



# 2

## **FLEXIBLE HOSES & BELLOWS**

Flexible hoses / Bellows / Braid

The reason that hoses can move flexibly despite of steel hoses is their cross-sectional shape. Cross section of flexible hoses and bellows is wave-like shape with continuous mountain and valley parts. Expansion and contraction of each convolution enables various movements. Dimensions of wave shape and model types depend on application.

In order to recommend suitable flexible hoses and bellows for working conditions, we prepare several types of products.

※We are ready to produce models not listed in the catalog. Please feel free to consult us.

## Type A (standard)

■ Type A (standard) flexible hoses are made by corrugating thin-walled stainless steel pipes. They are high-quality flexible hoses exposed to complete solution heat treatment. The corrugations are formed like individual rings (annular type) which are not twisted under high pressure.

■ The hoses are highly flexible and have excellent strength, corrosion resistance and pressure resistance.

### Standard specifications

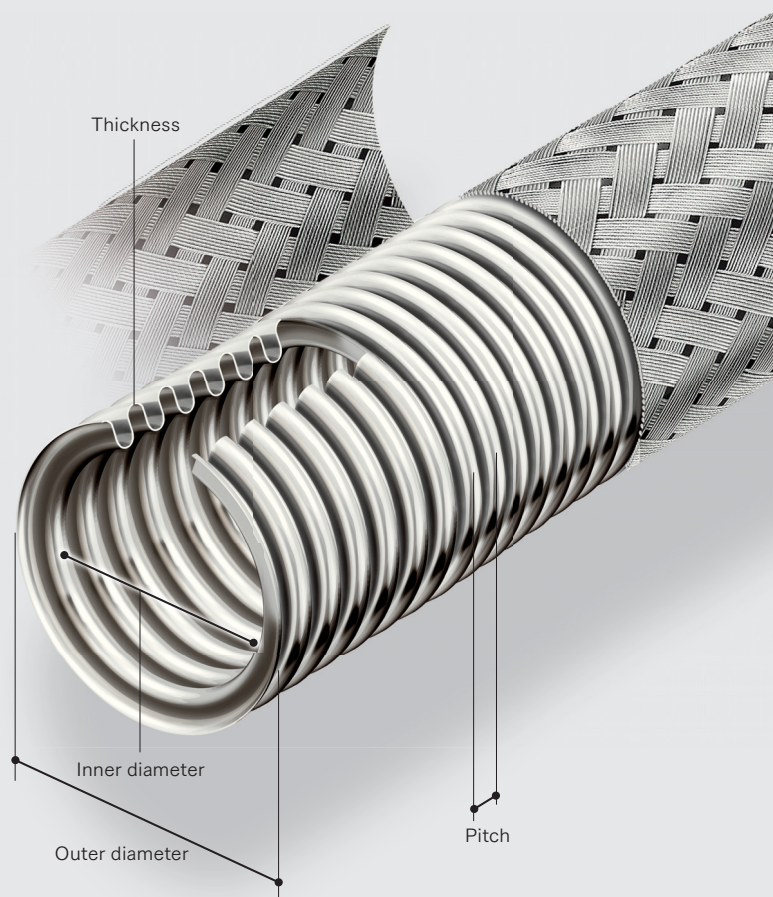
Flexible hose materials  
SUS304, SUS316L

Braid material  
SUS304

Wire braid: 250 A (10<sup>B</sup>) or less

Tape braid: 50 A (2<sup>B</sup>) or more

※For other materials, please consult us.



### Standard dimensions

Nominal diameter		Inner diameter (mm)	Thickness (mm)	Pitch (mm)	Outer diameter (mm)		Min. bending radius (mm)		Max. working pressure (MPa) <sup>※1</sup>		Weight (kg/m)	
A	B				No braid	Single braid	Constant bending	Repeated bending	Single braid	Double braid	No braid	Single braid
8	1/4	7.2	0.26	2.5	12.2	13.5	45	165	9.4	14.9	0.15	0.27
10	3/8	10.0	0.26	3.0	16.0	17.5	50	180	7.4	13.0	0.21	0.36
15	1/2	12.0	0.26	3.3	17.5	19.0	65	245	6.6	13.0	0.21	0.38
20	3/4	19.0	0.30	4.2	26.0	27.5	95	335	3.7	7.4	0.36	0.61
25	1	25.5	0.30	4.5	34.0	35.5	100	340	2.6	5.2	0.53	0.84
32	1·1/4	32.0	0.35	5.0	42.0	44.0	130	405	3.1	6.0	0.80	1.33
40	1·1/2	39.0	0.35	5.5	49.0	51.0	200	505	2.8	4.5	0.88	1.48
50	2	50.0	0.40	6.0	62.0	64.0	240	580	2.0	3.6	1.38	2.18
65	2·1/2	65.0	0.60	10.0	86.0	88.0	320	665	2.0	3.5	2.93	3.95
80	3	77.0	1.00	10.5	104.0	107.0	400	920	1.8	2.6	6.79	8.12
100	4	100.0	1.00	15.0	135.0	137.5	450	980	1.4	1.5	8.25	10.3
125	5	126.0	1.20	15.0	162.0	164.5	520	1400	1.2	2.0	13.0	14.6
150	6	150.0	1.20	18.0	190.0	192.5	540	1550	1.0	1.6	13.8	16.7
200	8	197.0	1.50	18.0	247.0	250.0	720	1800	0.9	1.6	26.9	31.0
250	10	245.0	2.00	22.5	305.0	308.0	960	2500	0.6	1.2	42.6	48.6
300	12	294.0	2.00	30.0	364.0	368.0	1000	2750	0.6	1.3	46.1	54.0
350	14	340.0	1.50	30.0	410.0	414.0	1150	2400	0.6	—	39.8	49.1
400	16	385.0	1.50	35.0	465.0	469.0	1150	2400	0.5	—	44.6	54.9
450	18	435.0	1.50	35.0	515.0	519.0	1250	2650	0.4	—	49.8	60.6
500	20	485.0	1.50	40.0	575.0	579.0	1250	2650	0.4	—	55.1	67.0

※Flexible hoses for high pressure and ultrahigh pressure can be specially designed. ※The specifications are subject to change for product improvement without prior notice. ※The maximum working pressure may vary depending on the design conditions.

※1: Pressure at working temperature of 40° C, safety factor of 3 and weld efficiency of 0.7



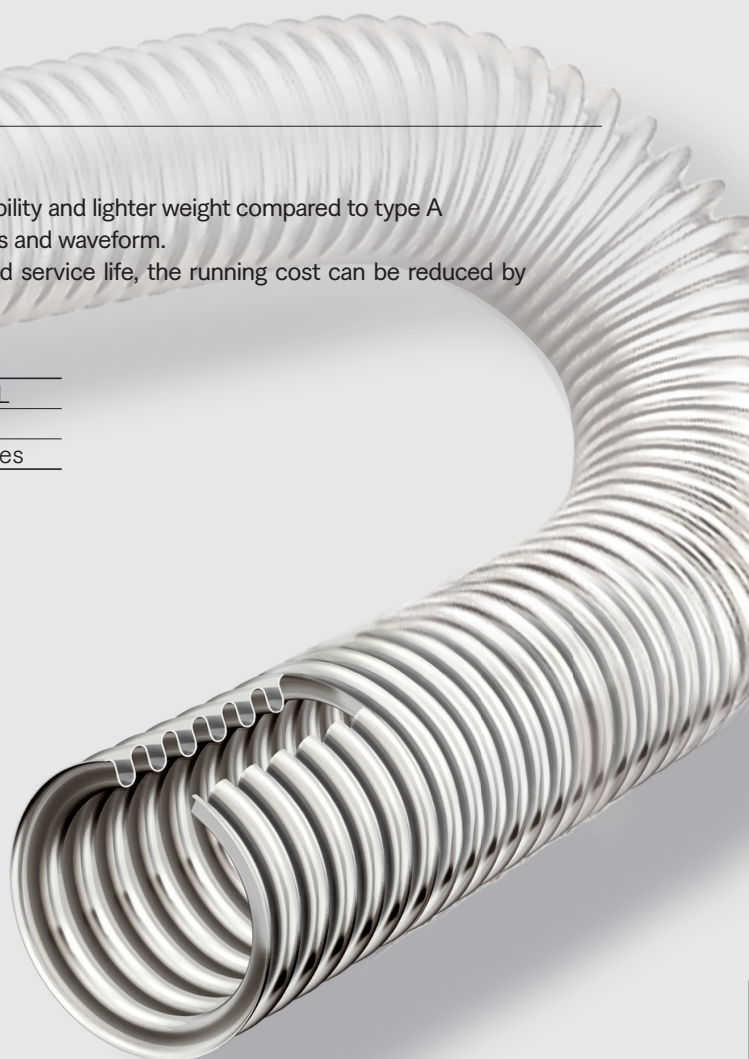
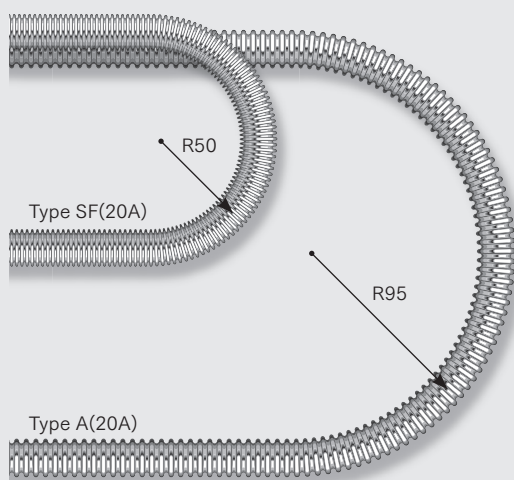
# Type SF (Superfree)

- Type SF (Superfree) flexible hoses have higher flexibility and lighter weight compared to type A (standard) as the result of improvement of thickness and waveform.
- Through improved working efficiency and increased service life, the running cost can be reduced by using this type.

## Standard specifications

Flexible hose materials	SUS304, SUS316L
Braid material	SUS304
Wire braid	Applicable to all sizes

※For other materials, please consult us.



## Standard dimensions

Nominal diameter		Inner diameter (mm)	Thickness (mm)	Pitch (mm)	Outer diameter (mm)		Min. bending radius (mm)		Max. working pressure (MPa) <sup>※1</sup>	Weight (kg/m)	
A	B				No braid	Single braid	Constant bending	Repeated bending		No braid	Single braid
3	—	3.3	0.10	0.7	5.0	6.0	10	75	6.1	0.04	0.07
5	—	4.5	0.15	1.5	7.5	9.0	25	100	5.0	0.06	0.08
8	1/4	5.5	0.15	1.75	8.5	10.0	30	125	4.0	0.06	0.09
10	3/8	10.0	0.15	2.2	13.5	15.0	45	180	3.0	0.10	0.12
15	1/2	12.0	0.15	2.5	16.0	17.5	45	185	2.0	0.12	0.16
20	3/4	21.5	0.20	4.0	29.5	31.0	50	210	1.5	0.30	0.56
25	1	26.5	0.20	5.5	36.0	37.5	70	240	1.3	0.30	0.62
32	1 1/4	33.5	0.20	6.0	44.0	46.0	80	280	1.2	0.40	0.96
40	1 1/2	41.2	0.26	6.5	54.0	56.0	100	330	1.2	0.71	1.35
50	2	50.5	0.26	7.0	65.0	67.0	130	365	1.1	0.98	1.77
65	2 1/2	65.0	0.40	8.0	82.0	85.0	170	545	1.2	1.85	3.00
80	3	77.5	0.40	10.0	98.0	101.0	200	600	1.0	2.00	3.37
100	4	102.0	0.50	11.0	127.0	130.0	240	750	1.0	3.19	4.97
125	5	127.0	0.50	12.0	152.0	155.0	300	930	1.0	4.23	6.81
150	6	151.0	0.50	16.0	180.0	183.0	350	970	0.6	4.92	7.77

※ The specifications are subject to change for product improvement without prior notice.

※ The maximum working pressure may vary depending on the design conditions.

※1: Pressure at working temperature of 40° C, safety factor of 3 and weld efficiency of 0.7

## Type WF (Worm Free Flex<sup>®</sup>)

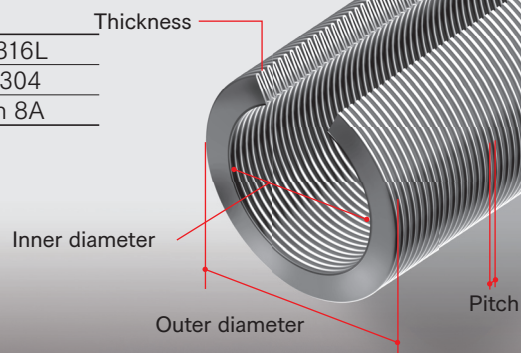
■ Type WF (Worm Free Flex) is formed flexible hose with ultra flexibility, being born out of a different idea to conventional items.

### ■ Features

- Elasticity, like rubber hose
- Outstanding pressure tightness
- Outstanding durability
- Extremely low pressure loss

### ■ Standard specifications

Hose material	SUS316L
Braid material	SUS304
Wire braid	From 8A



### ■ Standard dimensions and performance table

Nominal diameter		Inner diameter (mm)	Thickness (mm)	Pitch (mm)	Outer diameter (mm)		Min. bending radius (mm)		Max. working pressure (MPa) <sup>※1</sup>		Weight (kg/m)	
A	B				No braid	Single braid	Constant bending	Repeated bending	No braid	Single braid	No braid	Single braid
3	1/8	3.2	0.10	0.5	5.1	—	10	55	Vacuum~1.5	—	0.06	—
5	—	4.2	0.15	0.6	7.8	—	25	60	Vacuum~0.7	—	0.15	—
8	1/4	4.8	0.15	0.6	9.0	10.5	30	60	Vacuum~0.5	16	0.18	0.21
10	3/8	9.4	0.15	0.6	14.0	15.5	45	65	Vacuum~0.3	11	0.37	0.40
15	1/2	11.5	0.15	0.7	16.5	18	45	70	Vacuum~0.2	10	0.43	0.47
20	3/4	20.7	0.20	1.0	30.5	32	50	85	Vacuum~ Atmospheric pressure	3.5	1.20	1.51
25	1	25.5	0.20	1.2	37.0	38.5	70	95	Vacuum~ Atmospheric pressure	2.0	1.41	1.73

※ The specifications are subject to change for product improvement without prior notice.

※ The maximum working pressure may vary depending on the design conditions.

※1: Pressure at working temperature of 40° C, safety factor of 3 and weld efficiency of 0.7



## Type HC (equivalent to HASTELLOY C-22)

■ Type HC flexible hoses are made of nickel alloy (equivalent to HASTELLOY C-22). The nickel alloy obtained by adding larger amounts of molybdenum and chromium to nickel base shows higher corrosion resistance than stainless steel.

■ HASTELLOY is a registered trademark of Haynes International, Inc.

### Standard specifications

Hose materials	equivalent to HASTELLOY C-22
Braid material	SUS304
Wire braid	ALL sizes



### Standard dimensions

Nominal diameter		Inner diameter (mm)	Thickness (mm)	Pitch (mm)	Outer diameter (mm)		Min. bending radius (mm)		Max. working pressure (MPa) <sup>※1</sup>	Weight (kg/m)	
A	B				No braid	Single braid	Constant bending	Repeated bending		No braid	Single braid
8	1/4	5.5	0.15	1.75	8.5	10.0	40	130	9.9	0.06	0.14
10	3/8	10.0	0.15	2.2	13.5	15.0	50	190	7.0	0.09	0.22
15	1/2	12.0	0.15	2.5	16.0	17.5	50	200	5.2	0.11	0.28
20	3/4	21.5	0.20	3.5	28.5	30.0	60	240	2.9	0.31	0.58
25	1	26.5	0.20	5.0	35.0	36.5	70	250	1.7	0.35	0.68
32	1 1/4	33.5	0.20	5.5	42.5	44.5	80	330	1.7	0.41	0.96
40	1 1/2	41.2	0.20	6.0	51.5	53.5	80	330	1.1	0.54	1.20
50	2	50.5	0.20	6.0	62.5	64.0	90	390	1.0	0.69	1.50

※ The specifications are subject to change for product improvement without prior notice.

※ The maximum working pressure may vary depending on the design conditions.

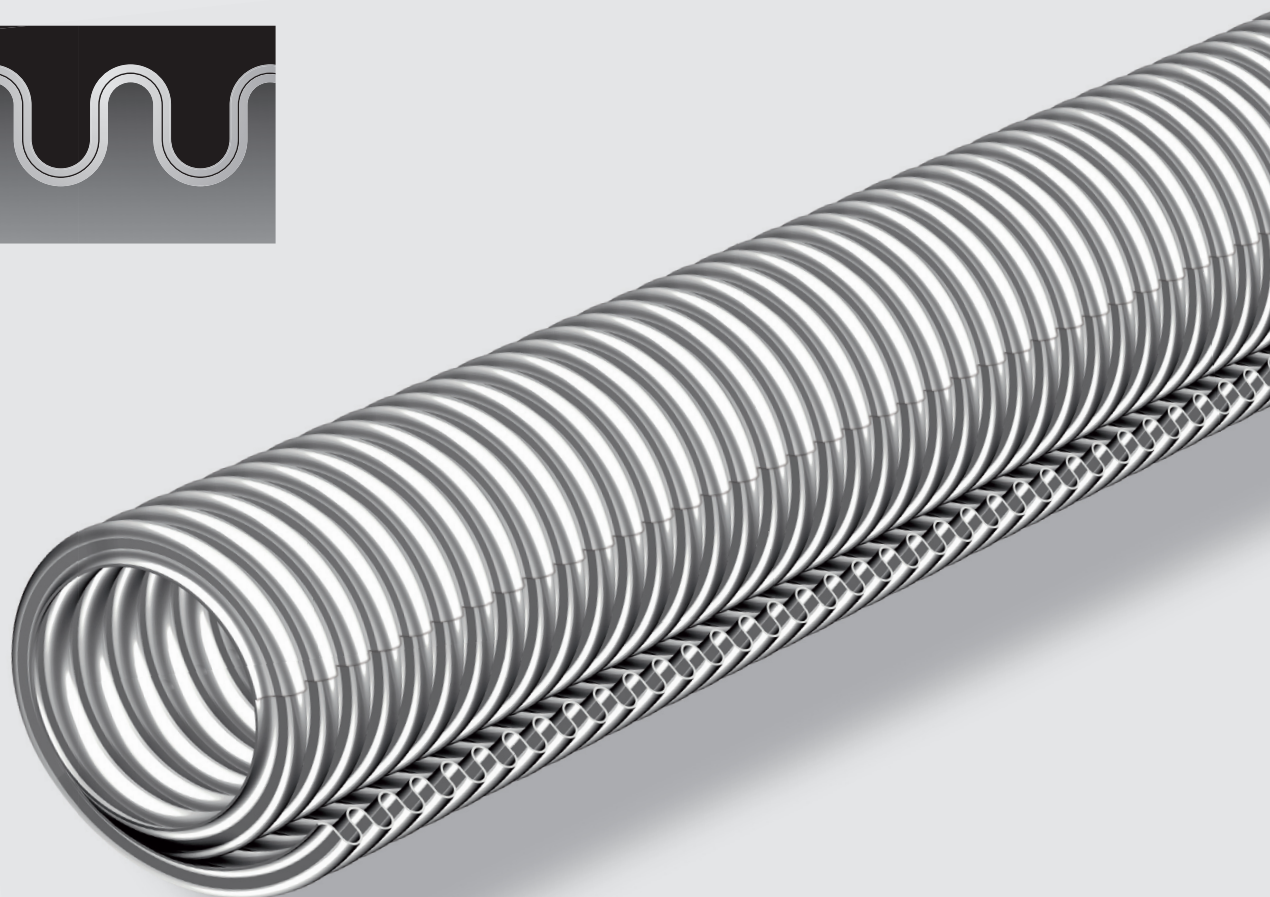
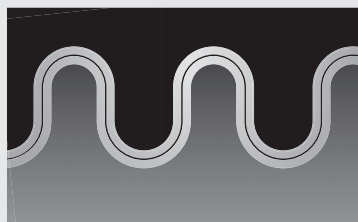
※1: Pressure at working temperature of 40° C, safety factor of 3 and weld efficiency of 0.7

## Type 2PLY (Double layer flexible Hose)

■ Type 2PLY (Double layer flexible Hose) has both flexibility and pressure tightness.

### ■ Standard specifications

Hose material	SUS316L
Braid material	SUS304
Wire braid	all sizes



### ■ Standard dimensions and performance table

Nominal diameter		Inner diameter (mm)	Thickness (mm)	Pitch (mm)	Outer diameter (mm)		Min. bending radius (mm)		Max. working pressure (MPa) <sup>※1</sup>	Weight (kg/m)	
A	B				No braid	Single braid	Constant bending	Repeated bending		No braid	Single braid
25	1	26.0	0.20	5.5	36.0	38.0	55	215	3.0	0.71	1.21
32	1-1/4	33.0	0.20	6.0	44.0	46.0	60	240	2.5	0.89	1.56
40	1-1/2	41.0	0.26	6.5	54.0	56.0	80	310	2.5	1.51	2.28
50	2	50.0	0.26	7.0	65.0	67.5	85	320	2.0	1.95	3.06
65	2-1/2	64.5	0.40	8.0	82.0	85.0	135	520	2.4	3.81	5.09
80	3	77.0	0.40	10.0	98.0	101.0	140	535	2.0	4.46	6.06
100	4	101.0	0.50	11.0	127.0	130.0	165	660	1.6	7.96	9.88
125	5	126.0	0.50	12.0	152.0	155.0	210	840	1.3	9.05	11.32
150	6	151.0	0.50	16.0	180.0	183.0	245	990	1.0	9.45	12.52

※ The specifications are subject to change for product improvement without prior notice.

※ The maximum working pressure may vary depending on the design conditions.

※1: Pressure at working temperature of 40° C, safety factor of 3 and weld efficiency of 0.7



# Thin wall formed bellows

## Standard specifications

Material	bellows SUS316L <sup>※1</sup>
Working pressure	vacuum~atmospheric pressure <sup>※2</sup>

※1. Special material can be fabricated. Please consult us.

※2. Please consult us for allowable pressure at pressure side.

## Standard dimensions

Nominal diameter A	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Pitch (mm)
15A	16.0	22.0	0.15	2.3
20A	20.5	28.5	0.15	2.2
25A	26.0	37.0	0.15	3.0
32A	33.0	46.0	0.15	3.4
40A	41.0	55.0	0.15	4.4
50A	51.0	65.0	0.20	4.4
65A	63.0	83.0	0.25	4.8
80A	80.0	103.0	0.25	5.5
100A	104.0	127.0	0.25	6.6
125A	126.0	151.0	0.3	7.2
150A	150.0	175.0	0.3	7.4
200A	205.0	230.0	0.3	7.6
250A	254.0	290.0	0.3	13.6
300A	305.0	340.0	0.3	14.6



※The specifications are subject to change for product improvement without prior notice.

# Press up Bellows

## Features

- The shape of conventional welded bellows is realized by forming processing.
- Excellent flexibility

## Standard specifications

Material	bellows SUS316L
Working pressure	vacuum~atmospheric pressure

## Standard dimensions

Nominal diameter A	Inner diameter (mm)	Outer diameter (mm)	Thickness (mm)	Pitch (mm)
16A	17.3	26.8	0.15	0.7
20A	20.5	31.5	0.15	1.0
25A	26.0	37.5	0.15	1.0
32A	33.0	49.0	0.15	1.3
40A	41.0	59.0	0.15	1.3
50A	50.0	70.0	0.20	1.3
80A	78.0	104.0	0.20	1.5
100A	101.0	132.0	0.25	1.75
300A	300.0	340.0	0.30	2.5
340A	340.0	380.0	0.30	2.5
400A	402.0	440.0	0.30	2.5



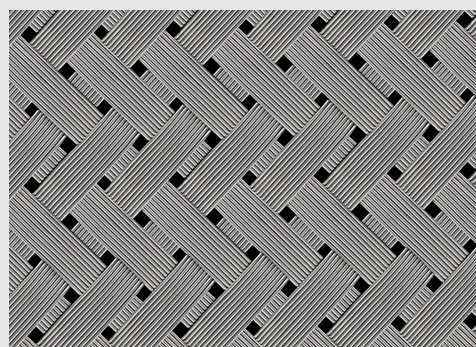
※The specifications are subject to change for product improvement without prior notice.

## What is braid?

- The braid is made by weaving stainless steel wires or band plates on the periphery of a flexible hose. The braid is used to prevent elongation of flexible hose under pressure and protect the flexible hose. The braids are classified into three kinds, wire braid, tape braid and twilled braid, according to the material shape.

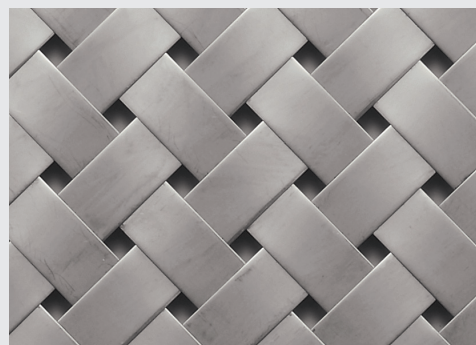
## Wire braid

- Some wires are bundled parallel and braided on a flexible hose. Thus obtained braid is called wire braid. This braid is flexible and suitable to absorb frequent displacement. When the internal pressure is high, a two-layer braid is used. Hoses of sizes of up to 250 A can be provided with this type of braid.



## Tape braid

- A braid obtained by weaving band plates on a flexible hose is called a tape braid. Compared to wire braid, tape braid has higher strength against internal pressure but has lower flexibility. It is suitable to absorb displacement when the frequency of displacement is low. When the internal pressure is high, a two-layer braid is used. Hoses of sizes of 50 A or more can be provided with this type of braid.



## Twilled braid

- Wires to be used for wire braid are braided into flat plates, and the flat plates are woven on a flexible hose. Thus obtained braid is called a twilled braid. It has high strength and excellent flexibility. Hoses of sizes of 50 A or more can be provided with this type of braid.

