



### **Procedures for Welding Inspection:**

HERCULES CUSTOM FABRICATION LTD is certified by the CANADIAN WELDING BUREAU to CSA Standard W47.1 Division 2.1. The minimum standards for welding in our plant are CSA W47.1 & W59 - M2003 with special emphasis on the list below.

Even throat and leg distances on welds.

- Welds to be at 45 degrees.
- No under cut allowed.
- No overlap allowed.
- No porosity allowed.
- No inclusion or slag holes allowed.
- Weld with minimum splatter.
- Corners must be welded completely.
- Starting and stopping must be blend.
- All bevel welds must be done in the flat position following the bevel weld procedure. All tacks must be ground out and inspected before welding begins.
- On multi-pass welding, the root pass must pass inspection before further welding begins.
- All build up passes must meet the minimum standard as stated above.
- All welders have welding gauges to monitor the size of welds.
- Welding procedures as out lined below are supervised continuously by our supervisor and/or quality assurance personnel.
- Unless specified otherwise by the customer all welds are visually inspected.
- Any weld not meeting the minimum standard is unacceptable
- Welders who have a problem meeting our standards should report immediately to the supervisor, QA or the office so the problem can be rectified. All unacceptable welds must be gouged or ground out and re-welded.
- Any non-conformances are brought to the attention of Q.A. and foreman.
- If Q.A. is unable to perform the inspection then a competent person will be appointed by Q.A., foreman or the president to perform the inspection necessary. All reports by the designated inspector will be reviewed by Q.A. and the Plant Foreman.
- Depending on the non-conformance, Q.A., the foreman will contact the customer and report the non-conformance, initiate or recommend procedures to correct the non-conforming items to meet our customer requirements and a non-conformance report is generated.
- After the rework has been performed it is re-inspected using the same procedures until it passes inspection.

### **Procedures for Dimensional Accuracy Inspection**

- Our customers set out the required Q.A. standards as show on the blue print and purchase order.
- All dimensions are highlighted on the blue print and any non-conformance is marked beside the highlighted and added to the Q.A. report
- All non-conformances are brought to the attention of the foreman
- If Q.A. is unable to perform the inspection then a competent person will be appointed by the Q.A., the foreman or the president to perform the inspection necessary. All reports by the designated inspector will be reviewed by Q.A. & the Plant Foreman.

- Depending on the non-conformance, Q.A., the foreman will contact the customer to report the non-conformance, initiate or recommend procedures to correct non-conforming items to meet our customer requirements and a non-conformance report is generated. If our customers accept our recommendation, a request for deviation is produced and sends to our customer for formal authorization. The job will be tagged on hold until such authorization is received.
- After the rework has been performed it is re-inspected using the same procedure until it passes inspection.

### **Administration Procedures**

- Once a purchase order is received, it is stamped, matched to the original quotation by purchasing and forwarded to engineering. Any discrepancies regarding price, quantity, delivery, or drawing # are reported to our customer.
- Activity reports are kept with the purchase order and all corresponding information will be logged in it.
- A bill of material, part drawing and forming drawing are prepared.
- All blue prints are stamped with customer's P.O. #, job #, item #(s), quantity, delivery, date ordered and weight.
- If at anytime engineering changes occur, the original blueprint is either destroyed or marked up with changes, date changes where made and contact person. This information is recorded on the purchase order activity report.
- Steel is ordered burnt to size from suppliers.
- Steel from the suppliers must have certificates of chemical analysis and origin.
- Q.A reports are issued. Each Q.A. report reflects specific requirements by our customer (i.e. stress relieve to a maximum hold temperature)
- If there is more than one piece on a job, job #(s) are given suffixes to identify each piece and copies of prints are made for each weldment.
- All jobs are given a Q.A. report to be filled in at each step of production by Q.A. If there is a quantity of more than one, each weldment receives a Q.A. report
- Q.A. reports are completed at each stage of fitting, welding and clean up. Once completed for the current stage they are filed in the job file.
- All new orders are added daily to the production schedule spreadsheet which is used by the foreman to maintain deliveries.
- A job folder is created and all information regarding the job is filed.
- Incoming steel is monitored for timely receipt.
- Materials entering our plant are stored inside by job #. Packing slips are signed and given to the office.
- When packing slips are received they are checked for accuracy and any errors are reported to the foreman. The foreman then has the item checked to see if it is cut accurately or if it requires replacement or rework.
- The received date is recorded in the production schedule and drawings are given to the foreman.
- Time cards are monitored daily and recorded in our production schedule program to keep track of all labor hours and personnel working on jobs.
- After blueprints and Q.A. reports are returned to the office, shipping arrangements are made, packing slips are prepared, and the customer purchase orders are marked accordingly to reflect the item or items which are being shipped. Packing slips are stapled to the back of the purchase order.

- If the weldment has a specific ship to destination other than the purchasing company, a copy of the packing slip will be sent by fax or mail to the purchasing company.
- The production schedule has shipping dates entered as they are completed.

### **Production Procedures**

- Blueprints and Q.A. reports are given to the plant foreman

### **Fitting**

- All items are checked prior to assembly by the fitters.
- If an item does not pass inspection a non-conformance report is generated with notes on corrective action being taken (see copy of non-conformance report). Non-conformance reports are filed in the job file. After an item passes inspection and is tagged, it goes on to the fitting stage (see Q.A. Report)
- Parts are fitted together, stamped for identification, marked with welding symbols, inspected for dimensional accuracy and checked to machine measurements by the Quality Assurance personnel prior to welding.
- If the weldment passes inspection it is tagged by Q.A. and proceeds to welding.
- If the weldment does not pass inspection a non-conformance report is generated. The weldment is reworked or rebuild until it does pass inspection. The initial inspection is signed off on the Q.A. report and is tagged for welding. Time spent reworking any weldment is documented on daily time sheet and Q.A. report.
- After weldments pass inspection they go on to the welding stage (see Q.A. Reports)

### **Welding**

- Welding procedures are supervised by our Q.A. personnel and the foreman.
- All root passes must pass inspection before build up welding continues.
- After welding is complete fabrications are rechecked for dimensional accuracy by the Q.A. personnel and all welds are visually checked (see Q.A. report) and, if required, N.D.T. will be performed at this time.
- Each weld is identified with the welder's stamp.
- If the weldment does not pass inspection a non-conformance report is generated, and the weldment is reworked or rebuild until it does pass inspection.
- After the weldment passes inspection and is tagged it goes on to next process.

### **Second Stage Fitting**

- All items are checked prior to assembly by the fitters.
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- Parts are fitted together, stamped for identification, marked with welding symbols, inspected for dimensional accuracy and checked to machine measurements by the Quality Assurance personnel prior to welding.
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- Each weld is identified with the welder's stamp.
- If the weldment does not pass inspection a non-conformance report is generated, and the weldment is reworked or rebuild until it does pass inspection.
- After the weldment passes inspection and is tagged it goes on to next process.

### **Additional Fitting**

- All items are checked prior to assembly by the fitters.
- If an item does not pass inspection a non-conformance report is generated with notes on corrective action being taken (see copy of non-conformance report). Non-conformance reports are filed in the job file. After an item passes inspection and is tagged, it goes on to the fitting stage (see Q.A. Report)
- Parts are fitted together, stamped for identification, marked with welding symbols, inspected for dimensional accuracy and checked by the Quality Assurance personnel prior to welding.
- If the weldment passes inspection it is tagged by Q.A. and proceeds to welding.
- If the weldment does not pass inspection a non-conformance report is generated. The weldment is reworked or rebuild until it does pass inspection. The initial inspection is signed off on the Q.A. report and is tagged for welding. Time spent reworking any weldment is documented on daily time sheet and Q.A. report.
- After weldments pass inspection they go on to the welding stage (see Q.A. Reports)

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- Each weld is identified with the welder's stamp.
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- After the weldment passes inspection and is tagged it goes on to next process.

### **Stress Relieving**

- Weldments are vibratory or thermally stress relieved as required by our customer

- Weldments requiring thermal stress relieving are stress relieved to CSA W59 for dimensional stability or as specified by our customer and heat charts are provided
- After stress relieving N.D.T. will be performed again (if required) and all weldments are cleaned up for final inspection (see Q.A. report)

### **Process for Clean up Weldments**

- All weld splatter is removed from weldment.
- All bevel welds requiring grinding are to be ground with hard disk and then polished with sanding disks.
- All painting is performed within specifications outlined by paint manufacturers.
- If a weldment doesn't pass inspection a non-conformance report is generated, and the part is reworked until it does pass inspection.
- When passed, Q.A. report(s) is are signed and returned to the office for shipping arrangements.
- All jobs must be tagged accepted before shipping.
- Packing slips are not prepared unless Q.A. reports are filled in and signed by Q.A & the plant foreman.