follows:
(a) Materials and items
The Manager of Design & Engineering shall be responsible for preparation of the Procurement Specifications and Engineering Instructions for materials or items, and or distribution of Procurement Specifications and Engineering Instructions by marking the group code identification, the specifications and instructions.
(b) Services
The respective requisition section shall prepare the Procurement Specifications for purchase. All procurement specifications shall be reviewed and approved by the Q.A. Manager.
The Manager of Q.A. Department is responsible for assuring those all applicable standards are to the customer's satisfaction. Q.A. requirements are compiled for the procurement of materials, items, and services. The Procurement Specifications shall include all necessary documents such as engineering procedures, standards and other requirements applied to the purchase order. The procurement Specifications shall be transmitted to responsible Materials Manager for preparation of purchase requests.

4. INSPECTION AND TEST PROGRAM

Assembly Fit-Up Inspection
Assembly Inspector is responsible for carrying out assembly fit-up check. Dimensional and tack welding checks according to drawing and quality plan requirements.
Inspector shall ensure that the fabrication will be carried out on a flat and level surface.
If assembly required to be taking welded as per drawing, tack welder shall be qualified prior to commencing the fabrication according applicable code/standard.
Prepare the Assembly Inspection Reports daily.
Welding /Pre-final Inspection
Welding /Pre-final Inspection shall be carried out by Q.C. Inspector and ensured that welder performance qualification tests and weld procedure qualification carried out on the special test pieces according to welding control chapter as prescribed in the Quality Manual.
Inspect weld preparations and fit up in all subassemblies and carry out dimensional checks.
Where heavy welds are called for check that suitable allowance for shrinkage has been allowed
Checks that preheat requirements are satisfactory.
Inspect weld runoff pieces and carry out dimensional checks, orientations, etc. according to the drawing/Quality Plan requirements.
Inspect all welding runs, final runs, back gouging or grinding & record. Any local preheats and post-heats treatments or other approved methods or code/standards as required by the drawings and quality plans.
Non Destruction Inspection
Quality inspection shall carry out all NDT examination comprising liquid penetrate magnetic particle, Ultrasonic and Radiography as required by the quality plan/specifications.

If defects require to be repaired, inspector shall inform production personnel through Material Rectification Note.
Repaired material shall be inspected by NDT according to approved procedure.

Pre-final Inspection
Qualified inspection according to drawing & the Quality Manual shall carry out pre-final inspection such as dimensional checks to clear the complete fabrication.

Surface Treatment Inspection
Surface Preparation
Bare steel components of steel structure, after fabrication shall be prepared by cleaning, pickling and wherever required by shot blasting or sand blasting.
After surface cleaning, surface shall be visually inspected for mill scales, oil spatter, grease, soil, cement, salts, acids or other corrosive chemicals, which are harmful for Painting.
Painting
To ensure the success of the painting operation, following environment conditions shall be monitored.
Surface temperature shall be measured to ensure that no condensation occurs on the surface.
Relative humidity will be measured to prevent condensation on the surface.
The instrument used for wet bulb/dry bulb temperature measurement is whirling Hygrometer.
Relative humidity and dew point temperature will be recorded periodically before the painting operation starts.
Before painting, type of paint, mix ratio etc. according to paint manufactures' recommendation shall be inspected and recorded.
After completion of painting on the steel structure surface, dry film thickness will be visually examined to establish application defects such as over spray, dirt inclusions, blisters, sags, runs, adhesion, flaking in confined corners etc.
Paint coating dry film thickness shall be measured by use of DFT gauge.

5. MEASURING CONTROL AND TEST EQUIPMENT
Scope
This chapter identifies the responsibilities for the control of measuring and test equipment, including measuring tools, gauges. Measuring and test equipment shall be periodically calibrated according to the instructions "Measuring Devices Calibration Control Procedure".
Responsibility and Authority
The Manager of Q.A. Department shall be responsible for the overall calibration/control of measuring and test equipment through the Quality Control Staff and maintenance/production for use and maintenance.
The Q.C. Engineer shall be directly responsible for calibration of measuring devices and maintaining reference standards used in the shop floor.
Mechanical & Electrical Measuring Equipment
The Manager of Q.A. Staff shall be responsible for the control and calibration of mechanical equipment as follows;
Maintaining master list of mechanical & electrical measuring equipment used for production.

Establishing calibration plan for mechanical & electrical measuring equipment according to the requirements.
Doing calibration of equipment according to the calibration plan.
Preparing & maintaining equipment calibration records according to enclosed format.

6. PRODUCTION CONTROL

Scope

This chapter defines responsibilities and the control of fabrication operations to ensure all the operations are carried out under controlled conditions.
All operations such as Cutting, Machining, punching, Drilling, Heat-treating, Pre/Post heating, Assembling, Welding etc. shall be carried out according to the documented instructions, specifications and drawings as systemized at shop floor workstations.
These documents shall include the criteria for acceptability of workmanship to ensure that the operations have been satisfactorily accomplished.

Production Control

The operators shall be responsible for the productivity and quality of product.
The Production Engineer shall supervise and supply the necessary instructions regarding operations at their workstations.

Operation Control

The operation shall be progressing with the job card system and shall be carried out according to the drawings, Inspection Sheets, officially distributed by Planning through Charge Heads.
Any discrepancy and deviation shall be reported to the responsible personnel according to Quality Manual Stipulations.
Production Planning Staff shall prepare Cutting Lists, Sketches, Templates, and Tapes for C.N.C. Machines, Drawings on all steps of processes for fabrication sequence and welding procedures.
(a) The Instruction sheets shall be identified with Contract number and Drawing number and shall be approved by Production Manager, Engineering Department and confirmed and by the Manager of the Q.A. Department.
(b) If any new standard, instruction or cutting list is necessary, Production Planning Department shall prepare them.
(c) If the previous sheets/documents are available for repeat order or new order, Production Planning staff shall initial the review of those sheets with personnel concerned before commencing the job.

Planning of Fabrication Sequence

Fabrication sequence including inspection by inspector stated on the Instruction Sheets shall be designated on the Operation Planning Card with drawing numbers to be referred to.

Revision of Inspection Sheets

If any change is required on the sheet after setting down, Planning shall prepare the change as follows
Temporary/minor change of fabrication sequence and/or fabrication procedures shall be carried out according to the control standard for change of “Technical Details”
Operations of special processes such as Bevelling, Drilling, Punching, Welding, Cutting, Plating, Sub-assembly fit-up etc. shall be carried out by qualified workers certified by a Qualification Institution.

The Q.A. Manager shall review all such qualification records and approve of the personnel.

Non-Conformance Control

If non-conforming items are detected, they shall be identified, recorded, noted, segregated and disposed according to related instructions in this Manual.

Finished/Semi-finished items shall be protected from penetrable conditions such as rust, rust damage and so on, and clearly distinguished with one or any combination of the following procedures throughout production (1) painting (2) labeling (4) Sampling (5) Sanding (6) Bagging & Stocking.

Handling

Acceptable or preferable handling procedures shall be prepared for handling the items during different fabrication phases and issued to shop floor personnel according to design requirements. Any prohibition on handling shall be informed clearly by production staff on the documents.

Control of Production Facilities

The Production Manager shall be responsible for the control of fabrication facilities through Maintenance Section. The Production Manager shall control special machines or equipment and tools.

7. WELDING CONTROL

Scope

This defines the responsibility and system for welding at METALCRAFTS to assure that qualified welders and qualified welding procedures are used.

Responsibilities

The Quality Assurance Manager, through Quality Assurance Engineer & Quality Control Engineer & Welding Supervisor will be responsible for control of welding quality according to welding procedure documents.

The Production Manager shall be responsible for control of welding electrodes, assignment of qualified welders and execution of welding at shop floor.

The Manager of Engineering staff shall be responsible for design of weld joints, welding parameters etc.

The Welding Supervisor shall be responsible for calling Independent Inspection Authority CWB (Canadian Welding Bureau) representative to witness the Welding Procedure, Welding Specification & Welder Qualification Tests and keep full master record of the procedure and welder operator test against an independent record system.

Qualification of Welder Procedure & Welders

The welders shall be qualified with weld performance qualification by CWB (Canadian Welding Bureau) representatives. The Quality Assurance Engineer with the help of welding Engineer shall prepare the Welder Procedure Specification (WPS) for qualification of procedure and welders.

Welding Procedure Qualification

i. The Welding Supervisor shall select competent welders to do welding procedure qualification test.

ii. Selected welders shall do the trial welding of the test pieces.

iii. The welded test pieces shall be mechanically tested and recorded by Q.C. Engineer.

iv. The parameters for welding shall be identified by evaluation of the test results of trial welder.

v. These results shall be documented as Welding Procedure Qualification Record (PQR).

Welder Performance Qualification

i. The Welders receiving test shall do welding of test pieces according to approved WPS order under supervision of Q.C. Engineer, CWB (Canadian Welding Bureau), Welding Supervisor & Welding Engineer.
ii. The welded test pieces shall be tested according to standards' requirements.
iii. Q.C. Engineer and Welding Supervisor shall review welding procedure and results of mechanical test for welder test pieces.

Qualification Renewal Control

The Welding Supervisor shall prepare and maintain current list of qualified welders.
The lists, so called Welders Renewal List identify personnel by name, Identification number and Specific Qualification.
The Welder Renewal List shall be prepared, distributed and updated periodically. With the updating of the Welder Renewal List, the Welder Process Record shall be maintained by Welding Supervisor.
This list shall include sufficient information to identify all qualified welders and their qualifications.

Welding Consumable Storage, Drying & Issue

Engineering instructions shall be given according to the material procurement procedure and clients specification for the purchase of all consumables.
The Electrodes shall be placed separately and stored at a controlled temperature. All electrodes having low hydrogen covering shall be dried at least two hours between 230 ^{o}C and 260 ^{o}C or according to manufacturers' recommendations before use.
The welders then place them in the heated ovens provided, local to the job. The production Supervisor ensures that only sufficient rods are drawn for the particular work period, approximately four hours.

Welding Consumable Storage, Drying & Issue (continued)

In addition, for low Hydrogen Electrodes, if exposed more then four hours, they shall be returned to the storage room for drying again.
Damaged and used welding rods shall be disposed in the designed waste containers.

Operation

The welding operation shall be performed according to approved WPS and Welding Engineers Instructions.
The Welding materials to be used shall be specified on the approved WPS. The Welding Supervisor shall monitor welders' activity to ensure compliance with approved WPS.
The Welding Supervisor shall monitor welding parameters and in-process welding data according to approved WPS parameters.
The Welding Supervisor shall record welding parameters on the Welding Process Record. The Welding Inspector shall check fit up of Assembly immediately before first run weld.
If non-conforming condition is noted during welding process, for example the parameters of fabrication instruction sheet or approved WPS have been violated, welding shall be stopped and the non-conformity tag and non-conformity notice shall be prepared and processed according to non-conformance chapter of this Manual. The Welding Inspector shall examine first side back gouges or grinding before second side welding begins in full strength joints.
When the welding has been completed, the weld dimensions, visual inspection & NDT shall be carried out by Welding Supervisor. The Welding Inspection Report shall be prepared, signed/stamped and dated by the Inspector, if acceptable. The completed report shall be reviewed and approved by Quality Assurance Engineer or Q.C. Engineer.

Q.A./Q.C. Engineer shall maintain the completed record after the inspection.

Welding Equipment

The operating control and maintaining of all welding equipment shall be responsibility of the Welding Supervisor & Production Manager and maintenance shall be included in the scheduled program.