	Title: YALE OFFICE OF FACILITIES PROCEDURE MANUAL Chapter: 01 - Yale Design Standard Division: HVAC Standards	Section: 33 61 00 04 Tunnels
		Date: 6/15/16
		Author: Office of Facilities
CC: Project Folder		

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PART 1 - INTRODUCTION

1.1 PURPOSE

- A. This section is intended to provide design guidelines for Utility Tunnel Systems.

PART 2 - GENERAL DESIGN REQUIREMENTS

A. GENERAL

1. Forbidden Utilities

Utilities that are not allowed in tunnels under any circumstance include: natural gas, and electric greater than 480VAC. No pipes shall be routed through tunnels that will reduce access through the tunnel. No pipes shall be routed perpendicular through a tunnel that will require somebody to duck or walk over the pipe.

2. Minimum Size

- a. The minimal width of a tunnel shall be 3 feet of clear walk space plus the maximum width of the pipe racking system. The minimum clear height for the walking space aisle shall be 6 ½ feet.


3. Egress

- a. Egress/access points/shafts shall be placed at a maximum of 300 feet or less where required by code.
- b. Provide ladders. Provide landings as required by vertical length in accordance to OSHA requirements.
- c. Provide security and locks on doors per Yale Utilities. The position of doors shall be monitored electronically.

4. Ventilation System

- a. Ventilation shall be forced mechanical system with supply and exhaust fans.
- b. Ventilation fans shall run continuously, regardless of space temperature.

5. Minimum Cover

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- a. The minimum cover on top of tunnels shall be in accordance to the following areas:
 - 1) Paved areas (parking lots, driveways, roadways, sidewalks, etc.): 18 inches
 - 2) Landscape areas (lawn/grassed areas, planting beds, etc.): 3 feet

6. Drains
 - a. Drains: Floor drains shall not be included in tunnels. Provide a trench in the edge of the tunnel to allow water to collect and be directed to the sump.

7. Duplex Sump Pumps
 - a. Refer to Manholes Paragraph A.8 for sump pumps. Note: Duplex sump pumps only required at low elevations.

8. Simplex Sump Pump
 - a. If water can overflow the sump and flow down to another lower elevation where there is a sump and no flooding or damage is caused by that water overflowing to the building, tunnel, etc., then a single pump will suffice in that higher elevation sump.
 - b. Sump pump GFCI receptacle shall be located a minimum of 4 feet above finished floor.
 - c. General Pump Specifications
 - 1) Refer to Manholes Paragraph A.8.f.1) through 4) and 6).
 - 2) Submersible Motor: 115VAC, 1-phase, 60 Hz oil filled for rapid heat dissipation with 15-foot, 3-conductor SOOW type cord and plug.
 - 3) Control panel and remote overflow alarm not required for single pump applications.

9. Lighting
 - a. Refer to Manholes Paragraph.A.9.a.
 - b. Light fixtures shall be mounted as close to the tunnel ceiling as possible.
 - c. Tunnel maintained light level shall be 10 footcandles minimum.
 - d. Provide 20A, 120/277VAC, Marine Grade, single-pole or three-way toggle switch with lighted handle. Handle shall illuminate when the switch is on. Manufacturer shall be Hubbell (Catalog No. HBL1221PL for single-pole and Catalog No. HBL1223PL for three-way). Alternate manufacturers are not allowed.
 - e. Provide silicone rubber weatherproof switch plate for use with above light switch. Manufacturer shall be Hubbell (Catalog No. HBL1795). Alternate manufacturers are not allowed.

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- f. Light switches shall be mounted near tunnel entry and exit points and intermediate locations as needed.
10. Emergency Lighting and Exit Signs
 - a. Provide Simkar emergency light fixture (Catalog No. SWLEM) or approved equal.
 - b. Location of emergency light fixtures to be per NFPA 101 Life Safety Code.
 - c. Provide Simkar exit sign (Catalog No. SWLED) or approved equal.
 - d. Location of exit signs to be per NFPA 101 Life Safety Code.
 11. Receptacles
 - a. Refer to Manholes Paragraph.A.10.a.
 - b. Refer to Manholes Paragraph .A.10.b.
 - c. Receptacles in tunnel shall be mounted 4 feet above finished floor and approximate every 25 feet.
 12. Wire and Cable - Steam and Condensate Tunnels
 - a. Refer to Manholes Paragraph .A.11.
 13. Wire and Cable - Chilled Water Tunnels
 - a. Refer to Manholes Paragraph .A.12.
 14. Conduit and Accessories
 - a. Refer to Manholes Paragraph .A.13.
 15. Identification
 - a. Refer to Manholes Paragraph .A.14.
 16. Structural Requirements
 - a. Refer to Manholes Paragraph 4.A.10, Structural Requirements for manholes.
- B. WATERPROOFING MATERIALS
1. Refer to Manholes Paragraph 4.B, Waterproofing Materials for manholes.
- C. WATERPROOFING METHODS
1. Refer to Manholes Paragraph 4.B, Waterproofing Methods for manholes.