

## OUR COMMITMENTS :-

### END FINISH

One End Expanded Tubes are supplied with a commercial saw cut with minimum burrs as standard on one end, mechanically straightened, expanded & deburred on the other end, without any extra cost cut to specific lengths as specified by the customers.

### PACKING

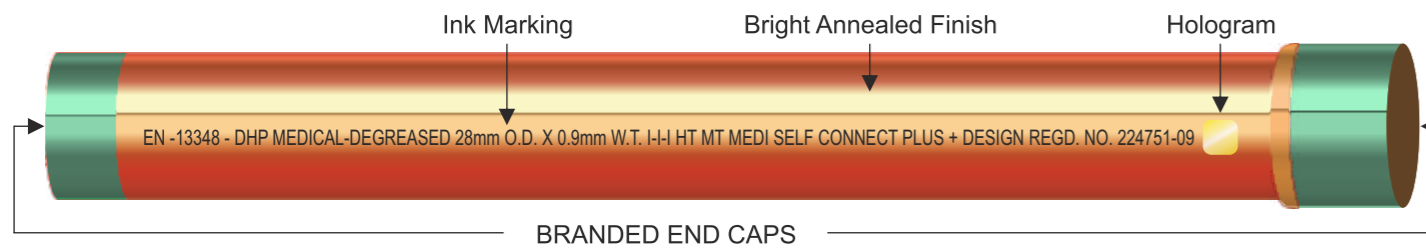
- Polythene Sheet & Resin Cloth
- Polythene Sheet, Corrugation Sheet & Resin Cloth
- Polythene Sheet, Thermocol/Bubble Wrap & Wooden Box.



### DELIVERY PERIOD

**For Standard Requirement :** Ex works – Umbergaon, 7 working days for ready stock, after receipt of technical & commercial clear purchase order & advance (subject to our confirmation)

**For Special Requirement :** Ex works – Umbergaon, within 30-45 days (for special requirement), after receipt of technical & commercial clear purchase order & advance (subject to our confirmation)

### TRACEABILITY PROVIDED FOR MANDEV'S MT MEDI SELF CONNECT PLUS +



SR. No	TRACEABILITY FEATURES	MEDICAL GRADE COPPER TUBE (LENGTH 3 MTR / 9.84 FEET)
1	PRODUCT NAME	"MT MEDI SELF CONNECT PLUS"+
2	MANDEV'S STRAIGHT TUBES WITH ONE END EXPANDED WITH REGISTERED DESIGN NO. 224751 - 09	√
3	MANDEV'S ONE END EXPANDED TUBES CAN REDUCE 78% COST FOR MEDICAL GRADE APPLICATION IN PLACE OF USE COUPLING	78%
4	MANDEV'S ONE END EXPANDED TUBES CAN REDUCE 100% COST IN PLACE OF USING ELBOW FOR MEDICAL GRADE APPLICATION	100%
5	9 ELEMENT SECURED GOLDEN COLOUR HOLOGRAM (FOIL STICKER) FIXED ON THE TUBES 	2 Nos Of Golden Color Hologram Fix On Both End Of The Tube With 1 Feet Distance
6	INKJET MARKING ON STRAIGHT TUBES	√
7	END CAP WITH GREEN COLOR AND MANDEV ENGRAVED LOGO 	√
8	MANDEV PRINTED POLYTHENE BAGS WITH VARIOUS SECURITY ELEMENTS	√
9	TRACKING & CONFIRMING AUTHENTICITY, TRACEABILITY & 100% RELIABILITY.  (I) MANDEV PROVIDED TEST CERTIFICATE HARD COPY (ORIGINAL WITH HOLOGRAM) MENTIONING BATCH NO., BILL NO., DATE AND FULL QUANTITY.  (II) MANDEV'S STOCKIESTS WILL PROVIDE MANDEV TUBES TEST CERTIFICATE (ENDORSED) WITH THEIR CO'S SEAL (STAMP) AND DULY SIGNED BY THEIR DIRECTOR / PROPRIETOR.	√
10	STANDARD CORRUGATED PACKING	Sheet
11	STANDARD WOODEN CASES PACKING (IF REQUIRED)	√
12	MANDEV PROVIDE TEST CERTIFICATE HARD COPY (ORIGINAL WITH HOLOGRAM) MENTIONING BATCH NO., BILL NO., DATE AND FULL QUANTITY FOR TRACKING & CONFIRMING AUTHENTICITY, TRACEABILITY & 100% RELIABILITY.	√



Copper tubes to paint your world green



"Life is for one generation, a good name is forever."

|| Faith is in the name ||

**MANDEV TUBES PVT. LTD.**

AN ISO 9001 : 2015, 14001 : 2015, 45001 : 2018, 7396-1 : 2016 certified company by URS and CE mark by WRG  
Towards Leadership Through Commitment & Quality

**Factory:**  
269. G.I.D.C. Ind. Estate,  
Opp. Usha Garment,  
Umbergaon, Dist. Valsad,  
Gujarat - 396 171. India.

**Office:**  
706, Lodha Supremus,  
7th Floor, Senapati Bapat Marg,  
Railway Colony, Lower Parel, Mumbai - 400013.  
Contact : 022 66131818  
Email : sales@mandevtubes.com

Website : [www.mandevtubes.com](http://www.mandevtubes.com)



ECO-FRIENDLY RECYCLABLE LONG LASTING

Copper tubes,  
arteries for MEDICAL GAS applications





## INTRODUCTION

MANDEV TUBES IS AN ISO 9001: 2015, 14001:2015, 45001:2018, 7396-1:2016 CERTIFIED COMPANY BY URS AND CE MARK BY WRG.

MANDEV TUBES PVT. LTD., an Integrated manufacturing units based in Umbergaon / Gujarat, having its head office in Mumbai commenced its operations in 1964. Over 50 years of committed service towards the copper tubing industry has earned global recognition for Mandev Tubes and trust of its customers by retaining its name today as one of the reputed brand in copper tubing industry.

We are always dedicated towards meeting customized demands of a defect free product.

MANDEV is devoted to document the effectiveness of the company's quality assurance system & backs the effort with stringent SPC (Statistical Process Control) programs. Rather than inspecting quality 'In' at the end of production operation, the SPC program ensures that Mandev's Online Monitoring System continually check the tubes during each stage of the manufacturing process.

## MEDICAL GAS PIPELINE SYSTEM (MGPS) FOR HOSPITAL & MEDICAL COLLEGES

A centralized MGPS is now recognized as a basic life support infrastructural requirement of a hospital, and patient care becomes a possibility without complications. The medical gases used in a hospital are life-supporting element that provides direct influence in maintaining the life of a patient. This complex and extensive system is designed and executed to deliver the right gas at the right pressure and flow Rate.

MGPS helps maintains hygiene in high-risk areas such as OTs, ICUs, ICCUs, and Nursery & saves the effort involved in dragging cylinders. MGPS ensures uninterrupted supply to the life saving oxygen & a vacuum facility to help a care giver save the patient without anxiety. A MGPS is designed to provide as safe and effective method of delivering the required medical gas from the source of supply through a MGPS to the patient via a terminal unit. Each medical gas must be supplied from a separate system & it is essential that all parts of each system are gas specific to ensure that there is no possibility of cross-connection between any systems.

## IMPORTANT NOTE FOR MEDICAL GAS PIPE LINE SYSTEM (MGPS)

The supply of gases and vacuum is controlled through central manifold / pump rooms and phosphorous, deoxidized, non - arsenical, degreased seamless round Copper Tubes (Grade: CW024A / Cu-DHP) confirming to EN 13348:2008/2016 with incorporation of amendment A1:2005 (Previously BS:EN 1057: 1996/BS:2871 Part-1 Table X) The tube shall be installed in conformance with the requirements of Health Technical Memorandum 02-01 (HTM 02 supersedes all previous version of HTM 2022) The tube may also be installed in conformance with NFPA 99, standard for health care facilities 2005 Edition (ASTM: Standard Specification for Seamless Copper Tubes for Medical Gas System) All copper pipes should be manufactured in-house by a manufacturer equipped with all manufacturing and calibrated testing equipment's with qualified manpower required to suit the said specifications (BS: EN : 13348:2008 /2016 / ASTM: B 819-00). Each lot should have manufacturer's Test Certificate and Preferably inspected by reputed third party inspection agency.

## ONE END EXPANDED COPPER TUBE “ MT MEDI SELF-CONNECT PLUS+”

With the continuous research and development taking place at Mandev Tubes we have been able to innovate and develop the ONE END EXPANDED COPPER TUBE “MT MEDI SELF-CONNECT PLUS+” (DESIGN REGISTRATION NO 224751-9). The unique design helps eliminate a COUPLING Cost, while joining two tubes. It reduces installation costs by up to 78% compare to regular tube installation cost, As tube can be installed and inserted in same diameter tube (In One End Expanded Tube), 1 extra coupling joint eliminated, which results in preventing leakage by 50% and save 50 % of brazing cost.

Further as the tubes are of Half Hard temper, one can eliminate ELBOW Cost, while joining two tubes. It reduces installation cost by up to 100% compare to regular installation cost, As they can be easily bend with the help of a mechanical bender which would help eliminate 2 Elbow joints and preventing leakage by 100% and save 100% of brazing cost.

One End Expanded Tubes are provided in the following outside diameter and size  
Range : MIN. DIAMETER- 10mm MAX. DIAMETER- 108mm MIN. LENGTH-3mtr

## MARKING INFORMATION

Tubes from 10mm & upto 108mm diameter will be permanently marked along their length at repeated distances of not greater than 600mm, with atleast the following : Number of this Standard (EN13348) nominal cross-sectional outside diameter X wall thickness, identification for R250 (Half Hard) temper by the following symbol I-I-I, manufacturer's identification mark, date of production : year & quarter (I To IV) or year & month (1To12).

TEMPER	COMMON TERM	TENSILE STRENGTH (Mpa) Min	ELONGATION (%) Min	HARDNESS (HV5)
DESIGNATION IN ACCORDANCE WITH EN 1173				
R220	Annealed	220	40	40 TO 70
R250	Half hard	250	30	75 TO 100
R290	Hard	290	3	Min 100

## NOMINAL OUT SIDE DIAMETER & WALL THICKNESS FOR MGPS

OUT SIDE DIAMETER (mm) (d)	WALL THICKNESS						
	0.7	0.8	0.9	1	1.2	1.5	2
8	-	R	-	R	-	-	-
10	-	R	-	R	-	-	-
12	-	x	-	R	-	-	-
14	-	-	-	X	-	-	-
15	R	-	-	R	X	-	-
16	-	-	-	X	-	-	-
18	-	-	-	R	X	-	-
22	-	-	R	R	X	R	-
28	-	-	R	R	X	R	-
35	-	-	-	-	R	R	X
42	-	-	-	-	R	R	X
54	-	-	-	-	R	R	R
76	-	-	-	-	-	R	X
104	-	-	-	-	-	R	R
108	-	-	-	-	-	R	R

Note 1: Hardness figures in parentheses are not requirements of this European standard but are given for guidance purpose only.

Note 2: 1 MPa is equivalent to 1 N/mm<sup>2</sup>

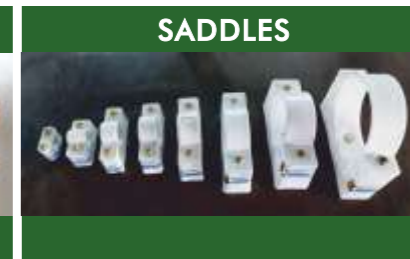
STANDARD PACKING OF COPPER FITTINGS													
SR. NO.	SIZE	ELBOW		COUPLING		TEE		ELBOW REDUCER		COUPLING REDUCER		TEE REDUCER	
1	10 MM	25	50	50	100	25	50	25	50	25	50	25	50
2	12 MM	25	50	50	100	25	50	25	50	25	50	25	50
3	15 MM	25	50	50	100	25	50	25	50	25	50	25	50
4	22 MM	10	20	15	30	5	10	10	20	15	30	5	10
5	28 MM	5	10	10	20	5	10	5	10	10	20	5	10
6	35 MM	2	5	5	10	2	5	2	5	5	10	2	5
7	42 MM	2	5	5	10	2	4	2	5	5	10	2	4
8	54 MM	1	2	3	6	1	1	1	2	3	6	1	1
9	76 MM	1	1	1	2	1	1	1	1	1	2	1	1

## COPPER PIPE AND FITTING SPECIFICATION

As per European standard 13348:2008/2016 specification specifies copper pipes and fittings are suitable for distributing the following medical gases intended to be used at operating pressure up to 2000 Kpa

- Oxygen, Nitrous Oxide, Nitrogen, Helium, Carbon Dioxide, Xenon
- Air for breathing
- Specific mixture of these above mentioned gases
- Air for driving surgical tools
- Anesthetic gases and vaporous
- Vacuum

## FITTINGS & SADDLES :



Our copper pipes are also available with our self manufactured Copper Fittings as well as saddles for the medical gas pipeline installation.

Available size range from 10mm to 108mm.

## COMPULSORY INSPECTION REQUIREMENT FOR MGPS

### CHEMICAL COMPOSITION

Chemical Compositon of copper pipe shall conform to the following requirements.

The analytical methods shall be carried out By Direct Emission Spectrometer.

- Copper + silver : min. 99.90%
- Phosphorous : min. 0.015%, max. 0.040%

### CARBON CONTENT TEST

The determination of carbon content shall be carried out on the sample obtained in accordance with the reference method described in EN 723.



### FREEDOM FROM DEFECTS TEST (EDDY CURRENT TEST)

Each tube shall be subjected to an Eddy Current Test for detection of local defects, in accordance with EN 1971.

### CLEANLINESS AND RESIDUE

All pipes should be internally & externally cleaned and should be free of particulate matter & toxic residues which shall then be capped individually at both ends to unable contamination. “Stress relieved” one end expanded tubes meet the permissible cleanliness level of 0.20mg/dm<sup>2</sup>, for residue, confirming to EN-13348:2008/2016.

### TENSILE TEST

The tensile test shall be carried out in accordance with the method given in EN ISO 6892-1 on the test pieces prepared from the test samples obtained As Per EN 13348:2008/2016 specifications.

### HARDNESS TEST

When required the Vickers hardness test shall be carried out in accordance with EN ISO 6507-1.

### CLIMATIC TEST

Specimens of ink-marked tube, 200mm long shall be placed vertically in a climatic drying cabinet. After exposure to a temperature of (80+/-3) Deg. C. and 100% atmospheric humidity for 2hrs. and after having been rubbed five times in one direction, longitudinally, with a cotton cloth under strong manual pressure the marking shall be remain legible.

### ABRASION TEST

A specimen of market tube having a length of more than 600mm shall be rubbed five times in one direction longitudinally with a cotton cloth under strong manual pressure afterwards the making shall be remain legible.