



**EUROMAG**  
INTERNATIONAL

*Measure > Sense > Innovate*

# SENSOR MUT2300US

Electromagnetic flowmeter



*The electromagnetic flowmeter designed for the toughest applications*



DS401-6-US



## Sensor MUT2300US

The MUT2300US sensors represent the state of the art of Euromag International production for water cycle and process applications. The innovative inner part of the sensor that increase considerably the liquid flow rate and the reading accuracy of signal generated to the electrodes, enables an extremely wide range of measurement.

These performances allow to measure also low flow rates precisely and repeatable, even in difficult/problematic applications with solid parts.

This flanged sensor series bases its operation on the Faraday Principle, by which a conductor crossing a magnetic field generates an electrical potential perpendicular to the field itself. On the top and on the lower side of the stainless steel AISI 304 flow tube, two coils are installed; the magnetic field generated

by the electric current crossing the coils, induces in the electrodes a potential difference proportional to the flow rate.

With the aim of measuring such potential of very low values, the interior of the flow tube is electrically insulated, thus the process liquid is no longer in contact neither with the material of the flow tube nor with that of the flanges.

The converter used generates the current supplying the coils, acquires the electrodes potential difference, process the signal to calculate the flowrate and manages all the communications. The entire sensor has an IP68 protection degree suitable for a permanent immersion in water up to a depth of 4.92 ft.



## Body and flanges

The flanges and the sensor external surface are acrylic painted. This treatment gives the sensor an excellent resistance to water and external agents even in permanent immersion or buried. The MUT2300US may be supplied in stainless steel, flanges included, or with a special paint ideal for application in C4 class environment (UNI EN ISO 12944-2).

## Internal lining

The standard internal insulating lining is in Hard rubber (Ebonite) in compliance with WRAS, FDA. The liquid temperature can reach 176° F. Thanks to its high resistance to scraping, the Ebonite is considered the best material for fluids containing scattered solids for applications of water treatment, residual water, potable water and irrigation.

## Electrodes

The standard electrodes are in Hastelloy C and therefore this guarantees a wide compatibility with process fluids. If required, they may be supplied in Hastelloy B, Titanium, Tantalum and Platinum. A partially empty tube detection (fourth electrode) is installed and can be enabled or disabled through the software.

## Coupling and connection to the sensor

MUT2300US sensors may be coupled with any Euromag converters. In the separate version the sensor is connected to the converter through a cable whose length depends on the liquid conductivity; the maximum length must not exceed 328 feet on the powered version and 98 feet on the battery version.

## Negligible pressure drop

The electromagnetic flowmeters do not have any moving internal parts, thus they have a very low pressure drop. The OIML R-49 permits a maximum pressure drop of 9psi at velocity of about 26.25 ft/s. The MUT2300US flowmeters, thanks to its unique design, projected to accelerate the flow and amplify the signal to the electrodes, guarantees a pressure drop less than 1.45psi at velocity of 26.25 ft/s. The pressure drop is always less than 0.14psi at velocities lower than 3.28 ft/s.



MUT2300US - MC608A



MUT2300US - MC406 VERTICAL



MUT2300US - MC406 VERTICAL



MUT2300US - MC608A

# Installation with no upstream and downstream distances

The cone shaped section of the internal part of the sensor, allows an optimized and accelerated flow profile which permits to install the sensor in any kind of condition; no need to have straight sections/segments of pipes upstream and downstream. This U0-D0 condition enables to have an extreme flexibility on the flowmeter installation position.

## Standards reference

The Euromag magnetic meters are marked CE and are manufactured according to the following standards: according to the following standards:

- Certified to NSF ANSI61
- 2014/35/EU - EN 61010-1:2013 (LVD)
- 2014/30/EU - EN 61326-1:2013 (EMC)
- EN ISO 15609-1 and EN ISO 15614-1
- UNI EN ISO 12944-2, painting for C4 class environments (on request)

## Applications

- Measure of potable or reflow water
- Distribution, municipal water
- Industrial waste water
- Over night applications with very low flow rate
- Industrial process liquids, muds and concretes
- Installation in small places without straight distances
- Leakage detection
- Fiscal measures, irrigation

## Advantages

No moving parts ■ No parts inside of the flowmeter ■ No obstruction on the flow tube ■ Very low pressure loss (below 3.28 ft/s is irrelevant) ■ Long lasting stability and precision, no filter needed, zero maintenance ■ No periodic cleaning ■ Accurate measure at high flow rate (firefighting systems) and at low flow rates (overnight flow rates) ■ Extremely sturdy structure, a dedicated robot welds all the parts, internal parts protected by a bi-component resin in order to increase protection from external agents ■ Ideal for pit installations even for permanent immersion in water or buried installations ■ Bi-directional measure

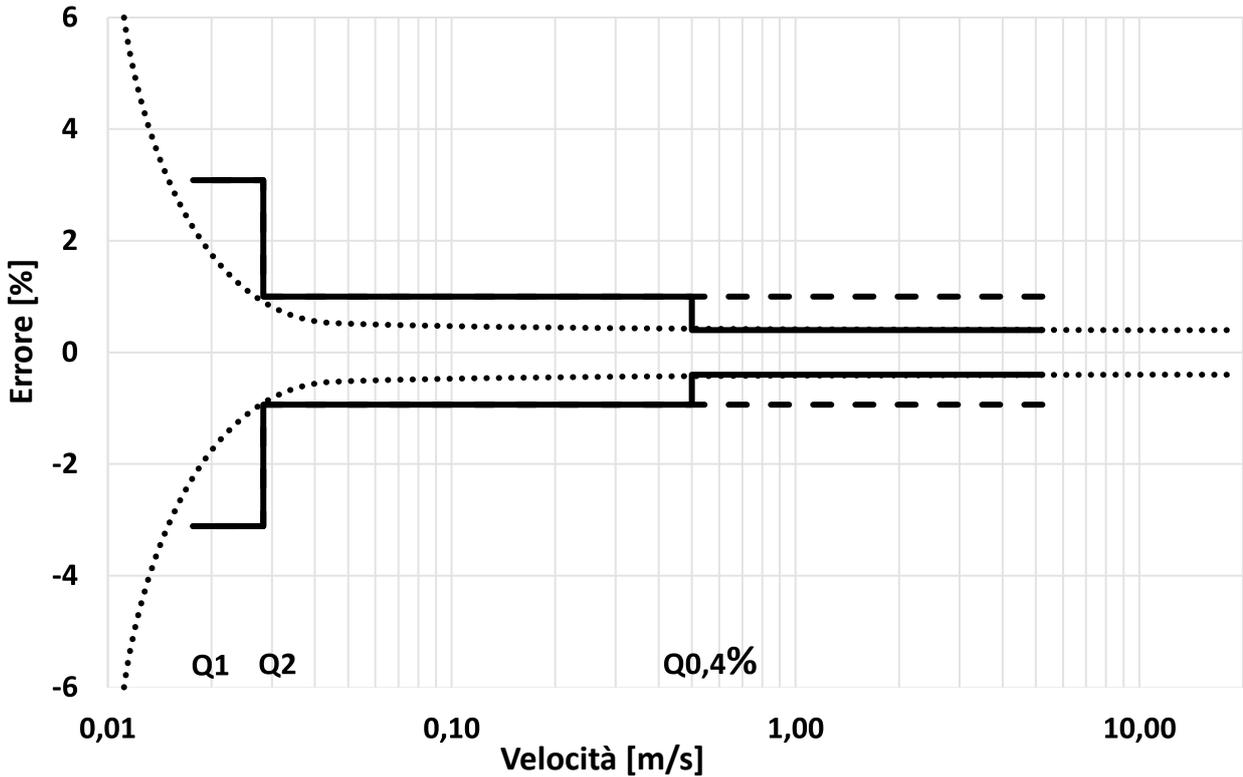
## Technical features MUT2300US

<b>Flow tube material</b>	AISI 304, AISI 316 (optional)									
<b>Flanges material</b>	Carbon steel (S235JR - 1.0037), AISI 304 optional, AISI 316 optional									
<b>Available electrodes</b>	Hastelloy C (standard), Hastelloy B, Titanium, Tantalum, Platinum									
<b>Internal lining</b>	Ebonite									
<b>Liquid temperature</b>	-104° F / +176° F									
<b>Available sizes</b>	<b>mm</b>	50	65	80	100	125	150	200	250	300
	<b>inches</b>	2"	2½"	3"	4"	5"	6"	8"	10"	12"
<b>Standard flanged connections</b>	ANSI 150, EN1092-1 PN 16									
<b>Flanged connections on request</b>	AS 2129 (Table D, E, F), AS 4087 (PN 16, 21), KS10K, others on request									
<b>Standard operation pressure</b>	305 psi									
<b>Pressure drop class</b>	DN≤3" ΔP10 (< 1.45 psi)					DN≥4" ΔP16 (< 2.32 psi)				
<b>Installation requirements/conditions</b>	U0-D0									
<b>Protection Degree</b>	IP68 permanent submersion at 4.92 ft (EN 60529)									
<b>Convertes compatibility</b>	MC608A/B/R/P, MC406									
<b>Electrical connections</b>	Cableglands M20 x 1.5 + terminal box + sealing resin									

## Calibration and maximum error

Each sensor is calibrated on an hydraulic test rig equipped with a ISO17025 traceable weighing system. The accuracy is equal to 0,2% ± 0,08 inch/s (0,2% ± 0,04 inch/s on request). The repeatability of the measure is about 0,1%. Bi-directional measure. On request the sensors can be supplied certified MID OIML R49 (if coupled to MC406M converters) for custody transfer.

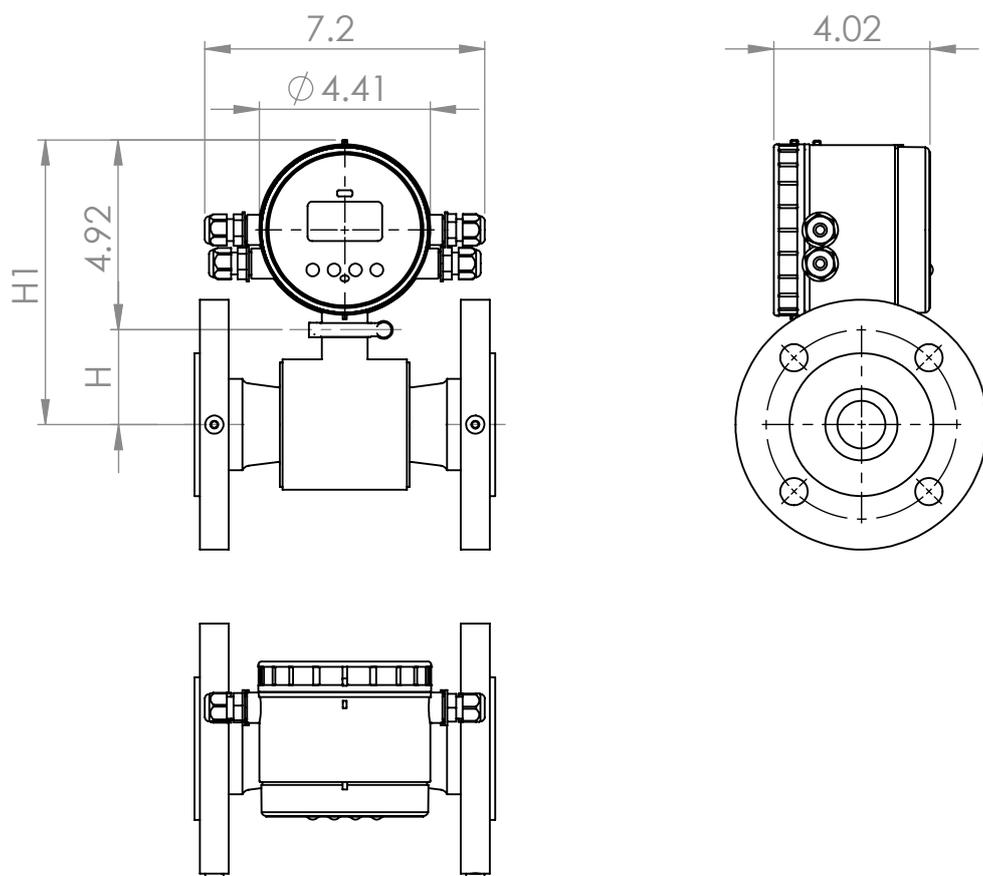
Maximum Permissible Error is within the limits indicated in the following graph:



## Flow rates chart

Sensor size	Flow [gpm]					Ratio Q3/Q1
	Min Q1	Trans. Q2	Q0,4%	Perm. Q3	Overl. Q4	
2"	0.55	0.88	15.41	110.07	137.59	200
2"1/2	0.20	1.41	26.42	176.11	220.14	200
3"	1.39	2.22	39.63	277.38	346.73	200
4"	2.20	3.52	61.64	440.29	550.36	200
5"	3.52	5.64	96.86	704.46	880.57	200
6"	5.50	8.81	140.89	1,100.72	1,375.90	200
8"	13.87	22.19	250.96	2,773.81	3,467.26	200
10"	22.01	35.22	396.26	4,402.87	5,503.58	200
12"	35.22	56.36	563.57	4,402.87	5,503.58	125

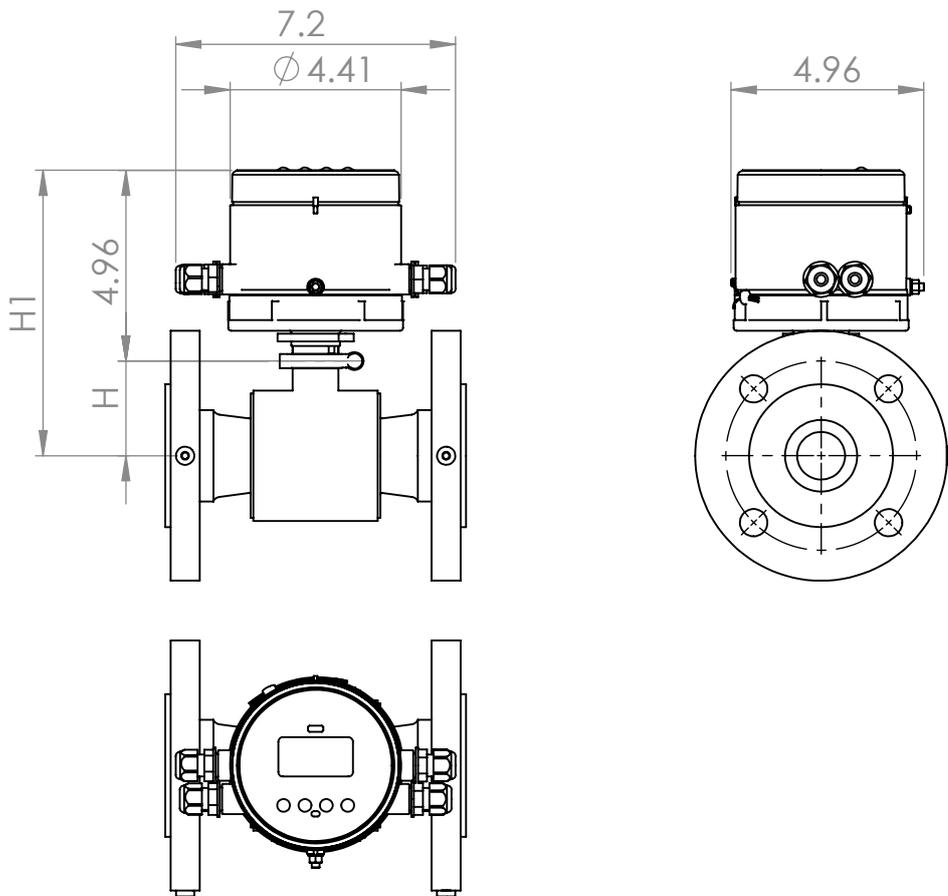
## MUT2300US - MC406 HORIZONTAL



### MC406 HORIZONTAL

SIZE	H	H1
2"	2.45	7.37
2" 1/2	2.45	7.37
3"	2.80	7.72
4"	3.10	8.02
5"	4.16	9.08
6"	3.98	8.90
8"	5.79	10.71
10"	6.91	11.84
12"	8.16	13.08

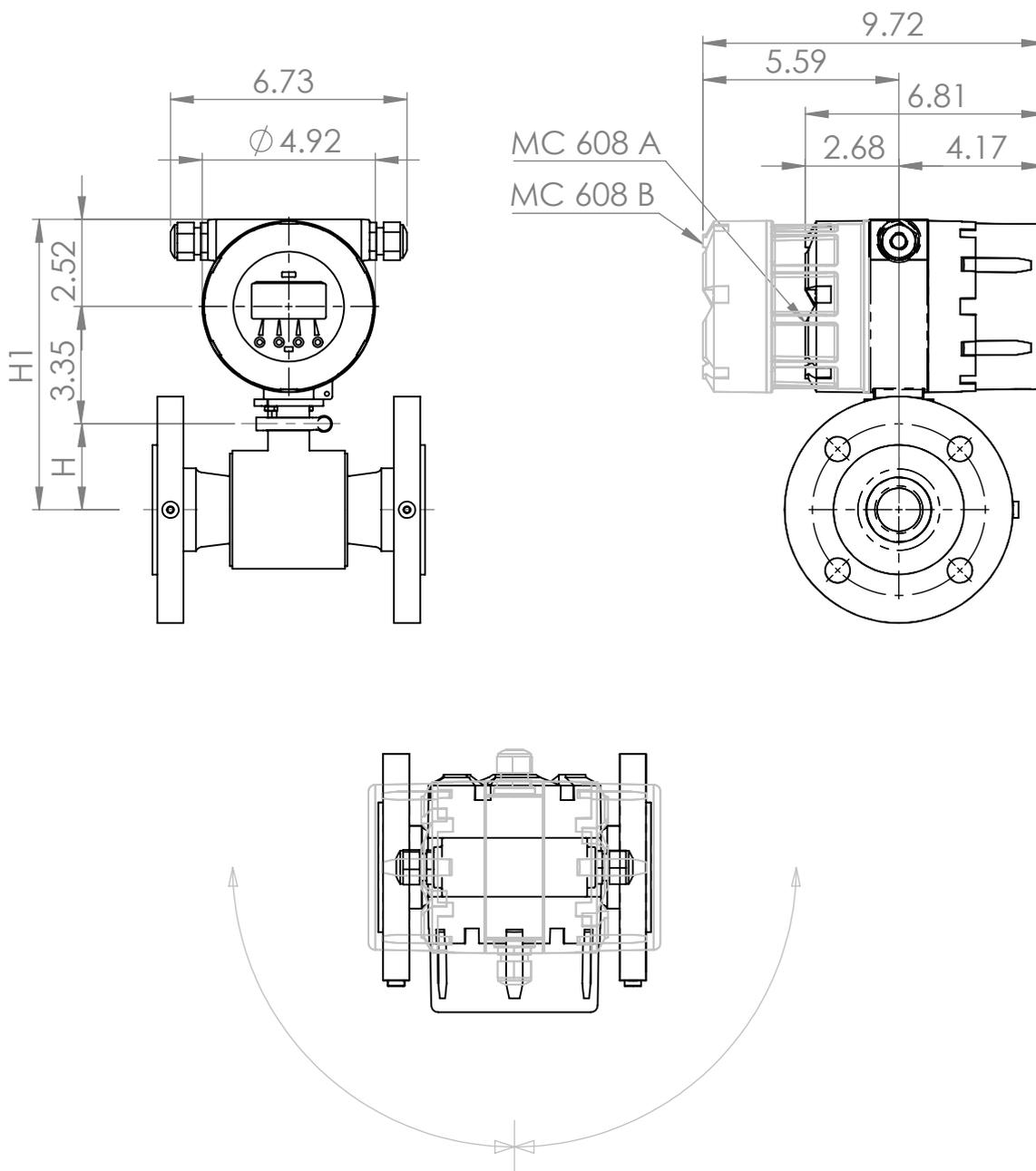
## MUT2300US - MC406 VERTICAL



### MC406 VERTICAL

SIZE	H	H1
2"	2.45	7.41
2" 1/2	2.45	7.41
3"	2.80	7.76
4"	3.10	8.06
5"	4.16	9.12
6"	3.98	8.94
8"	5.79	10.75
10"	6.91	11.88
12"	8.16	13.12

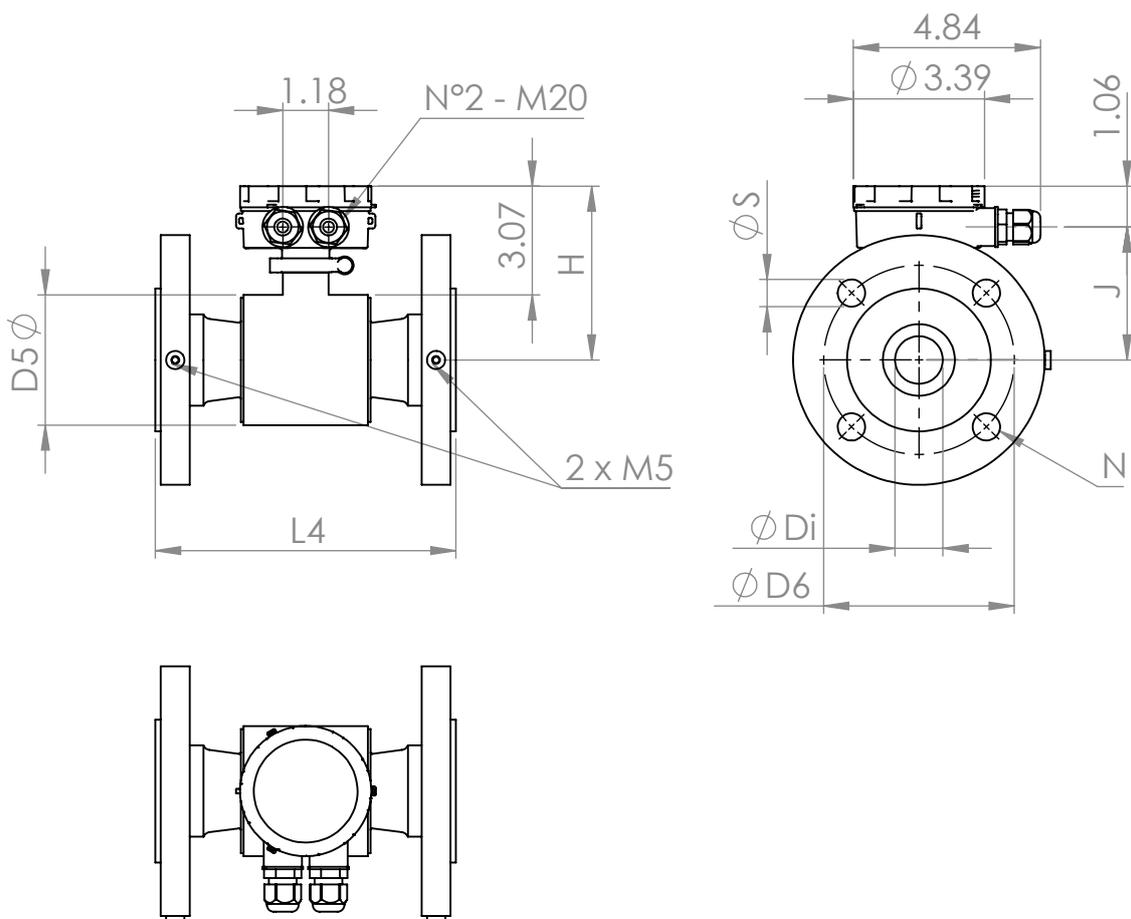
# MUT2300US - MC608 A/B/R



MC608 A/B/R

SIZE	H	H1
2"	2.45	8.31
2" 1/2	2.45	8.31
3"	2.80	8.66
4"	3.10	8.96
5"	3.98	9.84
6"	4.16	10.02
8"	5.79	11.65
10"	6.91	12.78
12"	8.16	14.02

## MUT2300US - SEPARATE

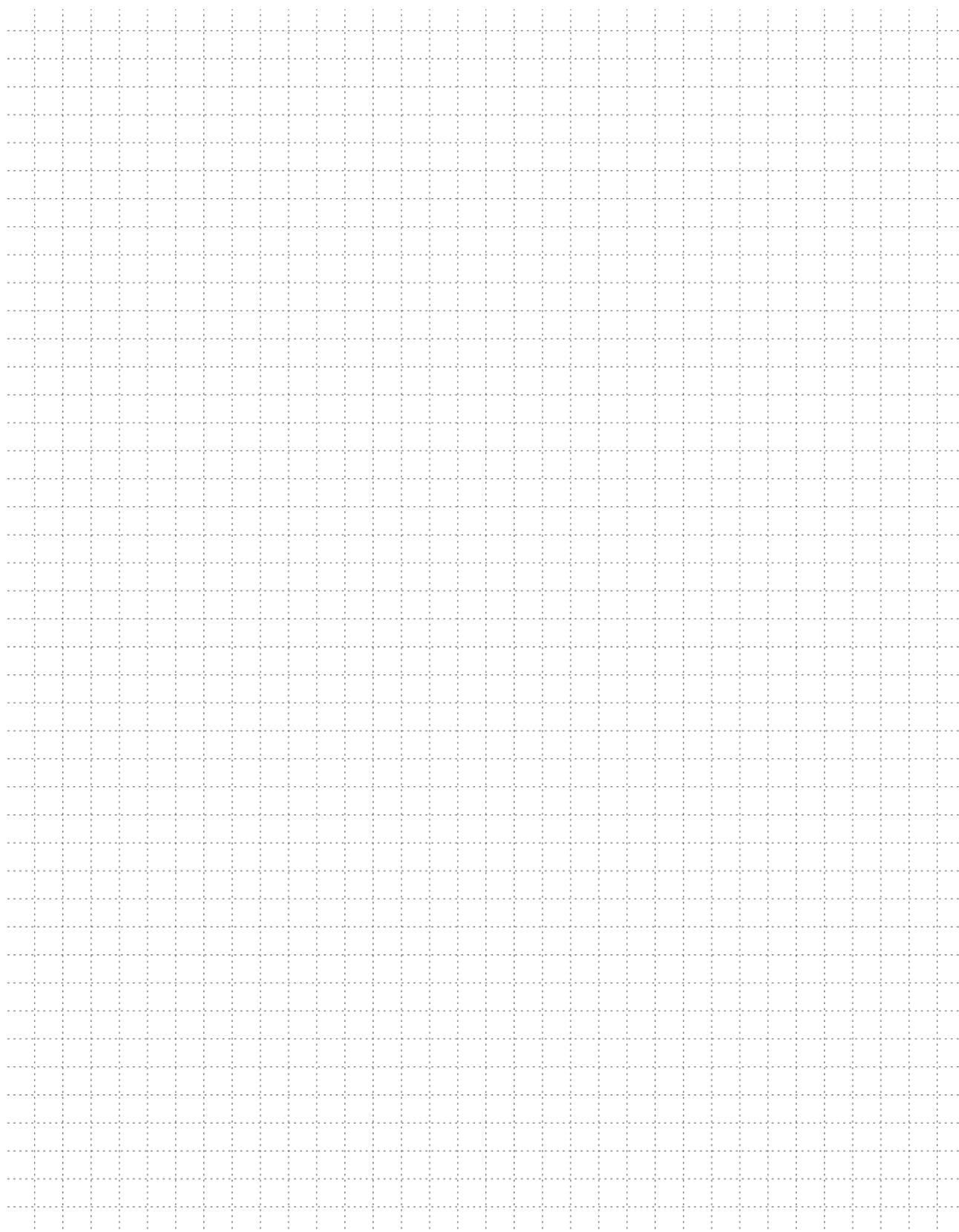


### MUT2300US - ANSI150

SIZE	D5	L4	J	Di	D6	N	S	H
2"	3.35	7.87(+0/-0.12)	3.44	1.20	4.75	4	3/4	4.51
2" 1/4	3.35	7.87(+0/-0.12)	3.44	1.35	5.50	4	3/4	4.51
3"	4.06	7.87(+0/-0.12)	3.79	1.82	6.00	4	3/4	4.86
4"	4.65	9.84(+0/-0.12)	4.09	2.44	7.50	8	3/4	5.16
5"	6.77	9.84(+0/-0.12)	5.15	2.95	8.50	8	7/8	6.22
6"	6.42	11.81(+0/-0.12)	4.97	3.94	9.50	8	7/8	6.04
8"	10.04	13.78(+0/-0.12)	6.79	6.07	11.75	8	7/8	7.85
10"	12.28	17.72(+0/-0.2)	7.91	8.07	14.25	12	1	8.98
12"	14.76	19.69(+0/-0.2)	9.15	10.20	17.00	12	1	10.22

## Zero upstream and downstream distances







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