



!!!! WARNING !!!!



WELDING FUMES AND GASES CAN BE DANGEROUS TO YOUR HEALTH.

BEFORE USING THIS PRODUCT THE WELDER (END-USER) MUST READ AND UNDERSTAND THE COMPLETE PRODUCT WARNING LABEL AND MATERIAL SAFETY DATA SHEET (MSDS).

THE MATERIAL SAFETY DATA SHEET (MSDS) WHICH OUTLINES THE POTENTIAL HEALTH HAZARDS AND SAFETY INFORMATION RELATED TO THIS PRODUCT CAN BE DOWNLOADED FROM THE MSDS PORTION OF THIS WEBSITE. IT IS ALSO AVAILABLE FROM YOUR EMPLOYER AND WELDING SUPPLY DISTRIBUTOR.

DO NOT PROCEED WITH USE OF THIS PRODUCT UNTIL YOU READ AND UNDERSTAND THE MATERIAL SAFETY DATA SHEET (MSDS) AND PRODUCT WARNING STATEMENT.

BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS.

SEE THE PRODUCT WARNING LABEL AND MSDS FOR COMPLETE WARNING INFORMATION.



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Royal 220-M (as a Stud Pull)

Premium High Strength Alloy for
Extracting Broken Bolts, Studs, Drills and Taps

The **Royal 220-M** is often used as the centerpiece of a stud pull system. This electrode incorporates a highly alloyed rod that is used to remove most bolts, studs, drills, easy-outs or taps including those that are case-hardened, stainless steel, plated and made from specially alloyed materials. A unique protective flux has been designed to insulate threads and prevent damage from welding.

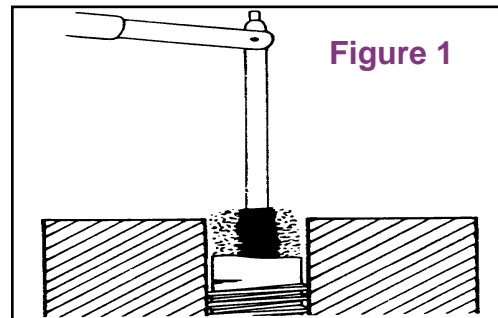
Procedure

1. Choose the correct size of electrode to suit the hole diameter. Set amperage according to the following chart.

Hole Size	Electrode Size	Amps
Up to $\frac{7}{32}$ "	1/16	25 – 35
$\frac{1}{4}$ " - $\frac{11}{32}$ "	5/64	35 – 45
$\frac{3}{8}$ " - $\frac{1}{2}$ "	3/32	40 – 85
$\frac{1}{2}$ " - $\frac{7}{8}$ "	1/8	85 – 130
$\frac{7}{8}$ " - $2\frac{1}{2}$ "	5/32	110 – 160
$2\frac{1}{2}$ " - 4"	3/16	140 – 220

Reduce above settings by 10% for overhead or horizontal stud removal.

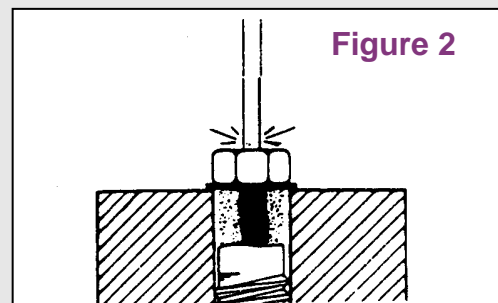
2. Position the **Royal 220-M** so that it is perpendicular to the broken piece. Strike an arc in the center of the broken part. Maintain a tight, short arc, allowing the slag to fill the threads. Do not allow any of the molten alloy to fuse to the side wall. Sliding a plastic straw over the **Royal 220-M** electrode can help to prevent any sidewall arcing. Be patient and do not overheat. Continue re-striking the center of the build-up. **See Figure 1**



3. The molten weld deposit may sag in some horizontal applications. A good remedy is to sleeve the hole with a copper tube.

4. Allow the weld deposit to cool before welding outside of the hole. This will help to prevent welding the deposit to the top edges of the hole.

5. Chip the slag from the center of the deposit. Continue to build deposit above the top edge of the hole. Place a washer and nut over the deposit (must be the same or smaller size than the stud or bolt).



6. If necessary, angle the rod to make sure that the nut is welded to the center of the deposit and not the base metal surface. **See Figure 2**

7. Allow the assembly to cool in still air before using a wrench to remove the broken part. **See Figure 3**

8. If the weld deposit build-up wasn't properly centered, there may be some difficulty extracting the part.

9. Remove any residual slag from the hole with an appropriately sized tap.

