

APPENDIX C  
SAMPLE MATERIAL SPECIFICATION FOR POLYESTER  
RESIN GROUTED ROCK BOLTS

C-1. Applicable Publications. Applicable references are listed in Appendix F.

C-2. Materials shall conform to the respective specifications and other requirements specified below.

a. Chain Link Fabric shall conform to Federal Specifications RR-F-191g,<sup>5</sup> No. 9 gage, 2-inch diamond mesh, with twisted and barbed selvage of top and bottom edges. Fabric shall be either zinc-coated, Type I, with 2.0 ounces of zinc per square foot of uncoated wire surface, or aluminum-coated, Type II, with 0.40 ounce of aluminum alloy per square foot of uncoated wire. Fabric width shall be 10-foot widths.

b. Tie Wire shall be 9 gage (0.148-inch-diameter) steel wire. All wire will be made from steel wire complying with Federal Specification QQ-W-461g,<sup>4</sup> finish 5, zinc coated with class 3 heavy zinc coating.

c. Rock Bolt Units. All rock bolts and accessories shall be the standard product of Celtite, Inc., of Cleveland, Ohio, or approved equal. The bolts shall be No. 11 deformed steel bars conforming to the requirements of ASTM A 615,<sup>25</sup> grade 60, threaded on one end as shown on the drawings. The contractor shall furnish anchor and encapsulating polyester resin cartridges having sufficient gel and cure times to provide time to place the bolt as required in these specifications and as shown on the drawings. Polyester resin rock bolt units shall be furnished with 8- by 8- by 1/2-inch bearing plates with hole for accommodating rock bolt, hardened flat washer, and hexagonal nut. Manufacturer's standard couplings for splicing rock bolts may be provided to provide the lengths required as indicated in the drawings.

d. Bearing Plates shall be of steel conforming to ASTM A 36<sup>22</sup> with holes for installation over rock bolts. Bearing plates shall be 8 inches by 8 inches by 1/2 inch for 1-3/8-inch-nominal-diameter rock bolts.

e. Hexagonal Nuts shall conform to ASTM A 325,<sup>24</sup> grade B, heavy-duty.

f. Flat Washers shall conform to ASTM A 325,<sup>24</sup> quenched and tempered to a Rockwell hardness of C38 to C45. A quenched and tempered flat washer shall always form the seat for a heavy-duty hexagonal nut.

g. Polyester Resin Cartridges. The resin shall be high-strength polyester containing nonreactive inorganic aggregate filler. The

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catalyst shall contain nonreactive inorganic filler. The compressive strength of the mixed and cured resin shall be 14,000 psi when tested in accordance with ASTM C 39-72, "Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens."<sup>26</sup> The material shall be thixotropic and of such viscosity that the bolt can adequately mix the material. The relative time of cure between end anchor cartridges and encapsulating cartridges should provide adequate time to place the bolt as required in the specifications and as shown on the drawings. All cartridges shall be inspected before insertion to see that the polyester resin components have not hardened. Resin that is older than six (6) months shall not be used.