For use in the Denver Water service area

Materials Specification – 34
for
TUNNELING MATERIALS

1. GENERAL

Pipe casing shall be manufactured in accordance with the following requirements.

2. CASING MATERIAL

Pipe casing shall be smooth wall welded steel cylinder fabricated in accordance with AWWA C200. It shall be round, straight, and free from defects or damage due to improper manufacturing or handling with a minimum yield strength of 35,000 psi.

Pipe casing shall be designed by the pipe manufacturer with sufficient wall thickness to resist the loads applied. The inside diameter shall be at least the diameter shown on Drawings. External loading shall be AASHTO H 20 highway or railroad loading plus jacking load, E-80 railroad loading. Pipe and bulkheads shall not have exterior or interior coatings. Grout ports shall be 2-inch standard pipe half couplings attached to the casing pipe by welding, fitted with threaded galvanized iron plugs, and set on 4 foot centers.

3. CASING JOINTS

Welded joints shall have ends beveled for field welding, be butt welded with complete joint penetration welds around the entire circumference of the pipe, and be formed and accurately manufactured so that when pipes are placed together and welded they form a continuous casing with a smooth and uniform interior surface.

Interlocking joints shall be Permalok, see the Acceptable Manufacturers section.

4. CASING SPACERS

Casing spacers shall be stainless steel, bolt on style type with a shell made of at least two halves. The bands shall be 14 gauge at a minimum; the risers shall be 10 gauge at a minimum, and the coating shall be fusion-bonded epoxy or heat fused PVC.

The four runners shall be 11 inches long at a minimum and manufactured of high abrasion resistant, low coefficient of friction, glass filled polymer. Runner heights shall be set to center the carrier pipe in the casing.

5. COMPOSITE SLEEVE CASING SPACERS

Composite sleeve casing spacers shall be a three-part system consisting of a unidirectional fiberglass sleeve, high strength filler and adhesive.

A. Unidirectional Fiberglass Sleeve:

1) Fiberglass and polyester/vinyl ester resin.
2) 0.065-inch per layer 0.500-inch non-conductive PVC liner – 8 layer system.
3) 11.50-inch width.

B. Filler:

1) Compressive strength: greater than 8,000 psi.

C. Adhesive:

1) LAP shear strength – greater than 1,200 psi.

6. CASING END SEAL

Provide preformed end seals designed to prevent entry of water or loss of material from casing. The end seals shall be made of 1/8 inch thick 60 durometer EPDM or neoprene rubber held together with mastic strips to seal the edges. The seals shall overlap the casing pipe by 2 inches and shall be held on with AISI 304L stainless steel worm gear clamps.

7. CARRIER PIPE

Carrier pipe 20-inches and smaller shall be Class 52 DI in accordance with MS-1, fusible PVC in accordance with MS-2, or integrally restrained joint PVC in accordance with MS-29.

8. CERTIFICATION

The manufacturer shall furnish a sworn statement that the inspection and all specified tests have been completed and that results comply with the requirements of these Standards. A copy of the Certification, including compliance with NSF/ANSI 61, shall be provided to Denver Water.

9. ACCEPTABLE MANUFACTURERS AND MODELS

Manufacturers	Models
Pipe Casing Joints	
Permalok Corporation	Permalok Interlocking Pipe Joining System
Casing Spacers	
Advance Products and Systems, Inc.	SI-12
BWM Company	SS-12
CCI Pipeline Systems	
Pipeline Seal and Insulator, Inc.	C12G
Composite Sleeve Casing Spacers	
Clock Spring Company, L.P.	
End Seals	
Advance Products and Systems, Inc.	AC, AW
Pipeline Seal and Insulator, Inc.	C, W