

FLEXIBLE HOSES & BELLOWS

FLEXIBLE SOLUTION. STRONG CONNECTIONS.



CORROSION
RESISTANT



HIGH TEMP
RESISTANCE



HIGH PRESSURE
CAPABILITY



FLEXIBLE &
DURABLE



QUALITY
ASSURED





Solar & Boiler Industry

For solar energy systems and boilers, metal hoses are used to

- ▼ Connect individual solar panels
- ▼ Accommodate thermal expansions
- ▼ Water supply
- ▼ Flexible connections to auxiliary devices such as accumulators or gas lines inside the device



Aviation & Aerospace

- ▼ Fuel lines
- ▼ Protects from high & low temperature and strong vibrations
- ▼ Flexible hose lines for engine control
- ▼ Protection of cables
- ▼ Use in cryogenic environments in rockets and satellites.



Food Industry

- ▼ Transfers drinking water, milk, juices, alcohol, oils, and other food-grade liquids.
- ▼ Connects gas lines and transports steam for food processing.
- ▼ Handles hot water and chemical sanitizers for cleaning.



Gas Production

- ▼ Transporting industrial and medical gases under high pressure.
- ▼ Transporting all liquefied gases at extremely low temperatures.
- ▼ Used in drilling rigs, pipelines, and refineries.
- ▼ Used in gas bottles and cylinder filling systems.



Energy Sector

- ▼ Used in high-pressure steam lines, natural gas transport, and nuclear cooling systems.
- ▼ Used for LNG transfer, hydrogen storage, and solar thermal applications.
- ▼ Handles high-temperature exhaust, geothermal systems, and waste heat recovery.



Vacuum Technology

- ▼ Highest vacuum performance for UHV systems and accelerators.
- ▼ Good vacuum performance in high vacuum pumping systems.
- ▼ Flexible, vibration-absorbing for roughing pump lines.
- ▼ Braided for pressure support in foreline connections.



Railways

- ▼ Entire cooling and exhaust gas system
- ▼ Absorbing mechanical vibrations
- ▼ Ventilation system for switch gases in high speed train
- ▼ Compensating for thermal expansion
- ▼ Cooling and air conditioning systems of locomotives
- ▼ Protects sensitive controls and electrical cables



Automotive Industry

- Metal flexible hoses are used in automotive exhaust systems to
- ▼ Absorb vibrations
 - ▼ Reduce noise
 - ▼ Compensate for thermal expansion
 - ▼ Also used as filler neck and fuel line



Power Generation

- ▼ Steam & combustion turbine systems
- ▼ Cooling turbine blades
- ▼ Fuel atomizer lines
- ▼ Gas transport lines
- ▼ Inert gas lines
- ▼ Fuel oil burner connections



More Information
www.toklaistasia.com / www.toklaisteel.com

Contact Us
 E-mail : sales@toklaisteel.com





Cryogenic Systems

- ▼ Transporting Nitrogen
- ▼ Transporting Ammonia
- ▼ Transporting Liquid oxygen
- ▼ Transporting Hydrogen & Helium and other cryogenic fluids.



HVAC Systems

- ▼ Connect pumps & adapts thermal expansion
- ▼ Isolate vibrations in refrigeration units and compressors
- ▼ Employed in high-rise buildings to handle the movement caused by seismic or thermal forces



Marine & Offshore

- ▼ Exhaust systems
- ▼ Cooling water systems
- ▼ Fuel lines
- ▼ Lubricants lines
- ▼ FPSO & SPM lines
- ▼ Offloading & transfer of fluids



Refineries

- ▼ Connecting catalytic cracking units
- ▼ Oil and gas burners
- ▼ Water lines in gas engine cooling systems
- ▼ Steam injection
- ▼ Hydrocarbon drain lines
- ▼ Fuel oil burner connections



Chemical Plants

- ▼ Connecting weigh scales
- ▼ Facilitating the loading and unloading of tank trucks
- ▼ Steam lines
- ▼ Transporting highly corrosive media



Steel Plants

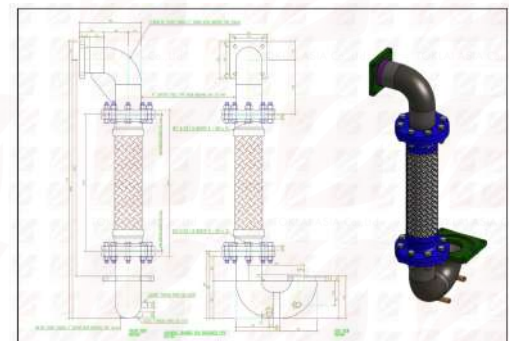
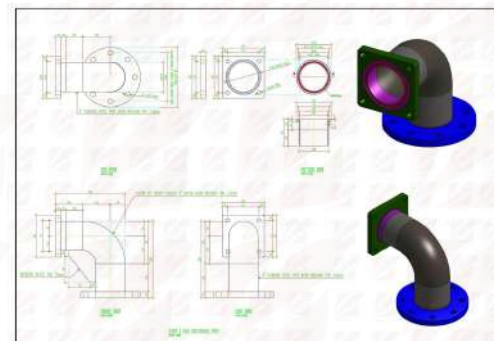
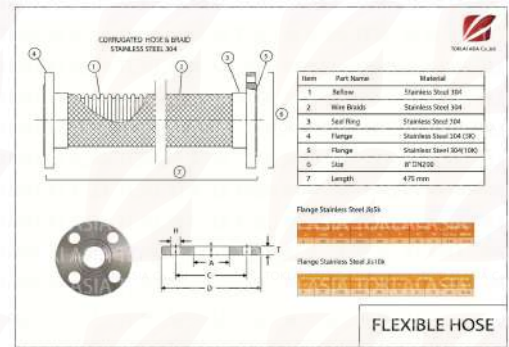
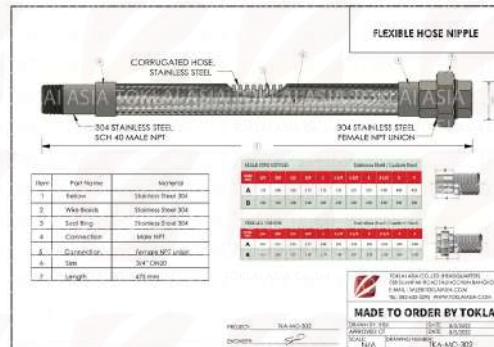
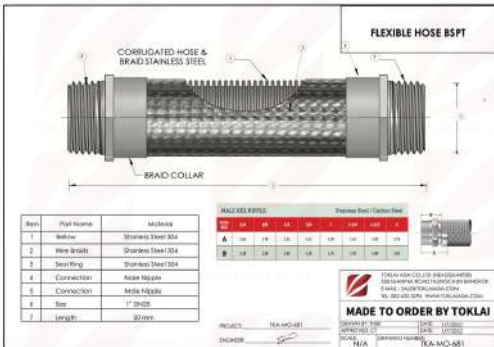
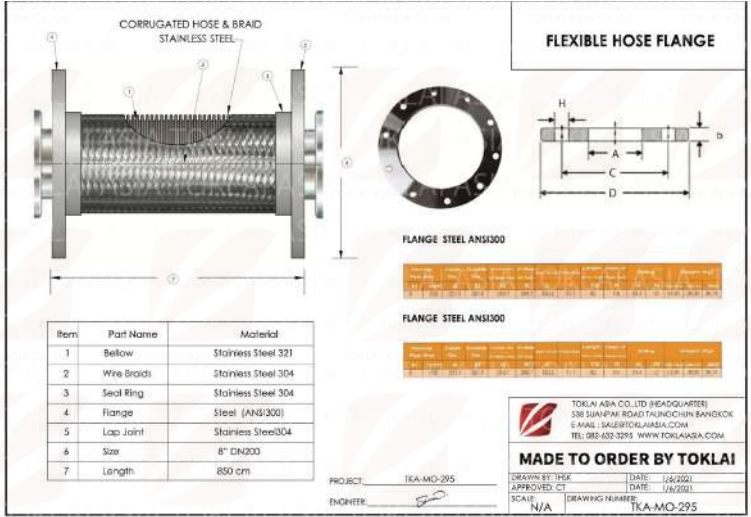
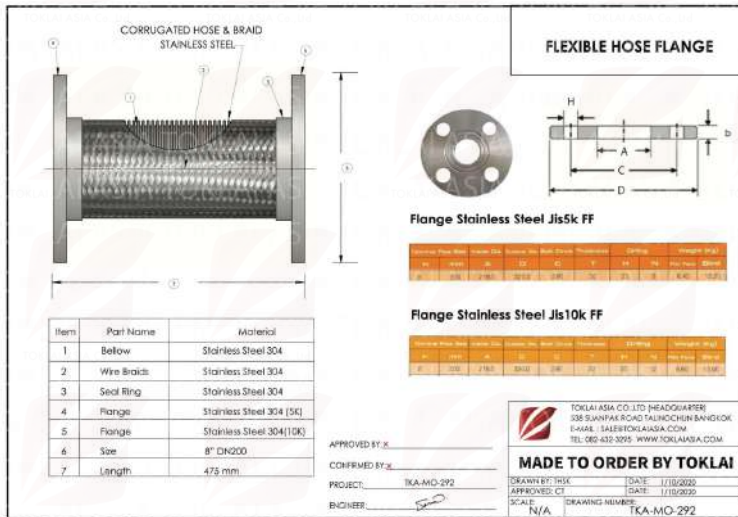
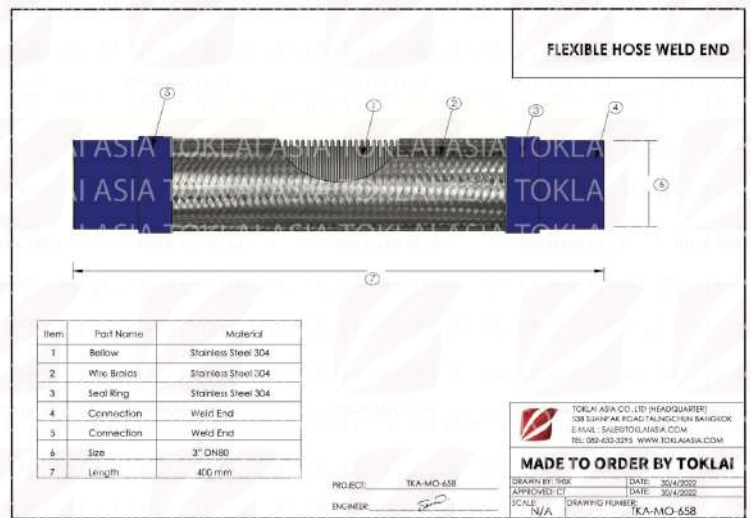
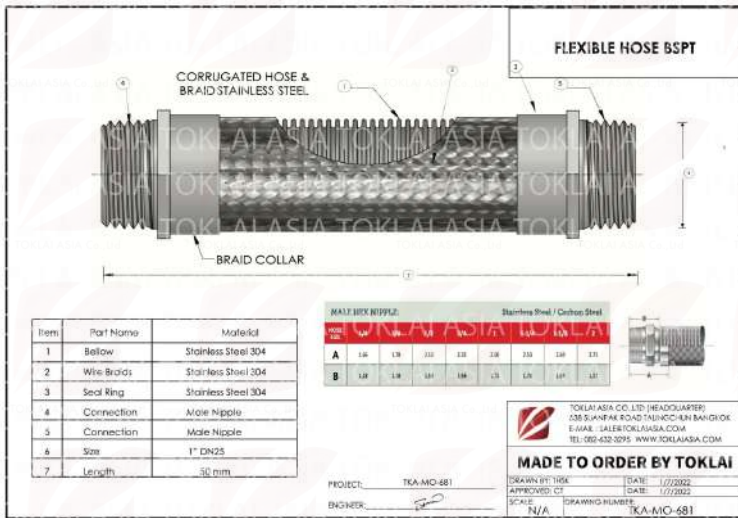
- ▼ High-temperature lubrication
- ▼ Water cooling lines
- ▼ Oxygen and water lancing
- ▼ Argon purging lines
- ▼ PCI coal injection
- ▼ Tuyere and stove cooling



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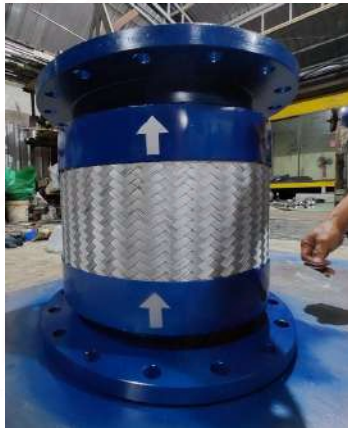
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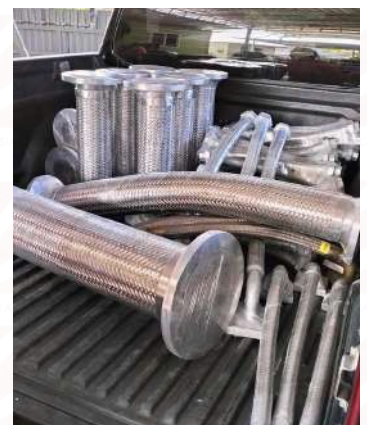
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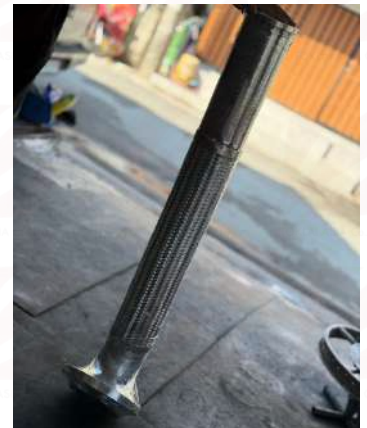
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Custom Bellows & Expansion Joint Manufacturer

At Toklai Asia, industry leader in manufacturing high quality stainless steel flexible hoses, corrugated hoses, braided hoses, and stainless steel hose fittings. These hoses are designed to meet the requirements of top OEM engineering companies in industrial.

Our production process is closely monitored by qualified QC experts, ensuring every hose assembly designed by international quality standards. With an in-house laboratory and testing facilities, can withstand extreme temperatures from -200°C to $+650^{\circ}\text{C}$. Our stainless steel corrugated hoses are made by an annular corrugated design for flexibility and pressure tightness, while an external layer of high-tensile stainless steel wire braiding enhances strength, prevents elongation, and increases pressure resistance. For higher pressure requirements, we offer double or triple-layer braiding options.

Whether you need unbraided corrugated hoses, close-pitch hoses for special applications, or contact Toklai Asia for superior performance and long-lasting quality.



บริษัท โตไค เอเชีย จำกัด (สำนักงานใหญ่)

สำนักงานใหญ่ : 538 ถนนสวนผัก แขวงตลิ่งชัน
เขตตลิ่งชัน กรุงเทพฯ 10170

E-mail : sales@toklaisteel.com



More Information
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Contact Us

E-mail : sales@toklaisteel.com





RADCOFLEX

flexible metal hose and assemblies

CIG Gases

DET NORSKE VERITAS
ESTABLISHED 1864

THE AUSTRALIAN GAS ASSOCIATION
RIDGE OF
CERTIFICATE
APPROVAL
DATE 4TH MARCH, 1986

MAGNETS APPROVED DESIGN
The Applicant complies with the requirements of THE AUSTRALIAN GAS ASSOCIATION

PARRAP/PARNOR FLEXIBLE CONNECTOR
RADCOFLEX AUSTRALIA PTY. LTD.

(1/2 - 2") CLASS D 2.6 MPa
(2 1/2 - 4") CLASS B - 7.0 kPa

The Certificate is issued on the express conditions:-
1. That all appliances sold by a manufacturer or his agent, which are covered by this Certificate of Approval, must carry The Australian Gas Association's badge of approval. These badges shall be obtained from the Association and shall be used by the manufacturer or his agent in accordance with the terms and conditions set out hereon or with such other terms and conditions as shall from time to time be prescribed by the Association.
2. That the Certificate holder will afford all reasonable facilities for persons authorised by the Association to examine appliances, etc., in respect of which this Certificate is issued.
3. Any manufacturer or his agent who, in his efforts to sell on appliances bearing the badge of approval of the Association, exports or otherwise, without having complied with the guarantee of conformity with basic requirements for safety, efficiency and durability, will be liable to the cancellation of the Certificate of Approval under which such appliance has been lodged.
4. That neither the Association nor its Board nor officers shall be liable at the suit of any claimant for damages or by way of indemnity arising out of any contract for the sale of any appliance to which a badge of approval is affixed or afterwards or arising out of the use of any such appliance in connection with the Association's Board officers or servants have been negligent or otherwise.
In the event of a manufacturer wishing to alter the specification relating to the Certificate he undertakes to inform the Association of such alterations in time for tests to be carried out before production begins.

General Manager

Signed

Postal Address:
P.O. Box A59
Sydney Tower, N.S.W. 2000
D.X. 14 Telux 27691

JZ

METROPOLITAN WATER SEWERAGE AND DRAINAGE BOARD
HEAD OFFICE: 116 - 123 Bathurst Street, Sydney, N.S.W.

Radcoflex Australia Pty. Ltd.
13 Prince William Drive,
Seven Hills N.S.W. 2147

"Parnor" Stainless Steel Braided Corrugated Flexible Metal Hose
"Parrap" Stainless Steel Braided Corrugated Flexible Metal Hose

GAS
Sydney Limited
The Commonwealth Industrial Products Division
Incorporated in the South West
40-56 Appian Street
Surry Hills, N.S.W. 2010
EQ 2000

Telephone: 288 0266 Extension 6650
Reference: 120/9121380
Mr. J. Rogerson

playing with CIG
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corrugated metal hose parnor stainless steel



description

Corrugated flexible metal hose with close pitch annular corrugations from butt-welded tube. Can be reinforced by one or two metallic braids. Provides a good flexibility.

manufacture

Stainless steel grades:

AFNOR Z2CN 18.10, AISI 304L, BS 304 S12 DIN 1.4301
AFNOR Z10CNT 18.10, AISI 321, BS 231 S12, DIN 1.4541
and on order: AFNOR Z2 CND 17.12, AISI 316L,
BS 316 S12, DIN 1.4404

Reinforcement by 1 or 2 stainless steel braids.

principal applications

Conveyance of all fluids within a wide range of temperatures. Static assemblies or cyclic motions. Being inherently leakproof, PARNOR suits numerous uses in chemical, petrochemical, cryogenic, nuclear, thermal and many other fields.

We strongly advise not to use in torsion.

temperature

Excellent behaviour subject to the above considerations from -269°C (liquid helium) up to $+600^{\circ}\text{C}$.

specifications

pressure

The table gives the following pressures:

P_r = burst pressure in "normal" conditions, i.e. tubing being straight and motionless under internal hydrostatic pressure at $+20^{\circ}\text{C}$ temperature.

P_n = nominal pressure = $\frac{P_r}{4}$ = maximum working pressure in "normal" conditions.

$$\text{Practical rule: } P_s = P_r \times \frac{K_t}{K_s}$$

P_s = maximum working pressure in use.

K_t = correction factor for abnormal temperature applications.

K_s = safety factor depending on details of application.

All tubes are tested in "normal" conditions at a test pressure generally equal to twice the working pressure, and, when specified, undergo a vacuum tightness proof by means of a helium mass detector with a leakage rate inferior to 10^{-5} lusec.

bends



$$\text{Bending radius} = \text{coiling radius} + \frac{\text{outside diameter}}{2}$$

The table gives the values of:

R_s = theoretical minimum static bending radius (tubing being stationary)

R_d = theoretical minimum dynamic bending radius (constant deflections)

These theoretical values apply to low pressures and to temperatures between -30°C and $+150^{\circ}\text{C}$.

Practical rule:

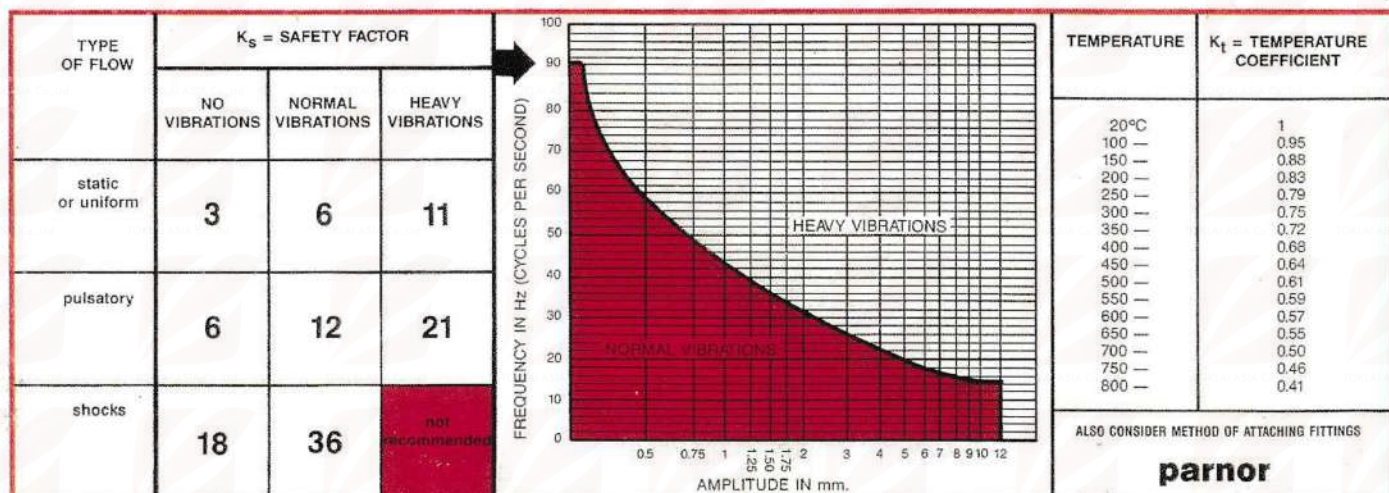
– for $-30^{\circ}\text{C} < t < +150^{\circ}\text{C}$ with working pressure

P_u , take:

$$\text{bending radius} = R_s \text{ (or } R_d) \times \left(1 + \frac{P_u}{2 P_n}\right)$$

– for $t < -30^{\circ}\text{C}$ or $t > +150^{\circ}\text{C}$ whatever be P_u , take:

$$\text{bending radius} = R_s \text{ (or } R_d) \times 1.5$$



nominal bore		number of braids	outside mm	pressure bars		bend radius		weight per metre
inside mm	inches			nominal P _N	burst P _R	static R _S	dynamic R _d	Kg
6	¼"	0	9.7	12	-	20	125	0.05
		1	11.6	175	700			0.16
		2	13.5	200	800			0.27
9	⅜"	0	15	16	-	40	160	0.09
		1	16.5	100	400			0.26
		2	18	120	480			0.43
12	½"	0	20	12	-	45	210	0.12
		1	22	95	380			0.36
		2	24	105	420			0.59
15	⅝"	0	23	7	-	50	230	0.15
		1	25	75	300			0.42
		2	27	90	360			0.69
19	¾"	0	28	5	-	50	240	0.24
		1	30	60	240			0.53
		2	32	80	320			0.83
25	1"	0	36	4	-	60	250	0.33
		1	38	40	160			0.73
		2	40	65	260			1.13
32	1¼"	0	44	3	-	80	265	0.42
		1	46.5	40	160			1.07
		2	49	60	250			1.72
38	1½"	0	51	2	-	110	310	0.50
		1	55	40	160			1.37
		2	58	58	235			2.24
50	2"	0	66	1.5	-	140	355	0.78
		1	70	35	140			1.84
		2	73	45	180			2.90
63	2½"	0	81	1	-	180	415	1.31
		1	85	30	120			2.72
		2	88	40	160			4.13
75	3"	0	96	0.7	-	200	475	1.55
		1	100	24	96			3.18
		2	103	33	135			4.81
100	4"	0	127	0.5	-	225	585	2.26
		1	131	20	80			4.65
		2	134	26	105			7.04
125	5"	0	152	0.3	-	425	850	3.30
		1	156	12	48			5.90
		2	159	14	56			8.50
150	6"	0	174	0.2	-	525	1050	4.70
		1	178	10	40			7.30
		2	181	12	48			9.90
200	8"	0	233	0.2	-	600	1100	6.30
		1	238	10	40			11.00
250	10"	0	285	0.2	-	700	1150	10.90
		1	290	10	40			15.50
300	12"	0	337	0.2	-	900	1200	12.70
		1	342	10	40			19.50
350	14"	0	396	0.18	-	1200	2500	16.70
		1	401	8	30			25.80
400	16"	0	446	0.18	-	1350	2800	19.30
		1	451	8	30			28.80
450	18"	0	497	0.15	-	1500	3000	28.70
		1	502	5	20			32.47
500	20"	0	558	0.15	-	1550	3300	32.50
		1	563	4	15			37.20
600	24"	0	660	0.1	-	2000	3800	38.50
		1	665	3.5	14			46.00

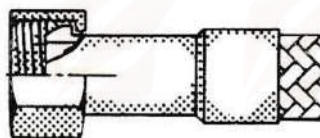
corrugated hose fittings

Listed on page 22 and 23 are our standard range of fittings suitable for corrugated metal hoses.

It should be noted that a large percentage of our production is in manufacturing special hose assemblies which require custom produced fittings.

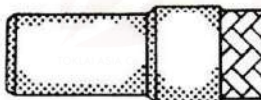
Radcoflex are the leaders in producing high quality special assemblies, such as refrigeration assemblies, blow-out preventer assemblies, cryogenic assemblies, and "COMBI" oxygen lance hoses, all manufactured to the most exacting quality assurance standards.

SWIVEL FEMALE — BSP



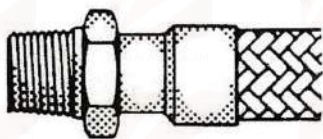
CSF-S	STEEL
CSF-SS	STAINLESS
CSF-B	BRASS

WELDING NIPPLE SCH. 40 PIPE



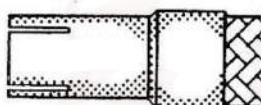
CW-S	STEEL
CW-SS	STAINLESS

THREADED MALE HEX PIPE NIPPLE — BSP



CMH-S	STEEL
CMH-SS	STAINLESS
CMH-B	BRASS

CLAMP ON



CCO-S	STEEL
CCO-SS	STAINLESS
CCO-C	COPPER

THREADED FEMALE COUPLING — BSP



CFC-S	STEEL
CFC-SS	STAINLESS
CFC-B	BRASS

MALE TUBE — O.D. x S.W.G.



CMT-C	COPPER
CMT-S	STEEL
CMT-SS	STAINLESS

FEMALE UNION — BSP



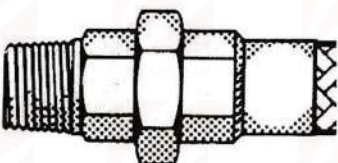
CFU-S	STEEL
CFU-SS	STAINLESS
CFU-B	BRASS

WELDING NIPPLE — 90°



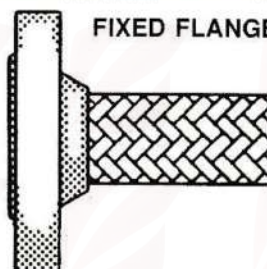
CW-90-S	STEEL
CW-90-SS	STAINLESS

MALE UNION — BSP



CMU-S	STEEL
CMU-SS	STAINLESS
CMU-B	BRASS

FIXED FLANGE



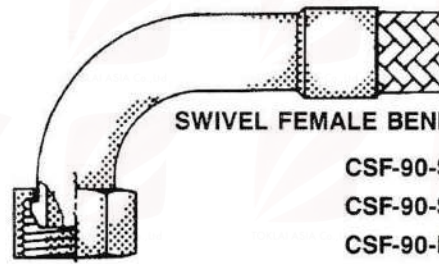
CF-S	STEEL
CF-SS	STAINLESS
CF-B	BRONZE

corrugated hose fittings



FLOATING FLANGE

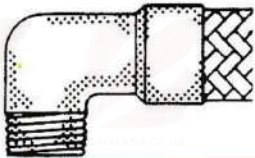
- CFF-S** STEEL STUB & STL FLANGE
- CFF-SS** S.STEEL STUB & STL FLANGE
- CFF-B** BRONZE STUB & STL FLANGE
- CFF-SSS** S.STEEL STUB & S.STL FLANGE.



SWIVEL FEMALE BEND — BSP

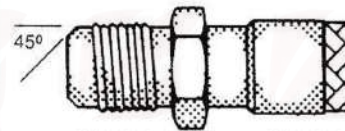
- CSF-90-S** STEEL
- CSF-90-SS** STAINLESS
- CSF-90-B** BRASS

MALE ELBOW — BSP



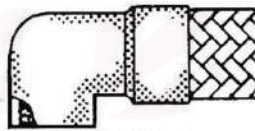
- CME-S** STEEL
- CME-B** BRASS
- CME-SS** STAINLESS

SAE MALE HEX PIPE NIPPLE



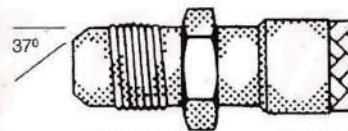
- CSAE-MH-S** STEEL
- CSAE-MH-B** BRASS
- CSAE-MH-SS** STAINLESS

FEMALE ELBOW — BSP



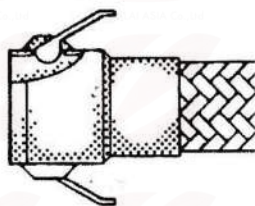
- CFE-S** STEEL
- CFE-B** BRASS
- CFE-SS** STAINLESS

JIC MALE HEX PIPE NIPPLE



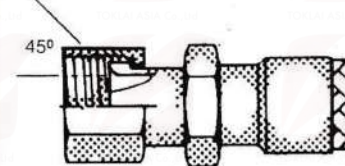
- CJIC-MH-S** STEEL
- CJIC-MH-B** BRASS
- CJIC-MH-SS** STAINLESS

FEMALE QUICK COUPLING



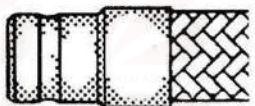
- CFQ-S** STEEL
- CFQ-B** BRASS
- CFQ-SS** STAINLESS

SAE SWIVEL FEMALE



- CSAE-SF-S** STEEL
- CSAE-SF-B** BRASS
- CSAE-SF-SS** STAINLESS

MALE QUICK COUPLING



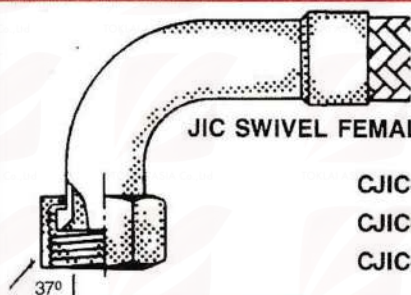
- CMQ-S** STEEL
- CMQ-B** BRASS
- CMQ-SS** STAINLESS

JIC SWIVEL FEMALE



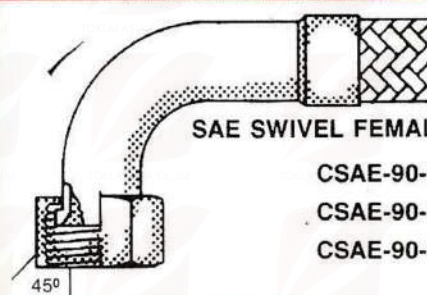
- CJIC-SF-S** STEEL
- CJIC-SF-B** BRASS
- CJIC-SF-SS** STAINLESS

JIC SWIVEL FEMALE — 90° BEND



- CJIC-90-S** STEEL
- CJIC-90-B** BRASS
- CJIC-90-SS** STAINLESS

SAE SWIVEL FEMALE — 90° BEND



- CSAE-90-S** STEEL
- CSAE-90-B** BRASS
- CSAE-90-SS** STAINLESS

The table provides general information only and for specific applications of a severe nature a chemical engineer should always be consulted.

●	Perfectly suited	To be studied upon request
◉	Suitable, but in time characteristics may vary depending on concentrations and/or temperatures	ac/at All concentrations All temperatures
◐		bp Boiling point Temperature in degree Celsius
■	Not recommended	

[illegible]

LEGEND	●	Perfectly suited	To be studied upon request	Galvanised Steel	S.S. Steel 201	S.S. Steel 304	S.S. Steel 304 L	S.S. Steel 316 L	Medium-Carbon Steel	Cast Iron	Aluminium	Brass	Asbestos	Neoprene	P.V.C.	Nitrile	PT.F.E.
	◐	Suitable, but in time characteristics may vary on depending on concentrations and/or temperatures															
■		Not recommended															
Oleic acid					◐	◐	◐	◐	◐	◐	●	◐	●	◐	●	◐	●
Oxalic acid 5%/20°	■			■	●	●	●	●	■	■	●	◐	●	■	●	◐	●
Oxalic acid 5%/bp				■	■	■	◐	●		◐	■	■		■	■	■	●
Phosphoric acid 1 to 85%/20°	■			◐	●	●		◐	■	■	■	■	■		●		●
Phosphoric acid 50 to 90%/20 to 80°				■	■	■	■	■	■	■	■	■	■	■	■		●
Carbolic acid				◐	●	●	◐				●						
Picric acid ac/20° 10%/bp	■			■	●	●	●	●	■	■	◐	■	●		■		●
Salicylic acid 10%/20 to 100°					●	●	●	●			●		●				●
Hydrosulphuric acid					●	●	●	●	◐		●	■	■	◐	●	●	●
Sulphurous acid 10 to 20%/20°	◐			◐	●	●	◐	◐	◐	◐	◐	■	■	◐	●	◐	●
Sulphuric acid 0 to 10%/20° - 0 to 3%/80°	■			■	■	■	■	●	■	■	■	■	■	◐	●	●	●
Sulphuric acid 10 to 100%/20°	■			■	■	■	■	◐	■	■	■	■	■	■	●	■	●
Sulphuric acid ac and high temperature	■			■	■	■	■	■	■	■	■	■	■		■		
Tannic acid ac/bp	◐			◐	◐	●	●	◐	◐	◐	◐	◐			■		●
Tartaric acid 0 to 50%/20° - 20%/bp	◐			◐	◐	●	●	◐	◐	■	◐	■					●
Uric acid 20°				◐	●	●	◐				◐	■			●	●	●
Compressed air	●			●	●	●	●	●	●	●	●	●	●	●	●		●
Alcohols 20°/bp				◐	●	●	●	●	●	●	●	●	◐	●			
Ammonia (gas)	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●
Liquid ammonia ac 20 to 100°	●			●	●	●	●	●	◐	●	●	■	●	■		■	●
Acetic anhydride 20°/bp				◐	●	●	●	●			◐	■			■		●
Carbon dioxide					●	●	●	●					●	●			
Sulphur dioxide	■			◐	◐	◐	◐	●	■	◐	●	◐	●	●	●	◐	●
Amminobenzene	●			●	●	●	●	●	◐	◐	●	■	●	◐	◐	■	●
Asphalt	●			●	●	●	●	●	●		●	●	●	◐	◐	◐	●
Benzene	●			◐	◐	◐	◐	●	◐	◐	●	◐	●	■	■	■	●
Benzine	●			●	●	●	●	●					●	■			●
Benzol	◐			●	●	●	●	●	◐	●	■	■	●	■	■	■	●
Bicarbonate of ammonia, K, Na-ac/at	◐			●	●	●	●	●	◐	◐	■		●				
K and Na dichromate - ac/at				◐	●	●	◐				●		●				
K and Na bisulphate 10%/20°	■			■	■	◐	◐	●	■	■	■	◐	●		●		●
Concent. calcium bisulphite/20° - bp	■			◐	●	●	●	●	■	■	●	■	●				●
Bisulphite of Na 5-40%/20°, K 10%/20 to 90°	■			■	■	◐	◐	●	■	●	◐		●				
Borax 100°	◐			●	●	●	●	●	◐		■	■	●	■		■	●
Humid - pure dry bromine 20°	■			■	■	■	■	■	■	■	■	■	■	■	◐	■	●
Butadiene	●			●	●	●	●	●	●	●	●	●	●	◐			●
Butane	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●
Butylene	●			●	●	●	●	●	●		●	●	●	■			
Camphor					●	●	●	●			●		●				
Ammonium and Mg carbonate ac/at					●	●	●	●			●		●				
K and Na carbonate ac/at	■			■	●	●	●	●	■	◐	■	■	●				●
K and melted Na carbonate					■	■	■	■			■	■	●		■		
Lime					■	●	●	●			■		●	●	●	■	●
Sat. potassium chlorate/bp					■	●	●	◐			●			■		■	
Chlorine (gas) dry 20 to 100°	●			■	■	■	●	◐	●	◐	◐		●				●
Chlorine humid 20°	■			■	■	■	■	■	■	■	■	■	◐	◐	●	◐	●
Chloroform	●			●	●	●	●	●	●	●	◐	◐	●	■	■	■	●

compatibility tables cont.

LEGEND	●	Perfectly suited	To be studied upon request	ac/at	All concentrations	All temperatures <th rowspan="2">bp</th> <td>Boiling point</td> <th rowspan="2">Temperature in degree Celsius</th> <th rowspan="2">Galvanised Steel</th> <th rowspan="2">S.S. Steel 201</th> <th rowspan="2">S.S. Steel 304</th> <th rowspan="2">S.S. Steel 304L</th> <th rowspan="2">S.S. Steel 316 L</th> <th rowspan="2">Medium-Carbon Steel</th> <th rowspan="2">Cast Iron</th> <th rowspan="2">Aluminium</th> <th rowspan="2">Brass</th> <th rowspan="2">Asbestos</th> <th rowspan="2">Neoprene</th> <th rowspan="2">P.V.C.</th> <th rowspan="2">Nitrile</th> <th rowspan="2">PT.F.E.</th>	bp	Boiling point	Temperature in degree Celsius	Galvanised Steel	S.S. Steel 201	S.S. Steel 304	S.S. Steel 304L	S.S. Steel 316 L	Medium-Carbon Steel	Cast Iron	Aluminium	Brass	Asbestos	Neoprene	P.V.C.	Nitrile	PT.F.E.
	○	Suitable, but in time characteristics may vary on depending on concentrations and/or temperatures																					
■		Not recommended																					
Chlorides *																							
Wax	●		●		●		●		●		●		●		●		●		●				●
Glue	●		●		●		●		●		●		●		●		○		●		○		●
Creosote	●	○	●		○		○		○		○		○		○		○		○		■		○
K and Na cyanide ac/at	■		●		●		●		■		■		■		■		■		●				●
Cyclohexane	○	○	○		○		○		○		○		○		○		○		○		○		○
Diethylene glycol	○		●		●		●		○								●		●				●
Dowtherm	●		●		●		●		●		●		●		●		●		■		■		●
Sea Water 20°	○		■		○		○		■		○		○		■		○		●		●		○
Sea Water 60/100°	■		■		■		■		○		■		■		■		○		●		○		■
Inks	○		○		○		○		○		○		○		○		○		●				○
Volatile oil	●		●		●		●		●		●		●		●		●		●		○		○
Ethers	○		●		●		●		○		○		○		○		○		○		■		○
Ethylene glycol	○		○		○		○		○		○		○		○		○		○		○		○
Fluorine			○		○		○																■
Al. fluoride 10%/20° Na 5%/20°			■		■		■		○		○		○		○		○		○		○		○
Formaldehyde ac/20 to 100°			○		○		○										○		○		○		○
Freon 12			●		●		●		○		○		○		○		○		○		○		○
Freon 22			●		●		●		○		○		○		○		○		○		○		○
Fuel oils	●		●		●		●		○		○		○		○		○		○		○		○
Furfural	○		○		○		○		○		○		○		○		○		○		○		○
Gas oils	●		●		●		●		○		○		○		○		○		○		○		○
Natural gas	●		●		●		●		○		○		○		○		○		○		○		○
Glycerine bp	●		●		●		●										○		○		○		○
Tar at	●		●		●		●										○		○		○		○
Hexane	●		●		●		●		○		○		○		○		○		○		○		○
Crude oils without H ₂ SO ₄ 200°	○		●		●		●		○		○		○		○		○		○		○		○
Crude oils with H ₂ SO ₄ 200°	■		■		■		■		○		○		○		○		○		○		○		○
Lubricating oil	●		●		●		●		○		○		○		○		○		○		○		○
Mineral oils 50°	●		●		●		●		○		○		○		○		○		○		○		○
Vegetable oils bp	○		○		○		○		○		○		○		○		○		○		○		○
Gaseous hydrogen	●		●		●		●		○		○		○		○		○		○		○		○
Dry sulphurised hydrogen 200°	○		●		●		●		○		○		○		○		○		○		○		○
Sodium thiosulphate 25%/bp			●		●		●										○		○		○		○
Dry iodine 20°	■		●		●		●		■		■		■		■		○		○		○		○
Fruit juices	●		○		○		○		○		○		○		○		○		○		○		○
Molasses	●		○		○		○		○		○		○		○		○		○		○		○
Mercury 20°	●		●		●		●		○		○		○		○		○		○		○		○
Methane	●		●		●		●		○		○		○		○		○		○		○		○
Methanol ac/20°. bp	●		○		○		○		○		○		○		○		○		○		○		○
Naphthalene			●		●		●										○		○		○		○
Ca - Cu - ferrous nitrate ac/at	○		■		○		○		○		○		○		○		○		○		○		○
K - Na nitrate ac/at	○		■		○		○		○		○		○		○		○		○		○		○

* It is difficult to indicate the corrosion resistance of various materials in the presence of mineral or organic chloride solutions. The main risks are stress corrosion cracking and pit corrosion. It is therefore recommended to contact our technical department for such uses.

LEGEND	● Perfectly suited	○ Suitable, but in time characteristics may vary on depending on concentrations and/or temperatures	■ Not recommended	To be studied upon request ac/at All concentrations All temperatures bp Boiling point Temperature in degree Celsius	Galvanised Steel	S.S. Steel 201	S.S. Steel 304	S.S. Steel 304 L	S.S. Steel 316 L	Medium-Carbon Steel	Cast Iron	Aluminium	Brass	Asbestos	Neoprene	PVC	Nitrile	PT.FE.
Hot oxygen	●	○	■		○	●	●	●	●	○	○	●	●	●	■	○	■	■
Cold oxygen	●	○	■		●	●	●	●	●	●	●	●	●	●	●	●	○	●
Ozone	●	○	■							■	■		■	○	○	●	■	●
Melted paraffin	●	○	■		●	●	●	●	●	●	●	●	●	●	■			●
Pentane	●	○	■		○	○	○	○	○	○	○	●	○	○	●			●
Ammonium perchlorate 10%/bp	●	○	■			■	■	■	○			●		●	■		■	
Perchloroethene and vapours at	●	○	■			■	■	○	●	●	○	●	○	●	■		■	●
K permanganate ac/at	●	○	■		○	●	●	●	●	○	○	●	○	●				
Sodium peroxide 10%/100°	●	○	■		○	●	●	●	●	○		●	■	●	■	■	■	●
Crude oil	●	○	■		○					○		●	■	●		■		
Phenol 20°	●	○	■		○	○	●	●	○	○	○	●	○	○	■	○	■	●
Pure ammonium and Na phosphate ac/at	●	○	■			●	●	●	●	○				●				●
Potash 50%/20°	●	○	■			●	●	●	●	○	●	■	■	●	●	●		●
Potash 50%/bp	●	○	■		■	■	■	■	●	■	●	■	■	●	■	■	■	■
Propane	●	○	■		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Soaps	●	○	■		●	○	○	○	○	○	○	○	○	○	○	○	○	○
Sodium silicate ac/at	●	○	■		○	●	●	●	●	○	○	●	○	○				●
Melted Sodium 780°	●	○	■			■	■	■	○			■	■	■	■	■	■	■
Soda 50%/50°	●	○	■			■	●	●	○	○	○	■	■	●	●	○	●	●
Soda 70%/60° - 50%/110°	●	○	■			■	○	○	○	○	○	■	■	●		■		●
Melted sulphur > 445°	●	○	■		■	■	●	●	○	■		●	■	●	■		■	■
Sugar (solutions-syrups) ac/at	●	○	■		●	●	●	●	●			●	●					●
Aluminium sulphate ac/20°	●	○	■			○	●	●	○		■	■	○	●	●			●
Aluminium sulphate 10% bp - ac/bp	●	○	■		○	■	○	○	○	○	■	■	○	●	■	■	■	●
Aluminium sulphate ac/bp	●	○	■			■	■	○	○			■	■	●	■			●
Ca-Cu sulphate ac/at - Fe sulphate ac/20°	●	○	■		■	●	●	●	●	■	■	■	○	●				●
Magnesium sulphate	●	○	■		○	●	●	●	●	○	○	○	○	●	●	●	●	●
Mn-Ni sulphate ac/at	●	○	■		■	●	●	●	●	■	■	■	○	●				●
K-Na sulphate - ac/at	●	○	■		○	●	●	●	●	○	○	■	○	●				
Zinc sulphate	●	○	■		○	●	●	●	●	○		○		●	●	●	●	
Na - Ammonium sulphite - 50%/bp	●	○	■		○	■	●	●	○	○				●	■	■		
Pure C sulphide bp - Na sulphide sat./20°	●	○	■			●	●	●	●			●		●	■	■		●
Na sulphide 50%/90° - sat./100°	●	○	■			■	○	○	○		○	■		●	■	■	■	●
Turpentine (oil)	●	○	■		●	●	●	●	●	○	○	●	●	●	○	○	○	●
Dry C Tetrachloride 20° bp	●	○	■			●	●	●	●				○	●	■			●
Toluene	●	○	■		●	●	●	●	●	●	●	●	●	●	■	■	■	●
Trichloroethene and vapours at	●	○	■		○	■	○	○	○	○	○		○	●	■	■	■	●
Urea 150°	●	○	■		■	■	■	■	●	■		●	■	●	■	■	■	●
Saturated vapour	●	○	■		●	●	●	●	●	●	●	○	●	●		■		●
Superheated vapour	●	○	■		●	●	●	●	●	●	○	●	○	●	■	■	■	○
Varnishes and solvents	●	○	■		○	●	●	●	●	○		●	■	●	●			●
Vinegar	●	○	■		■	●	●	●	●	■	■		■	■	○	●	○	●
Xylenes	●	○	■		○	●	●	●	●	○		●		●	■	■	■	●

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