

## **WELDING**

The name and county of each Science, Engineering and Technology exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks. One exhibit per class unless otherwise noted. Several classes require a display board which should be a height of 24" and not exceed 1/4" in thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24" boards are cut from one end of a 4'x8' sheet of plywood. Nothing should be mounted within 3/4" of the top or bottom of the board. Fabricated board such as plywood, composition board, or particle-type lumber may be used for display boards. Display boards should be sanded and finished to improve their appearance. The finish on a display board will be judged as a woodworking exhibit. Display boards should include an overall title for the display, plus other necessary labeling. All reports should be computer generated, enclosed in a clear, plastic cover, and attached securely to the display. Reports should be written using the scientific method whenever possible (background, the question or hypothesis, what you plan to do and what you did, method used and observations, results, what you learned).

**Division 920: Welding** (All metal welding processes accepted.)

All welds exhibited in class 1 or 2 must be mounted on a 12" high x 15" long display board of thickness not to exceed 3/8". Attach each weld on a wire loop hinge or equivalent, so the judge can look at the bottom side of the weld when necessary. Each weld should be labeled with information stating: 1) type of welding process (stick, MIG, TIG, Oxy-Acetylene, etc.) 2) kind of weld, 3) welder setting, 4) electrode/wire/rod size, and 5) electrode/wire/rod ID numbers. Attach a wire to display board so it can be hung like a picture frame.

### 4-H Welding Project Tips and Suggestions

#### CLASS 1

1. All welds should be made with the same electrode/wire/rod size and number.
2. Welds should be made only on one side of metal so penetration can be judged.
3. Welds should be cleaned with chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.
4. It is suggested that all welds be on the same size and thickness of metal. These pieces, referred to as coupons, should be 1.5 to 2 inches wide and 3.5 to 4 inches long. A good way to get this size is to buy new cold rolled strap iron and cut to length.

The extra width is needed to provide enough metal to absorb the heat from the welding process and prevent the coupons from becoming too hot before the bead is completed. Narrower coupons will become very hot, making an average welder setting too cold at the bead start, just about right in the middle, and too hot at the end. The correct way to weld narrow strips is to make short beads and allow time to cool, however this project requires a full length bead. (continued on next page)

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Stick welding: Suggested coupon thickness- ¼" if using ⅛" rod. Suggested rod-AC and DC straight or reverse polarity- first E-7014, second E-6013

MIG welding: Suggested coupon thickness--¼" if using .035 wire and ⅛" if using .023 wire

Oxy-Acetylene: Suggested coupon thickness--⅜" and suggested rod--⅜" mild steel rod

## CLASS 2

1. It is suggested that all welds be on same size and thickness of metal. These pieces are referred to as coupons. The welds can be on one coupon that is about 4" x 4" or on individual coupons that are about 2" X 4" inch and ¼" thick. Suggested rods for this class of position welds for AC and DC straight or reverse polarity is, first E-6013, second E-7014 and E-6010 for DC reverse polarity only.
2. Welds should be cleaned with a chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.

## CLASSES 3 and 4

1. All welds should be cleaned and protected from rust with paint or light oil. Plans are to be complete enough that if they were given to a welding shop, the item could be made without further instructions. Bill of materials should include a cost for all items used including steel, electrodes, paint, wheels, etc.

**H920001 - Welding Joints** - a display of one butt, one lap and one fillet weld.

**H920002 - Position Welds** -a display showing three beads welded in the vertical down, horizontal and overhead positions.

**H920003 - Welding Article** -any shop article or piece of furniture where welding is used in the construction. 60% of item must be completed by 4-H'er and notes regarding laser welding or machine welding must be included. All plans, plan alterations and bill for materials must be attached to the article. Protect plans with a cover. If no plans are included with welding article, item will be disqualified.

**H920004 - Welding Furniture** – any furniture where 75% welding is used in the construction. 60% of item must be completed by 4-H'er and notes regarding laser welding or machine welding must be included. All plans, plan alterations and bill for materials must be attached to the article. Protect plans with a cover. If no plans are included with furniture, item will be disqualified.

**H920005 - Careers Interview** – Interview someone who is working in the field of welding and research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1" margins. Multimedia reports should be 3 to 5 minutes in length.