SPECIFICATIONS - DETAILED PROVISIONS
Section 06640 - Plastic Lining for Concrete Structure

C O N T E N T S

SECTION 06640
PLASTIC LINING FOR CONCRETE STRUCTURE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section covers premolded self-anchoring plastic sheet linings to be applied to the following interior surfaces of precast and cast-in-place reinforced concrete structures.

1. Reinforced concrete manhole barrels and cones.

2. Reinforced concrete pipe.

3. Vertical wall surface above concrete fills (bench and flow channel), and underside of top slab of cast-in-place reinforced concrete structures.

1.02 GENERAL

A. The manufacturer of the sheet lining shall furnish an affidavit attesting to the successful and completely satisfactory use of the materials as a lining for the service intended, before shipment thereof.

B. The accepted plastic sheet manufacturer's standard printed specifications covering the installation of the lining in concrete structures shall be considered as being incorporated herein, and all work for and in connection with said plastic lining installation shall be strictly in accordance therewith. Such manufacturer's specifications shall include and cover application of sheets to concrete forms, including preparation of forms, joint welding and removal of forms; miscellaneous requirements covering transportation, handling, storing, and inspection; and necessary precautions with respect to ventilation and protection of workmen.

C. All work for and in connection with the installation of plastic sheet lining, the preparation of surfaces, and the sealing and welding of joints shall be performed by the manufacturer of the lining or by a firm or individual who has been trained and certified by said manufacturer.

D. Training certification shall be submitted by manufacturer in writing.

1.03 SUBMITTALS

A. Complete specifications and data covering the materials to be furnished and detailed drawings covering the installation thereof, including but not limited to the attachment of the linings to the forms, manhole bench, and channel, and the arrangement and sealing or welding of the butt and corner joints, shall be submitted in accordance with the procedure set forth in the submittals section.

B. The Contractor shall furnish data certified by the manhole and pipe manufacturers that the lining is of the materials specified. No lined manhole sections, pipe or fitting will be accepted for use in the Work on this project until certificates have been submitted and approved by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All liner plates furnished shall be composed of chemically inert synthetic resin, pigments, and plasticizers suitably compounded and processed; formed under pressure into permanently flexible sheets; white in color, and shall conform to the following:

1. Premolded Plastic Sheet Linings shall be Amer-Plate "T-Lock", not less than 0.065 inch thick, as manufactured by Ameron, Corrosion Control Division, Brea, California or approved equal.

2. Welding Strip shall be Amer-Plate "T-Lock" welding strip or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Manholes. Where designated on the construction drawings or in the contract documents, manholes shall be provided with interior plastic lining. Precast vertical risers and cones shall be completely lined. The entire circumference of the manholes and manhole bench shall be covered with the plastic lining with the longitudinal edges of the lining joined with an overlapping flap or 4-inch wide strip and welding strips. Manhole channel shall also be covered except for lowest 90° of channel invert. Welding shall provide a continuous joint equal in corrosion resistance and impermeability to the liner material.

B. Reinforced Concrete Pipe

The upper 300° portion of the interior of all reinforced concrete sanitary sewer pipe shall be sealed and protected with plastic lining. All outlets and connections within the designated limits of the plastic pipe lining shall be completely sealed and protected with the plastic pipe lining. Joints shall be kept at a minimum. Except where outlets are required, the plastic lining for each length of pipe shall consist of a single sheet of material. Where joints occur between individual sheets or sections of plastic liner, they shall be continually heat-welded, either by lapping adjacent sheets or with the use of auxiliary welding strips cut from the same kind and thickness of material as the liner plates (with the exception of the T-lock ribs). At outlets, the lining shall be turned back into the joint or otherwise suitably terminated so that the edges are adequately protected and anchored.

The lining for each pipe section shall be furnished to the pipe manufacturer as a single sheet.

The pipe liner shall extend to the end of the interior concrete surface at both bell and spigot end of the pipe. Unless otherwise authorized, a 4-inch joint strip shall be molded integral with the plastic liner as furnished for installation in the pipe. This joint shall have no T-lock ribs on the back of the strip and is intended to lap over the lining of the adjacent pipe for field welding thereto. These joint extensions shall be made of the same material as used in the specified T-lock liner plates. The joint strip shall overlap the liner plate of the downstream pipe a minimum of 1 inch. All adhesive, welding materials, separate strips of lining material for field joints (where authorized) shall be furnished by the lining material manufacturer. All welding shall be performed by a welder certified by the manufacturer.

C. All Work in connection with the installation of the plastic lining in precast manhole sections and concrete pipe shall be performed in strict conformity with the lining manufacturer's recommendation. Liner sheets shall be fastened in place securely in the forms for the manhole sections and concrete pipe before reinforcing steel or concrete is placed.

D. Care shall be taken in handling and transporting plastic lined manhole sections and pipe to prevent damage to the liner. No interior hooks or other interior lifting device shall be used in handling the manhole sections and pipe; all handling requiring lifting or suspension shall be done by using exterior slings. No manhole sections or pipe with damaged lining will be accepted until and unless the damage has been repaired to the satisfaction of the Engineer.

E. Walls of Cast-in-Place Structures. Plastic sheets for wall linings shall be set and properly secured to the concrete contact faces of the forms which form the surfaces to be lined. The sheets shall be placed with the smooth face next to the form and so that the line of tees on the back side of the sheets will be vertical in the walls. The sheets shall be butt jointed without more than 1/8 inch opening in any joint between adjacent sheets and the sheets held in place with small-headed finishing nails placed within 1/4 inch of the edge of the sheets. After all sheets are in place on the form being lined, the joints between sheets shall be sealed on the back side with a one inch wide welding strip heat-welded over the joints. A termination strip shall be provided at the intersection of the walls and bottom slab or one inch below top of concrete fill.

Where possible, the form to be lined shall be set in place, the lining attached, and all lining joints covered before the reinforcing steel is installed. The outer form shall then be set in place and the form ties installed through the liner in the normal manner. The number of form ties used shall be held to the minimum.

The lining installation and sealing shall be such that a continuous plastic lining is provided and that entrance of concrete or mortar between the lining and the form is prevented.

Forms shall be removed in a careful manner and not before the concrete has attained sufficient strength and has been properly cured. Finishing nails used to hold the liners in place on the forms may pull out with the forms but if not, shall be removed afterwards. The small nail heads should come through the plastic liner sheet easily.

After the forms have been removed, the exposed butt joints in the liner, including nail and form tie holes, shall be sealed with welding strip, heat-welded over the areas involved. Sealing shall be such that a continuous plastic lining is provided. Workmanship shall be neat and of the highest quality.

F. Ceiling of Cast-in-Place Structures. Plastic sheets for the ceiling surface shall be set properly secured, and joints sealed in accordance with the requirements specified above for wall surfaces, and other requirements as may be required to conform to the manufacturer's accepted instructions and recommendations.

G. Repairs. All repairs to damaged portions of the linings shall be made and all holes in the linings sealed before final acceptance of the work, in conformity with the lining manufacturer's instructions and recommendations. The requirement for neat, high quality work is emphasized.

H. Testing. All surfaces covered with the lining shall be tested with an acceptable electrical holiday or flaw detector after installation and any imperfections discovered thereby shall be repaired as specified above.

3.02 FIELD JOINTS IN PLASTIC LINING

A. The joint between plastic lined pipes or manhole sections shall be prepared in the following manner before making the lining joints:

1. The inside joint shall be filled and carefully pointed with cement mortar for the full circumference of the pipe or manhole section. The mortar shall not, at any point, extend into the pipe or manhole section beyond a straight line connecting the surfaces of the adjacent pipe or manhole sections.

2. No lining joint shall be made until after the trench has been backfilled. Pipe and manhole joints must be dry before lining joints are made. All mortar and other foreign material shall be removed from lining surfaces adjacent to the pipe or manhole joint.

B. Field joints in the lining at pipe or manhole joints may be either of the following described types:

1. The joint shall be made with a separate 4-inch wide joint strip and two, 1-inch wide welding strips. The 4-inch strip shall be centered over the joint, secured to the lining with a manufacturer approved adhesive compound and welded along each edge to adjacent liner sheets. The width of the space between the ends of pipe lining material shall not exceed 2 inches. The 4-inch joint strip shall overlap the lining in each pipe a minimum of 1 inch.

2. The joint shall be made with a lining flap extending about three inches beyond the spigot end of the pipe. One welding strip is required. The joint flap shall overlap the lining in the adjacent pipe a minimum of one inch. A manufacturer approved adhesive compound shall be used to hold the flap in place during welding. The flap shall be protected from damage during installation. Excessive tension and distortion in bending back the strip to expose the pipe joint during laying and joint mortaring shall be avoided.

3. All joints between pipe and wall fittings in manholes and between wall fitting and lining of manhole walls, where lining is required, shall be made by one of the two ways described above.

4. All welding of joints and the adhesive compound shall be in strict conformity with the recommendations of the lining manufacturer.

3.03 TESTING AND REPAIRING

A. After the pipe, manhole, or special structure is installed and backfilled, all surfaces covered with plastic lining, including welds, shall be tested with an electric holiday detector. The voltage and specific methods of testing shall be as recommended by the manufacturer of the lining material. In addition, all welds shall be physically tested by non-destructive probing. All patches over holes, or repairs to the liner wherever damage has occurred, shall be installed in conformity with the instructions and recommendations of the liner manufacturer. Each transverse welding strip which extends to a lower edge of the liner shall be tested. The welding strip shall extend 2 inches below the liner to provide a tab. The force shall be applied normal to the face of the structure by means of a spring balance. Liner adjoining the welding strip shall be held against the concrete during application of the force. The 10-pound pull shall be maintained if a weld failure develops, until no further separation occurs. Defective welds shall be retested after repairs have been made. Tabs shall be trimmed away neatly after the welding strip has passed inspection. Inspection shall be made within two days after joint has been completed.

END OF SECTION 06640