

SECTION S962 - JOINT BOND

S962-1 DESCRIPTION

Work consists of electrically bonding metallic pipe and fitting joints as required in the Contract Documents and as directed by the Project Manager.

Work is to be in conformance with the requirements of Section S900 General Water Provisions.

S962-2 MATERIALS

S962-2.01 Thermite Weld Equipment

Electrical connection of copper wire to metallic pipe or fittings shall be by the thermite weld method. Thermite weld materials shall consist of weld molds and weld cartridges according to the weld manufacturer's recommendations for each wire and pipe sizes and materials. Weld materials from different manufacturers shall not be interchanged. Weld molds shall be graphite molds. Ceramic "one-shot" molds will not be acceptable.

S962-2.02 Wire

Wire for bonded joints shall be single conductor stranded copper with 0.110 minimum thickness black high molecular weight polyethylene (HMWPE) insulation. Use #8 AWG wire on pipe sizes 12 inch diameter and smaller and #4 AWG on pipe sizes larger than 12 inch diameter.

S962-3 CONSTRUCTION DETAILS

Thermite welding shall be performed in accordance with the manufacturer's specifications. Joint bonds shall be applied only to pipe or fitting joints designated in the Contract Documents or by the Project Manager.

Each joint designated to be bonded shall be provided with two insulated copper cable joint bonds for push-on joint and three wires for mechanical joint.

Using a mechanical grinder, remove the minimum area of coating from pipe or fitting surface required for placement of weld mold on the pipe, creating a bright, shiny surface.

For new pipe installations, joint bonds should be completed before polyethylene tubing installation is completed at the joint. To attach joint bond wires to water mains that are already encased in a polyethylene tube, the Contractor shall first cut back the polyethylene to expose the pipe. The Contractor shall make an "X" shaped cut in the polyethylene and temporarily fold back the polyethylene at the point where the joint bond will be attached to the pipe. After the joint bond wires are attached to the pipe, the Contractor shall repair the polyethylene tubing. The Contractor shall use polyethylene compatible adhesive tape to repair the tubing. The polyethylene shall be folded back against the pipe and the repair tape shall be applied on all four sides of the joint bond. The repair tape shall completely cover the area of the polyethylene tube that was cut and shall completely cover all exposed metallic pipe or fitting material.

Prepare joint bond wire for thermite welding by assuring that cable is absolutely dry. Cable shall be free of dirt, grease and other foreign products. Cut cable in such a way as to avoid flattening or forcing out of round. To prevent deformation of cable, cut cable with cable cutters. Remove insulation in a manner that will avoid damage to strands. Hold cable at an approximate 30 degree angle to pipe or fitting surface when welding.

When weld has cooled, remove weld slag and test weld for strength by striking a sharp blow to the weld with a hammer while pulling firmly on the wire. Reweld unsound welds and retest weld. Thoroughly clean mold and mold covers after completion of each weld to assure that no slag will penetrate into next weld. After soundness of weld has been verified, thoroughly clean with a stiff wire brush and brush coat entire weld area with an approved bitumastic coating. Lift wire away from pipe or fitting and apply bitumastic coating completely around, on top and underneath the wire. Push wire back down on the pipe.

The wire for the joint bond connected between each pipe or fitting shall be cut and fabricated to a length that will fit each bond location in the field. The wire shall have sufficient slack to allow for pipe movement at the joint and protect against undue stress during backfilling.

Joint bonds are not required at mechanical joints where mechanical joint restraint glands have been installed.

Cushion sand shall be backfilled around the water main so that the sand covers the pipe to a minimum depth of 12 inches on top, and along both sides of the pipe. The excavation shall be backfilled in stages using select granular backfill (water) material which is free from stone, rocks, roots, organic material, trash or other debris, and carefully tamped to ensure that no voids exist around the bond wire and the bond wires are not damaged.

S962-4 METHOD OF MEASUREMENT

The quantity to be measured for payment shall be by the number of pipe joints electrically bonded .

S962-5 BASIS OF PAYMENT

The unit price bid shall include the cost of: surface preparation; furnishing and installing all thermite weld equipment and materials; wire; bitumastic coating; repairing polyethylene tubing; wire and furnishing all labor, material and equipment necessary to complete the work.

Excavation, rock excavation, furnishing and placing of bedding and select granular backfill, temporary pavement, and surface restoration will be paid for under separate items.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
S962.01	Joint Bond	Each