SECTION 22 63 13

CORRUGATED MEDICAL TUBING (CMT) FLEXIBLE GAS PIPING SYSTEM) FOR LABORATORY AND HEALTHCARE FACILITIES

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\*\* NOTE TO SPECIFIER \*\* Omega Flex, Inc.; CORRUGATED MEDICAL TUBING (CMT).
This section is based on the products of Omega Flex, Inc., which is located at:451 Creamery WayExton, PA 19341Toll Free Tel: 800-355-1039Tel: 610-524-7272Fax: 610-524-7282Email: [request info (tracpipe@omegaflex.net)](https://arcat.com/rfi?action=email&company=Omega%252BFlex%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(15193ogf)%253A%2520&coid=47600&spec=15193ogf&rep=&fax=610-524-7282)
Web: <https://www.omegaflexcommercial.com>
 [ [Click Here](https://arcat.com/company/omega-flex-inc-47600) ] for additional information.
Commercial solutions for all your gas piping needs including natural gas and propane, diesel, gasoline, biofuels, and medical gas. Applications include backup generators, boilers, commercial laundries and restaurants, high rise apartments and condos, hospitals, assisted living and dental.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Corrugated Medical Tubing (CMT) flexible gas piping systems for laboratory and healthcare facilities.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 23 11 13 - Facility Fuel Oil Piping.
		2. Section 23 11 23 - Facility Natural Gas Piping.
		3. Section 23 11 26 - Facility Liquified Petroleum Flexible Gas Piping.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. National Fire Protection Association (NFPA):
			1. NFPA 99 - Health Care Facilities Code.
		2. Underwriters Laboratories (UL).
			1. UL 1365. Outline of Investigation for Corrugated Medical Tubing (CMT) Systems
		3. Compressed Gas Association (CGA):
			1. CGA G4.1 - Cleaning of Equipment for Oxygen Service.
		4. ASTM International (ASTM):
			1. ASTM B103, Standard Specification for Phosphor Bronze Plate, Sheet, Strip, and Rolled BarASTM B16, Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Crew Machines.
			2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
		5. International Code Council (ICC):
			1. ICC-ES AC156 - Seismic Certification by Shake-table Testing of Nonstructural Components.
			2. ICC-ESR-4565 - Evaluation Report for OmegaFlex Products.
		6. American society of Civil Engineers (ASCE):
			1. ASCE-7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
		7. Federal Emergency Management Agency (FEMA):
			1. FEMA 461 - Publication about Testing Protocols for Performance Based Design.
		8. Manufacturers Standardization Society:
			1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation (ANSI-approved American National Standard) which includes Amendment 1 Issued 10-17-2019.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data:
			1. Manufacturer's data sheets on each product to be used.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Typical installation methods.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
		2. Installer Qualifications: Each installer must meet applicable qualifications in accordance with state and/or local requirements as established by the administrative authority that enforces the health care facilities codes where medical gas piping is installed. The MediTrac Corrugated Medical Tubing (CMT) must only be installed by a valid ASSE 6010 or state equivalent certified installer who has been successfully trained through the MediTrac CMT installation program by a factory authorized trainer.
	3. DELIVERY, STORAGE, AND HANDLING
		1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
			1. Protect pipe and fittings from damage due to impact and point loading. Pipe shall be properly supported to avoid damage due to flexural strain. The contractor shall not allow dirt, debris, or other extraneous materials to get into the pipe and fittings.
		2. Protect from damage due to weather, excessive temperature, and construction operations.
	4. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
	5. WARRANTY
		1. Manufacturer's standard limited warranty unless indicated otherwise.
			1. Piping System Manufacturer: Warrants to the original owner at the original installation site that the MediTrac Corrugated Medical Tubing System will be free from defects in material or workmanship for one year from the date of installation.
			2. Contact manufacturer for full terms and conditions for the Omega Flex, Inc. Limited Warranty for MediTrac Corrugated Medical Tubing System.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Omega Flex, Inc., which is located at:451 Creamery WayExton, PA 19341Toll Free Tel: 800-355-1039Tel: 610-524-7272Fax: 610-524-7282Email: [request info (tracpipe@omegaflex.net)](https://arcat.com/rfi?action=email&company=Omega%252BFlex%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(15193ogf)%253A%2520&coid=47600&spec=15193ogf&rep=&fax=610-524-7282);Web: <https://www.omegaflexcommercial.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 - Product Requirements.
	1. CORRUGATED MEDICAL TUBING (CMT) FLEXIBLE MEDICAL GAS PIPING
		1. Basis of Design: MediTrac Flexible Corrugated Medical Tubing (CMT) System as Manufactured by OmegaFlex. Corrugated copper alloy tubing with axially swaged brass fittings equipped with a stainless steel anti-tamper sleeve and copper tube stub; providing easy attachment to traditional copper tube systems and direct connection to piping system components.
			1. Standards Compliance Listings:
				1. UL Listed: MH64301 to UL SUB 1365.
				2. UL Through Penetration Ratings: W-L-1604 and C-AJ-1751.
			2. ICC Seismically Qualified per ICC-ES AC156; Testing protocol per ICC-ESR-4565.
				1. The seismic certifications are consistent with the technical requirements of the major US seismic codes and standards including: International Building Code,ASCE-7, FEMA 461, the City of Los Angeles Department of Building Safety, and the State of California Division of State Architect and HCAI.
			3. Minimum Design Safety Factor: 3.5 times the Maximum Operating Pressure per NFPA 99-2018 or newer section 5.1.10.1.4 (2).
			4. Maximum Continuous Use Operating Pressure: 185 psig (1275.5 kPa).
			5. Maximum Continuous Use Operating Temperature: 250 degrees F (121 degrees C).
			6. Emergency Temperature Exposure Limit: 1000 degrees F (538 degrees C).
		2. Material:
			1. Tubing: Corrugated medical tubing material conforming to ASTM B103.
				1. Copper alloy UNS No. C51000 complying with requirements of NFPA 99-2018 5.1.10.4 (2).
				2. Meets CGA G4.1 cleanliness requirements.

\*\* NOTE TO SPECIFIER \*\* Delete tubing size options not required.

* + - * 1. Tubing Size: 1/2 inch (12.7 mm).
				2. Corrugated Tubing ID; Nominal: 0.597 inches (15.16 mm).
				3. Jacket OD; Nominal: 7/8 inches (22 mm).
				4. Bend Radius: 6 inches (152 mm)
				5. Tubing Size: 3/4 inch (19.0 mm).
				6. Corrugated Tubing ID; Nominal: 0.820 inches (20.83 mm).
				7. Jacket OD; Nominal: 1-1/8 inches (29 mm).
				8. Bend Radius: 8 inches (203 mm)
				9. Tubing Size: 1 inch (25.4 mm).
				10. Corrugated Tubing ID; Nominal: 1.060 inches (26.92 mm).
				11. Jacket OD; Nominal: 1-3/8 inches (35 mm).
				12. Bend Radius: 10 inches (254 mm)
				13. Tubing Size: 1-1/5 inch (38.1 mm).
				14. Corrugated Tubing ID; Nominal: 1.525 inches (37.73 mm).
				15. Jacket OD; Nominal: 2-1/8 inches (54 mm).
				16. Bend Radius: 24 inches (610 mm)
				17. Tubing Size: 2 inch (50.8 mm).
				18. Corrugated Tubing ID; Nominal: 2.060 inches (52.32 mm).
				19. Jacket OD; Nominal: 2-5/8 inches (66.67 mm).
				20. Bend Radius: 30 inches (762 mm)
			1. Jacket: Low Density FR Polyethylene, Plenum Rated.
				1. Flame Spread Index: Less than or equal to 25.
				2. Smoke Density Index: Less than or equal to 50.
				3. Complying with requirements of NFPA 99-2018 5.1.10.1.5 and ASTM E84.
			2. Metallic Fittings: Yellow Brass: Copper Alloy No. CA360 or equivalent, cleaned to CGA G4.1, and comply with NFPA 99-2018 5.1.10.7.1.
		1. Flexible Medical Gas Piping Sizes: Includes fire-retardant jacket for added strength and reliability. High-performance, UL-1365 tested.

\*\* NOTE TO SPECIFIER \*\* Delete size options not required.

* + - 1. MT-0500-CMT-150:
				1. Tubing Size: 1/2 inch (12.7 mm).
				2. Length: 150 ft (45.72 m). Weight: 45 lbs (20.4 kg).
			2. MT-0500-CMT-300:
				1. Tubing Size: 1/2 inch (12.7 mm).
				2. Length: 300 ft (91.44 m). Weight: 88 lbs (39.9 kg).
			3. MT-0750-CMT-150:
				1. Tubing Size: 3/4 inch (19 mm).
				2. Length: 150 ft (45.72 m). Weight: 64 lbs (29.0 kg).
			4. MT-0750-CMT-300:
				1. Tubing Size: 3/4 inch (19 mm).
				2. Length: 300 ft (91.44 m). Weight: 120 lbs (54.4 kg).
			5. MT-1000-CMT-100:
				1. Tubing Size: 1 inch (25.4 mm).
				2. Length: 100 ft (30.48 m). Weight: 54 lbs (24.5 kg).
			6. MT-1000-CMT-200:
				1. Tubing Size: 1inch (12.7 mm).
				2. Length: 200 ft (60.96 m). Weight: 100 lbs (45.4 kg).
			7. MT-1500-CMT-100:
				1. Tubing Size: 1-1/2 inch (38.1 mm).
				2. Length: 100 ft (30.48 m). Weight: 265 lbs (120.2 kg).
			8. MT-1500-CMT-300:
				1. Tubing Size: 1-1/2 inch (38.1 mm).
				2. Length: 300 ft (60.96 m). Weight: 405 lbs (183.7 kg)
			9. MT-2000-CMT-0100:
				1. Tubing Size: 2 inch (50.8 mm).
				2. Length: 100 ft (30.48 m). Weight: 185 lbs (86.9 kg).
			10. MT-2000-CMT-300 2:
				1. Tubing Size: 2 inch (50.8 mm).
				2. Length: 300 ft (60.96 m). Weight: 515 lbs (233.6 kg).
		1. Fittings:

\*\* NOTE TO SPECIFIER \*\* Delete fitting options not required.

* + - 1. Straight End: 1/2 inch (12.7 mm
			2. Straight End: 3/4 inch (19.0 mm)
			3. Straight End: 1 inch (25.4 mm)
			4. Straight End: 1-1/2 inch (38.1 mm)
			5. Straight End: 2 inch (50.8 mm)
			6. Coupling: 1/2 inch (12.7 mm
			7. Coupling: 3/4 inch (19.0 mm)
			8. Coupling: 1 inch (25.4 mm)
			9. Coupling: 1-1/2 inch (38.1 mm)
			10. Coupling: 2 inch (50.8 mm)
			11. Tee: 1/2 inch (12.7 mm
			12. Tee: 3/4 inch (19.0 mm)
			13. Tee: 1 inch (25.4 mm)
		1. Tubing Support Hangers:
			1. Corrugated Medical Tubing is to be supported from the building structure.
			2. Hangers and Supports: Must Comply with MSS SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.
				1. Hanger Sizing: Sized for regular copper tubing but select one size larger to fit over the jacket.

\*\* NOTE TO SPECIFIER \*\* Delete size options not required.

* + - 1. CMT Size: 1/2 inch (12.7 mm).
				1. Copper Tube Size for Hanger: 3/4 inch (19.0 mm).
				2. Maximum Spacing: 6 feet (1829 mm).
			2. CMT Size: 3/4 inch (19.0 mm).
				1. Copper Tube Size for Hanger: 1 inch (25.4 mm).
				2. Maximum Spacing: 7 feet (2134 mm).
			3. CMT Size: 1 inch (125.4 mm).
				1. Copper Tube Size for Hanger: 1-1/4 inch ( mm).
				2. Maximum Spacing: 8 feet ( mm).
			4. CMT Size: 1-1/2 inch (38.1 mm).
				1. Copper Tube Size for Hanger: 2 inch (50.8 mm).
				2. Maximum Spacing: 10 feet (2438 mm).
			5. CMT Size: 2 inch (50.8 mm).
				1. Copper Tube Size for Hanger: 2-1/2 inch (52.3 mm).
				2. Maximum Spacing: 10 feet (3048 mm).
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until the substrates have been properly constructed and prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
			1. Cleaning of Medical Gas Tubing: If manufacturer-cleaned and -capped fittings or tubing is not available or if precleaned fittings or tubing must be recleaned because of exposure, have supplier or separate agency acceptable to authorities having jurisdiction perform the following procedures:
				1. Clean medical gas tube and fittings, valves, gauges, and other components of oil, grease, and other readily oxidizable materials as required for oxygen service in accordance with CGA G-4.1.
				2. Wash medical gas tubing and components in hot, alkaline-cleaner-water solution of sodium carbonate or trisodium phosphate in proportion of 1 lbs (0.453 kg) of chemical to 3 gal. (11.3 L) of water.
				3. Scrub to ensure complete cleaning.
				4. Rinse with clean, hot water to remove cleaning solution.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
			1. Install flexible, corrugated medical tubing with polyethylene jacket in accordance with manufacturer's written instructions.
			2. Corrugated medical tubing is allowed to be installed below grade or in slab when encased in a non-metallic watertight conduit with long sweep bends.
			3. Install tubing using only components manufactured by tubing manufacturer.
			4. Make tubing joints using only tools and fittings specified by tubing manufacturer.
			5. Maintain caps and plugs at tubing ends until ready to apply fittings to make joints.
			6. Do not bend tubing to a radius smaller than the minimum bend radius specified.
			7. Support tubing in accordance with manufacturer's written instructions, with maximum support spacing as specified in PART 2.
				1. Comply with requirements for seismic-restraint devices specified in Section 22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
	4. IDENTIFICATION
		1. Install identifying labels and devices for specialty gas piping, valves, and specialties. Comply with requirements in Section 22 05 53 - Identification for Plumbing Piping and Equipment.
		2. Install identifying labels and devices for healthcare medical gas piping systems in accordance with NFPA 99. Use the following or similar captions and color-coding for piping products where required by NFPA 99:
			1. Carbon Dioxide: Black or white letters on gray background.
			2. Helium: White letters on brown background.
			3. Nitrogen: White letters on black background.
			4. Nitrous Oxide: White letters on blue background.
			5. Oxygen: White letters on green background or green letters on white background.
	5. FIELD QUALITY CONTROL
		1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
		2. Testing Agency:

\*\* NOTE TO SPECIFIER \*\* Delete the following options not required.

* + - 1. The Owner will engage a qualified testing agency to perform tests and inspections.
			2. The Contractor is to engage a qualified testing agency to perform tests and inspections.
			3. The Contractor is to perform tests and inspections with the assistance of a factory-authorized service representative.
			4. The Contractor is to perform tests and inspections.
			5. Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
		1. Tests and Inspections:
			1. Piping Leak Tests for Specialty Gas Piping: Test new and modified parts of existing piping.
				1. Cap and fill specialty gas piping with oil-free, dry nitrogen to pressure of 50 psig (345 kPa) above system operating pressure, but not less than 150 psig (1035 kPa).
				2. Isolate test source and let stand for four hours to equalize temperature.
				3. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
			2. Repair leaks and retest until no leaks exist.
			3. Inspect specialty gas regulators for proper operation.

\*\* NOTE TO SPECIFIER \*\* See Section 014000 'Quality Requirements' for retesting and reinspecting requirements and Section 017300 'Execution' for requirements for correcting the Work.

* + 1. Piping will be considered defective if it does not pass tests and inspections.
		2. Prepare test and inspection reports.
	1. CLEANING AND PROTECTION
		1. Protect tubing from damage.
		2. Retain sealing plugs in tubing, fittings, and specialties until installation.
		3. Clean tubing not properly sealed, and where sealing is damaged, in accordance with "Preparation" Article.
		4. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION