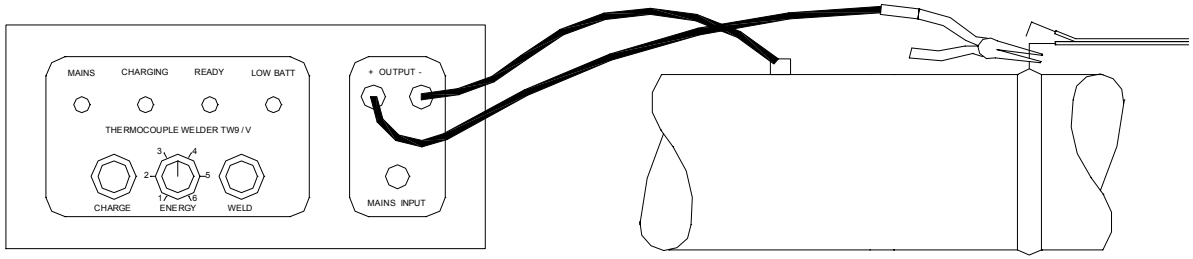
Zap Gun
Operating procedure
600 series



OPERATING PROCEDURE

1. Attach ground magnet to a clean workpiece.
2. Turn the ENERGY adjustment knob to the desired strength. (A strength of 4 is usually sufficient.)
3. Strip the thermocouple wire back approximately 1/4" - 3/8".
4. Bend the ends of the wire at a 90 degree angle.
5. Secure one of the bare leads in the plier tips and hold against a clean workpiece at the desired location.
NOTE: Pliers must not come in contact with the workpiece or adjacent lead.
6. Press and release the CHARGE button.
7. When the charging light changes to the ready light, press and release the WELD button.

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not indicate that it is recommended over other types not illustrated.

(B) Figure 127.4.8(D) shows basic types of weld attachments used in the fabrication of branch connections. The location and minimum size of these attachment welds shall conform to the requirements of Para. 127.4.8. Welds shall be calculated in accordance with Para. 104.3.1 but shall not be less than the sizes shown in Fig. 127.4.8(D).

The notations and symbols used in this paragraph and in Fig. 127.4.8(D) are as follows:

t_c = the smaller of ¼ in. (6.0 mm) or $0.7t_{nb}$
t_{nr} = nominal thickness of reinforcing element (ring or saddle), in. (mm)
t_{min} = the smaller of t_{nb} or t_{nr}
t_{nb} = nominal thickness of branch wall, in. (mm)
t_{nh} = nominal thickness of header wall, in. (mm)

(C) Figure 127.4.8(E) shows branch connections made by welding half couplings or adapters directly to the run pipe.

These branch connections and specially made integrally reinforced branch connection fittings which abut the outside surface of the run wall, or which are inserted through an opening cut in the run wall, shall have opening and branch contour to provide a good fit and shall be attached by means of full penetration groove welds except as otherwise permitted in (F) below.

The full penetration groove welds shall be finished with cover fillet welds and meet the requirements of Para. 104. The cover fillet welds shall have a minimum throat dimension not less than that shown in Fig. 127.4.8(E).

(D) In branch connections having reinforcement pads or saddles, the reinforcement shall be attached by welds at the outer edge and at the branch periphery as follows.

A89 *(D.1)* If the weld joining the added reinforcement to the branch is a full penetration groove weld, it shall be finished with a cover fillet weld having a minimum throat dimension not less than t_c; the weld at the outer edge, joining the added reinforcement to the run, shall be a fillet weld with a minimum throat dimension of $0.5t_{nr}$.

(D.2) If the weld joining the added reinforcement to the branch is a fillet weld, the throat dimension shall not be less than $0.7t_{min}$. The weld at the outer edge joining the outer reinforcement to the run shall also be a fillet weld with a minimum throat dimension of $0.5t_{nr}$.

(E) When rings or saddles are used, a vent hole shall be provided (at the side and not at the crotch) in the ring or saddle to reveal leakage in the weld between branch and main run and to provide venting during welding and heat treating operations. Rings or saddles may be made in more than one piece if the joints between the pieces have strength equivalent to ring or saddle parent metal and if each piece is provided with a vent hole. A good fit shall be provided between reinforcing rings or saddles and the parts to which they are attached.

(F) Branch connections NPS 2 and smaller which do not require reinforcements (see Para. 104.3) may be constructed as shown in Fig. 127.4.8(F). The groove welds shall be finished with cover fillet welds with a minimum throat dimension not less than that shown in Fig. 127.4.8(F). This construction shall not be used at design temperatures greater than 750°F (400°C) nor at design pressures greater than 1025 psi (7100 kPa).

127.4.9 Attachment Welds. Structural attachments may be made by complete penetration, partial penetration, or fillet welds.

(A) Low energy capacitor discharge welding may be used for the welding of temporary attachments directly to pressure parts, provided that they be removed prior to subjecting the piping system to operating pressure or temperature. After their removal, the affected areas shall be examined in accordance with Para. 136.4. Performance and procedure qualifications are not required.

This method of welding may also be used for the permanent attachment of nonstructual items, such as strain gages or thermocouples, provided that:

(A.1) a welding procedure specification is prepared describing the capacitor discharge equipment, the materials to be joined, and the techniques of application; the qualification of the procedure is not required;

(A.2) the minimum thickness of the material to which the attachment is to be made is 0.090 in. (2.3 mm);

(A.3) the power input is limited to less than 125 W-sec.

127.4.10 Heat Treatment

(A) Preheat and postweld heat treatment for welds shall be in accordance with Para. 131 or 132 as applicable.

(B) Heat treatment may be accomplished by a suitable heating method which will provide the desired heating and cooling rates, the required metal temperature, temperature uniformity, and temperature control.

127.4.11 Repair Welding

(A) Defect Removal. All defects in welds or base materials requiring repair shall be removed by flame or arc gouging, grinding, chipping, or machining