**Hose Caddy Project**  **Procedure Sheet Name:**

\*Keep your name on all pieces throughout construction. **Per:**

**Post, Washer & Handle**

**1.** **\_\_\_\_\_\_\_\_\_ Obtain and cut Square Tube for post.**

* Obtain .120 wall X 1 ¼” Square Tube from Steel Rack.
* Cut to length using a Horizontal Band Saw.
* Deburr ends using a Belt Sander.

**2.** **\_\_\_\_\_\_\_\_\_** **Layout and center punch hole locations in piece A.**

* Use a tape measure, Combination Square, and Marker to mark the locations of the holes.
* Center punch the hole locations using a small hammer and center punch.

**3. \_\_\_\_\_\_\_\_ Drill (4) .2656” (17/64”) Diameter Thru holes using the Jet Drill Press.**

* Use Twist Drill Bit found in Drill Press Cabinet Drawer.
* Install drill bit, use center point divot to align vise. Snug vise bolts.
* Place wood backing board under square tubing piece in vise. Lock material to the left while drilling.
* Keep material flat while drilling. Drill all holes all the way through square tube.

**4. \_\_\_\_\_\_\_\_ Drill (2) .50” (1/2”) Diameter holes and (2) .875” (7/8”) Diameter holes using the Ellis Drill Press**

**& Step Drill Bit.**

* Use Step Drill Bit found in Drill Press Cabinet Drawer & Ellis Drill Press.
* Install Bit in chuck. Set to 60 RPM.
* Place wood backing board under square tubing piece in vise.
* Clamp piece to left. Align drill bit in hole in piece using X & Y adjustment screws on the vise.
* Keep material flat while drilling. Use power-feed while drilling. (Push handle to the right to engage – push to the left to dis-engage)
* Roll tubing over and drill out both sides.
* Check hole size with 1/2” Round Bar and ½“ PVC pipe.
* Deburr holes using Random Orbit Sander & 220 grit abrasive.

**5. \_\_\_\_\_\_\_\_ Obtain piece C (Washer). Transfer hole center points.**

* Obtain washer and machine screws from instructor \_\_\_\_\_\_\_\_.
* Use template in Tool Room. Clamp template to washer using locking pliers at edge of table.
* Tap lightly with small hammer and transfer punch to transfer hole center points to washer.
* Holes must be exact (1-7/16” across centers).
* Mark hole centers deeper using Center Punch.

**6. \_\_\_\_\_\_\_\_ Drill & tap holes for the Sillcock in piece C.**

* Use a #27 twist drill bit, vise, drilling board and the Jet Drill Press.
* Install Bit in chuck. Clamp drilling board in vise.
* Clamp washer to drilling board using locking pliers.
* Drill holes. Return bit to holder in tool room.
* Obtain T – Handle & #8 X 32 UNC Tap from tool room.
* Clamp Washer half way off table top edge.
* Apply small amount of cutting oil on tap.
* Tap holes: twist tap clock-wise while applying moderate pressure.
* Screw in machine screws to check threads.
* Deburr holes with Random Orbit Sander and 220 grit abrasive.

**7. \_\_\_\_\_\_\_\_ Weld piece C (Washer) on piece A.**

* Draw center line across washer using the tapped hole centers.
* Clamp washer to front of square tube using C locking pliers.
* Washer must be perfectly centered. Holes must be perpendicular to square tube.
* Tack washer to square tube on back side only. Have checked by instructor \_\_\_\_.
* Weld washer to square tube on back side only. Use ½” long beads.
* ***Do not weld through the screw holes.***

**Name:**

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**8. \_\_\_\_\_\_\_\_ Cut and weld plug in the top end of piece A.**

* Obtain 1/4” X 1” Flat Bar from Steel Rack.
* Cut piece to 15/16” using a Hack Saw and Vise.
* Grind 1” side and corners to exact fit using Locking Pliers and a Belt Sander.
* Insert piece 1/16” into end of Square Tube. Use small magnate to hold piece in tubing.
* Tack in place – have instructor check fit-up \_\_\_\_\_\_.
* Weld in place. 3F down works best.
* Sand Fillet welds using a Flap Disk.

**9. \_\_\_\_\_\_\_\_ Cut and bend Handle.**

* Obtain .375” (3/8”) Diameter Rebar from Steel Rack.
* Cut piece to length using an Abrasive Cutoff Saw or Iron Worker (Round Bar hole).
* Chamfer one end, radius other end using a Belt Sander and Battery Powered Drill.
* Measure and mark chamfered end at 2”.
* Align 2” mark on top of vice jaws. Bend to approximately 45 degrees with a hammer.
* Check angle with a Combination Square.

**10. \_\_\_\_\_\_\_\_ Plug weld Handle in the .375” (3/8”) diameter hole.**

* Insert chamfered end into square tube and align bent part of handle with square tube.
* Hold in place with small magnate on backside. Use 1 small tack on front side.
* Have fit-up checked by instructor \_\_\_\_\_\_\_.

* Plug Weld around the front end only.
* Grind plug weld flush using a Grinder & Stone Wheel.

**Base Frame**

1. **\_\_\_\_\_\_\_\_\_ Cut (4) piece A’s to length.**

* Obtain 2” X 2” X 1/8” Angle Iron from Steel Rack.
* Use Iron Worker to cut (4) ***identical*** ***length*** pieces. Refer to Cut List for length.
* Measure length + ½” more and mark 1st piece. Align mark on front of cutting blade.
* Bring down blade to hold piece in place. Set stop on backside of machine. Continue cut.
* Check length of 1st piece before cutting the other three.

1. **\_\_\_\_\_\_\_\_\_ Layout 45 degree angles on piece A’s.**

* Use combination square and marker to draw cut lines.
* Refer to Detail drawing (Sheet 2 of 4) for locations.
* Draw line on outside of the legs.

1. **\_\_\_\_\_\_\_\_\_ Cut a 45 degree miter on each end of piece A.**

* Refer to Detail Assembly Drawing. Inside corners should line up.
* Use a plasma cutter, cut off die grinder, or Reciprocating Saw (SawsAll) to cut on the line.
* Clamp piece in a vise and grind/deburr piece using a 4 ½” grinder w/ grinding wheel if needed.
* Check fit using Tacking Fixture.
* ***Do not force pieces into the fixture – trim ends if needed.***

1. **\_\_\_\_\_\_\_\_\_** **Cut (4) piece D’s.**

* Obtain #3 (3/8” diameter) Rebar from steel rack. Check Drawing & Cut List for length.
* Cut to length using the Abrasive Cut-Off Saw or Iron Worker (Round Bar Hole).
* Deburr ends using a belt sander.

1. **\_\_\_\_\_\_\_\_\_ Tack weld all 4 pieces together using a GMAW machine.**

* Clamp tacking fixture to welding table using C locking pliers or QuickGrip clamps.
* Align inside corners of angle iron. Use additional locking pliers to hold angle in place.
* Clamp work lead to angle iron.
* Tack the inside corners 1st. (3) locations – on the ends of each joint.
* ***Do not weld joints in the tacking fixture.***

1. **\_\_\_\_\_\_\_\_\_** **Weld angle iron frame pieces together using a GMAW machine.**

* Obtain welding table from tool room. Clamp to booth table using C locking pliers or QuickGrip clamps.
* Set Welder to 1/8” thickness. Use longer stickout when welding joints with large gaps.
* Skip around while welding.
* Weld the inside Corner Joint Fillets first in the 3F down position.
* Weld inside Miter Joints 2nd. 1G position for tight joints.
* Weld outside Fillet welds in the 3F down position next.
* Turn frame over, weld Miter joints in the 1G position.
* Flap disk / deburr welding table when finished welding. Return to tool room.

1. **\_\_\_\_\_\_\_\_\_** **Weld piece D’s in frame using a GMAW machine.**

* Place ¾” scrap square tube pieces under Rebar to set Rebar height in frame.
* Eye ball 45 Degree angle. Tack ends, weld in place.

1. **\_\_\_\_\_\_\_\_\_** **Grind / Flap Disk welded joints with a 4 ½ grinder.**

* Grind bottom welds flush using a grinding stone & grinder.
* Flap Disk the outside corners.
* Do not grind inside welds - covered by concrete.

1. **\_\_\_\_\_\_\_\_\_** **Weld Post to Base Frame.**

* Obtain welding table. Clamp to booth table using C locking pliers or QuickGrip clamps.
* Using a tape measure and combination square, measure 5/8” from the center and draw a vertical line down the outside of the angle iron.
* Clamp post to frame using C Locking Pliers. Check Post fit-up with framing square.
* **Post must be “PLUMB” or perpendicular to the frame in both directions.**
* Tack Post to Frame in four corners.
* Have fit-up checked by instructor \_\_\_\_\_.
* Weld Post to Frame on outside and top fillet only. Weld in the 2F & 3F down position.

1. **\_\_\_\_\_\_\_\_\_** **Deburr and degrease Post & Base Frame – prepare for paint.**

* Use Random Orbit Sander, Grinder & flap disk, chisel, wire brush to remove spatter/marks.
* Obtain cloth rag & Acetone from paint room cabinet. **ACETONE IS** **HIGHLY FLAMMABLE**.
* Wipe down frame outdoors – away from sparks.
* Throw away rag in collection barrel. Return Acetone to cabinet.

1. **\_\_\_\_\_\_\_\_\_** **Paint Post & Base Frame.**

* Obtain Machine Screws, washers and nuts from instructor \_\_\_\_\_\_.
* Hang frame for painting. Use old GMAW wire, Machine screws, washers and nuts.
* Install #8 X ½” screws in washer. Leave loose to allow paint to cover material behind screw heads.
* Obtain grey primer from paint room cabinet. Shake 30 seconds minimum.
* Spray (2) light coats of primer on frame. (Outdoors if possible)
* Allow to dry between coats, usually 5 - 10 minutes.
* Obtain Green paint from paint room cabinet. Shake 30 seconds minimum.
* Spray (2) light coats of Green paint on frame (Outdoors if possible).
* Return paint to cabinet. Tape name on hanger. Allow paint to cure overnight.

1. **\_\_\_\_\_\_\_\_\_** **Pour Concrete in Base Frame.**

* Pre-plan glass bead pattern or have metal pattern completed and painted.
* Tape & paper off outside frame.
* Write First/Last name on bottom of frame using permanent marker.
* Place pouring board w/ plastic on top on pouring table. Place frame on top of plastic.
* Check your working time. Allow 30 minutes to pour concrete.
* Mix concrete using premix proportion containers.
* Tamp concrete into frame, screed off excess, trowel and/or brush surface lightly, insert beads or pattern by tapping them lightly into concrete. **DO NOT OVER WORK CONCRETE.**
* Using damp sponge, wipe off excess concrete from frame while concrete is still wet.
* Clean tools and sponge immediately when finished.
* Leave Frame on pouring board. Place board and frame together on rack to cure overnight.

**Name:**

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**Hanger Bracket**

**1. \_\_\_\_\_\_\_\_ Obtain and cut Sheet Metal to lengths. Pieces A, B, & C.**

* Obtain 16ga. X 4” wide and 16ga. X 1 ½” Sheet Metal strip from Ag Mech. Sheet Metal Rack.
* Use Hose Bracket Cut List to obtain lengths.
* Use Sheet Metal Sheer to cut metal to lengths.
* Set the length stop on the back of the machine for each cut or use scale on front of machine.
* Return un-used material to rack when finished.

**2. \_\_\_\_\_\_\_\_ Drill .2656” (17/64”) holes in piece B using the Jet Drill Press.**

* Use Tape Measure, Combination Square, Tracing Template and marker to draw hole locations, bend lines, profile and centerlines.
* Refer to detail drawing for layout.
* Have layout checked by instructor \_\_\_\_\_\_\_\_\_\_.
* Center punch hole centers using small hammer and center punch.
* Install .2656” (17/64”) Twist Drill Bit in chuck. Install drill board in Jet Drill press vise.
* Use locking plies to clamp piece (left side) to the board when drilling. Hold piece & vise in place by hand – vise doesn’t need to be bolted to table.

**3. \_\_\_\_\_\_\_\_ Cut and/or sand radius on ends of piece A & B.**

* Use radius templates in tool room to mark radii on pieces.
* Sand radii on piece A using Belt Sander or sanding board and Grinder w/flap disk.
* Cut radii on piece B using Plasma Cutter. Stay 1/8” away from line. Remark if needed. Sand to the line using Belt Sander or sanding board and Grinder w/flap disk.
* Deburr/sand all edges using Random Orbit Sander & 220 grit abrasive disk.

**4. \_\_\_\_\_\_\_\_ Bend piece B using the Box & Pan Break.**

* Use Tape Measure, Combination Square, and marker to re-draw lines if needed. Refer to detail drawing.
* Ensure that center line is drawn length-wise before bending.
* Place piece in break with front end of piece hanging out the front of the Break. Centerline facing up.
* Align bend line on piece to outside of Break joint line. Bend slightly past 90 degrees to allow for spring back.
* Remove and check with square. Re-bend if necessary. Ends must be 90 degrees to center part and parallel to each other.
* Place end with hole in Break. Align bend line on piece to outside of Break joint line. Bend slightly past 90 degrees to allow for spring back.
* Remove and check with square. Re-bend if necessary. Ends must be 90 degrees to center part and parallel to each other.
* Measure width opening in piece B at the bottom. Write down size \_\_\_\_\_\_\_.

**5. \_\_\_\_\_\_\_\_ Roll piece A to specified radius using Sheet Metal Rolls.**

* If needed, trim piece A to width opening in piece B using shear **BEFORE** rolling pc. A.
* Mark centerline across short distance of piece.
* Set rolls parallel, use spacer to set height, roll piece A to radius.
* **ADJUST EACH SIDE OF THE ROLLER THE SAME AMOUNT EACH TIME – ½ turn each pass through.**
* Check using rolling/tacking fixture found on Rolls Shelf.

**6. \_\_\_\_\_\_\_\_ Cut piece C to length. Bend and tack weld to piece A.**

* Bend piece C to 90 degree angle according to plan.
* Obtain tacking fixture. Clamp piece A in place.
* Align piece C – angle pointing upward, mark and trim ends to length/angle using a Hack Saw and a vise.
* Place angle downward. Tack Piece A & C together using GMAW.
* Return fixture to Rolls shelf.

**7. \_\_\_\_\_\_\_\_ Tack Weld Piece A, B, & C together – then weld using small intermittent beads.**

* Assemble pieces A, B, & C. Use previously drawn centerlines for alignment. Use light pressure with C locking pliers to hold in place.
* Tack weld top radius – once on each centerline intersection.
* Have fit-up checked \_\_\_\_\_\_.
* Use small ½” long beads. Weld four bottom corners and one in center of bottom side. Space 3 beads across top radius. Use 3F down position when possible.
* Weld front side Fillet on front of piece C to A.
* Form (backside) corner joint piece C to A using grinder and Flap Disk.
* Weld backside corner joint in piece C to A.

**8. \_\_\_\_\_\_\_\_\_** **Deburr and degrease piece – prepare for paint.**

* Use Random Orbit Sander, Grinder & flap disk, chisel, wire brush to remove spatter/marks.
* Obtain cloth rag & Acetone from paint room cabinet. **ACETONE IS** **HIGHLY FLAMMABLE**.
* Wipe down piece outdoors – away from sparks.
* Throw away rag in collection barrel. Return Acetone to cabinet.

**9. \_\_\_\_\_\_\_\_\_** **Paint Hanger Bracket Piece.**

* Obtain (2) ¼“ X 2” Stove Bolts, Lock Washers, and Nuts from instructor \_\_\_\_\_\_.
* Install bolts, washers, and nuts loosely.
* Use old GMAW wire to hang piece, hook top bolt/nut for painting.
* Obtain grey primer from paint room cabinet. Shake 30 seconds minimum.
* Spray (2) light coats of primer on piece. (Outside shop if possible)
* Allow to dry between coats, usually 5 - 10 minutes.
* Obtain Green paint from paint room cabinet. Shake 30 seconds minimum.
* Spray (2) light coats of Green paint on piece (Outside shop if possible)
* Return paint to cabinet. Tape name on hanger. Allow paint to cure overnight.

**Hose Caddy Assembly**

**1. \_\_\_\_\_\_\_\_ Bolt and rivet Hose Bracket to Post.**

* Obtain (1) 1/8” X 1/2” Blind Pop Rivet from instructor. \_\_\_\_\_\_\_\_.
* Bolt Hanger Bracket to Post. Make sure Bracket is perpendicular to post. Use carpenter or Combination Square.
* Ream holes with Battery Powered Drill & 17/64” Twist Drill Bit if needed.
* Tighten bolts/nuts using 7/16” box end wrench and screw driver.
* Place Post on back, Frame on Wood Blocks w/ mat to hold in place. Use center punch to mark piece C for Rivet. Refer to Assembly Drawing.
* Drill 1/8” diameter hole using Battery powered drill and 1/8”” twist drill bit in front of tubing only. Do not drill through both sides.
* Use Pop Rivet gun (found in tool room) to install Blind Pop Rivet.
* Return tools to tool room.

**2. \_\_\_\_\_\_\_\_ Install Faucet and plumbing pieces.**

* Obtain plumbing pieces from instructor \_\_\_\_\_\_\_.
* Apply “Loctite” (found in Tool Room Supply Drawer) to machine screws. Screw Faucet in place with screwdriver.
* Apply Teflon tape to threads on both ends of PVC nipple.
* Screw PVC nipple into Faucet, screw 90 Degree PVC Elbow onto nipple.
* Tighten using Water Pump Pliers until snug. Elbow must be facing straight down.
* Obtain and cut ½” PVC pipe (found in Tool Room Supply Drawer) to length. Use PVC pipe cutting shears.
* Apply PVC glue to inside/outside of the Pipe, and Hose Adapter.
* Quickly assemble and press pieces together (twisting slightly). Hold in place for 5 seconds.
* Apply PVC glue to inside/outside of the Pipe, and Elbow.
* Quickly assemble and press pieces together (twisting slightly). Hold in place for 5 seconds.
* Wipe away excess glue with small cloth rag.
* Return items back to tool room when finished. Throw away rag in oil rag barrel.

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**3. \_\_\_\_\_\_\_\_\_** **Paint plumbing pieces.**

* Tape/paper off Hose Caddy & Sillcock.
* Spray (2) light coats of primer – allow 5 minutes drying time between coats.
* Spray (2) light coats of Green – allow 5 minutes drying time between coats.
* Remove Tape/paper after paint is dry to the touch – 15 minutes.

**4. \_\_\_\_\_\_\_\_ Turn in Hose Caddy and procedure sheet for grade.**