AEROFLEX™
INDUSTRIES PVT. LTD.

"Commitment to Excellence"

AEROFLEX

The World's Leading Manufacture of Stainless Steel Flexible Hoses and Assemblies

TÜV CERT
EN ISO 9001 : 2000
Certificate: 0410020011160-E3
RWTÜV

COMPANY PROFILE

AEROFLEX Industries Private Limited an "ISO: 9001-2000" company certified by RWTUV Germany manufactures stainless steel corrugated hoses and hose assemblies at an ultra modern facility in Taloja, New Mumbai city, under supervision of experienced and qualified team. AEROFLEX has used state-of-the-arttecnology with strong emphasis on product quality and customer satisfaction. As a result of continuous improvement in every aspect of business, within a short span, today AEROFLEX has become one of the most reliable sources of quality metallic flexible hose assemblies both in domestic as well as in international market. It has been possible due to AEROFLEX ability to met exact customers requirements and strict adherence to delivery schedule with an individual attention to every customer. A full range of metallic flexible hoses & hose assemblies are manufactured in austenitic steel are AISI 304, 321, 316 & 316 L conforming to international quality standards. Our stainless steel corrugated flexible hoses conform to BS 6501 part-1 and are manufactured as per type A,B and C flexibility.

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body of RWTÜV Anlagentechnik GmbH

hereby certifies in accordance with TÜV CERT procedure that

AEROFLEX INDUSTRIES PRIVATE LIMITED

Works : Plot No.43, MIDC Taloja Indl. Area , Village Navade, Taluka Panvel, Dist. Raigad Navi Mumbai - 410 208, Maharashtra, India
Adm / Sales Office : Purushottamdas Thakkar Co.op. Ind. Estate, 1st Floor Off. No.2, 20, Chamsi Bhimji Rd., Anjeerwadi, Mazgaon, Mumbai 400 010, India

has established and applies a quality system for

Manufacture and Supply of Stainless Steel Hose with and without Wire Braiding, Flexible Hose Assemblies, Related End Fittings

An audit was performed, Report No. 2.5-2744/2000

Proof has been furnished that the requirements according to ISO 9001:2000

are fulfilled. The certificate is valid until 13 December 2006

Certificate Registration No. 04100 2001 1160-E3

Essen, 05.08.2004

RWTÜV

The TÜV CERT Certification Body for QM Systems ... of RWTÜV Systems GmbH

QUALITY POLICY

AEROFLEX Industries Private Limted is committed to total customer satisfaction based on total quality management in producing and marketing high quality products at competitive rates in order to meet and exceed the expectations of our customers.

We are committed to manufacture our products in a safe working environment with the aid of trained manpower.

HIGH-TECH QUALITY / R&D

Quality assurance at aeroflex industries is of vital importance. Every stage of production is constantly monitered by qualified QC engineers. AEROFLEX industries has complete in house test facilities for various type tests. As per international test standards specified for metallic flexible hoses.

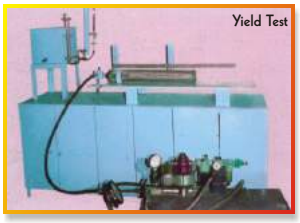
We conduct following tests regularly.

- ✓ Flex Fatigue or cycle life test
- ✓ Burst pressure or yield test
- ✓ Bend radius test
- ✓ Flame test

Every single hose assembly is tested hydraulically at 1.5 times working pressure before despatch. Pneumatic testing is also carried out whenever necessary. All raw material used in the manufacturer of hoses, braiding and end connection undergo rigid inspection to ensure highest quality standards. AEROFLEX is consequently in a position to assure absolute constancy of total quality.

Aeroflex industries Pvt. Ltd. has received approval from LLOYDS REGISTER confirming that our hoses meet the specification of BS-6501 part-I 2004.

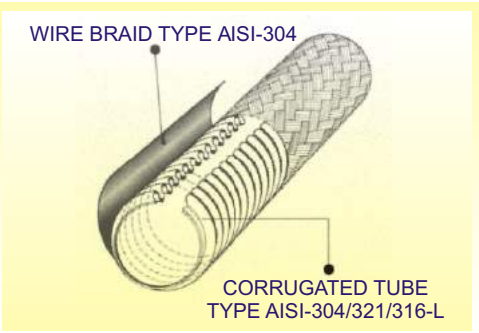
We can send a copy of our Apex quality manual on request



STAINLESS STEEL CORRUGATED FLEXIBLE HOSES

Hose

Stainless steel corrugated flexible hoses are offered from 6mm (1/4') to 300 mm (12'). The annular corrugated hose body provides the flexibility and pressure tight core of the assembly.



Braid

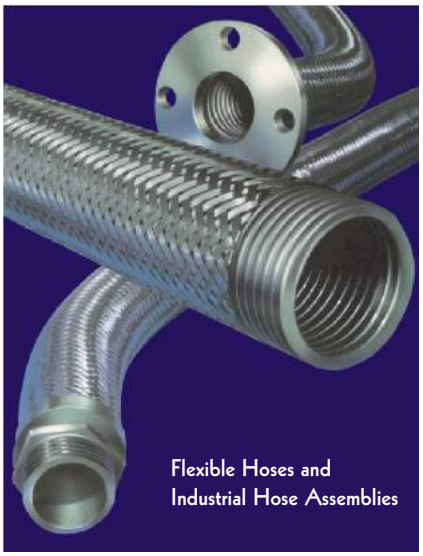
Unbraided corrugated hoses tend to elongate when pressurised above a certain level. To restrain this, an external layer of stainless steel wire braiding is provided on the hose. Braiding prevents longitudinal expansion of corrugated hose and thus increases the internal pressure strengthen of the hose many fold. Braiding is highly flexible and exactly follows the movements of the hose.

To increase the pressure ratings further, two or even three layers of braiding are provided. Unless specified, braiding in high tensile stainless steel AISI 304 wire, will be supplied braiding can also be supplied in copper. Tinned copper or stainless steel AISI 316 in case of bulk requirements.

Assemblies

AEROFLEX hose assemblies are engineered to perfection in flexibility, strength and reliability. Aeroflex industries can provide a corrugated stainless steel hose assembly that will meet your most demanding technical specification. We can supply the hose complete with any

all types of end connections in various types of materials. The end connections are tig welded to hose. HOSE ASSEMBLIES CAN BE SUPPLIED UNDER ANY THIRD PARTY INSPECTION.



Pressure Range

The recommended working pressure of type B hose are given in table 1, we manufacturer hose for higher working pressure also. Kindly contact us with your specified requirement giving full detail of the working conditions for pulsating, surge or shocking pressure the peak pressure must not exceed 50% of the max working pressure.

Flow Velocity

Corrugated metal flexible hoses have limitations in case of fluids with high flow velocities. As the high velocity causes resonant vibrations, resulting in premature failures.. Whenever flow velocity exceeds 50 m/sec for gas and 25 m/sec for liquids, an interlock hose liner should be used in the hose assemblies. The above flow velocity values get reduced to 50% for 90° bends and 25% for 45° bends.

Metal Hose Terminology

Annular – A hose profile that is designed so each convolution is a separate circle or ring.

Braid – Woven wire cover placed over hose which prevents elongation of the hose and permits higher working pressure.

Close Pitch – More corrugations per foot, which renders the longest fatigue life and minimum bend radius.

Constant Flexing Bend Radius – The minimum radius to which a hose can be repeatedly bent and render satisfactory flexure life.

Constant Motion – Motion that occurs on a regular cyclic basis at a constant travel.

Fittings – Parts attached to the ends of metal hose so that it can be connected to other components. Such as flanges, unions, nipples etc.

Flow Velocity – When the flow velocity exceeds 75 ft./second liquid, 150 ft./second gas in braided hose, a flexible metal liner should be used.

Intermittent Motion – Motion that occurs on a regular or irregular cyclic basis.

Maximum Test Pressure – Maximum pressure hose assemble should be subject to for testing purpose. Based on 150% of the Maximum Working Pressure.

Media – Conveyant in a hose assembly such as gases, liquids, etc.

Operating Conditions – Temperature, Pressure, Media, Motion and Application involved.

Random Motion – Uncontrolled motion that occurs usually from manual handling of hose.

Rated Burst Pressure – Pressure at which hose can be expected to fail. Braid will normally fail before core burst.

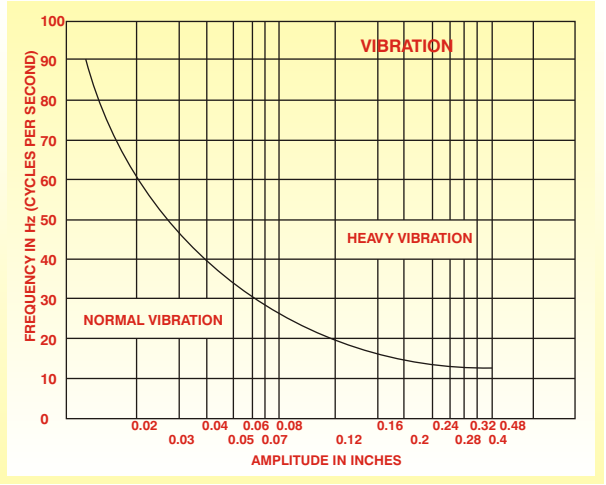
Safety Factor – Difference between working pressure and rated burst pressure.

Shock or Pulsating Pressure – Shock, pulsating or surge pressure can cause premature failure of hose.

Static Bend – Minimum center bend radius to which flexible metal hose may be bent for installation.

Vibration – High frequency, low amplitude motion.

Working Temperature – Temperature to which hose will be subjected during operation.



Advantages of Flexible Metal Hoses

- Suitable for wide temperature range (-270°C to 700°C)
- Compensates for thermal expansion contraction in the piping system
- High physical strength
- Fire resistant
- Moisture resistant
- Longer life
- Good corrosion characteristics
- Resistant to abrasion, penetration and damage
- Connects misaligned rigid piping absorbs or dampens vibration and similar equipments.
- A flexible and quick option for rigid piping in difficult locations.

Modes of Movements Static Installations

Where the flexible hose is used to connect misaligned pipes and remain in static position.

Occasional Flexing

Where the hose is required to flex occasionally, such as manually operated equipment.

Constant Flexing

When the hose is required to flex continuously, usually in moving machinery.

Vibration

High frequency, low amplitude movement e.g. On a compressor.

TABLE - 1 TECHNICAL DATA

NOMINAL BORE	MINIMUM BEND RADIUS		WITHOUT BRAID		SINGLE BRAID		DOUBLE BRAID	
N.B.	STATIC	FLEXING	MAX. working pressure	TEST pressure	MAX. working Pressure	TEST pressure	MAX. working	TEST pressure
mm	mm	mm	kg/cm^2	kg/cm^2	kg/cm^2	kg/cm^2	kg/cm^2	kg/cm^2
6	25	100	4	6	100	150	160	240
10	40	150	4	6	90	135	144	216
12	50	200	3	4.5	80	120	128	192
16	50	200	3	4.5	70	105	112	168
20	70	200	2	3	64	96	102	153
25	90	200	2	3	50	75	80	120
32	110	250	1.5	2.3	40	60	64	96
40	130	250	1.5	2.3	30	45	48	72
50	175	350	1.0	1.5	28	42	44	66
65	200	410	1.0	1.5	24	36	38	57
80	205	450	1.0	1.5	18	27	28	42
100	230	560	0.8	1.2	16	24	26	39
125	280	660	0.6	0.9	12	18	20	30
150	320	815	0.6	0.9	10	15	16	24
200	435	1015	0.5	0.75	8	12	12	18

* The above values are applicable for Aeroflex Braided Hoses & Assemblies *The above pressure ratings are for fluid and ambient temperature of 20° C. For higher temperatures apply correction factors as per Table II. *The above data for 250mm and 300mm N.B. can be supplied on request. *The burst pressure is 4 times the maximum working pressure *The above technical data is subject to change on account of design improvement.

Temperature Correction Factor

When hoses are required to work at higher temperatures, the working pressure given in Table 1 should be multiplied by the correction factor. This will determine the pressure rating of the hoses for higher temperatures .

Example

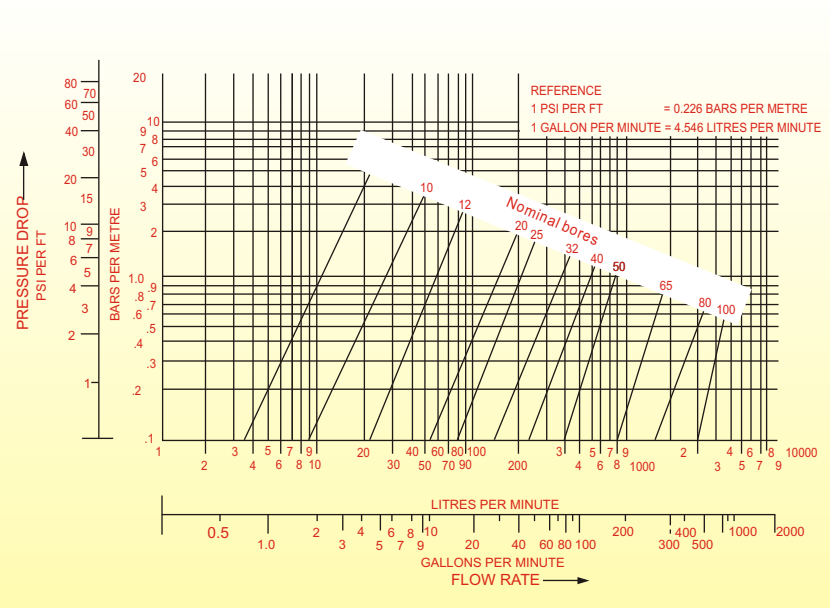
A 50 NB hose is required for a temperature of 200°C and working pressure of 19 kg./cm^2. The specified pressure for 50 NB single wire braid hose as per table is 28 kg/cm^2. The correction factor at 200°C is 0.69. Hence the working pressure permissible is 28 x 0.69=19.32 kg/cm^2. This is higher than the required pressure i.e. 19 kg/cm^2. Hence single braided hose is recommended.

TABLE II

Temp (°C)	-200	-150	-100	-50	0	20	50	100	150	200	250	300	350	400	450	500	550	600	650	700
Corr. Facotry	1.0	1.0	1.0	1.0	1.0	1.0	0.92	0.83	0.75	0.69	0.65	0.61	0.58	0.56	0.54	0.53	0.52	0.34	0.19	0.10

Pressure Loss

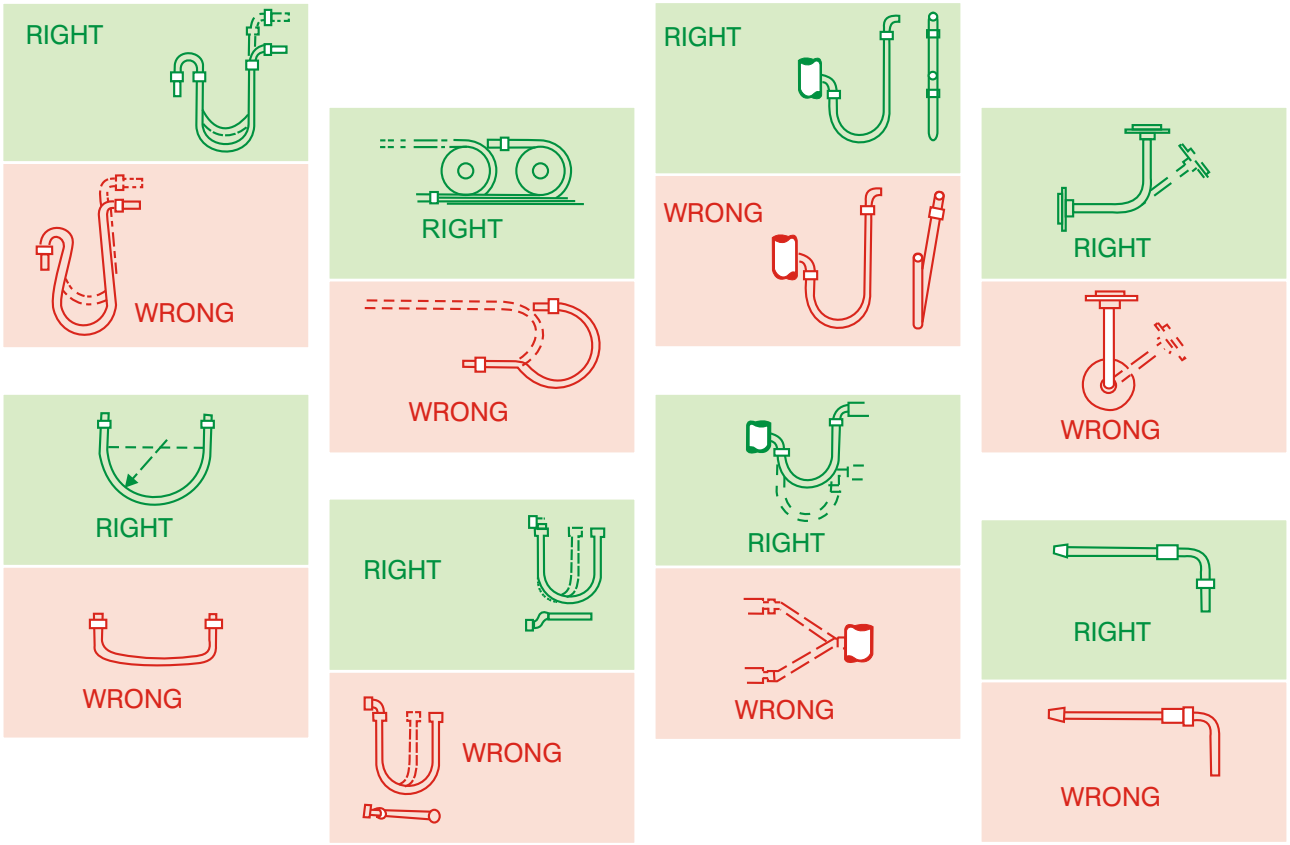
The pressure loss in corrugated hoses is 100% higher than in new welded steel pipes. This means that in the case of corrugated hose as increase in diameter of 15% is required to reduce the pressure loss to value of the pressure loss in steel pipes.



Because of the nature of the bore of a corrugated hose, the pressure drops due to greater friction than that of a smooth size of corrugated hose related to a flow rate where water is a fluid. To utilise the chart, Read off on the base line the flow rate required. Where a vertical line from the selected point on the base line intersects the nominal bore line the pressure drop Is shown on the vertical axis, corresponding to the point of intersection.

Installation

Stainless steel flexible hose assemblies should be installed in the right manner to obtain satisfactory service and longer life. The sharp bending near the end connection, stressed and twisted mounting and excessive fatigue are the main causes of premature failure of the assemblies. Correct and incorrect modes are shown in the installation chart.



CALCULATION OF MINIMUM HOSE LENGTH FOR FLEXING INSTALLATIONS

Static Flexing

Minimum Overall Length = L (Static) + (2 x P)

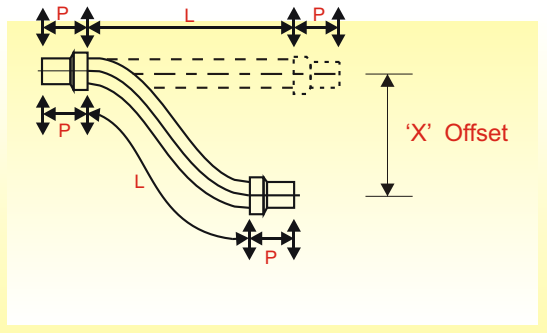
P - Dimension of end fittings.

Intermittent Flexing

Minimum Overall length = L (Flexing) + (2 x P)

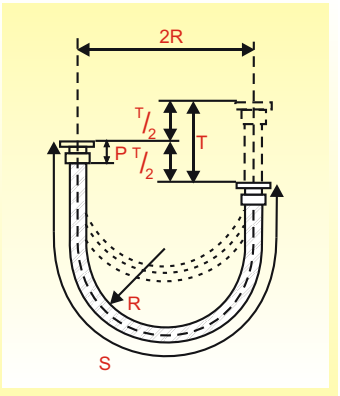
L - Dimension from chart below relative to Offset Motion 'X'

P- Dimension of the fittings.



LENGTH 'L' mm (FREE HOSE LENGTH)

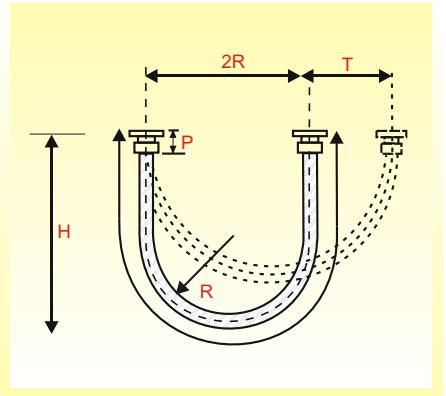
NOMINAL BORE mm	STATIC	DIMENSION 'X' mm (OFFSET MOTION)											
	0	15	25	35	50	75	100	125	150	175	200	225	250
6	85	140	180	215									
10,12	90	150	190	225	290								
20	95	170	220	255	310								
25	105	185	240	280	335	425							
32	110	205	260	305	365	450							
40	140	250	320	370	440	530	610						
50	170	300	380	440	520	630	730	800	870	940			
65	200	340	430	500	590	720	380	920	1000	1070	1130	1190	
80	215	380	500	580	680	820	940	1040	1140	1230	1310	1380	1450
100	230	405	525	610	720	875	1005	1120	1225	1325	1415	1490	1560
125	245	430	550	640	760	930	1070	1200	1310	1420	1520	1590	1670
150	280	510	650	760	910	1100	1270	1420	1560	1690	1800	1900	1990
200	320	560	710	830	990	1210	1400	1560	1720	1860	1990	2100	2210
250	360	620	780	900	1070	1320	1510	1690	1820	2010	2160	2290	2340



Vertical loop (Maximum travel about fixed point)

Vertical movement

S = 1.2 R + T/2 + 2P



Vertical loop (short horizontal travel)

Horizontal Movement

S = 1.2 (R+T/2) + 2P

S = Overall Length.

R = Bend Radius which must not be less than minimum shown in Table I.

P = Length over End Fitting & Ferrule.

H = Height

= 3.142

Important : In loop installations, both connections and travel should be in the same plane as the bend.

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