

1. **General:** The interior of all sanitary sewer manholes downstream from pump stations, drop manholes, man-hole pumping stations, and any other structure where the City Engineer determines that hydrogen sulfide gas may be a problem shall receive a polyurethane coating.
2. **Material:** The coating shall be high build, two-component, 100% solid, non-solvent, hybrid polyurethane material. The flash point of the individual components and the fluid mixture shall be a minimum of 415° F. Application shall be 125 mils in thickness.
3. The cured coating shall have a shore D hardness of 57 at 77° F and shall be capable of passing the flexibility test as prescribed by ASTM D-1737 using an 8mm diameter mandrel. The coating shall have a minimum tensile strength of 2,500 psi and a recoverable elongation of 30% minimum. It shall have good impact resistance and shall be able to bridge up to 1/8 inch settling crack, which may take place in the concrete structure, without damage to the coating. The coating shall be capable of repair at any time during its life.
4. The coating shall be resistant to attack from the following: oxidizing agents such as bleaches, sulfuric, acetic, hydrochloric, phosphoric, nitric, chromic, oleic, and stearic acids; sodium and calcium hydroxides, ammonium, sodium, calcium, magnesium, and ferric chlorides; ferric sulfate, petroleum oils and grease, vegetable and animal oils, fats, greases, soaps and detergents. The coating shall be impermeable to sewage gases and liquids and shall be nonconductive to bacterial or fungus growth.
5. **Surface Preparation:** New concrete shall be aged 30 days. All foreign matter shall be removed from the surface of old concrete using solvents (no alcohol shall be used) if necessary to remove grease. For old concrete, all surfaces to be coated will be sandblasted or water blasted to remove all residue, loose grout, or loose brick. Surface of new concrete shall be washed with ten percent muriatic acid solution and flushed with water to remove lime surfaces which have retained a glossy smooth surface shall be abrasively water blasted, sandblasted, or power wire brushed to produce a satisfactory anchor for the coating. The surface must be dry when applying the coating. Cracks shall be sealed by spraying directly into the crack and then over coating while still tacky. Any steel surfaces in the area to be coated will be prepared and primed as required. After blast cleaning the surface as described above, the surfaces of the concrete shall be dried by air blowing for four hours.
6. **Application:** The polyurethane coating shall be applied by high pressure airless spray with the two components mixing just before the spray gun. During application the applicators, including any persons in the immediate area, shall wear protective clothing including face masks, and anyone in the manhole during spraying shall be supplied respiration air.

Notes:

1. Pipe size to be determined by design flow.
2. Pumping stations shall conform to the following:
 - a) Pumping capacity to handle design flow with one pump out of service.
 - b) Multiple pumps of equal capacity.
 - c) At least 3 pumps, except that 2 pumps for flow less than 0.10 MGD.
 - d) Pumping stations shall be equipped with:
 - 1) Telemetry equipment capable of transmitting various alarm conditions such as high and low sump, flooded dry well, pump, or power failure, to a central dispatch location.
 - 2) Standby power generating equipment, unless it can be shown that a sustained failure will not cause overflow or flooding.
 - 3) Flow monitoring equipment, such as a meter in the discharge line, pump running time recorders with sump level recorders, or other approved methods. Also, provisions shall be made for facilitating installation of portable gravity flow meters in inflow meters.
 - e) Non-clog type pumps designed for sanitary sewage pumping.
 - f) Force mains sized to limit velocities to around 7 fps for up to 300 ft. in length, to around 5 fps for lengths in excess of 1000 ft. These values are approximate, and final design should be based upon analysis of a system head curve based upon commercially available pumps and pump diameters.

NO.	REVISED	BY	Criteria for Design of Sanitary Sewer Facilities	APPROVED
				 CITY ENGINEER RCE-28191
				DATE: 2-2-99
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CHECKED BY: DJR				
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