

Figure 5-56. Effect of adding shielding gaskets on connector shielding effectiveness. (Source: ref 5-16)

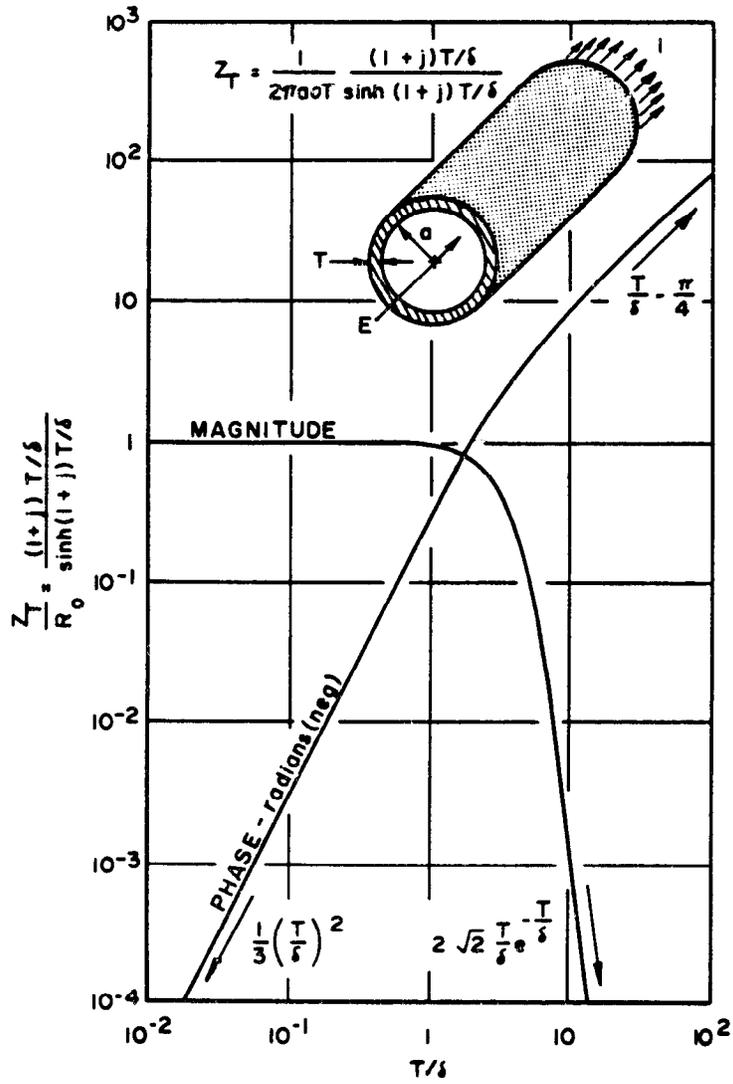


Figure 5-57. Normalized transfer impedance for solid cylindrical shields.
 (Source: ref 5-31)

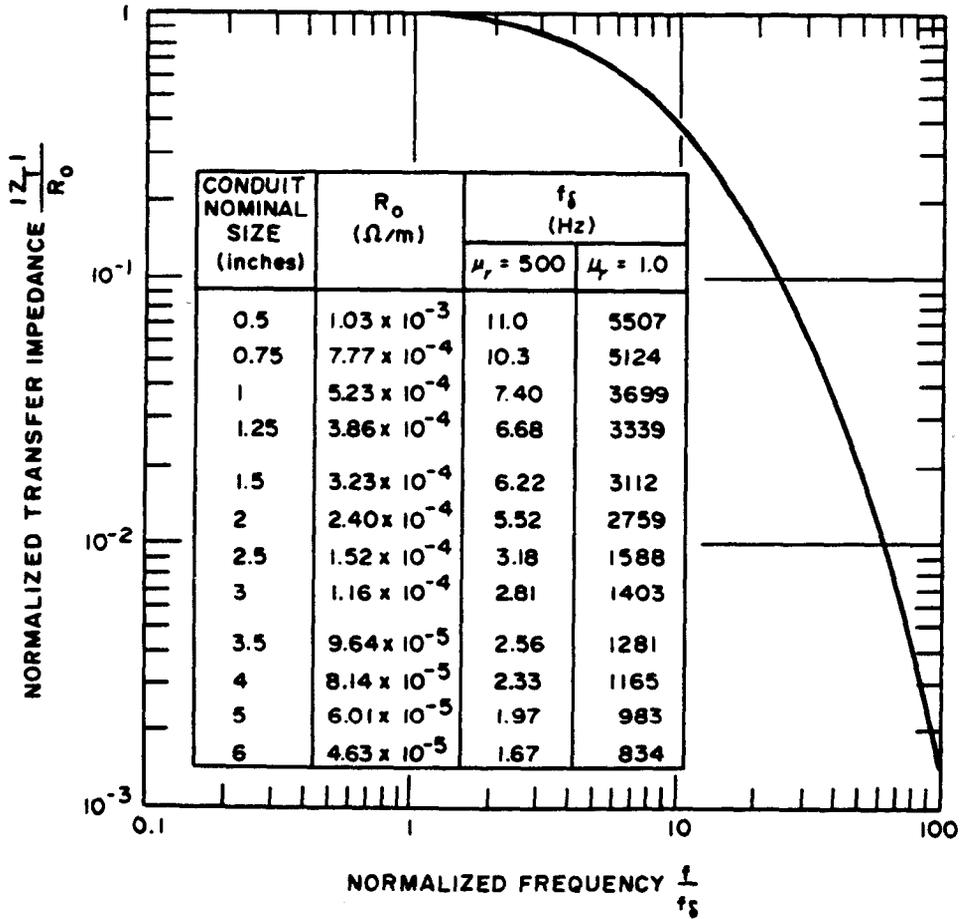


Figure 5-58. Magnitude of the transfer impedance of rigid steel conduit.
(Source: ref 5-31)

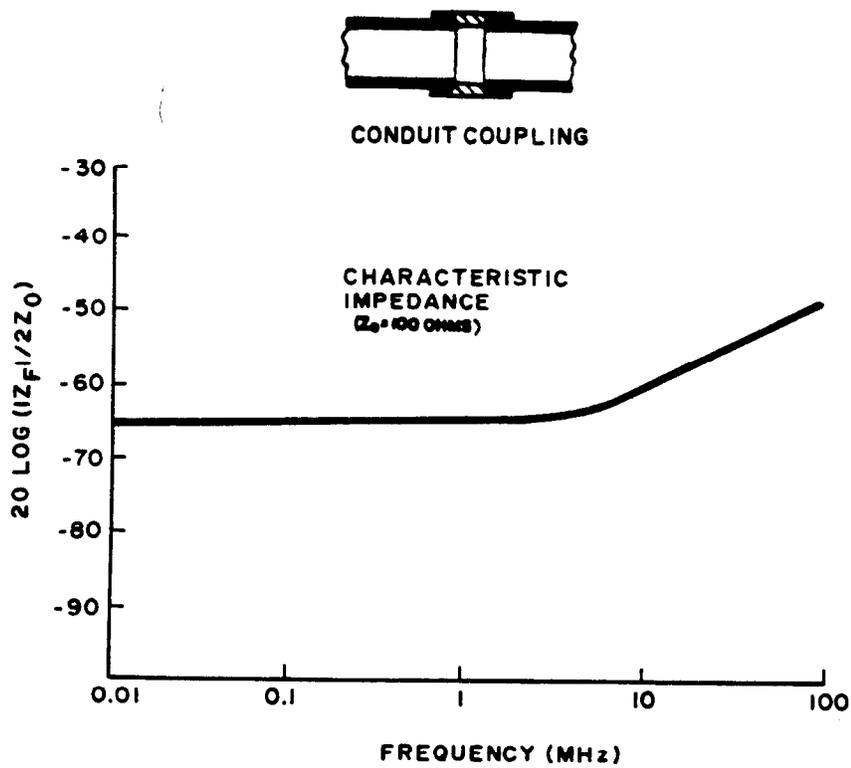
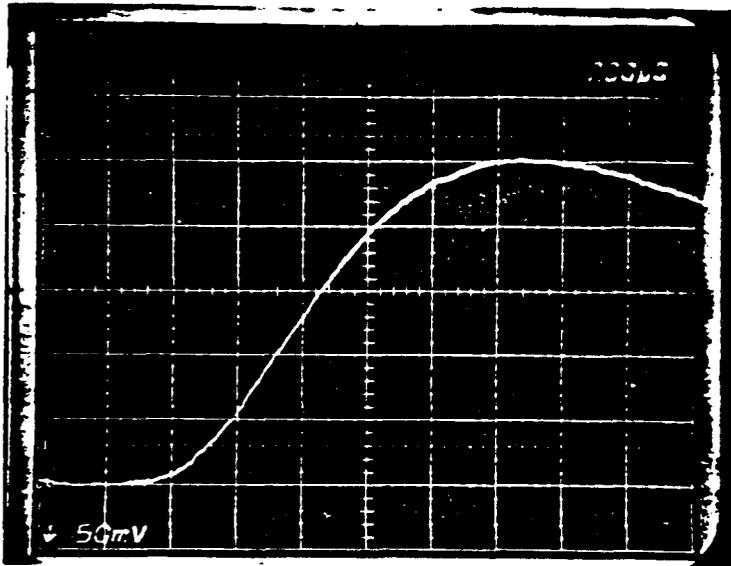
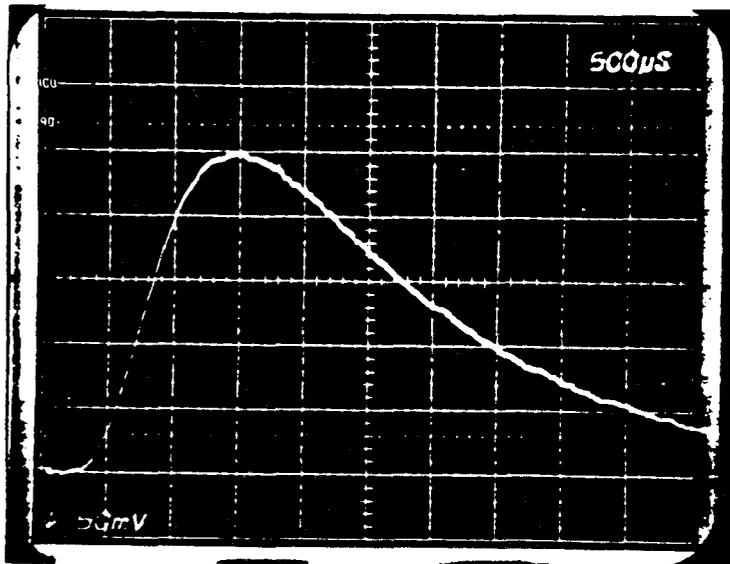


Figure 5-59. Flaw impedance (Z_F) of typical coupling. (Source: ref 5-17)



(a) Vertical: 1000 x 50 mV/div
Horizontal: 200 μ sec/div



(b) Vertical: 1000 x 50 mV/div
Horizontal: 500 μ sec/div

Figure 5-60. Diffusion signal for 1-inch galvanized steel conduit showing sense wire voltage.

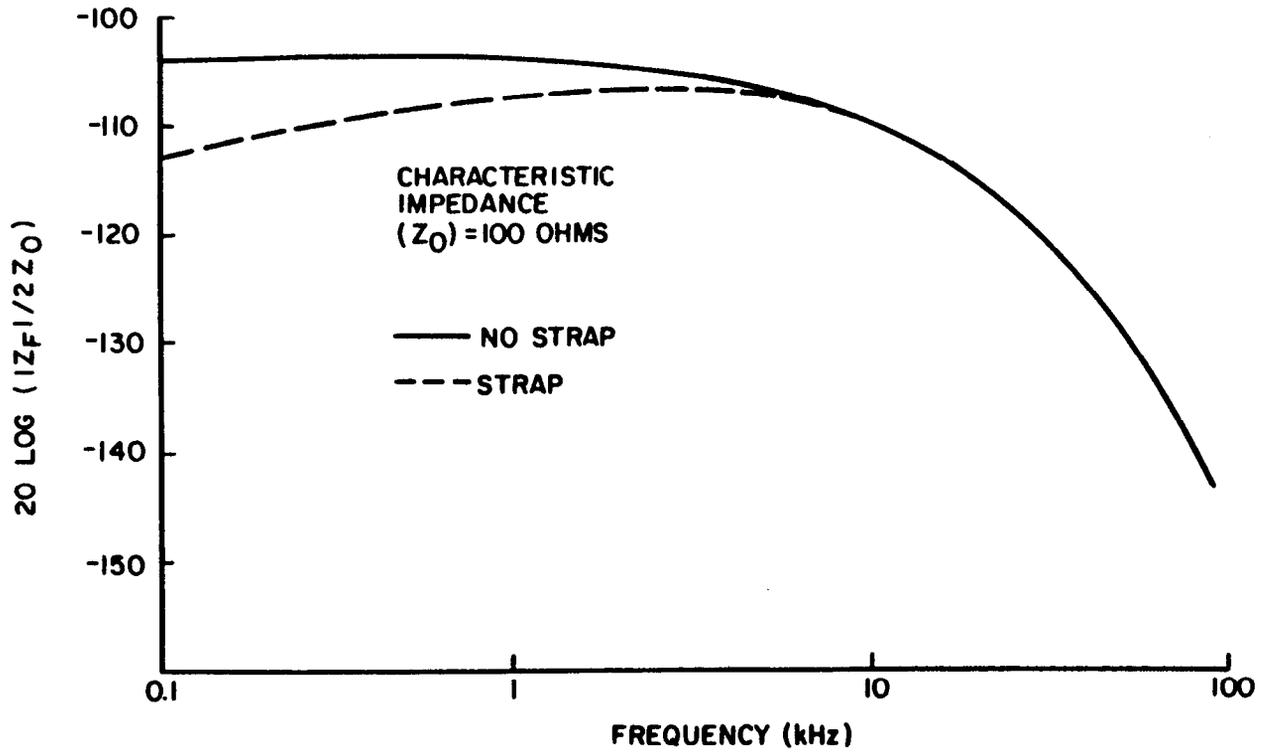


Figure 5-61. Flaw impedance (Z_F) of 0.038-millimeter (0.015-inch) wall flex-joint with and without copper strap. (Source: ref 5-17)

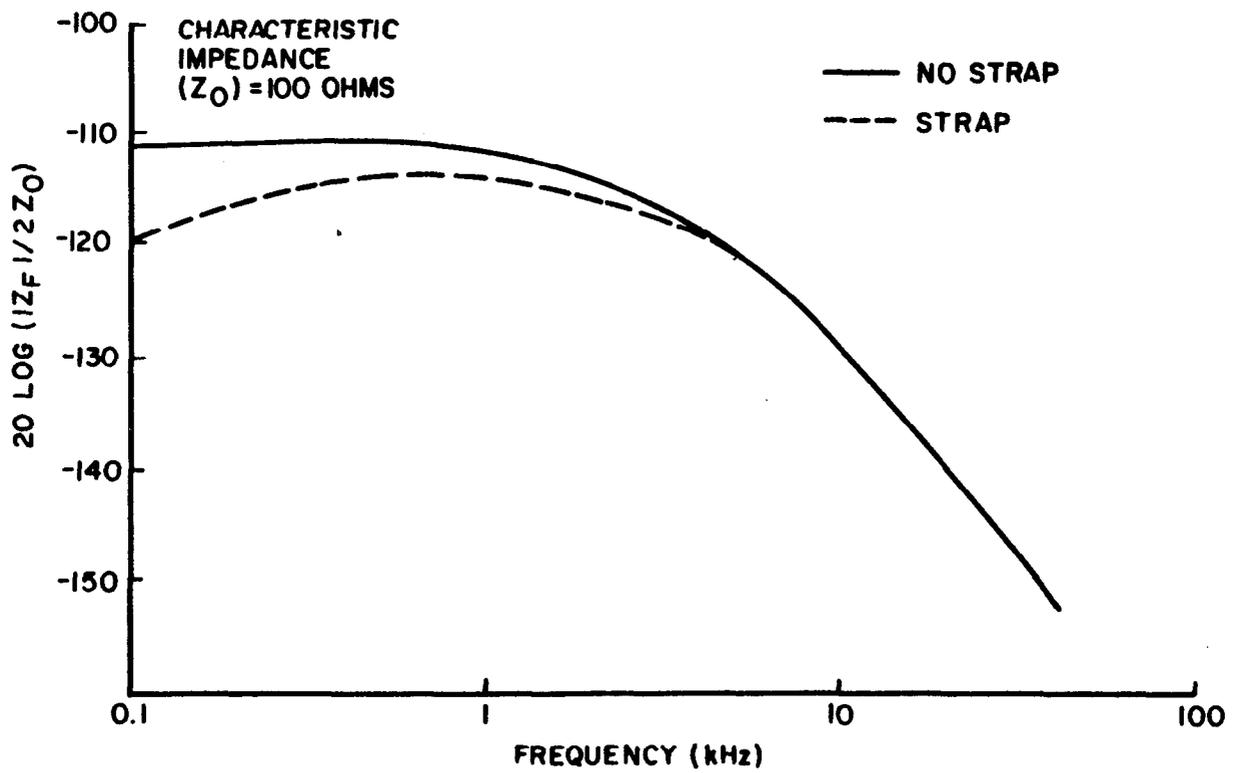


Figure 5-62. Flaw impedance (Z_F) of 0.76-millimeter (0.03-inch) wall flex-joint with and without copper strap. (Source: ref 5-17)

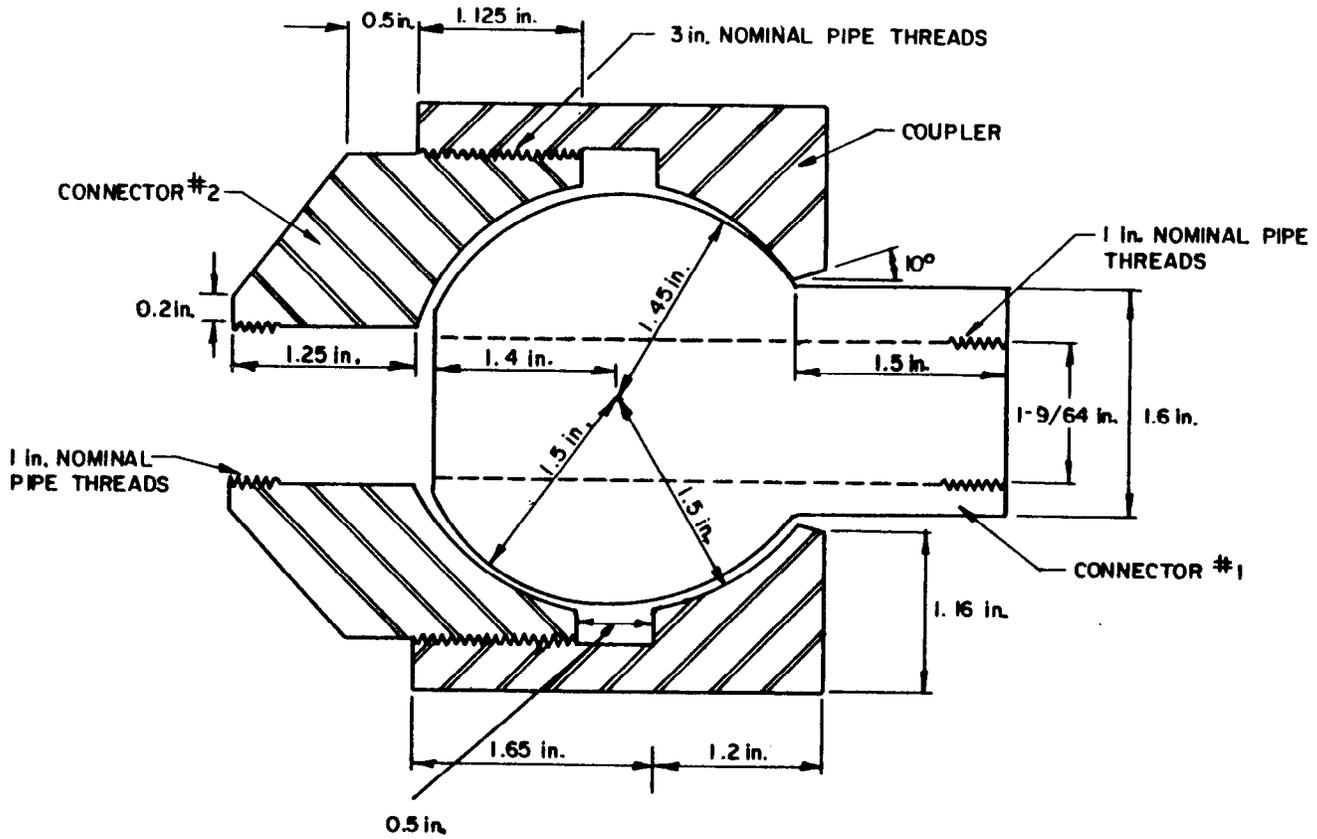


Figure 5-63. Experimental HEMP hardened union. (Source: ref 5-17)

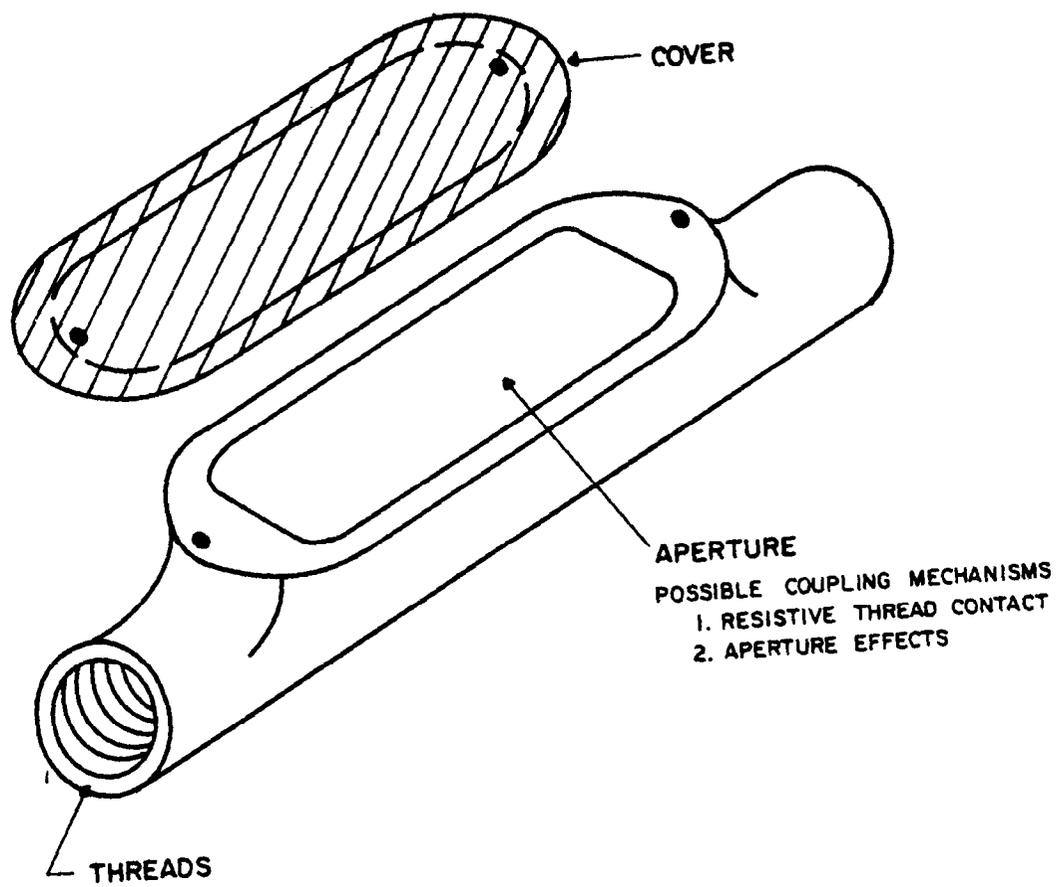


Figure 5-64. Type C conduit body. (Source: ref 5-17)

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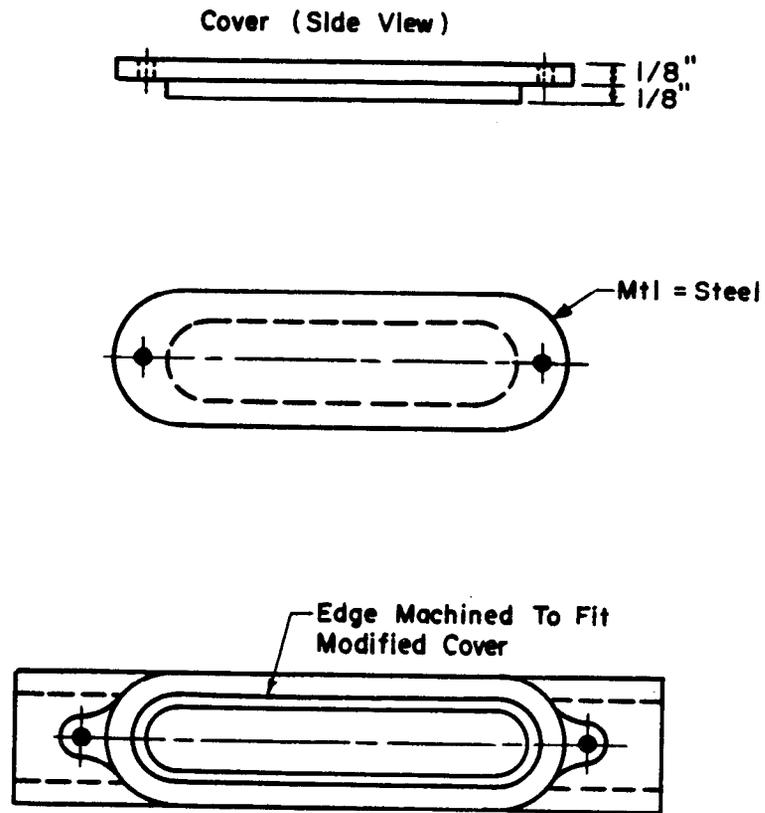


Figure 5-65. Machined conduit body cover for HEMP hardening.
(Source: ref 5-17)

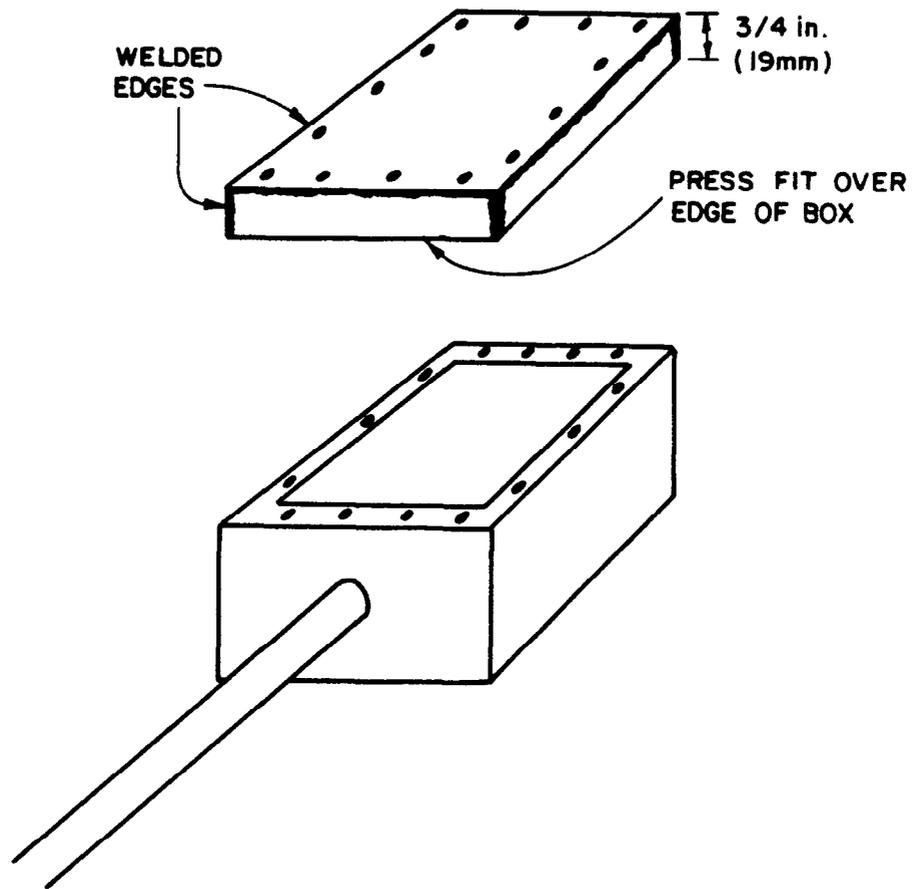


Figure 5-66. "Wrap-around" junction box cover. (Source: ref 5-17)

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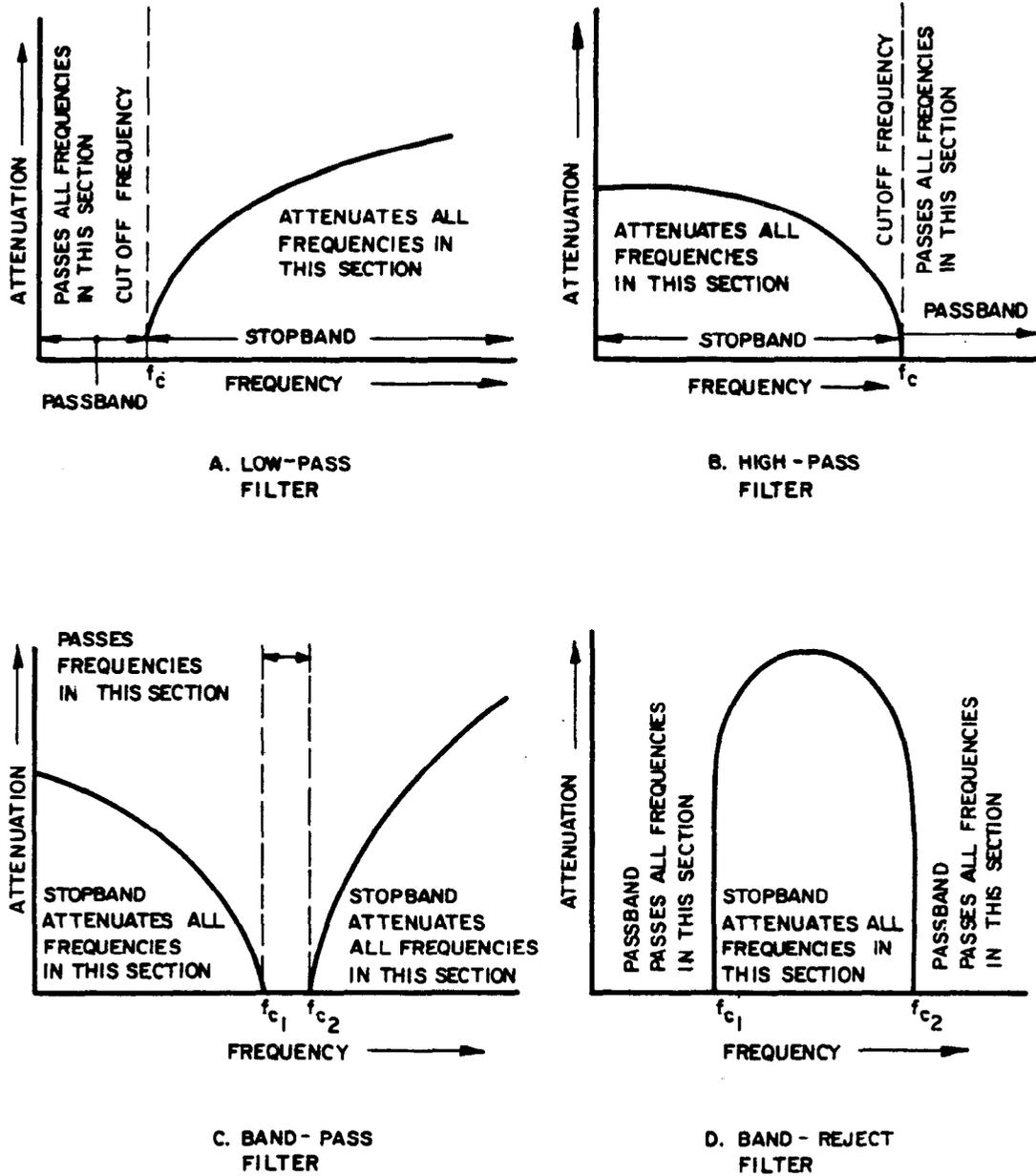


Figure 5-71. The four basic filter classes. (Source: ref 5-30)

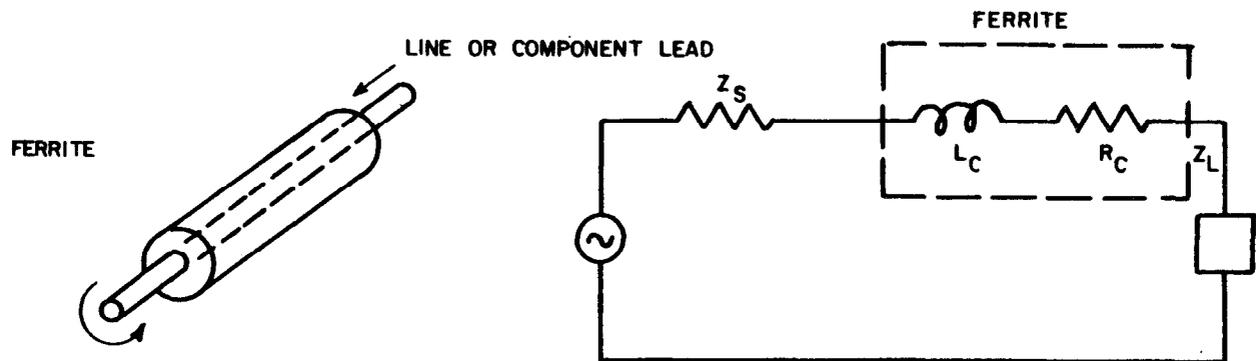
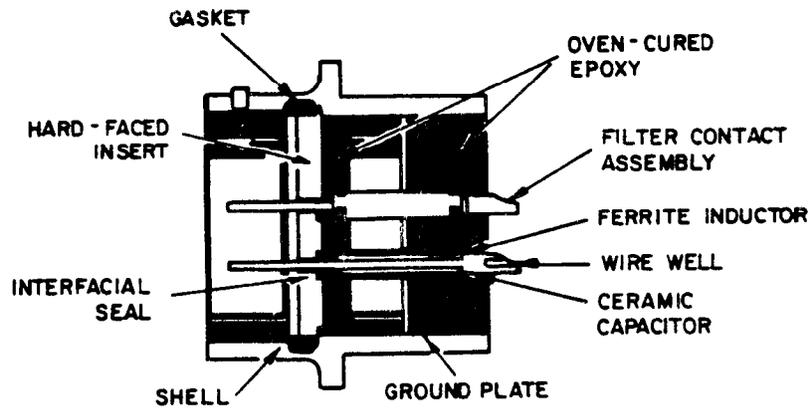
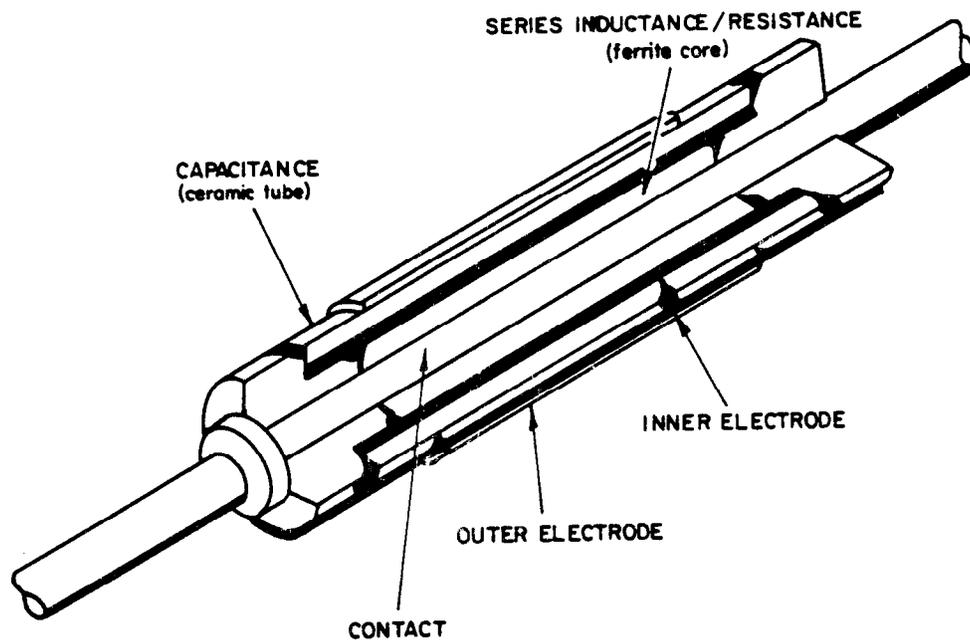


Figure 5-72. Ferrite bead on wire and ferrite bead equivalent circuit.
(Source: ref 5-32)



INTERNAL CONSTRUCTION OF A FILTER-PIN CONNECTOR
CONTAINING PASSIVE ELEMENTS



FILTER-PIN CONSTRUCTION CONTAINING PASSIVE ELEMENTS

Figure 5-73. Filter pin connector design. (Source: ref 5-7)

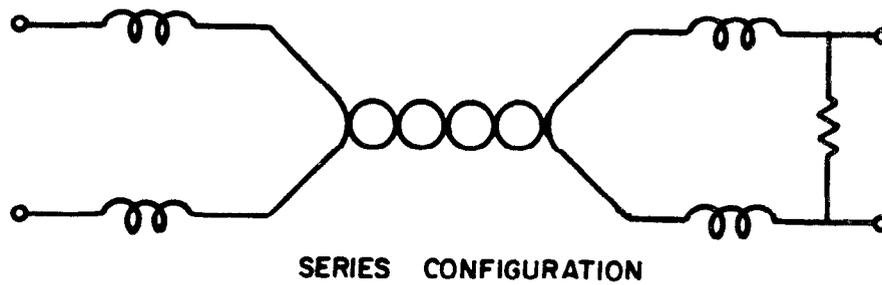
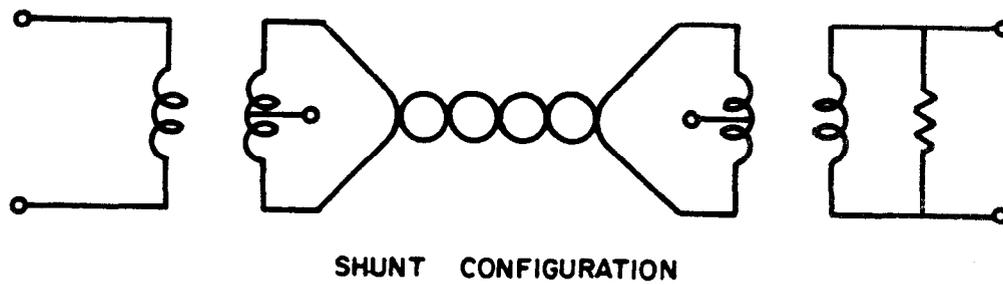


Figure 5-74. Shunt and series transformer wiring configuration.
(Source: ref 5-32)

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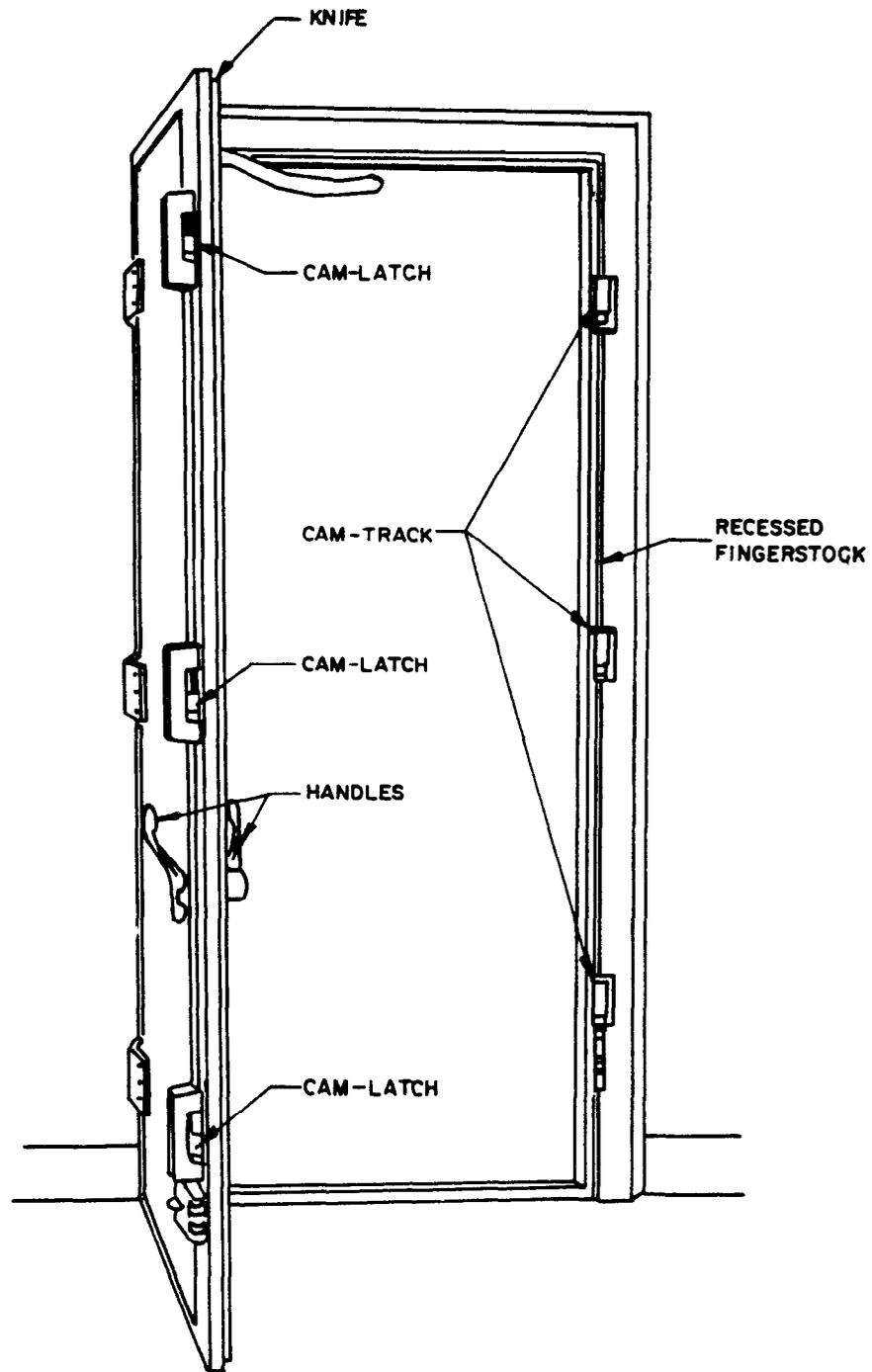
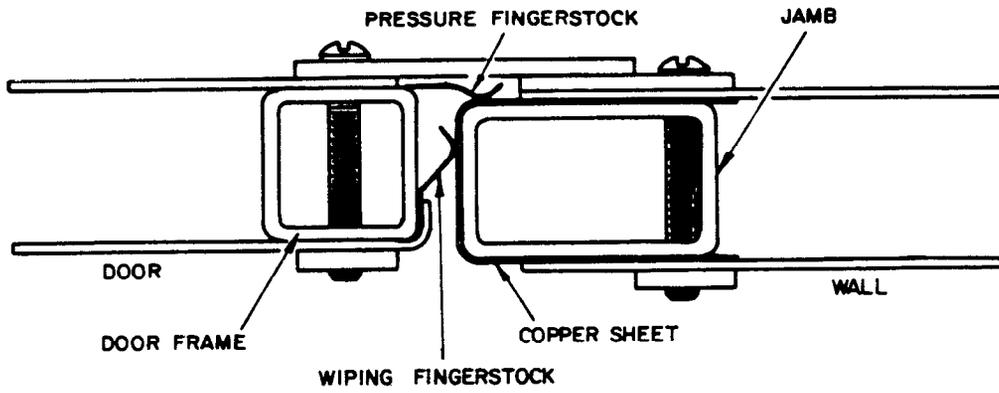
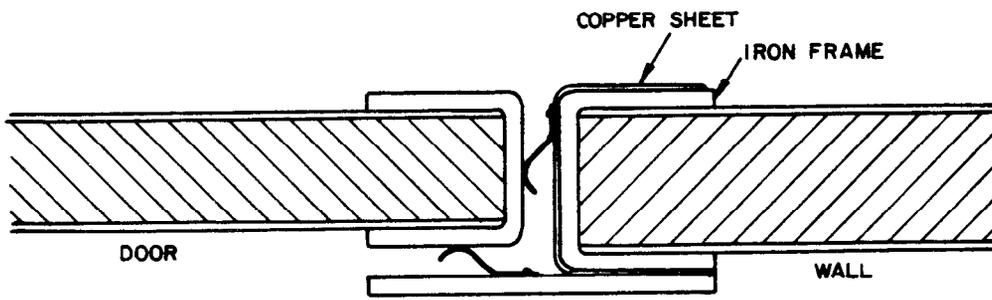


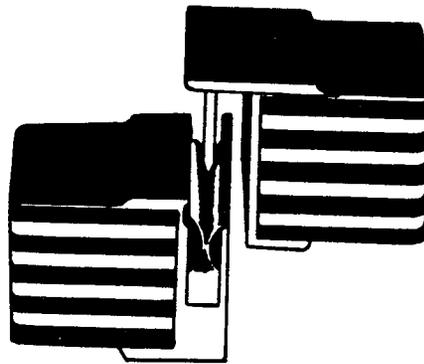
Figure 5-75. Typical shielded door closures. (sheet 1 of 2)



(a)



(b)



(c)

Figure 5-75. Typical shielded door closures. (sheet 2 of 2)

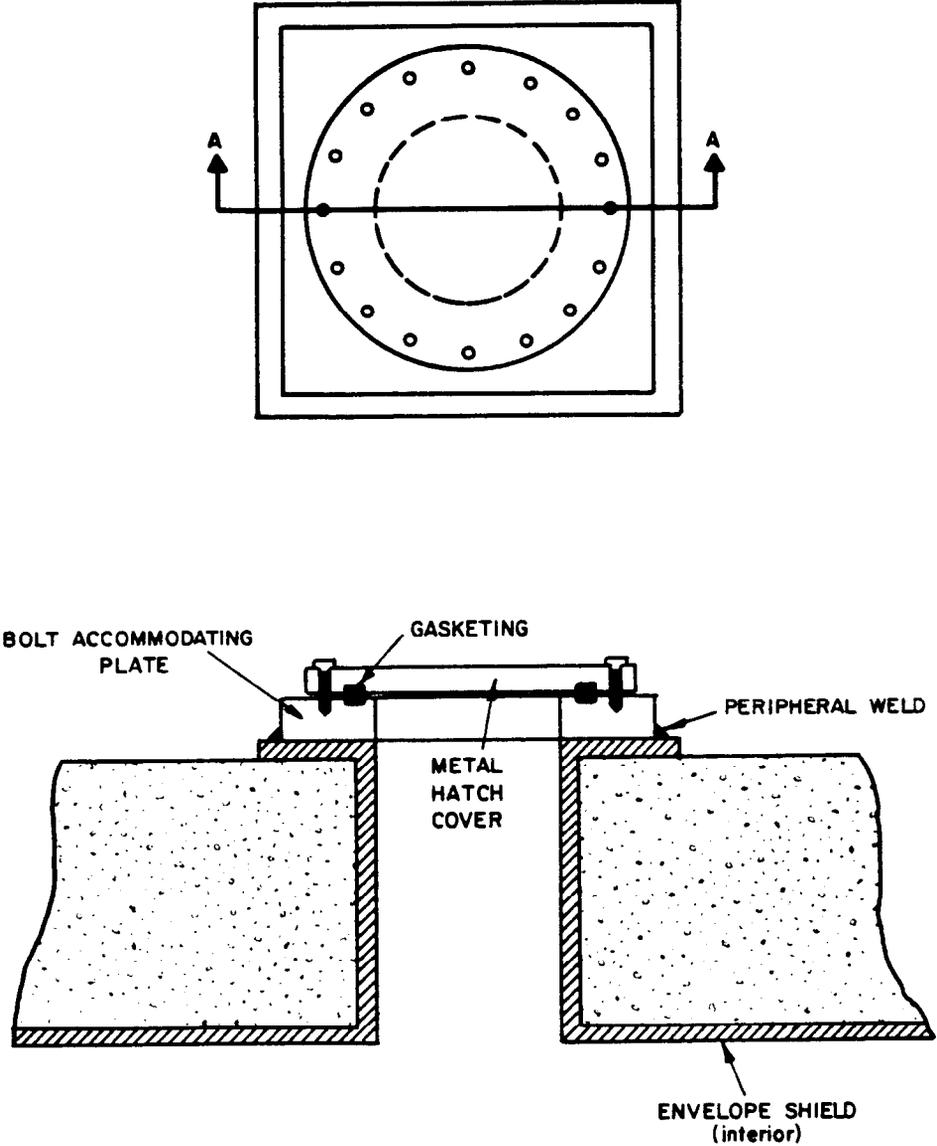


Figure 5-76. Emergency escape hatch configuration. (Source: ref 5-7)

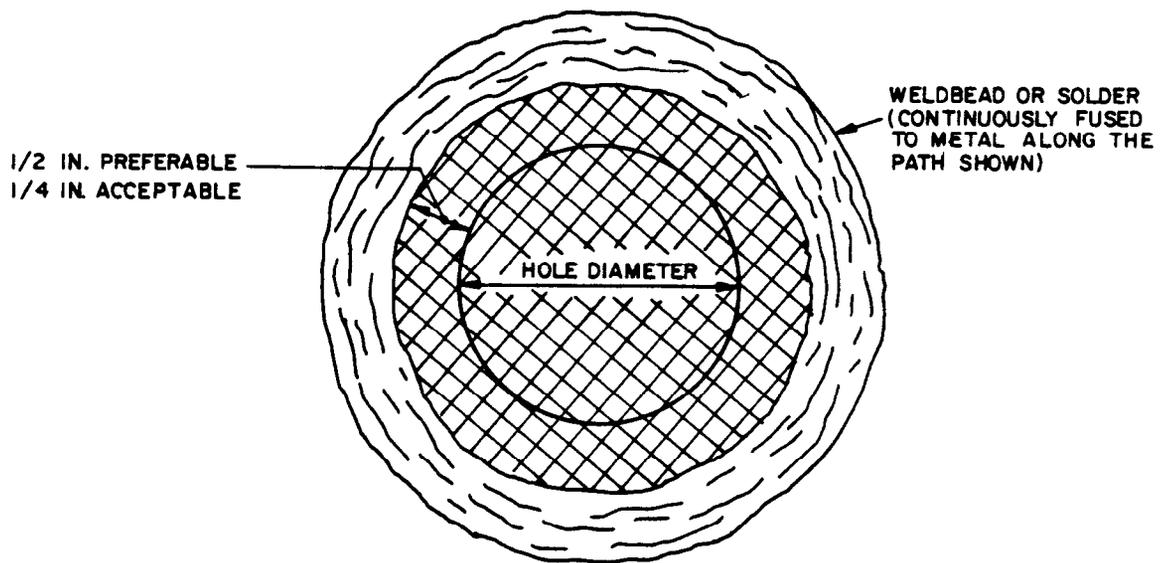


Figure 5-77. Typical welded screen installation over a ventilation aperture.
(Source: ref 5-3)

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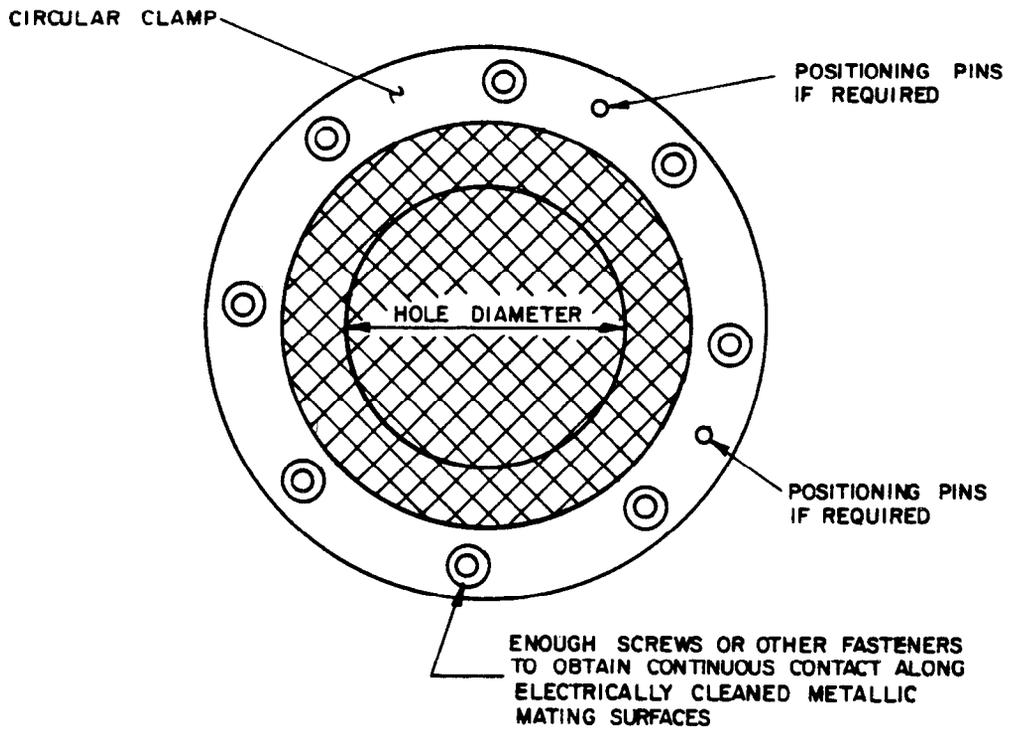


Figure 5-78. Typical clamped screen installation over a ventilation aperture.
(Source: ref 5-3)

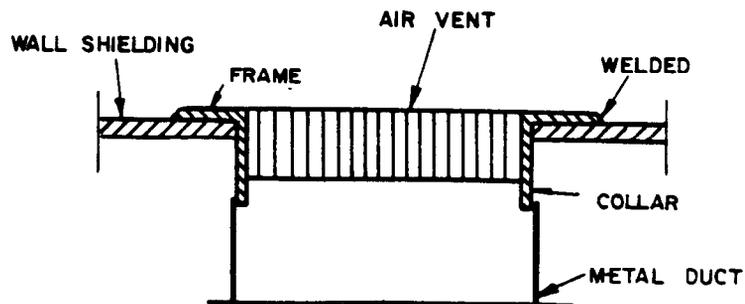
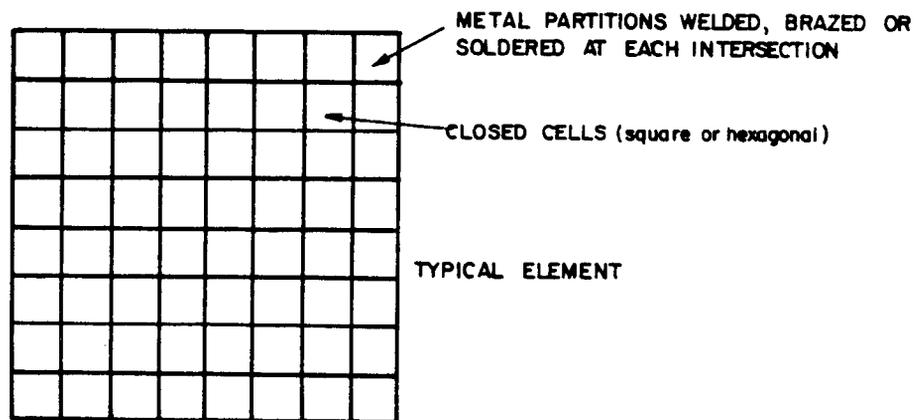


Figure 5-79. Honeycomb material for shielding air vents. (Source: ref 5-7)

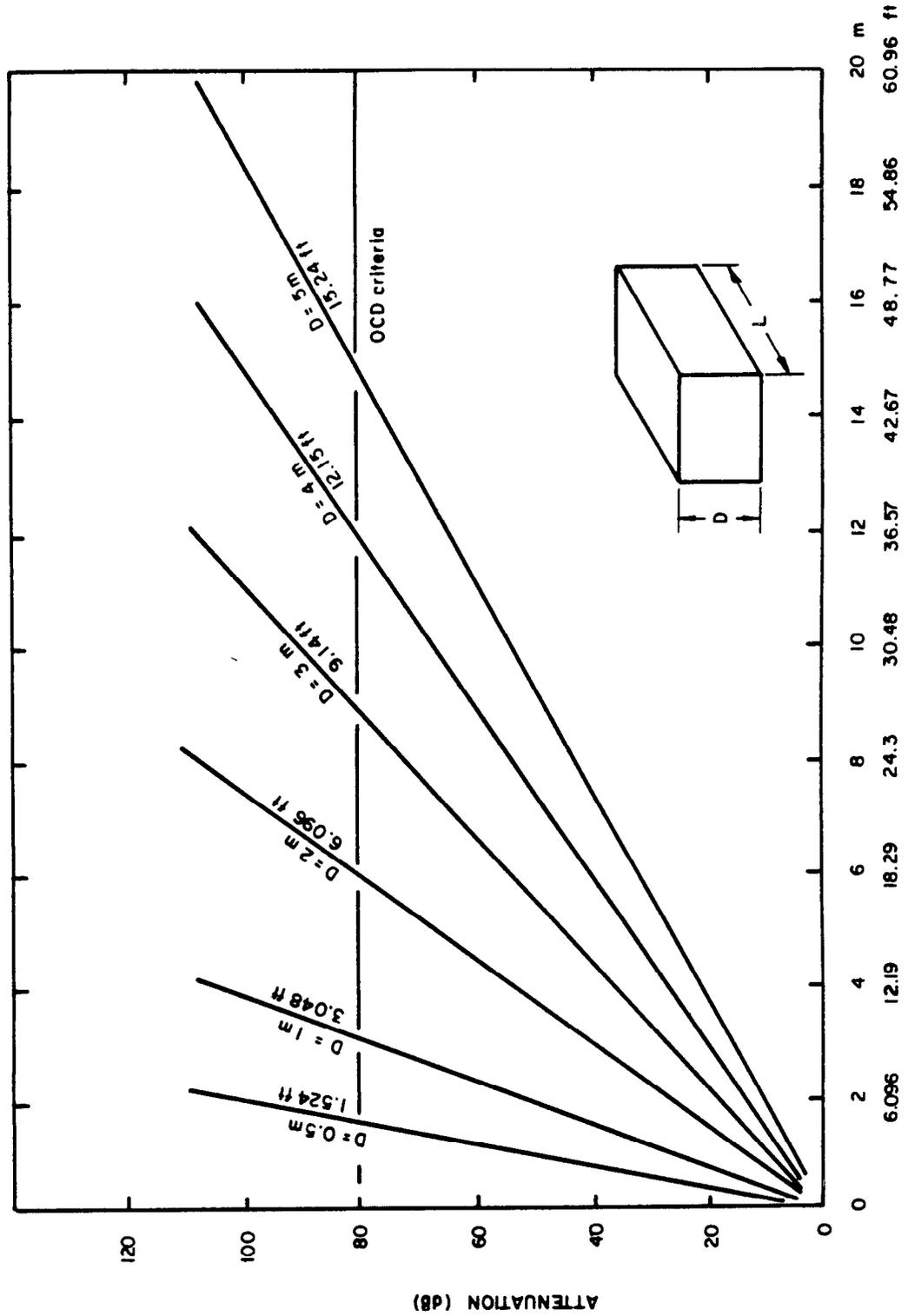


Figure 5-80. Waveguide attenuation as a function of waveguide dimensions.
(Source: ref 5-28)

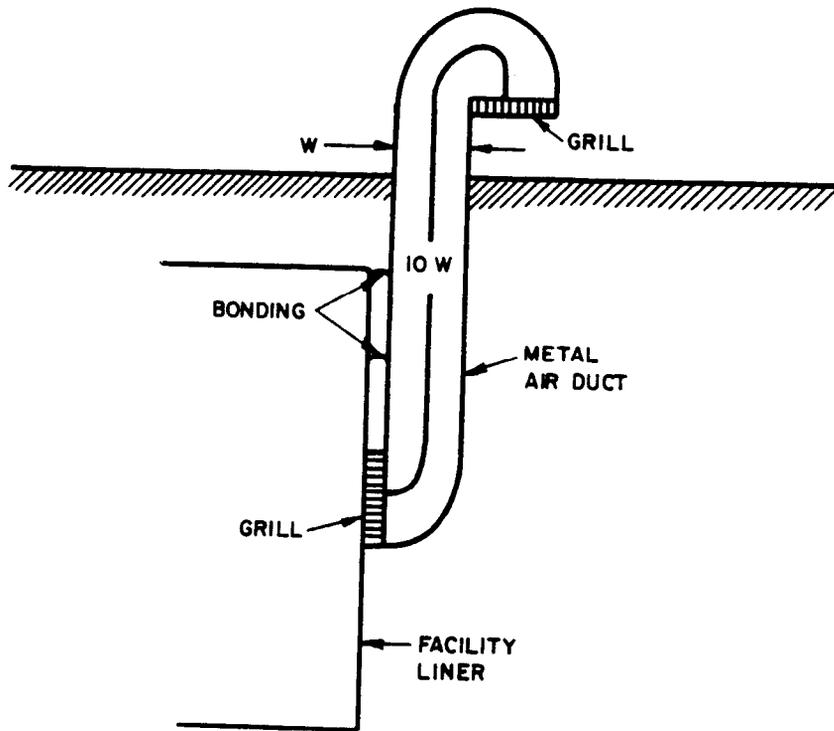


Figure 5-81. Air vent HEMP protection design. (Source: ref 5-7)

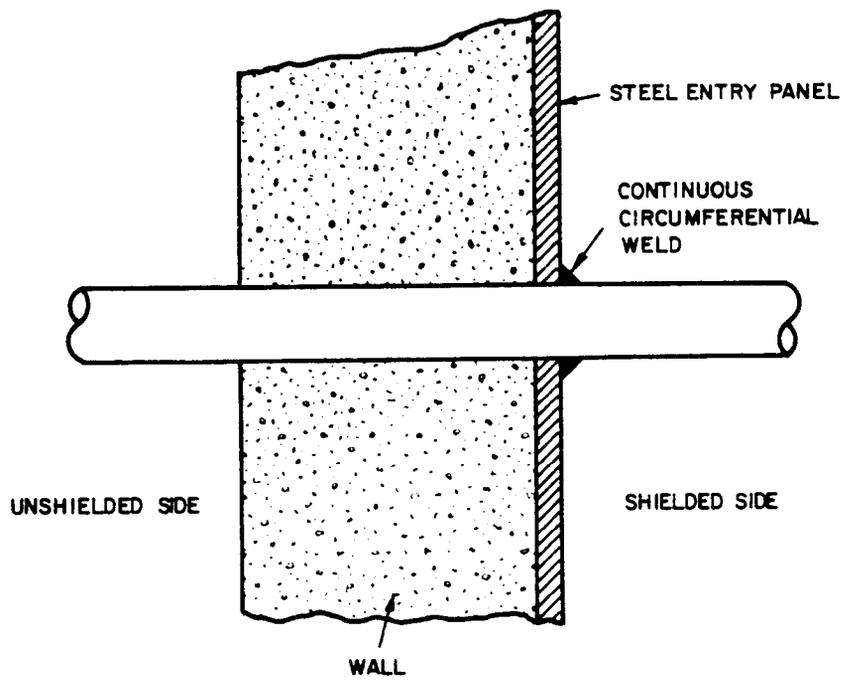


Figure 5-82. Conduit or metal pipe penetration design. (Source: ref 5-7)

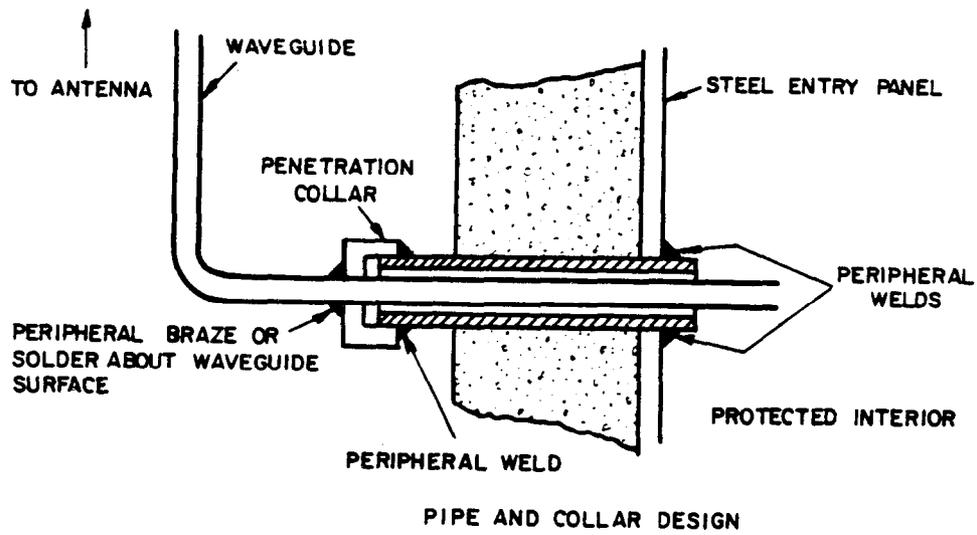
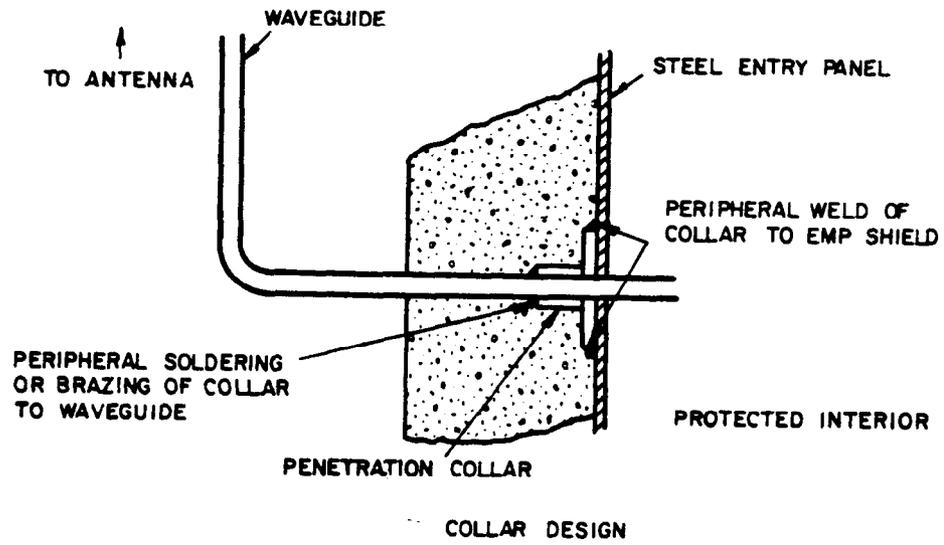
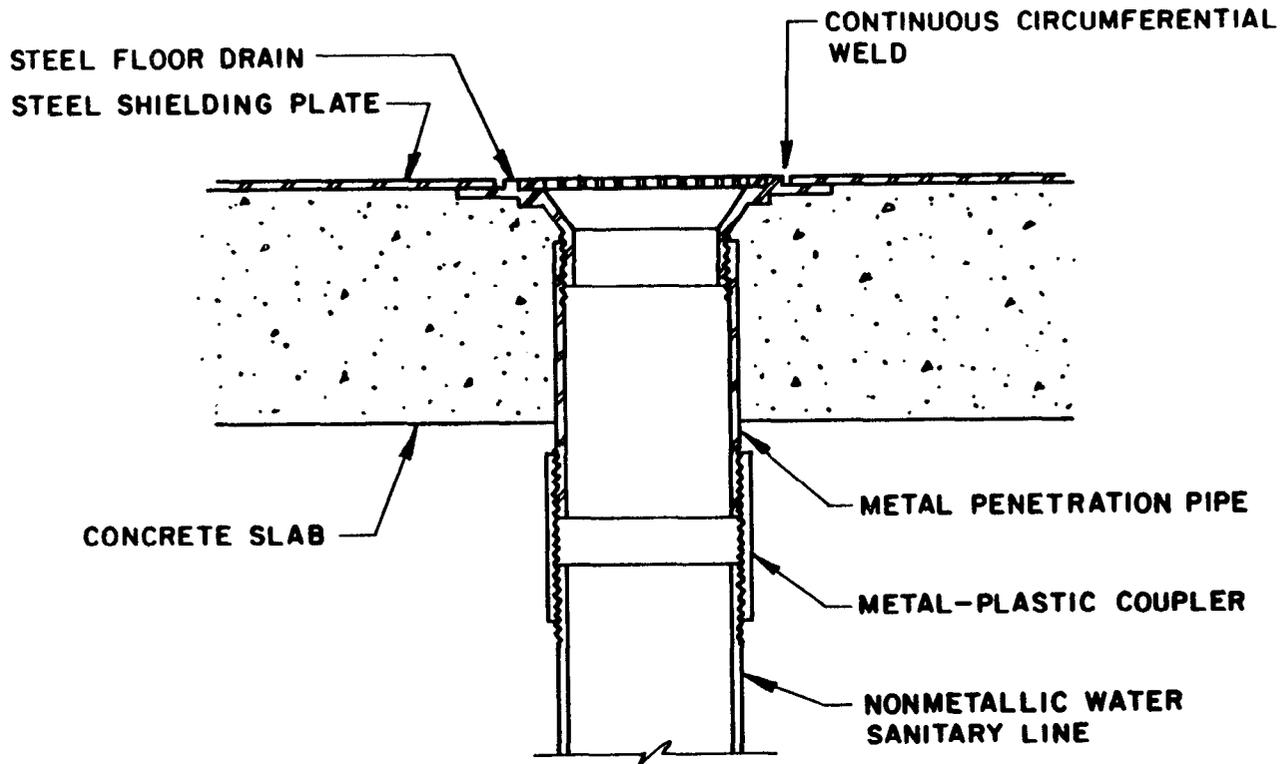
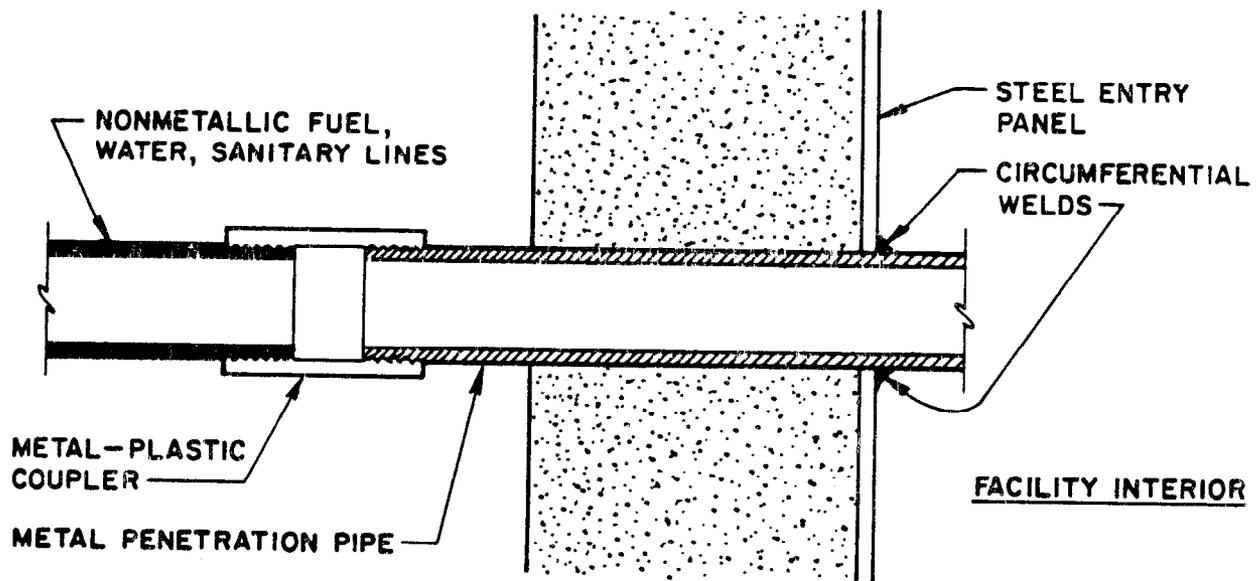


Figure 5-83. HEMP protection for waveguide entry. (Source: ref 5-7)

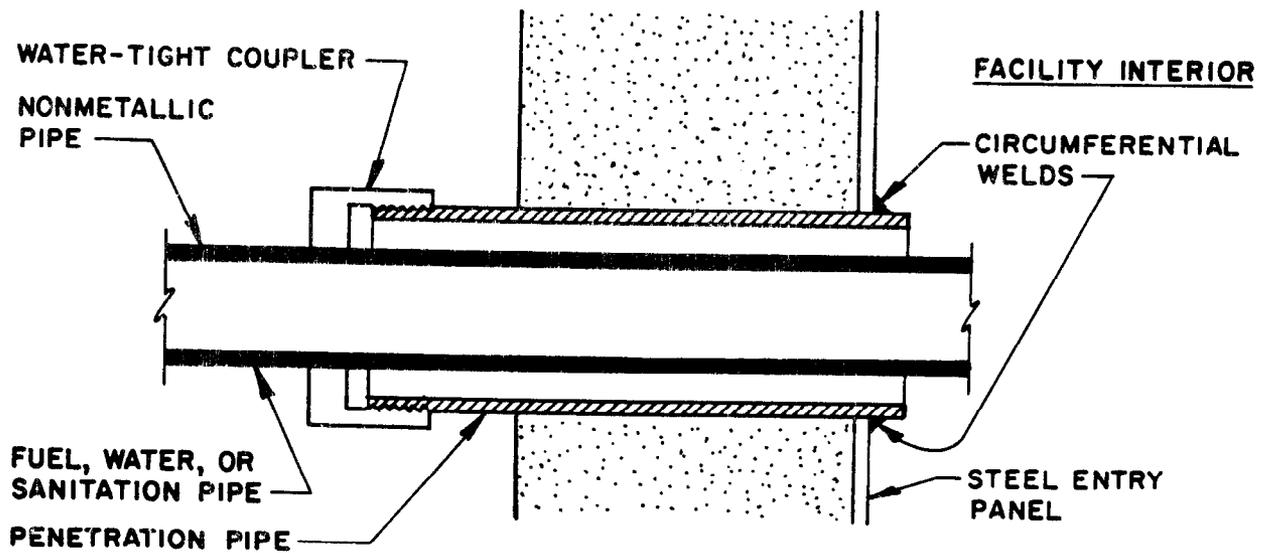


FLOOR DRAIN AND PIPE PENETRATION

Figure 5-84. Plastic pipe termination practices. (Source: ref 5-7)
(sheet 1 of 2)



PIPE TERMINATION



PIPE FEEDTHROUGH

Figure 5-84. Plastic pipe termination practices. (Source: ref 5-7)
(sheet 2 of 2)

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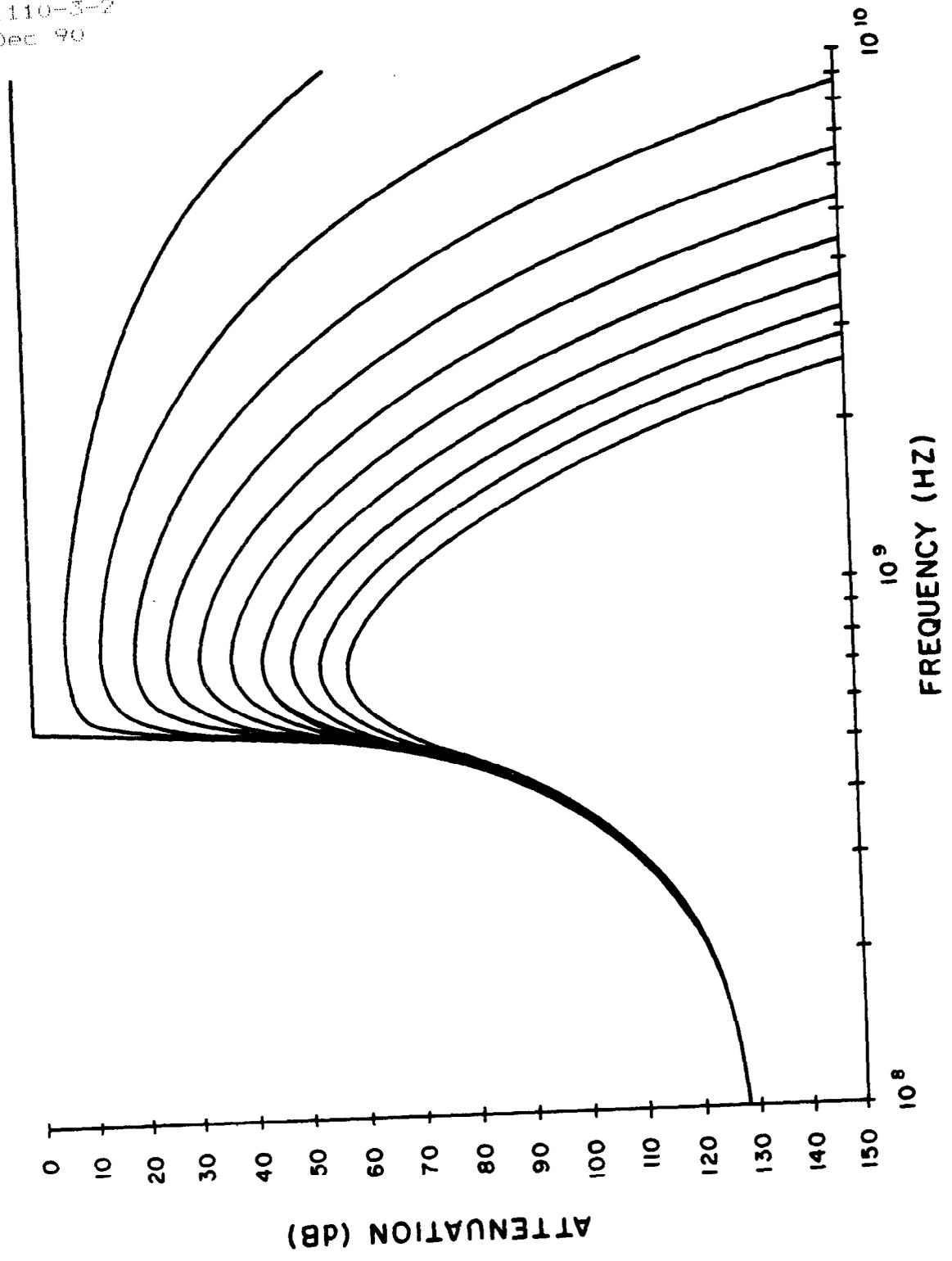


Figure 5-85. Theoretical attenuation of the TE₁₁ mode for a 1.5-inch (3.8-centimeter) internal diameter pipe with distilled water for various loss tangents. (Source: ref 5-20)

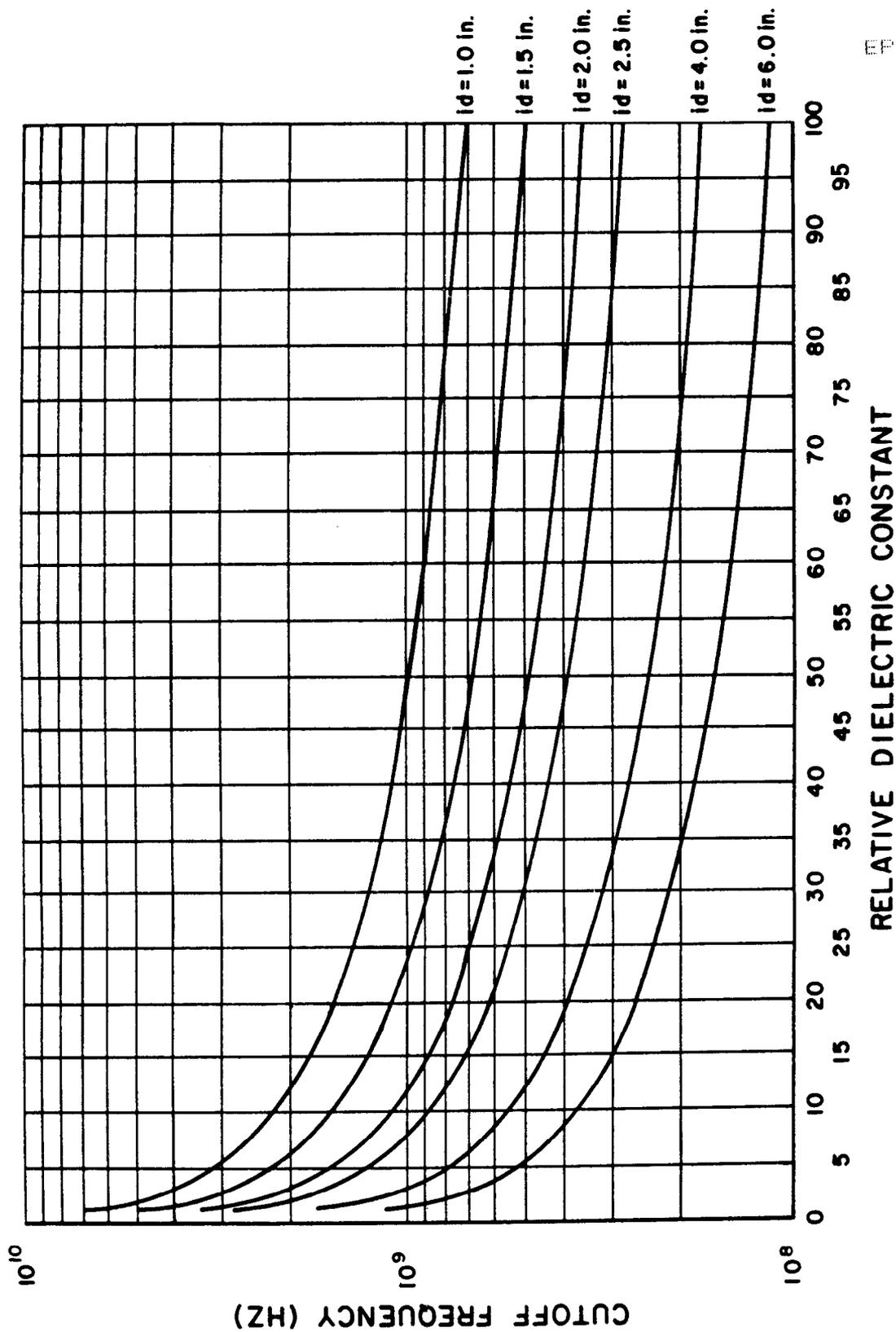


Figure 5-86. Cutoff frequency versus relative dielectric constant for various pipe diameters. (Source: ref 5-20)

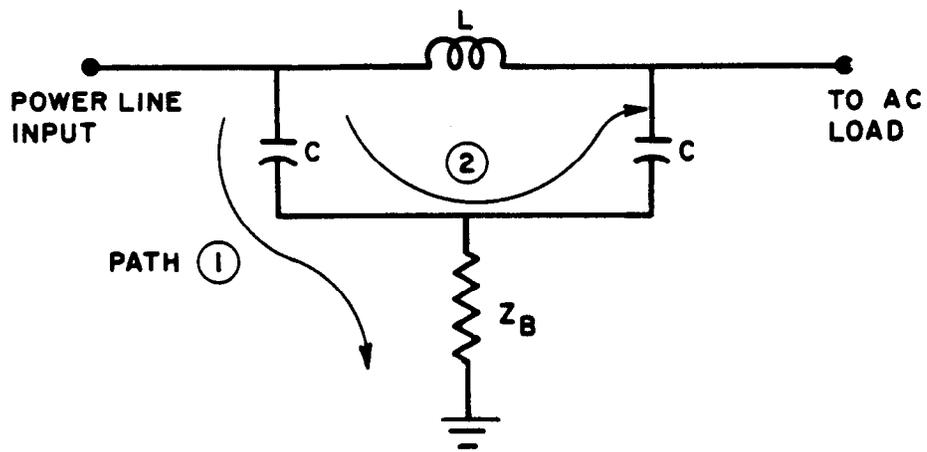


Figure 5-87. Effects of poor bonding on the performance of a power line filter. (Source: ref 5-6)

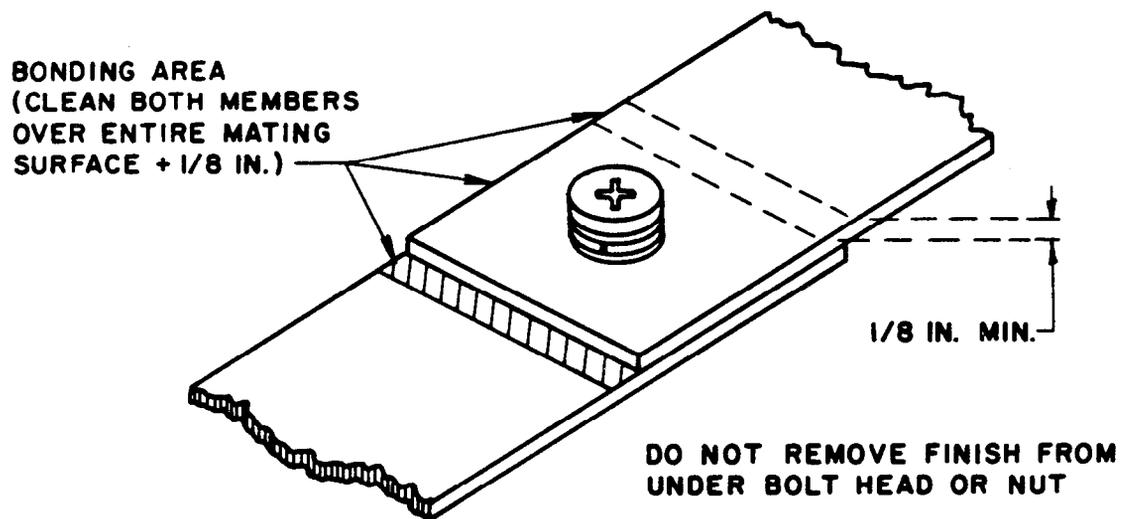


Figure 5-88. Bolted bond between flat bars. (Source: ref 5-6)

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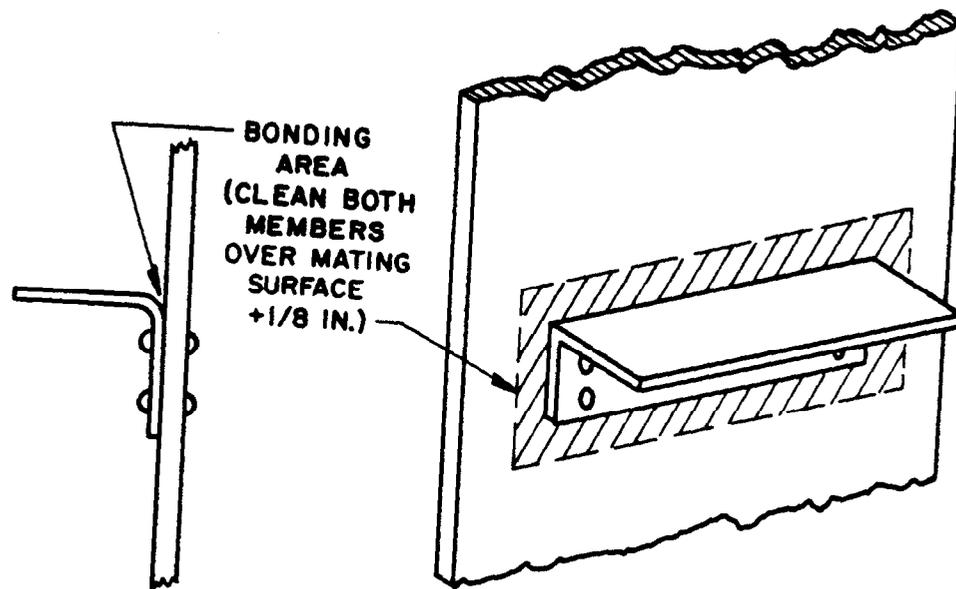


Figure 5-89. Bracket installation (bolt). (Source: ref 5-6)

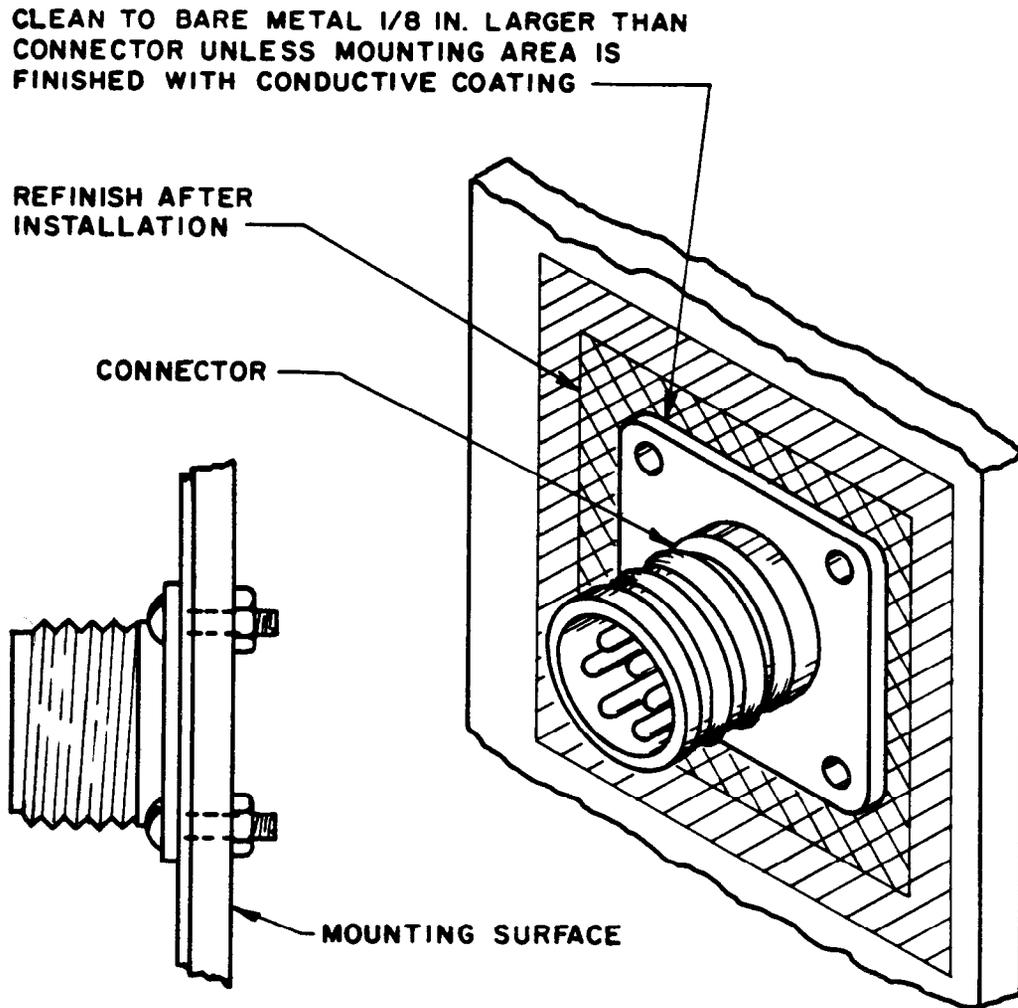


Figure 5-90. Bonding of connector to mounting surface. (Source: ref 5-6)

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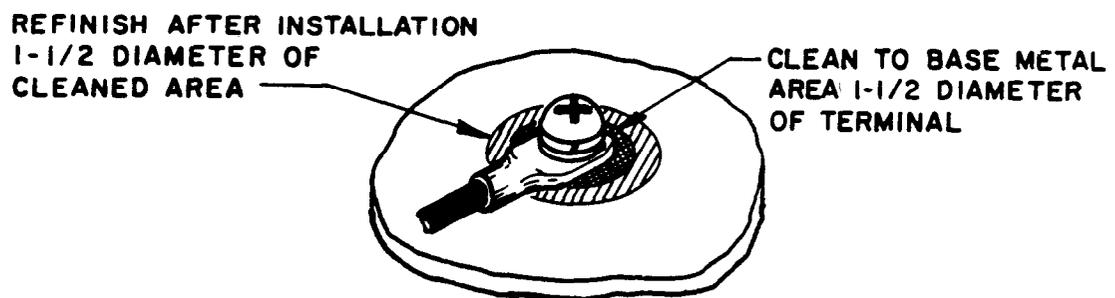


Figure 5-91. Bolting of bonding jumpers to flat surface. (Source: ref 5-6)

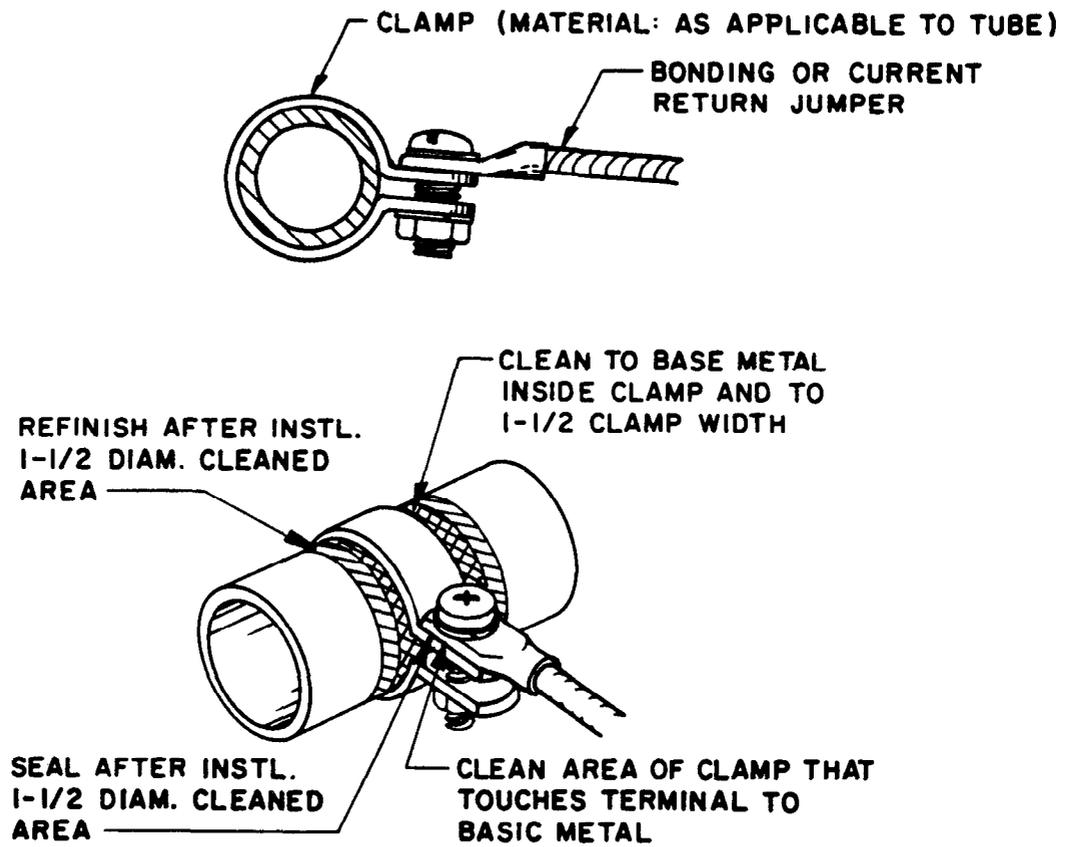


Figure 5-92. Bonding to rigid conduit. (Source: ref 5-6)

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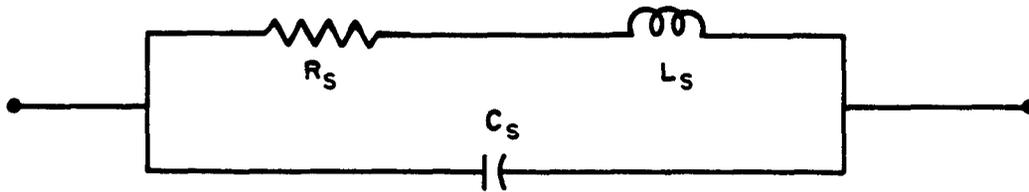


Figure 5-93. Equivalent circuit for bonding strap. (Source: ref 5-6)

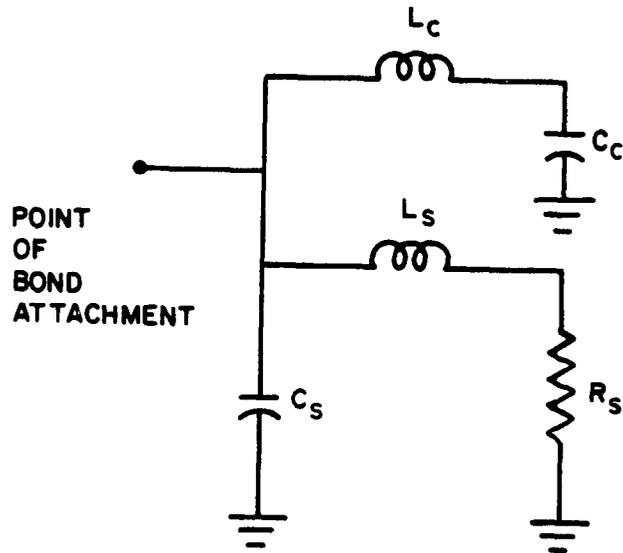


Figure 5-94. True equivalent circuit of a bonded system. (Source: ref 5-6)

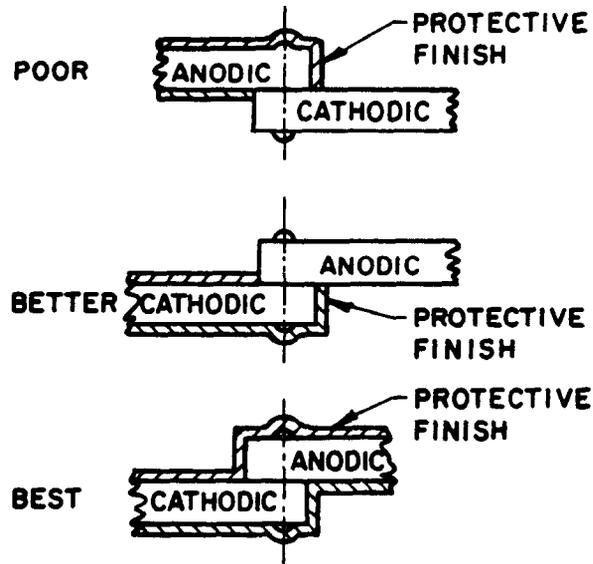


Figure 5-95. Techniques for protecting bonds between dissimilar metals.
(Source: ref 5-6)

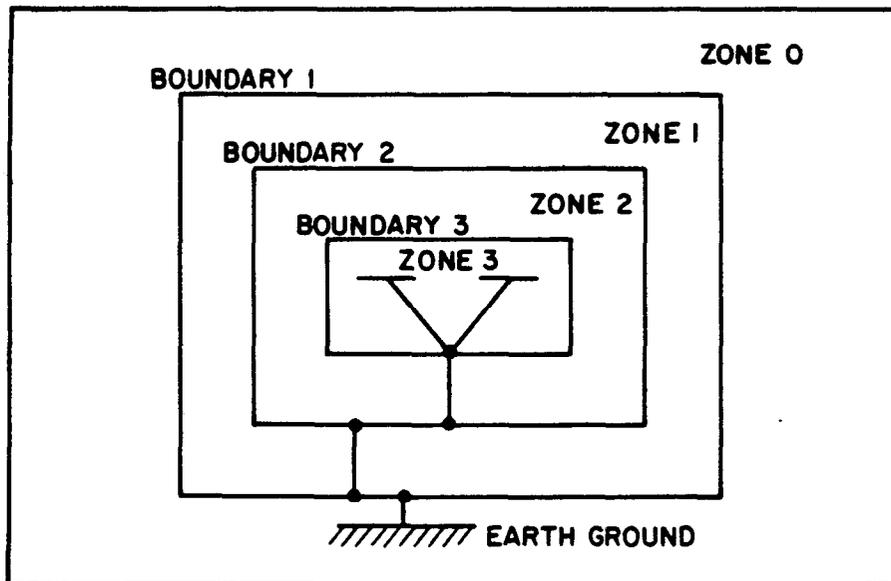


Figure 5-96. Zonal grounding.

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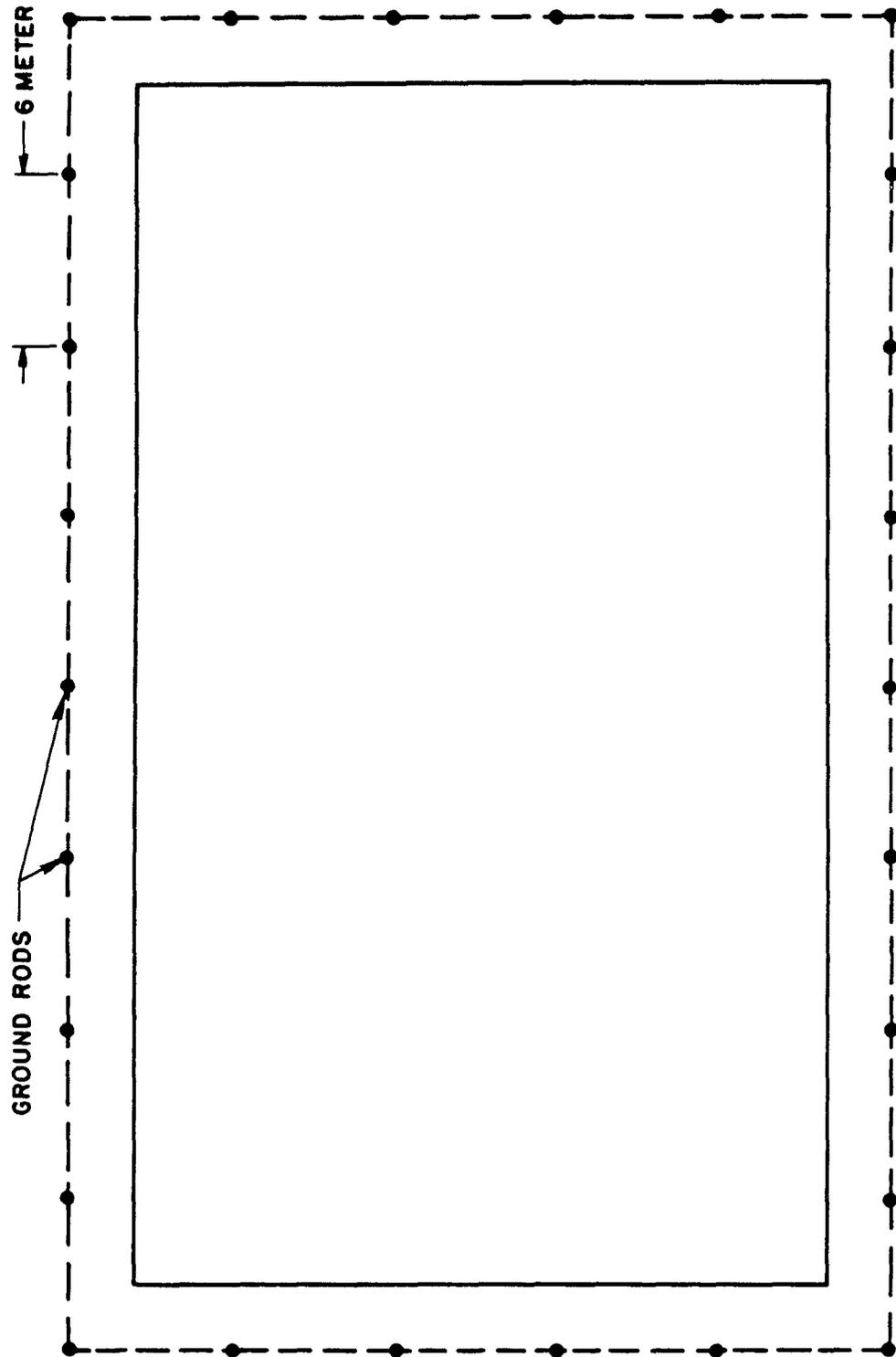


Figure 5-97. Minimum earth electrode system configuration for rectangular-shaped facility. (Source: ref 5-6)

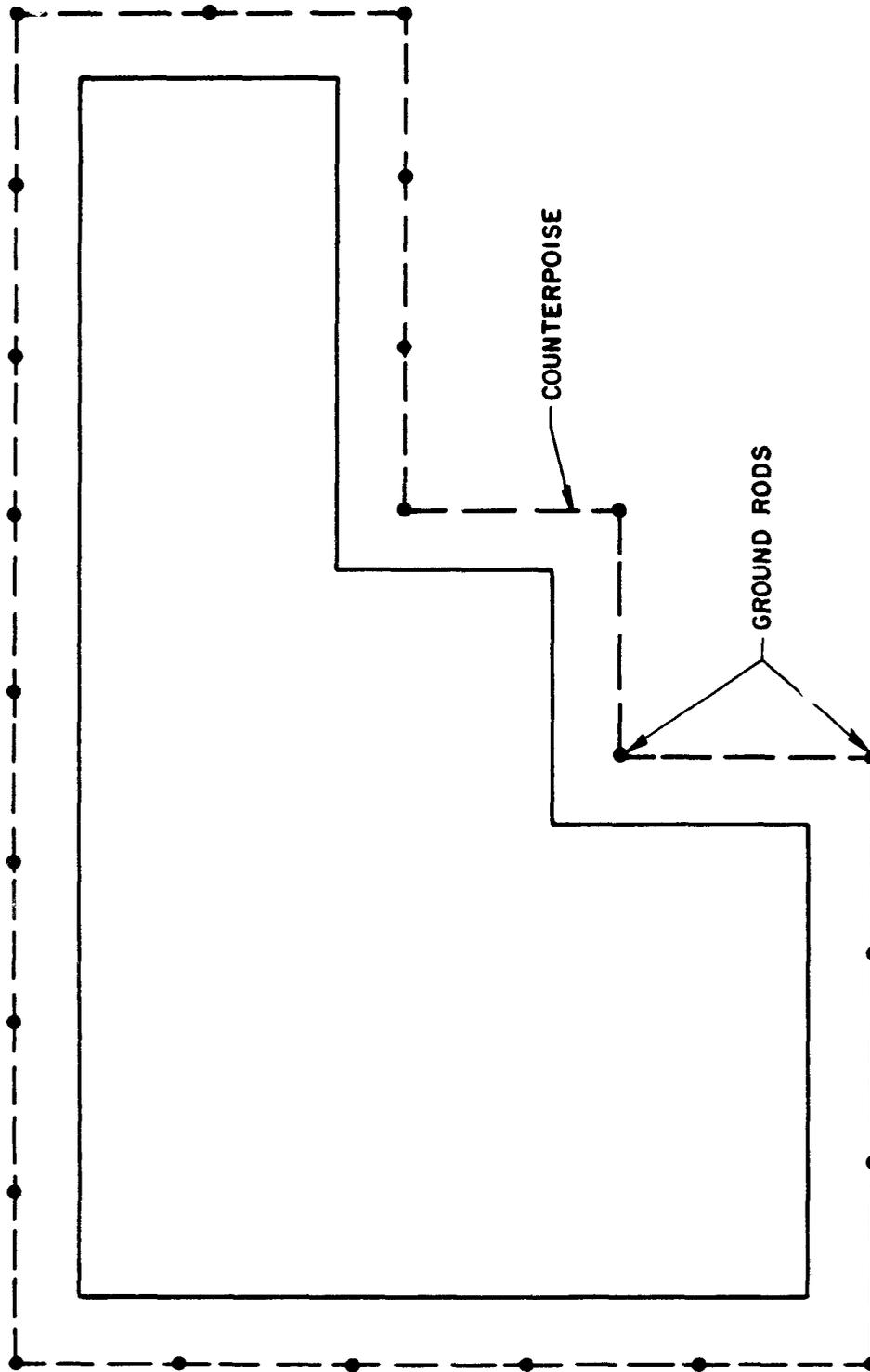


Figure 5-98. Electrode configuration for irregular-shaped facility.
(Source: ref 5-6)

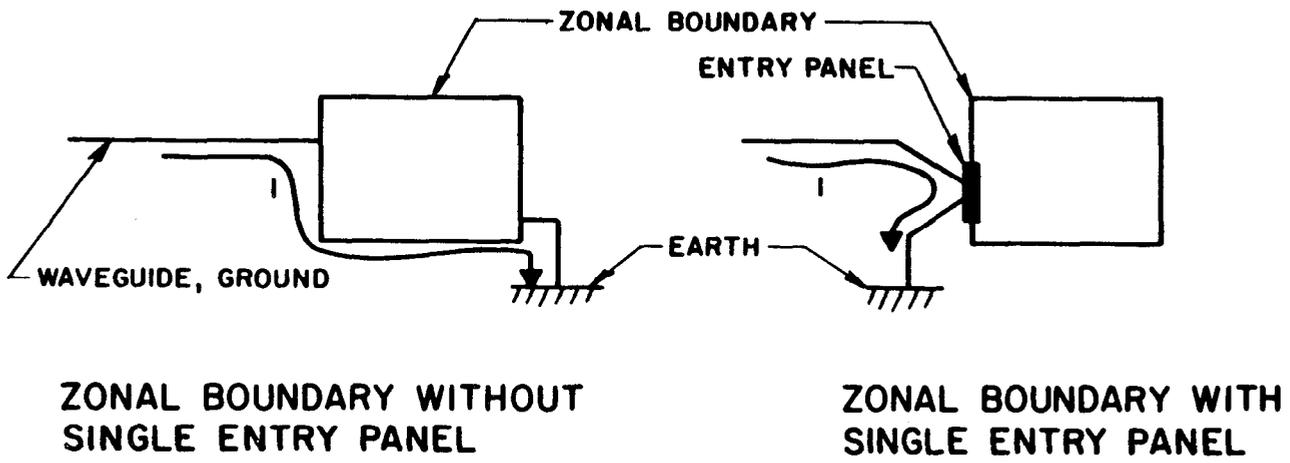


Figure 5-99. Current path on zonal boundaries.

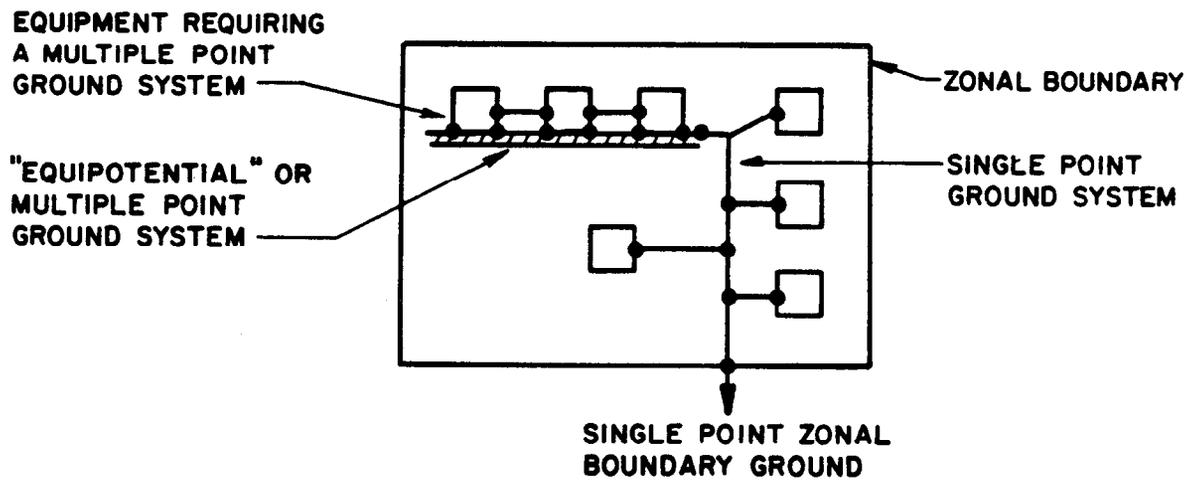


Figure 5-100. Typical hybrid ground configuration.

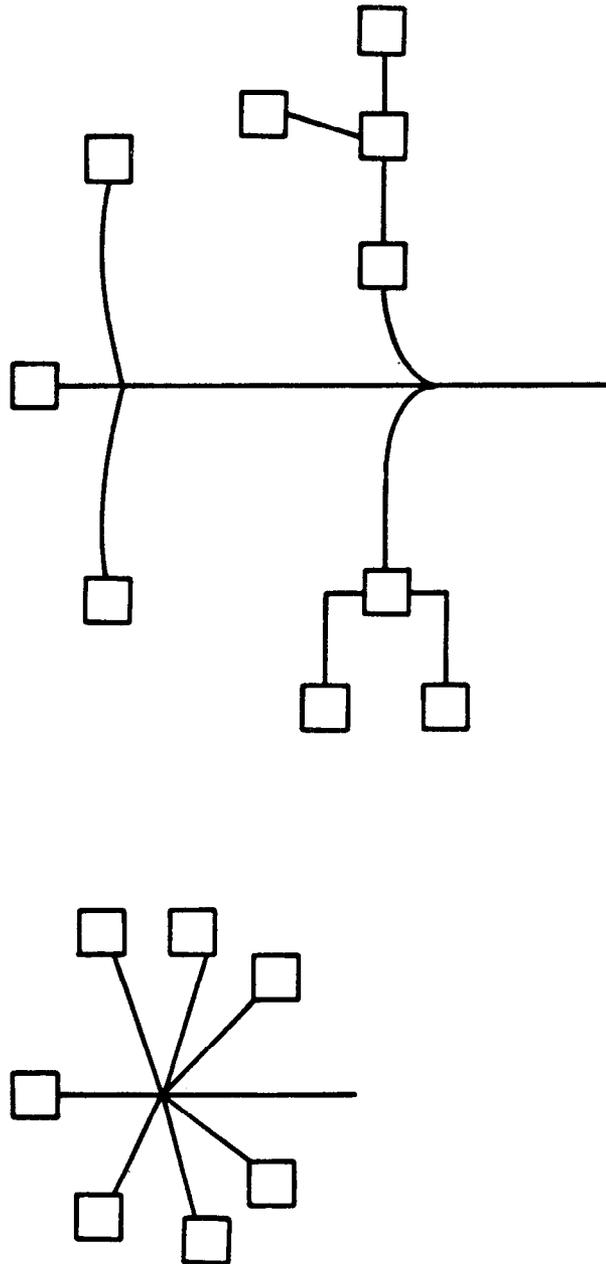


Figure 5-101. Typical ground configurations for HEMP protection.