Metal Flexible Hose

MHM series

MHF series

イハラサイエンス株式会社
IHARA SCIENCE CORPORATION

1. Metal Flexible Hose

Metal Flexible Hose is a flexible hose made of metal with corrugate formed pipe.

Using seam welded pipe made of a metal sheet or thin wall pipe, it's corrugated it by the method of bulge forming and/or mechanical molding for higher flexibility.

Also, metal braid type to increase the pressure resistance is available.

2. Type and Specification of Metal Flexible Hose

There are two types, flexible **MHM type** and **MHF type** which remains on bent configuration.

Table-1 Standard material

Part name	Material
Metal Flexible Hose	T316L
Braid	T304
Welded end fitting	316SS or 316LSS
Collar	304SS

Table-2 Heat treatment and cleaning of each type of Metal Flexible Hose

Type	Braid	Heat treatment & cleaning	Note
MHM-0	Unbraided	-	Flexible type
MHM-0-CP		Chemical polishing	
MHM-0-Q		Vacuum heat treatment	
MHM-1	Braided	-	
MHM-1-Q *		Vacuum heat treatment	
MHF-0	Unbraided	-	Fixed type
MHF-0-CP		Chemical polishing	
MHF-0-Q		Vacuum heat treatment	
MHF-1	Braided	-	
MHF-1-Q *		Vacuum heat treatment	

*: The blade can be vacuum heat treated, but the pressure resistance will decrease. It cannot be used at the upper limit of the pressure value in Table-4 Basic specifications.

There are two structures of Metal Flexible Hose, Unbraided and Braided, as shown below.

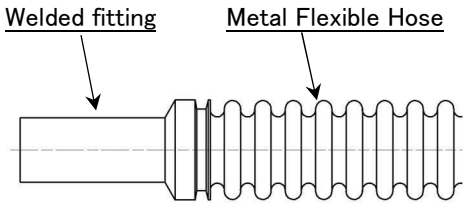


Fig-1 Unbraided

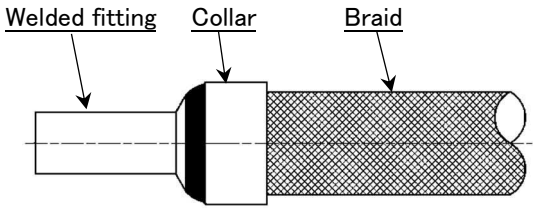


Fig-2 Braided

Table-3 Dimensional allowance of the total length

Total length	Tolerance
L= 300 ㎜ less	0 ～+10 ㎜
L= 300 ㎜ over ～500 ㎜ less	0 ～+15 ㎜
L= 500 ㎜ over ～1000 ㎜ less	0 ～+20 ㎜
L= 1000 ㎜ over ～3000 ㎜ less	0 ～+30 ㎜
L= 3000 ㎜ over	+3%

Note: Metal Flexible Hose without braid may stretch by about 0.5% for MHF type and about 2～3% for MHM type under pressurized up to maximum working pressure, but it may go back to original length after depressurization.

* Figures in Table-5 are reference only, not guaranteed for product specification.

Table-4 Basic specification of Metal Flexible Hose

Type	Braid 【note】	I.D. (mm)	O.D (mm)	Work temperature (℃)	Min. bend radius (mm)		Max.work press. (MPa/20℃)			Weight (g/m)
					Static	Dynamic	Static	Surging	Shock	
MHM04	Unbraided 【0】	6.35	10.7	−195 ～450	22.9	94.0	0.62	0.31	0.11	104
MHM06		9.53	14.0		25.4	101.6	0.48	0.24	0.08	104
MHM08		12.7	19.6		30.5	111.8	0.48	0.24	0.08	268
MHM12		19.05	27.4		43.2	162.6	0.30	0.15	0.05	336
MHM16		25.4	33.8		53.3	180.3	0.30	0.15	0.05	446
MHM20		31.8	44.5		63.5	200.7	0.30	0.15	0.05	938
MHM24		38.1	52.8		78.7	221.0	0.19	0.10	0.03	1042
MHM04	Braided 【1】	6.35	12.2		22.9	94.0	12.41	6.21	2.07	208
MHM06		9.53	15.5		25.4	101.6	10.74	5.37	1.79	253
MHM08		12.7	21.1		30.5	111.8	8.18	4.09	1.36	476
MHM12		19.05	29.0		43.2	162.6	6.19	3.10	1.03	592
MHM16		25.4	35.6		53.3	180.3	4.95	2.48	0.83	789
MHM20		31.8	46.5		63.5	200.7	4.45	2.23	0.74	1488
MHM24		38.1	54.9		78.7	221.0	3.66	1.83	0.61	1726
MHF04	Unbraided 【0】	6.35	10.4		25.4	—	0.62	0.31	0.11	60
MHF06		9.53	14.0		30.5	—	0.48	0.24	0.08	89
MHF08		12.7	19.6		38.1	—	0.48	0.24	0.08	164
MHF12		19.05	27.4		43.2	—	0.30	0.15	0.05	336
MHF16		25.4	33.8		53.3	—	0.30	0.15	0.05	446
MHF20		31.8	44.5		63.5	—	0.30	0.15	0.05	939
MHF24		38.1	52.8		45.4	—	0.19	0.10	0.03	1042
MHF04	Braided 【1】	6.35	11.9		25.4	—	6.21	3.11	1.04	164
MHF06		9.53	18.0		30.5	—	5.52	2.80	0.92	253
MHF08		12.7	21.1		38.1	—	4.59	2.33	0.77	283
MHF12		19.05	31.0		53.3	—	2.62	1.33	0.44	432
MHF16		25.4	38.9		68.6	—	2.45	1.24	0.41	625
MHF20		31.8	46.5		63.5	—	4.45	0.98	0.74	1488
MHF24		38.1	54.9		78.7	—	3.66	0.92	092	1726

Note-1 : Table-4 shows maximum working pressure at 20℃. As the working temperature rises, the maximum working pressure goes down. Maximum working pressures at various temperatures are calculated by multiplying temperature load factor (Table-5) by maximum working pressure. (Table-4)

Note-2 : Working temperature range is only for a sole Metal Flexible Hose. To be discussed for other working conditions.

Note-3 : In case of being surging or shock pressure, multiply 1/2 for surging or 1/6 for shock pressure by the maximum working pressure. *Figures in the table show calculated results.

Note-4 : When the fluid is at minus temperature, dew drop and/or freezing may occur resulting in less flexibility and badly effect to the equipment. Please inquire us for proper action.

Note-5: Regarding the minimum bending radius in Table 4, if the product is used for repeated bending, the bending radius will be larger than for fixed use.

Table-5 Temperature load coefficient at each temperature

Temperature	Coefficient	Temperature	Coefficient	Temperature	Coefficient
-195℃	1.00	150℃	0.88	350℃	0.72
20℃	1.00	200℃	0.83	400℃	0.68
50℃	0.99	250℃	0.78	450℃	0.64
100℃	0.93	300℃	0.75		

3. Standard inspection specifications

Though the inspection will be conducted in accordance with customers specification, but following inspection will be done as in house standard when not specified.

3.1 Metal Flexible Hose assembly (Braided) is inspected for airtightness by pressurizing the inside with nitrogen gas 1.0MPa.

3.2 Metal Flexible Hose assembly (Unbraided) is inspected for helium leak by vacuum spraying method. The standard of leak is less than 1.0×10^-9 Pa･m^3/sec.

4. Model number of Metal Flexible Hose assembly

MHM ① 04 ② - 04 ③ TE ④ 04 ⑤ D ⑥ - 0 ⑦ - 200 ⑧ - Q ⑨

［例］ MHM04-04TE04D-0-200-Q

①Hose type：Flexible type、②Hose size：1/4、③Left side joint size：1/4

④Left side fitting type：Tube end、⑤Right side fitting size：1/4、⑥Right side fitting type：BI-Lok

⑦Braid：Unbraided、⑧Overall length：200mm、⑨Heat treatment & cleaning：Vacuum heat treatment

①Hose type

Labels	Contents
MHM	Flexible type
MHF	Fixed type

④⑥Fitting type

Separate note P.5

Refer to「List of fitting shapes and notations」

②Hose size

Labels	Contents
04	1/4"
06	3/8"
08	1/2"
12	3/4"
16	1"
20	1-1/4"
24	1-1/2"

③Left side joint size

Labels	Contents
04	1/4"
06	3/8"
08	1/2"
12	3/4"
16	1"
20	1-1/4"
24	1-1/2"

⑤Right side fitting size

Labels	Contents
04	1/4"
06	3/8"
08	1/2"
12	3/4"
16	1"
20	1-1/4"
24	1-1/2"

⑦Braid

Labels	Contents
0	Unbraided
1	Braided

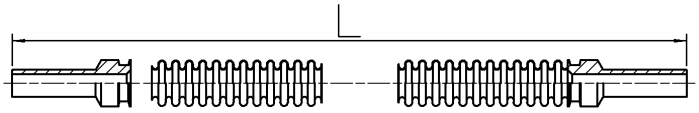
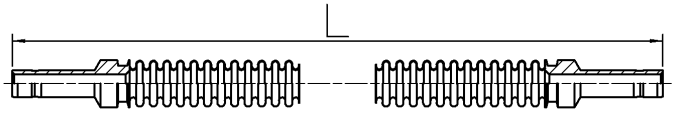
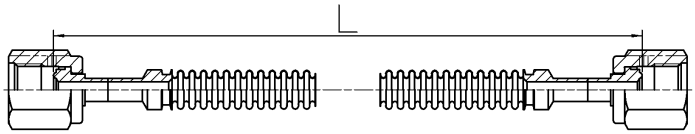
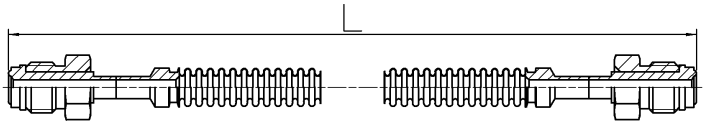
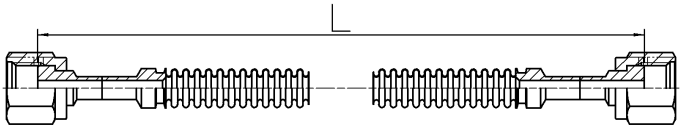
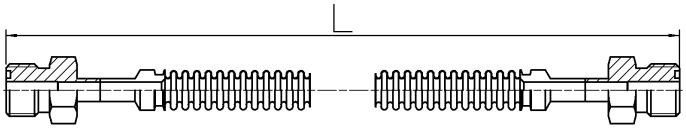
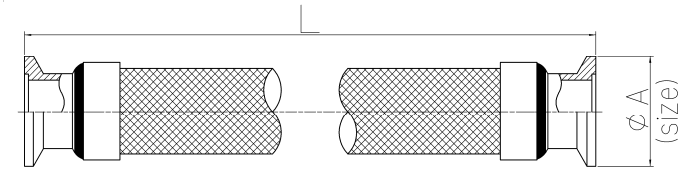
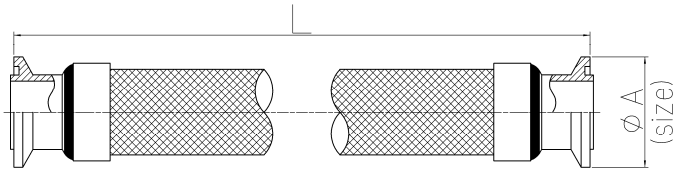
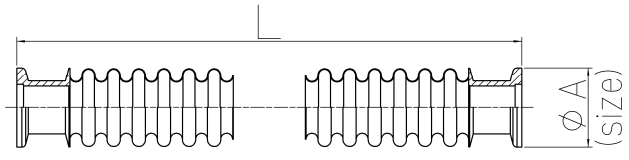
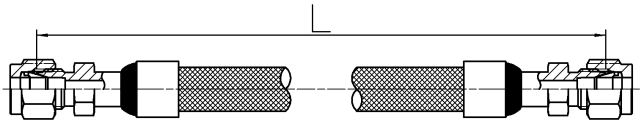
⑧Overall length(L)

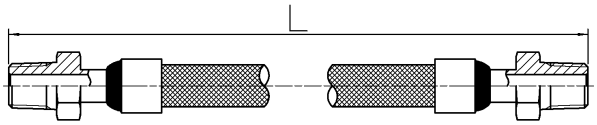
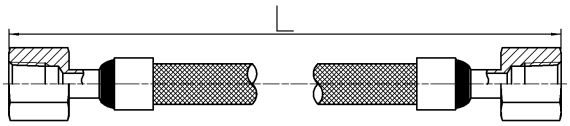
Unit：mm

⑨Heat treatment & cleaning

Labels	Contents
not write	Untreated
CP	Chemical polishing
Q	Vacuum heat treatment

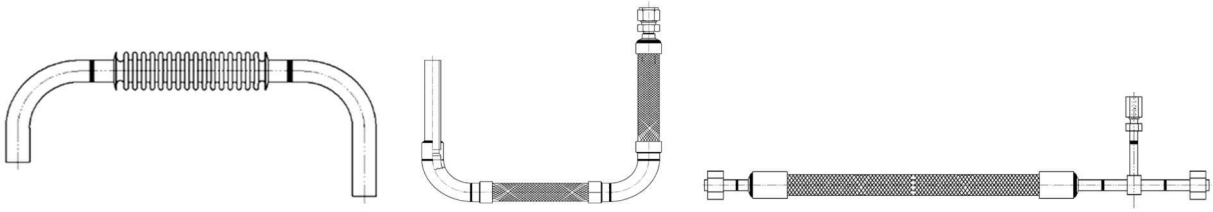
5. List of fitting shapes and notations

Note	Fitting type	Shape
TE	Tube End	
TA	Tube Adapter	
GN	Metal Seal (Female)	
GM	Metal Seal (Male)	
OGB	O-ring seal (Female)	
OUW	O-ring seal (Male) O-ring material：FKM	
CFF	Equivalent to TSG ferrule (Female) Size note(36, 42, 50, 58, 78)	 ※May be welded structure.
CFM	Equivalent to TSG ferrule (Male) Size note(36, 42, 50, 58, 78)	 ※May be welded structure.
NW	Vacuum Flange ISO-KF Size note(16, 25, 40, 50)	 ※May be welded structure.
D	BI-Lok Nuts and ferrules included	 ※Depending on the size combination, it may be a welded structure or TA+BI-Lok (DUA).

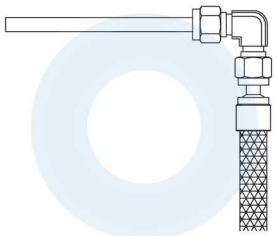
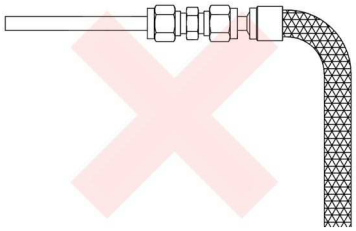
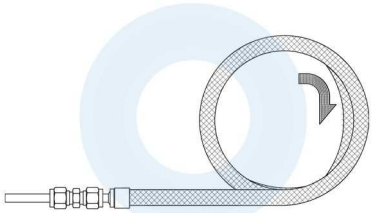
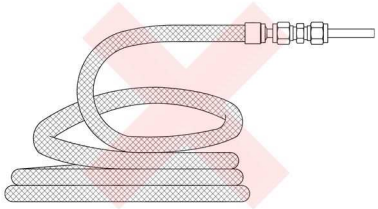
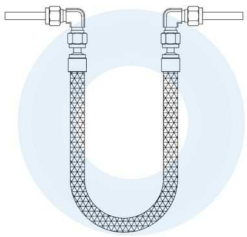
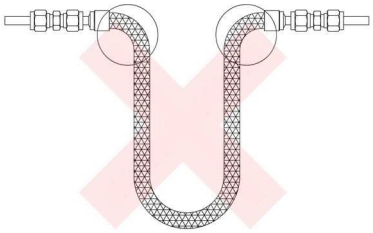
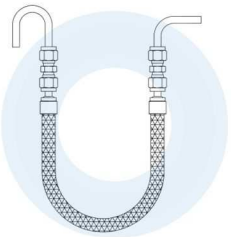
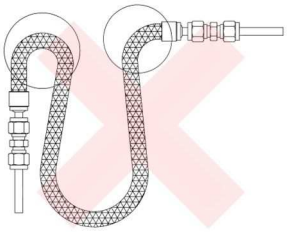
Note	Fitting type	Shape
RM	Male taper pipe thread (ISO/JIS R)	 ※Depending on the size combination, it may be a welded structure or TA+BI-Lok (DCT).
RF	Female taper pipe thread (ISO/JIS Rc)	 ※Depending on the size combination, it may be a welded structure or TA+BI-Lok (DSA).

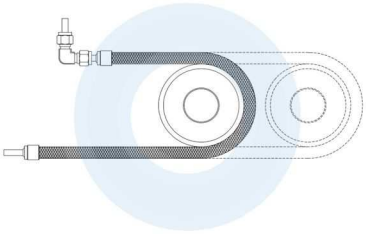
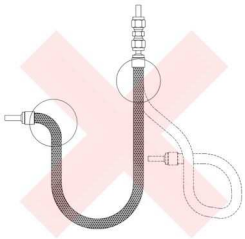
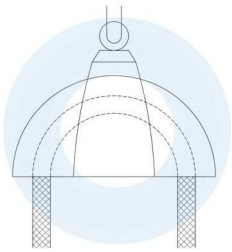
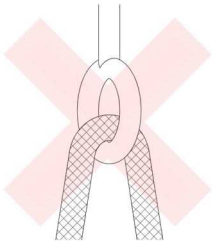
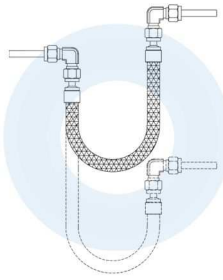
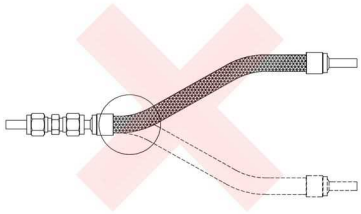
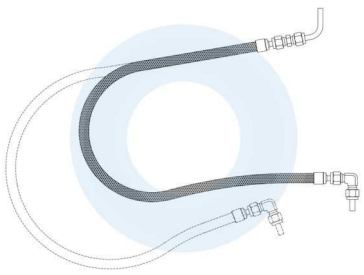
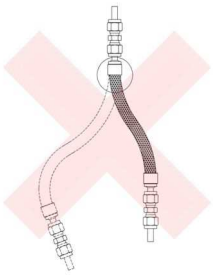
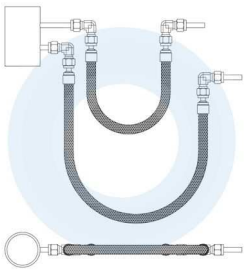
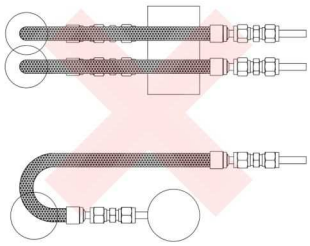
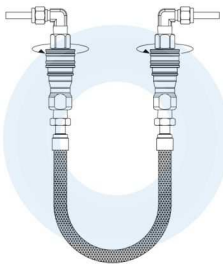
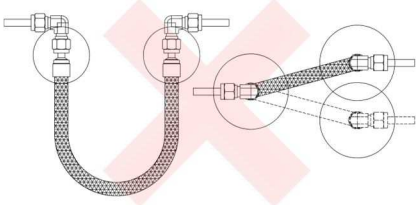
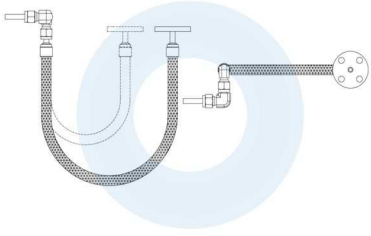
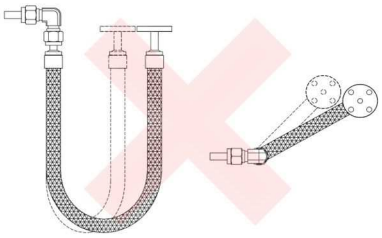
Note：In the case of chemically polished products, welding may be required depending on the requested length.
Please contact us separately.

In addition to the above, we will design according to the customer's usage.
Design (examples)



6. For correct handing of Metal Flexible Hose

Correct	Incorrect	Remarks
		Excessive bending will damage Metal Flexible Hose. Use an elbow at the bent section and install Metal Flexible Hose straight.
		Do not use the rolled Metal Flexible Hose by pulling on one side. Maintain the repeated bending radius and roll in a natural shape in the pulling direction.
		Forcible bending of the Metal Flexible Hose will significantly shorten its lifespan. For small bends, use elbows to ensure that Metal Flexible Hose maintains its repeated bending radius.
		

Correct	Incorrect	Remarks
		Due to continuous horizontal movement, bending loads that twist Metal Flexible Hoses are extremely dangerous. By installing rotating rollers that synchronize with the movement of the hose, unreasonable bending can be avoided.
		
		Particular care must be taken with areas that bend continuously. Use elbows and attach Metal Flexible Hoses to create U-shaped piping.
		
		Forcible bending of Metal Flexible Hose will significantly shorten its lifespan. For small bends, use elbows to ensure that Metal Flexible Hose maintains its repeated bending radius.
		If rotational motion is transmitted to the attachment part of Metal Flexible Hose, Metal Flexible Hose will twist. Attach a rotation joint to prevent Metal Flexible Hose from twisting.
		When installing a Metal Flexible Hose, if both ends are positioned in a different direction from the direction of movement, the hose will become twisted. Always install the hose so that it is parallel to the direction of movement.

イハラサイエンス株式会社
IHARA SCIENCE CORPORATION

ISO 9001/ISO14001 Certified Plants (DNV certification)

【Head Office】
11-3 Takanawa 3-chome Minato-ku, Tokyo Japan 108-0074
TEL:+81-3-6721-6981 FAX:+81-3-6721-6991

【IHARA SCIENCE TAIWAN Co., Ltd】
B2, 7F, No. 51, Sec. 2, Gongyi Rd., Nantun Dist.,Taichung City 408330, Taiwan (R.O.C.)
TEL : +886-4-2319-1116 FAX : +886-4-2319-1126

【IHARA KOREA Co.,Ltd】
Digital Empire Ⅱ 103-905, Sinwon-ro 88, Yeongtong-Gu, Suwon-Si Gyeonggi-Do, 443-734, South Korea
TEL:+82-31-695-6800 FAX:+82-31-695-6808

【NANTONG IHARA SCIENCE Co.,Ltd】
GP Dvi.: No.26-4 Tongsheng Road(S), Economic & Technological Development Zone, Nantong, Jiangsu 226017 P.R.China
TEL:+86-513-81520189 FAX:+86-513-85967652
CP Div.: No.1692 Bldg, N0.8 Xinghu Road, Economic & Technological Development Zone, Nantong, Jiangsu 226017 P.R.China
TEL:+86-513-89072116 FAX:+86-513-81520182

【IHARA SCIENCE USA CORPORATION】
17971 Sky Park Circle, Suite B, Irvine, California 92614 U.S.A.
TEL : +1-949-387-3727 FAX : +1-949-387-3739

⚠ Warning

If you don't select and handle fittings, valves and related accessories in an adequate manner, it may damage human beings and applicable systems.
Within the responsibility and authorization of users and piping designers, fittings, valves and related accessories shall be adequately selected, used and maintained based on the applicable conditions and product conformity to the system to be applied.
Please read carefully the operation manual and feel free to contact with Ihara if you have any question or request.

WARRANTY CLAUSE

1. Warranty Period

The warranty period of the products is one (1) year from putting into service or one and half (1.5) years after delivery whichever comes earlier.
However, the products specially specified and/or the cases used under deviating from the specification shall be exempted.

2. Scope of Warranty

Any failure and damage under maker's responsibility will be found during the warranty period, the substitute and/or replacement parts shall be provided at no charge. The warranty means the warranty of the products of our company.
Any liquidated damages caused by the failure or damage of our product shall be exempted from the scope of the warranty.

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