



KONGSBERG
AUTOMOTIVE

Fluid Systems

PTFE Fluid Transfer Solutions



► Introduction

Kongsberg Automotive Fluid Systems has been supplying Teflon®/PTFE media transfer solutions since 1979 and is still serving its chosen markets with innovative and competitive products.

- 1979 – Astraflex (UK) was founded as a privately owned company.
- 1980 – Teleflex Fluid Systems USA founded.
- 1991 – Teleflex purchases Astraflex
- 2003 – Astraflex changes its trading name to Teleflex Fluid Systems
- 2007 – Kongsberg Automotive acquires Teleflex Fluid Systems, Teleflex Automotive and Teleflex Industrial.

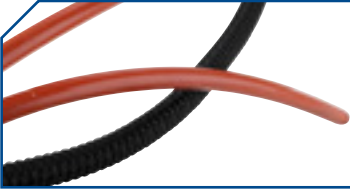









In a world which is becoming increasingly demanding you can rest assured that we will continue to develop and lead the global markets in Teflon®/PTFE hose technology.

► Corporate Profile

Our parent company, Kongsberg Automotive, has a turnover of \$1.5 billion and is focussed on continuous, managed growth through product innovation and a customer-focused approach. At KA Fluid Systems, we design and manufacture specially engineered products, serving as a leading supplier to the automotive, industrial, marine and medical markets. We are experts in the markets we serve. Dedicated to customer service, we strive to design real-world solutions with products that are practical, cost-effective and reliable.



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► What is Teflon®/PTFE

- Teflon®, or Polytetrafluoroethylene (PTFE), to give it its full chemical name, was discovered in 1938 by DuPont scientist Dr. Roy Plunkett.
- Teflon®/PTFE is a plastic resin in the Fluorocarbon group.
- Teflon®/PTFE is an ideal problem solver for fluid transfer applications involving aggressive chemicals, extremes of temperature/movement or where hygiene is paramount.

► Key Properties

- A wide operating temperature range (-60°C to +260°C / -100°F - +500°F)
- Inert to virtually all chemicals
- Resistance to weathering/ageing: unaffected by UV light, resistant to oxidation, surface fouling and discolouration
- Non-flammable
- Lightweight
- Superior flex fatigue life
- Low permeability
- Lowest coefficient of friction of any solid material known to man.
- Unlimited shelf life
- Preformable*
- Solvent resistant

*With Patented KA Fluid Systems' Technology



► Flexible Solutions

Innovative design, in-built quality and customer care are significant reasons for the continued growth of KA Fluid Systems. At every stage of manufacture, strict quality controls are applied in adherence to our ISO and TS accreditations. To complement this we provide design support to our customers worldwide. We offer the highest level of technical advice for both product selection and application, giving the most cost effective hose solution.

Comprehensive in-house testing facilities are available to our customers. They include Hydrostatic, Volumetric Expansion, Salt Spray and Tensile Testing, Shake and Bake, Impulse Test Engineered safety and the dedicated approach to continuous improvement have contributed to the successful development of one of the most comprehensive ranges of PTFE hose found anywhere in the world.

► Key Processes

- Production materials are 100% verified by supplier certification and strictly controlled by trained quality assurance engineers. Approved suppliers are selected by supplier audits and are regularly monitored to ensure supplied material meets the required quality level.
- Quality empowered staff set up machines and then monitor critical characteristics with support from the laboratory test facility and dedicated state of the art measuring technology.
- Trained operators are responsible for providing both product integrity and accurate process control. They utilise some of the most modern braiding and extrusion technology available to produce a superior quality product.
- Every shipment of hose produced is identified by an individual label incorporating codes for date of manufacture and material batch serial numbers.
- Independent product verification tests are carried out in our own fully equipped test laboratory. These facilities are also available for customer specific tests as defined in the order.

► Temperature and Pressure

Whilst PTFE has a working temperature range between -60°C to +260°C (-100°F to +500°F) (dependent upon the grade selected) as with all other types of hose, increased working temperatures require a reduction in maximum rated working or burst pressure. Whenever excessive flexing, vibration, thermal fluctuations or rapid pressure impulsing is in evidence, further consideration should be taken on the effect on the hose performance. If in any doubt please contact our Technical Department.

► Database For Pressures

All stated burst pressures are static and are measured on samples at ambient temperature from which averages are recorded to create relevant specifications. Burst pressures are conservatively rated to provide a high margin of safety.

► Minimum/Maximum Continuous Lengths

All PTFE hose is manufactured in random lengths, but if special lengths are required please contact your approved distributor or KA Fluid Systems' Sales Department.

► Chemical Resistance

The PTFE Hose liner is virtually inert to all chemicals and solvents. It is resistant to fuming Sulphuric and Nitric acids, Amines, Antioxidants and Methanol. It is only known to react with elemental Alkali metals (molten or in solution), Fluorine and Chlorine Trifluoride. See back of catalogue for compatibility chart or in doubt contact KA Fluid Systems.

► Validation Disclaimer

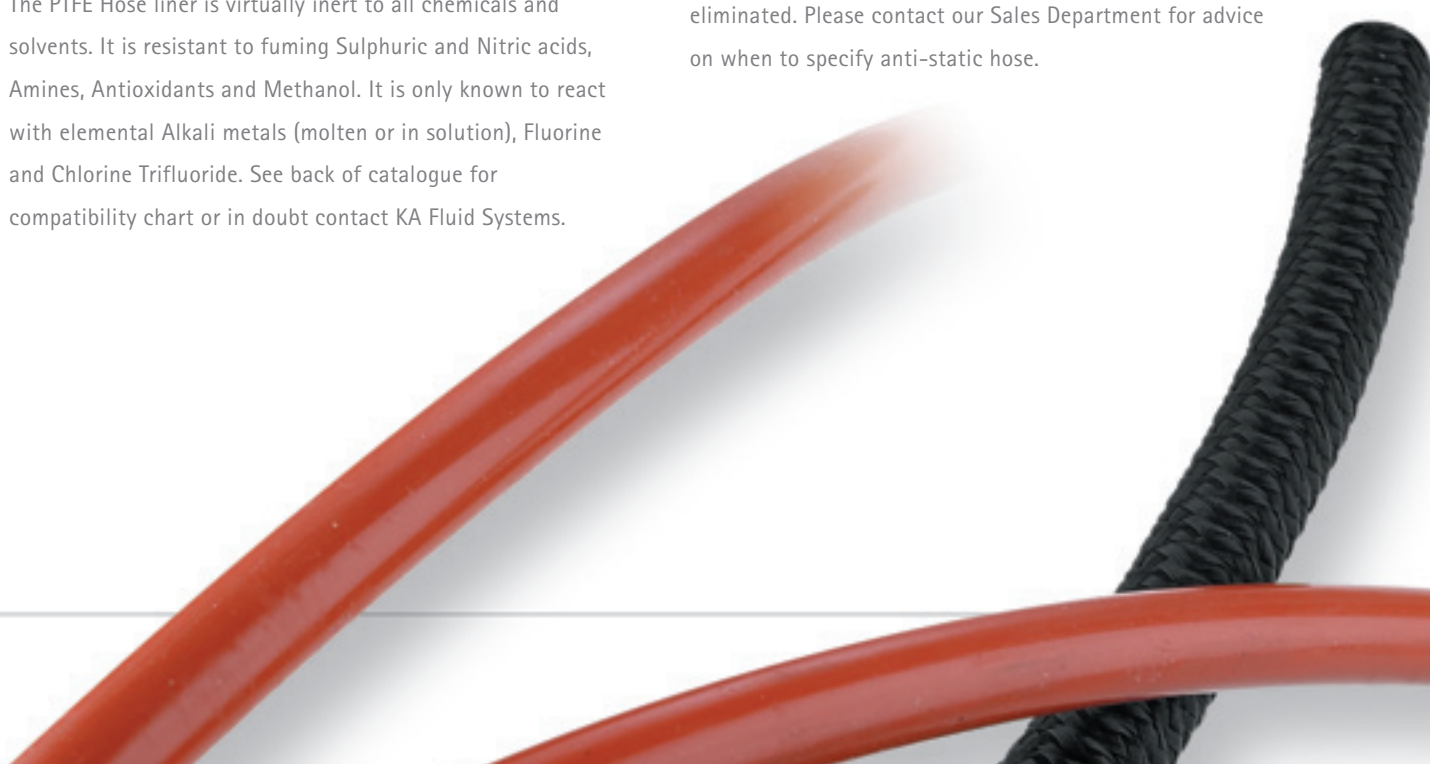
Teflon® hoses can be used to convey hazardous fluids, steam and other dangerous materials which can cause personal injury or property damage. The customer is therefore responsible for all validation and testing prior to issuing hose assemblies into application.

► Pressure Testing

The responsibility rests completely on the purchaser to ensure 100% robust and effective testing of every hose assembly before supplying for final use. Whilst all hose is checked extensively throughout all stages of manufacture, KA Fluid Systems' hose is proof pressure tested in sample random pieces and not in bulk lengths. Bulk testing can be offered on all products but does incur a premium. Please contact our Sales Department.

► Reduced Static PTFE Hose

Given that Teflon®/PTFE has a very high electrical isolation value, a damaging electrostatic charge can build up inside the hose when electrically resistive fluids are being transmitted at high flow rates (particularly if the PTFE hose assemblies are long). To prevent this, a special carbon is mixed with the PTFE to make it electrically conductive. The need for earth conductor braids or wires in the bore of the hose is therefore eliminated. Please contact our Sales Department for advice on when to specify anti-static hose.



► Conditions of Sale

All our goods are supplied in accordance with our standard terms and conditions, a copy of which is available on request from our sales department. All shipments of finished goods are subject to Incoterms 2000.

► Certification

Standard certificates of conformity and test certificates (hose assemblies) supplied for a nominal fee when requested on customer's purchase order. 'Retro' certification will be chargeable at a higher rate. Contact your local KA Fluid Systems Sales Department for details.

► Returns Policy

Liability – KA Fluid Systems reserve the right to refuse returned goods until liability has been established. No returns will be accepted without prior written authorisation from KA Fluid Systems and a clear, documented CAR/RMA number on the goods. All claims should be made to KA Fluid Systems within one month of receipt of goods; failure to comply with this request may result in rejection of any claim. For further information please refer to our terms and conditions of sale.

Packing Guide*

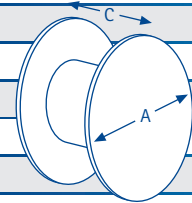
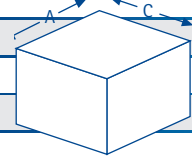
Imperial Range Hose Size (inches)	Average Drum Capacity (metres)	Easy-Flex / TW Hose Size (inches)	Average Drum Capacity (metres)
1/8	1500	1/4	400
3/16	1000	3/8	300
1/4	1000	1/2	250
5/16	700	5/8	200
3/8	550	3/4	180
13/32	400	7/8	130
1/2	300	1	110
5/8	250	1 1/4	60
3/4	200	1 1/2	50
7/8	150	1 3/4	40
1	120		

*KA Fluid Systems UK only

Tape Wrapped & Convo-Flex® lengths, box sizes and drum sizes available upon request. Please consult our Sales Office.

Note: Unless otherwise agreed all shipments are $\pm 10\%$ original order quantity.

Packing Dimensions*

	Small	Medium	Large
			
Drum - A	500	750	850
B	500	750	850
C	330	330	490
			
Box Pallet - A	960	900	1150
B	620	900	1000
C	730	960	950

*KA Fluid Systems UK only

Transport Obligations, Costs and Risks

Group E – Departure

Under EXW (Ex Works), the seller minimises his risk by only making the goods available at his own premises.

EXW Ex Works

Carriage to be arranged by the buyer.
Risk transfer from the seller to the buyer when the goods are at the disposal of the buyer.
Cost transfer from the seller to the buyer when the goods are at the disposal of the buyer.

Group F – Main Carriage not paid by seller

Under F Terms, and under FCA (Free Carrier) unless otherwise agreed, the seller arranges and pays for the pre-carriage in the country of export.

FCA Free Carrier

Carriage to be arranged by the buyer or by the seller on the buyer's behalf.
Risk transfer from the seller to the buyer when the goods have been delivered to the carrier at the named place.
Cost transfer from the seller to the buyer when the goods have been delivered to the carrier at the named place.

FOB Free On Board

Carriage to be arranged by the buyer.
Risk transfer from the seller to the buyer when the goods pass the ship's rail.
Cost transfer from the seller to the buyer when the goods pass the ship's rail.

Group C – Main carriage paid by seller

Under C Terms the seller arranges and pays for the main carriage but without assuming the risk of main carriage.

CFR Cost & Freight

Carriage to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods pass the ship's rail.
Cost transfer at port of destination, buyer paying such costs as are not for the seller's account under the contract of carriage.

CIF Cost, Insurance & Freight

Carriage and insurance to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods pass the ship's rail.
Cost transfer at port of destination, buyer paying such costs as are not for the seller's account under the contract of carriage.

CPT Carriage Paid To

Carriage to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods have been delivered to the carrier.
Cost transfer at place of destination, buyer paying such costs as are not for the seller's account under the contract of carriage.

CIP Carriage & Insurance Paid

Carriage and Insurance to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods have been delivered to the carrier.
Cost transfer at place of destination, the buyer paying such costs as are not for the seller's account under the contract of carriage.

Group D – Arrival

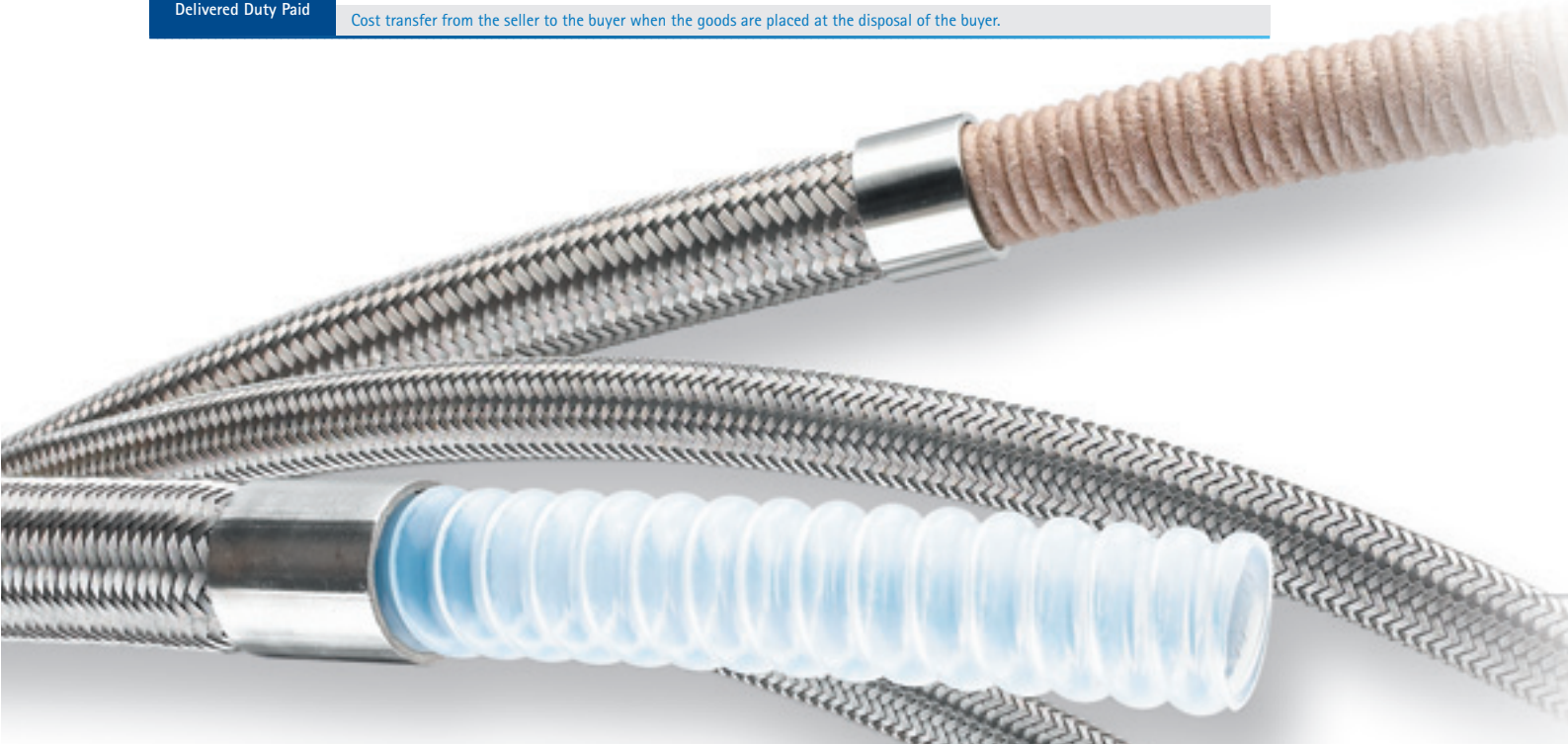
Under D Terms the seller's cost/risk is maximised because he must make the goods available upon arrival at the agreed destination.

DDU Delivered Duty Unpaid

Carriage to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods are placed at the disposal of the buyer.
Cost transfer from the seller to the buyer when the goods are placed at the disposal of the buyer.

DDP Delivered Duty Paid

Carriage to be arranged by the seller.
Risk transfer from the seller to the buyer when the goods are placed at the disposal of the buyer.
Cost transfer from the seller to the buyer when the goods are placed at the disposal of the buyer.



► Vacuum and Hose Performance

To ensure the selection of the right hose for a particular application, it is important to understand the potential effects of vacuum and its relationship to hose construction. Vacuum is also properly referred to as negative pressure which further helps to explain its effects on hose.

The primary factors that affect hose performance under vacuum are hose size and construction, temperature and bend radius. Hose construction determines the 'hoop' strength or the relative ability of the hose to resist collapse. Generally, smaller IDs, thicker walls, external reinforcement such as wire wrap or covers and bonding together the hose layers serve to increase hoop strength. As the temperature of a hose increases, the hoop strength typically decreases because the hose material softens. As a hose approaches its static bend radius limit, hoop strength can be adversely affected because the hose profile will go from round to oval. If combinations of these factors exist (i.e. large ID, thin wall, high temperature, extreme bending), hoop strength is reduced further.

Teflon® hose is a relatively thin walled product and is therefore subject to vacuum collapse if not properly specified and protected. With single braided smooth bore hose, the unbonded metal braid (the pressure handling element of the hose) is of limited value in a vacuum application, especially as temperature increases. The addition of internal or external springs or bonded covers is the best way to overcome potential vacuum collapse. Certain styles and smaller sizes, such as 'HV' convoluted, high pressure and -03 through -10 medium pressure smooth bore are rated for 28" Hg at ambient temperature and within specified bend radii.

UK Part Codes	USA Part Code	Inches of Hg
TTWW13.5B01	T1568-8	28
TTWW19.8B01	T1568-12	28
TTWW25.9B01	T1568-16	25
TTWW32.3B01	T1568-20	20
TTWW38.8B01	T1568-24	12
TTWW51.2B01	T1568-32	5
T1568-HV Series		
T1568-24HV	T1568-24HV	28
T1568-32HV	T1568-32HV	28
T1568-48HV	T1568-48HV	28
T1568-64HV	T1568-64HV	28
TSRV Series		
TSRV3.4B01	T1167-3	28
TSRV4.9B01	T1167-4	28
TSRV6.5B01	T1167-5	28
TSRV7.9B01	T1167-6	28
TSRV10.5B01	T1167-8	28
TSRV12.8B01	T1167-10	28
TSRV15.9B01	T1167-12	20
TSRV22.2B01	T1167-16	14
T1764 Series		
T1764-04	T1764-04	28
T1764-05	T1764-05	28
T1764-06	T1764-06	28
T1764-07	T1764-07	28
T1764-08	T1764-08	28
T1764-10	T1764-10	28
T1764-12	T1764-12	28

When vacuum is involved in an application, always determine the expected range of temperature and the potential bending conditions before specifying a particular hose. A common mistake to be avoided involves the use of a transfer hose connected to an 'upstream' valve. Since the hose assembly is open ended, the vacuum that is created when the valve is closed can be overlooked. However as fluid continues to flow downstream, the vacuum created can often exceed 28" Hg, causing even a 'full vacuum' rated hose to collapse. In this case, additional reinforcement is recommended.

► Smooth Bore Hose

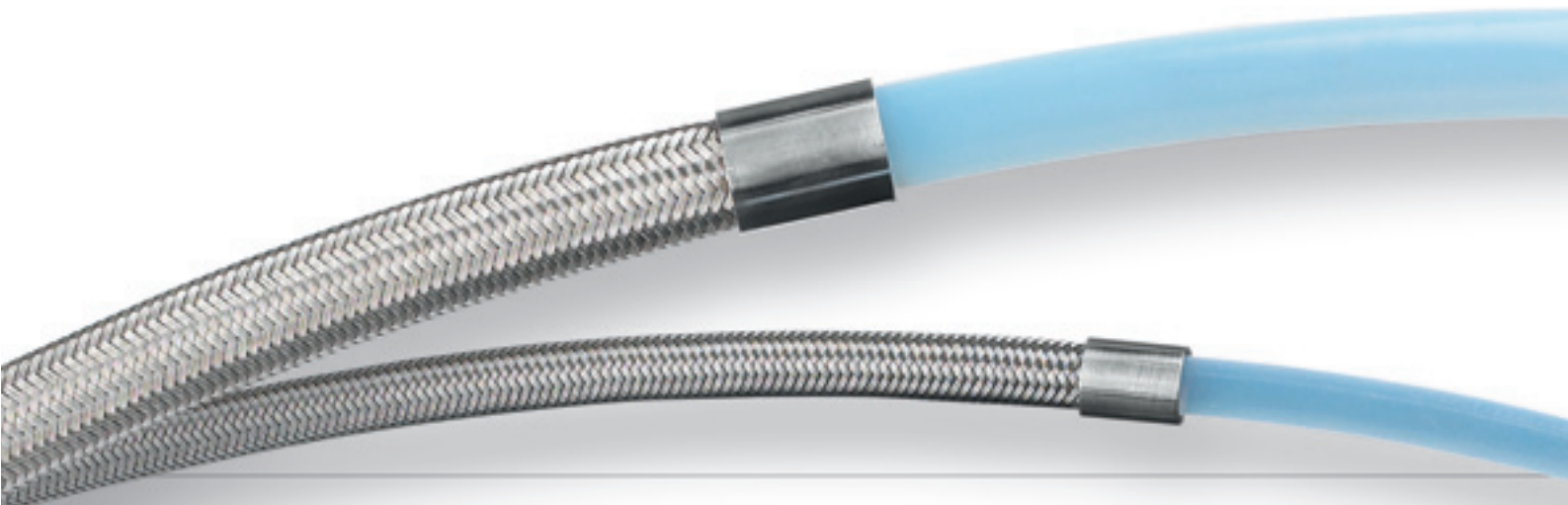
- Dash range meets or exceeds SAE 100R14 standard.
- Metric range for use with European hydraulic fittings.
- Customer-specific products may be discussed with our Sales Team, subject to volume.

The PTFE hose core is manufactured from Teflon®/PTFE. No pigments or additives are incorporated. The wire braiding (1 or 2 wire available) is produced from AISI 304/S15 or BS970-1 1996 quality hard drawn tensile stainless steel wire. Anti-static (carbon) versions of all hoses are available for where electrically resistive fluids are being transferred at high flow rates, please contact your KA Fluid Systems' sales team for further information.

SAE 100 R14 Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
T1167-03	TSRV3.4B01	DASH 3 SAE 100 R14	0.76	0.030	6.10	0.250	0.40	0.016	3.40	0.125	0.25	0.010	3,000	207	12,000	827	38	2.000
T1167-04	TSRV4.9B01	DASH 4 SAE 100 R14	0.76	0.030	7.77	0.312	0.50	0.020	4.93	0.187	0.35	0.014	3,000	207	12,000	827	51	2.000
T1167-05	TSRV6.5B01	DASH 5 SAE 100 R14	0.76	0.030	9.19	0.375	0.50	0.020	6.45	0.250	0.40	0.016	2,625	181	10,500	724	76	3.000
T1167-06	TSRV7.9B01	DASH 6 SAE 100 R14	0.76	0.030	11.00	0.445	0.60	0.024	7.95	0.312	0.45	0.018	2,500	172	10,000	690	100	4.000
T1167-07	TSRV9.5B01	DASH 7 SAE 100 R14	0.76	0.030	12.70	0.503	0.60	0.024	9.52	0.375	0.45	0.018	2,250	155	9,000	621	127	4.500
T1167-08	TSRV10.5B01	DASH 8 SAE 100 R14	0.76	0.030	13.60	0.549	0.70	0.028	10.46	0.405	0.50	0.020	2,000	138	8,000	552	133	5.200
T1167-10	TSRV12.8B01	DASH 10 SAE 100 R14	0.76	0.030	16.08	0.648	0.70	0.028	12.80	0.500	0.50	0.020	1,500	103	6,000	414	165	6.500
T1167-12	TSRV15.9B01	DASH 12 SAE 100 R14	0.76	0.030	19.38	0.778	0.75	0.030	15.88	0.625	0.60	0.024	1,250	86	5,000	345	197	7.700
T1167-14	TSRV19.0B01	DASH 14 SAE 100 R14	0.76	0.030	22.22	0.885	0.80	0.031	19.00	0.750	0.60	0.024	1,100	76	4,400	303	229	8.200
T1167-16	TSRV22.2B01	DASH 16 SAE 100 R14	0.89	0.030	25.78	1.030	1.20	0.047	22.22	0.875	0.80	0.031	1,000	69	4,000	276	229	9.000
T1167-18	TSRV25.4B01	DASH 18 SAE 100 R14	0.89	0.030	28.83	1.135	1.20	0.047	25.40	1.000	0.80	0.031	900	62	3,600	248	305	10.000
T1167-20	TSRV28.6B01	DASH 20 SAE 100 R14	0.89	0.030	32.74	1.290	1.20	0.047	28.57	1.125	0.80	0.031	750	52	3,000	207	406	16.000

Notes: USA part numbers – see imperial data
Other part numbers – see metric data



Smooth Bore Hose

Smooth Bore Metric Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TSSV4.9B01	TSSV4.9B01	4.9mm STD	0.89	0.035	7.87	0.310	0.60	0.024	4.89	0.193	0.40	0.016	4,000	276	12,000	827	51	2.008
TSSV5.1B01	TSSV5.1B01	5.1mm STD	0.89	0.035	8.05	0.317	0.60	0.024	5.10	0.201	0.40	0.016	3,830	264	11,500	793	64	2.520
TSSV6.7B01	TSSV6.7B01	6.7mm STD	0.76	0.030	9.35	0.368	0.60	0.024	6.70	0.264	0.40	0.016	3,250	224	9,750	672	76	2.992
TSSV8.0B01	TSSV8.0B01	8.0mm STD	0.89	0.035	11.30	0.445	0.60	0.024	8.00	0.315	0.40	0.016	3,160	218	9,500	655	102	4.016
TSSV8.4B01	TSSV8.4B01	8.4mm STD	0.64	0.025	11.05	0.435	0.60	0.024	8.40	0.331	0.40	0.016	3,000	207	9,000	621	102	4.016
TSSV10.0B01	TSSV10.0B01	10.0mm STD	0.64	0.025	12.65	0.498	0.60	0.024	10.00	0.394	0.40	0.016	2,660	183	8,000	552	127	5.000
TSSV10.3B01	TSSV10.3B01	10.3mm STD	0.89	0.035	13.44	0.529	0.60	0.024	10.30	0.406	0.40	0.016	2,660	183	8,000	552	133	5.236
TSSV13.2B01	TSSV13.2B01	13.2mm STD	0.89	0.035	16.55	0.652	0.75	0.030	13.20	0.520	0.50	0.020	2,330	161	7,000	483	152	5.984
TTSV13.6B01	TTSV13.6B01	13.6mm STD	0.89	0.035	17.15	0.675	0.75	0.030	13.60	0.535	0.50	0.020	2,330	161	7,000	483	150	5.906
TSSV16.6B01	TSSV16.6B01	16.6mm STD	0.89	0.035	19.75	0.778	0.75	0.030	16.60	0.654	0.50	0.020	1,660	114	5,000	345	178	7.008
TSSV19.8B01	TSSV19.8B01	19.8mm STD	0.89	0.035	22.96	0.904	0.85	0.033	19.80	0.780	0.60	0.024	1,500	103	4,500	310	203	7.992
TSSV22.1B01	TSSV22.1B01	22.1mm STD	0.89	0.035	25.27	0.995	0.85	0.033	22.10	0.870	0.60	0.024	1,330	92	4,000	276	229	9.016
TSSV26.1B01	TSSV26.1B01	26.1mm STD	0.89	0.035	29.25	1.152	0.85	0.033	26.10	1.028	0.60	0.024	1,160	80	3,500	241	305	12.008

Smooth Bore Heavy Wall Metric Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TSHV6.7B01	TSHV6.7B01	6.7mm HEAVY WALL	1.02	0.040	10.06	0.396	0.60	0.024	6.70	0.264	0.40	0.016	3,330	230	10,000	689	76	2.992
TSHV8.4B01	TSHV8.4B01	8.4mm HEAVY WALL	1.02	0.040	11.75	0.463	0.60	0.024	8.40	0.331	0.40	0.016	3,000	207	9,000	621	102	4.016
TSHV10.0B01	TSHV10.0B01	10.0mm HEAVY WALL	1.02	0.040	13.35	0.526	0.60	0.024	10.00	0.394	0.40	0.016	2,660	183	8,000	552	127	5.000
TSHV10.3B01	TSHV10.3B01	10.3mm HEAVY WALL	1.02	0.040	13.60	0.535	0.60	0.024	10.30	0.406	0.40	0.016	2,660	183	8,000	552	133	5.236
TSHV13.4B01	TSHV13.4B01	13.4mm HEAVY WALL	1.02	0.040	16.75	0.659	0.75	0.030	13.40	0.528	0.50	0.020	2,330	161	7,000	483	152	5.984
TSHV16.6B01	TSHV16.6B01	16.6mm HEAVY WALL	1.02	0.040	20.07	0.790	0.75	0.030	16.60	0.654	0.50	0.020	1,660	114	5,000	345	178	7.008
TSHV19.8B01	TSHV19.8B01	19.8mm HEAVY WALL	1.02	0.040	23.15	0.911	0.85	0.033	19.80	0.780	0.60	0.024	1,500	103	4,500	310	203	7.992
TSHV22.1B01	TSHV22.1B01	22.1mm HEAVY WALL	1.02	0.040	25.53	1.005	0.85	0.033	22.10	0.870	0.60	0.024	1,330	92	4,000	276	229	9.016
TSHV26.1B01	TSHV26.1B01	26.1mm HEAVY WALL	1.02	0.040	29.45	1.159	0.85	0.033	26.10	1.028	0.60	0.024	1,160	80	3,500	241	305	12.008

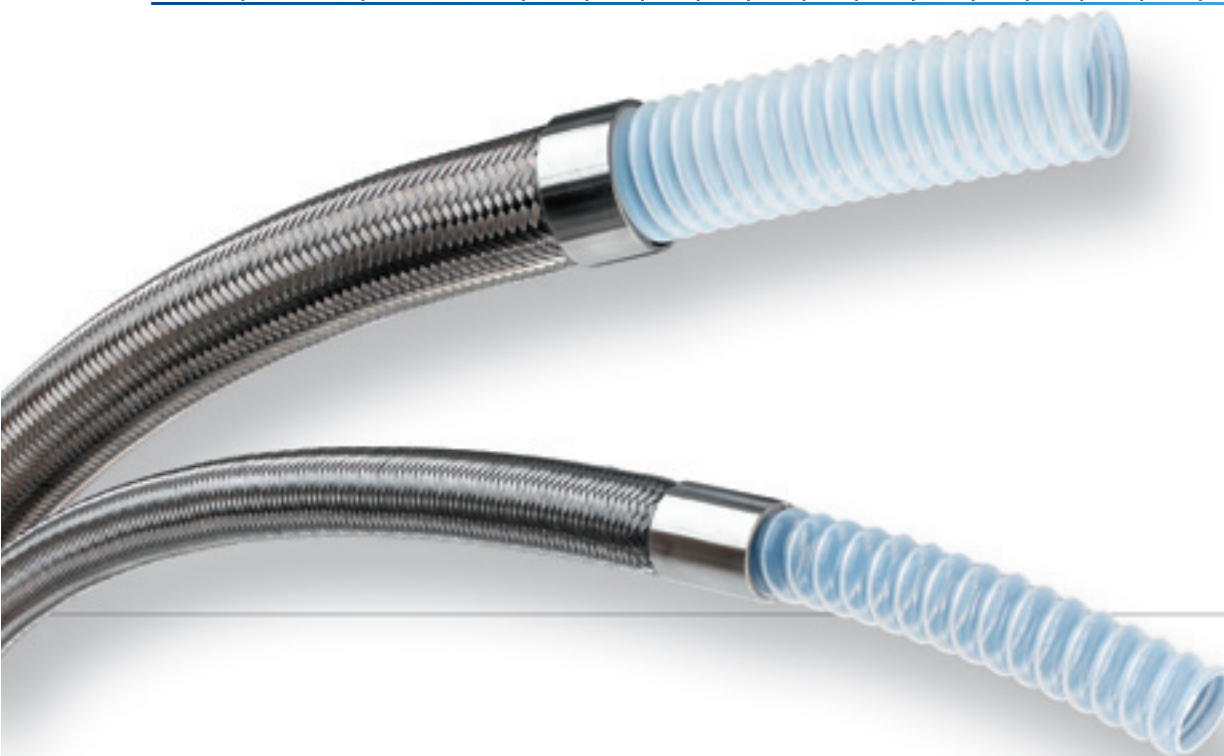
► Easyflex®

KA Fluid Systems has developed an automated process for the manufacturing of seamless, extruded convoluted hose.

Originally designed for easy assembly by re-sellers looking to extend their product portfolio. Easyflex® has a 'true' I/D and eliminates the need to de-convolute the hose when using standard hydraulic inserts. A range of ferrules to suit this product is available from KA Fluid Systems. Easyflex® is also available in assembly form from our Assembly Division. Anti-static (carbon) versions of all hoses are available for where electrically resistive fluids are being transferred at high flow rates, please contact your KA Fluid Systems' Sales Team for further information.

Easyflex® Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TCEV7.1B01	TCEV7.1B01	1/4" EASYFLEX	0.76	0.030	12.30	0.484	0.50	0.020	7.10	0.280	0.50	0.020	2,500	172	7,500	517	18	0.709
TCEV9.5B01	TCEV9.5B01	3/8" EASYFLEX	0.76	0.030	15.25	0.600	0.60	0.024	9.50	0.374	0.60	0.024	2,000	138	6,000	414	20	0.787
TCEV12.8B01	TCEV12.8B01	1/2" EASYFLEX	0.89	0.035	18.80	0.740	0.60	0.024	12.83	0.505	0.60	0.024	1,500	103	4,500	310	25	0.984
TCEV15.9B01	TCEV15.9B01	5/8" EASYFLEX	0.89	0.035	22.10	0.870	0.60	0.024	15.88	0.625	0.60	0.024	1,200	83	3,600	248	51	2.008
TCEV19.0B01	TCEV19.0B01	3/4" EASYFLEX	0.89	0.035	24.65	0.970	0.70	0.028	19.05	0.750	0.70	0.028	1,000	69	3,000	207	64	2.520
TCEV22.4B01	TCEV22.4B01	7/8" EASYFLEX	0.89	0.035	28.70	1.130	0.80	0.031	22.35	0.880	0.80	0.031	830	57	2,500	172	76	2.992
TCEV25.5B01	TCEV25.5B01	1" EASYFLEX	1.02	0.040	32.77	1.290	0.80	0.031	25.40	1.000	0.80	0.031	667	46	2,000	138	89	3.504
TCEV32.2B01	TCEV32.2B01	1 1/4" EASYFLEX	1.02	0.040	40.72	1.603	0.80	0.031	32.20	1.268	0.80	0.031	500	34	1,500	103	127	5.000
TCEV38.1B01	TCEV38.1B01	1 1/2" EASYFLEX	1.12	0.044	48.25	1.900	0.80	0.031	38.10	1.500	0.80	0.031	435	30	1,305	90	152	5.984
TCEV50.4B01	TCEV50.4B01	2" EASYFLEX	1.20	0.047	61.50	2.421	0.80	0.031	51.40	2.024	0.80	0.031	333	23	1,000	69	200	7.874



► Tape Wrapped

Combining extreme flexibility of application, corrosion resistance, long term durability and chemical inertness, this hose can be used in many diverse applications.

Chemical transfers, food handling, and various processing applications, from pure water to hazardous waste. This cost effective hose can replace existing nylon, rubber, metal hose or solid piping and tubing. Constructed using a helical tape wrapped PTFE with a glass fibre overlay, overbraided with AISI 304/S15 stainless steel. Anti-static versions available.

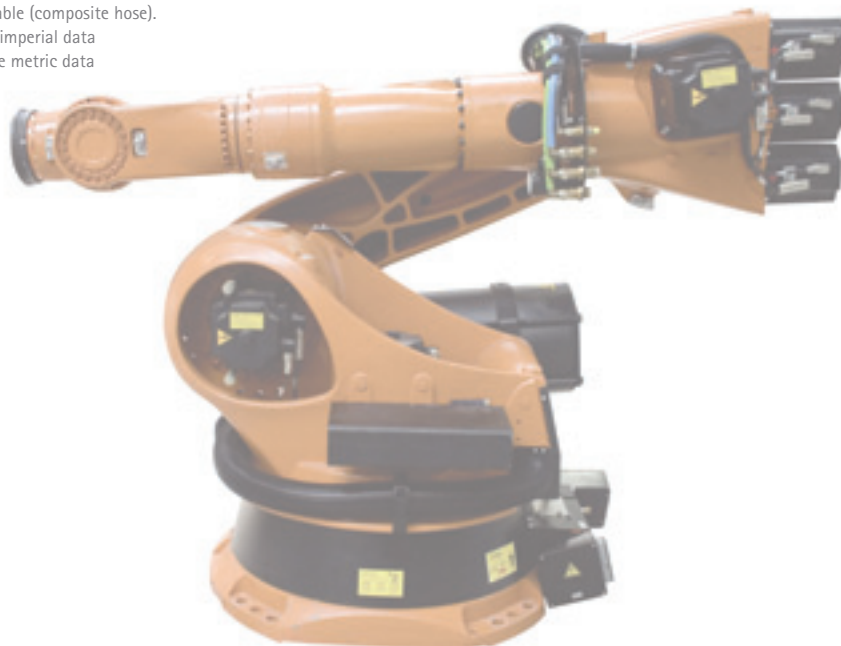
The tape-wrapped convoluted hose assemblies are also highly resistant to the demands of thermal cycling in laundries, rubber and plastic moulding and other types of steam service characterised by frequent on/off cycles. However they are not recommended for steam-cold water cycling applications.

Working temperature range -54°C to 200°C (65°F to 400°F)

Tape Wrapped Convuluted Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
T1568-06	TTWV9.7B01	3/8" TWC	-	-	15.00	0.540	0.80	0.024	9.65	0.375	0.60	0.024	1,000	69	4,000	276	25	1.000
T1568-08	TTWV13.5B01	1/2" TWC	-	-	19.18	0.820	0.80	0.031	13.45	0.500	0.80	0.031	1,250	86	5,000	345	38	1.500
T1568-10	TTWV16.5B01	5/8" TWC	-	-	23.04	0.910	0.80	0.031	16.48	0.625	0.80	0.031	1,400	97	5,600	386	51	2.000
T1568-12	TTWV19.8B01	3/4" TWC	-	-	26.87	1.070	0.80	0.031	19.85	0.750	0.80	0.031	1,100	76	4,400	303	64	2.500
T1568-16	TTWV25.9B01	1" TWC	-	-	32.90	1.340	0.80	0.031	25.88	1.000	0.80	0.031	875	60	3,500	241	76	3.000
T1568-20	TTWV32.3B01	1 1/4" TWC	-	-	39.78	1.570	0.80	0.031	32.30	1.250	0.80	0.031	875	60	3,500	241	89	3.500
T1568-24	TTWV38.8B01	1 1/2" TWC	-	-	45.70	1.810	0.80	0.031	38.85	1.500	0.80	0.031	750	52	3,000	207	114	4.500
T1568-32	TTWV51.2B01	2" TWC	-	-	58.27	2.320	0.80	0.031	51.18	2.000	0.80	0.031	500	34	2,000	138	133	5.250

Notes: Wall thickness not available (composite hose).
 USA part numbers – see imperial data
 Other part numbers – see metric data



► Convo-Flex®

Convo-Flex® Virgin-TCMV

Convo-Flex® Anti-Static-TCMF

- Convo-Flex® tube is helically convoluted and therefore is self draining. It offers easy cleaning, good flexibility and vacuum resistance.
- Convo-Flex® is available in a choice of virgin (TCMV) or anti-static (TCMF) liners.
- Having a generally heavier wall than its Easy-Flex® cousin, the Convo-Flex® range is more suited to use in more arduous applications throughout the process plant industry, including suction duties.

- Convo-Flex® can be assembled with a variety of overbraid materials (including stainless steel and polypropylene). Contact our Sales Office for further details.
- Convo-Flex® can be supplied with an integral stainless steel reinforcement wire following the convolutions of the hose. The wire provides greater kink resistance, general mechanical strength, and increased security on vacuum applications at elevated temperatures.

Convo-Flex® Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Convo OD Nominal		Tolerance +/-		Convo ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TCMV7.1BT	TCMV7.1BT	1/4" Convo-Flex	0.76	0.030	11.68	0.460	0.75	0.030	7.00	0.276	0.75	0.030	58	4.0	203	14.0	18	0.709
TCMV9.5BT	TCMV9.5BT	3/8" Convo-Flex	0.76	0.030	14.95	0.589	0.75	0.030	9.65	0.380	0.75	0.030	58	4.0	203	14.0	20	0.787
TCMV12.8BT	TCMV12.8BT	1/2" Convo-Flex	0.89	0.035	17.90	0.705	0.75	0.030	13.08	0.515	0.75	0.030	58	4.0	203	14.0	25	0.984
TCMV16.0BT	TCMV16.0BT	5/8" Convo-Flex	0.89	0.035	21.85	0.860	0.75	0.030	16.00	0.630	0.75	0.030	44	3.0	160	11.0	30	1.181
TCMV18.6BT	TCMV18.6BT	3/4" Convo-Flex	1.00	0.039	26.40	1.039	1.00	0.039	19.00	0.748	1.00	0.039	44	3.0	160	11.0	50	1.969
TCMV24.8BT	TCMV24.8BT	1" Convo-Flex	1.20	0.047	35.00	1.378	1.25	0.049	25.40	1.000	1.25	0.049	44	3.0	145	10.0	60	2.362
TCMV32.0BT	TCMV32.0BT	1 1/4" Convo-Flex	1.20	0.047	41.00	1.614	1.25	0.049	31.00	1.220	1.25	0.049	36	2.5	131	9.0	80	3.150
TCMV35.5BT	TCMV35.5BT	1 1/2" Convo-Flex	1.60	0.063	45.00	1.772	1.50	0.059	35.50	1.398	1.50	0.059	36	2.5	131	9.0	100	3.937
TCMV45.0BT	TCMV45.0BT	1 3/4" Convo-Flex	1.60	0.063	55.00	2.165	1.75	0.069	44.00	1.732	1.75	0.069	29	2.0	116	8.0	120	4.724
TCMV47.5BT	TCMV47.5BT	2" Convo-Flex	1.60	0.063	59.50	2.343	2.00	0.079	47.50	1.870	2.00	0.079	29	2.0	116	8.0	125	4.921
TCMV65.0BT	TCMV65.0BT	2 1/2" Convo-Flex	1.60	0.063	76.25	3.002	2.50	0.098	60.25	2.372	2.50	0.098	22	1.5	87	6.0	150	5.906
TCMV80.0BT	TCMV80.0BT	3" Convo-Flex	1.60	0.063	92.00	3.622	3.00	0.118	74.00	2.913	3.00	0.118	19	1.3	73	5.0	260	10.236
TCMV100.0BT	TCMV100.0BT	4" Convo-Flex	1.82	0.072	121.30	4.776	4.00	0.157	98.00	3.858	4.00	0.157	15	1.0	65	4.5	400	15.748



► Hose Assemblies

Individually manufactured smoothbore and convoluted hose assemblies are available with a range of connections from KA Fluid Systems.

Typical markets served include Breathing Equipment, Autosport, Hydraulics, High Pressure, Rail Industry, Food processing, Automotive, Pharmaceutical, Petrochemical and Marine. Various braid materials are available including 304/316 Stainless Steel, Polypropylene, Polyester, Aramid, Kynar and Fibreglass. Internal or external wire reinforcement is available to provide greater vacuum and kink resistance. A range of optional sleeving and external protection is available. Please contact your KA Fluid Systems' sales team for further information.

Assemblies supplied from Normanton, UK are in accordance with Pressure Equipment Regulations SI 1999 No.2001 and Pressure Equipment Directive 97/23/EC.



► Lifeflex®

The combination of precision automotive engineering and proven everyday robustness makes Lifeflex® a truly unique hose. Patented engineering has created a 100% smoothbore high pressure hose with flexibility and kink-resistance to rival convoluted products, whilst the automotive standard Teflon®/PTFE liner handles extremes of internal and external temperature.

- Liner is Fluorocomp® and is fully compliant with all known fuels, including Biofuels and CNG.
- Minimal volumetric expansion and length change over the full range of pressure.
- Ultra-low fuel permeation (i.e. CARB 24hr test)
- LEV 2/Tier 2 compliant.
- ECE R110 Accredited (CNG)
- Smooth Bore (Patented Design) - providing a better flow rate and easier cleaning.
- Available with anti-static liner - request this option as Part No. T1765.

Lifeflex® Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
T1764-04	T1764-04	3/16" Lifeflex	0.76	0.030	9.55	0.376	0.56	0.022	4.90	0.193	0.28	0.011	4,000	276	16,000	1,103	32	1.250
T1764-05	T1764-05	1/4" Lifeflex	0.76	0.030	11.61	0.457	0.56	0.022	6.35	0.250	0.33	0.013	3,750	259	15,000	1,034	44	1.750
T1764-06	T1764-06	5/16" Lifeflex	0.76	0.030	13.18	0.519	0.56	0.022	7.34	0.289	0.38	0.015	3,500	241	14,000	965	57	2.250
T1764-07	T1764-07	3/8" Lifeflex	0.76	0.030	14.53	0.572	0.56	0.022	8.64	0.340	0.38	0.015	3,000	207	12,000	827	70	2.750
T1764-08	T1764-08	7/16" Lifeflex	0.76	0.030	16.23	0.639	0.56	0.022	10.57	0.416	0.51	0.020	2,500	172	10,000	689	72	2.850
T1764-10	T1764-10	1/2" Lifeflex	0.76	0.030	19.15	0.754	0.56	0.022	12.57	0.495	0.51	0.020	1,800	124	7,200	496	108	4.250
T1764-12	T1764-12	5/8" Lifeflex	0.76	0.030	21.95	0.864	0.56	0.022	14.99	0.590	0.51	0.020	1,500	103	6,000	414	140	5.500



► Fluorocomp®

Fluorocomp® is a patented, pre-formable composite hose designed to perform exceptionally in safety-critical, high temperature automotive environments. The PTFE-impregnated braid functions as an integral heat-shield, whilst the anti-static Teflon®/PTFE barrier layer ensures total compatibility with fuels and oils up to +260°C.

- Safe fluid transfer in hot spots.
- Cost effective.
- Pre-formable for uncompromised routability.
- Lev2/Tier 2, Bin 5 compliant.
- Applications include: turbo feed/drain, fuel rail and oil cooler on many global vehicle platforms.
- Suitable for use with Biofuels (E85, B100) and alternative Fuels (CNG, LPG, etc.).
- In-built heat-shield (fibreglass braid).
- Excellent noise/vibration attenuation.



Fluorocomp® Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TFH2001-050	TFH2001-050	1/4" Automotive	1.83	0.072	-	-	0.20	0.008	6.40	0.252	0.41	0.016	1,000	69	6,200	427	51	2.000
TFH2001-060	TFH2001-060	5/16" Automotive	2.01	0.079	-	-	0.20	0.008	7.85	0.309	0.41	0.016	1,000	69	7,300	503	76	3.000
TFH2001-070	TFH2001-070	3/8" Automotive	2.57	0.101	-	-	0.20	0.008	9.42	0.371	0.41	0.016	750	52	6,100	421	89	3.500
TFH2001-080	TFH2001-080	7/16" Automotive	2.57	0.101	-	-	0.20	0.008	10.92	0.430	0.41	0.016	750	52	3,000	207	102	4.000
TFH2001-100	TFH2001-100	1/2" Automotive	2.67	0.105	-	-	0.30	0.012	13.08	0.515	0.51	0.020	750	52	3,000	207	140	5.500
T1758-05	T1758-05	1/4" Industrial	2.06	0.081	10.50	0.414	0.47	0.019	6.38	0.251	0.41	0.016	800	54	3200	216	70	2.750
T1758-06	T1758-06	5/16" Industrial	2.17	0.086	12.19	0.480	0.51	0.020	7.85	0.309	0.41	0.016	800	54	3200	216	76	3.000
T1758-07	T1758-07	3/8" Industrial	2.29	0.090	13.84	0.545	0.51	0.020	9.27	0.365	0.41	0.016	800	54	3200	216	83	3.250
T1758-08	T1758-08	7/16" Industrial	2.16	0.085	15.11	0.595	0.51	0.020	10.80	0.425	0.51	0.020	800	54	3200	216	96	3.750
T1758-10	T1758-10	1/2" Industrial	2.48	0.098	18.03	0.710	0.51	0.020	13.08	0.515	0.51	0.020	800	54	3200	216	134	5.250

Notes: Hose wall and tolerance used instead of Braid OD for automotive products
Alternative sizes available on request, subject to minimum order



▶ Autosport Aftermarket Brake Hoses

KA Fluid Systems PTFE hoses are widely used as original equipment and high-performance upgrades in many demanding autosport applications, especially braking systems.

▶ Key Advantages:

- Unrivalled flex-life (>18 million normal cycles) for exceptional durability.
- Minimal volumetric expansion (hose swelling) for powerful braking and amazing 'feel'!
- Negligible water ingress, meaning brake fluid is not contaminated and performance is not compromised.
- Available with a range of protective covers to enhance the look of your vehicle.

Please contact KA Fluid Systems for details of your nearest supplier of FMVSS106-compliant brake hose assemblies.

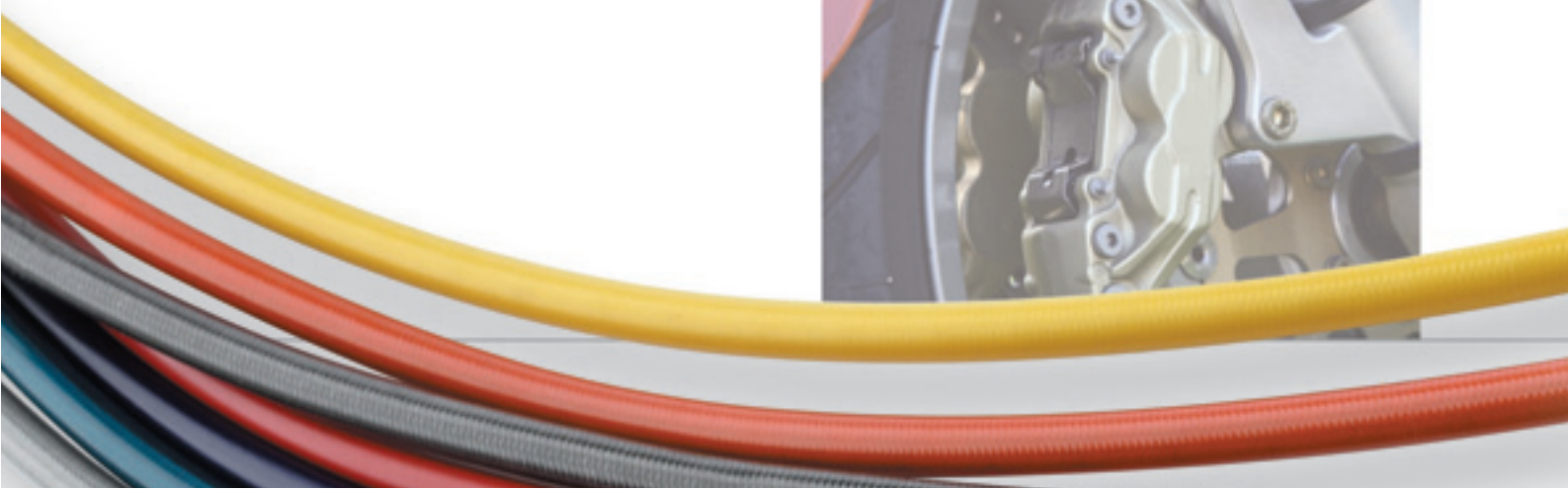
▶ Automotive

Automotive Original Equipment Brake Hoses. Our automotive hose range has been developed to provide 'ultra' low volumetric expansion for safety critical applications such as clutch and brake. Our products are used by many global car manufacturers, including BMW, Mercedes, Renault, Ford, GM, PSA and VW Group.

When high volume/high speed assembly is required, there is only one choice - KA Fluid Systems cut-to-length technology allows 'zero flare' ensuring our customers maximise their 'in house' efficiencies and all but eliminate scrap.

Product is, as standard, carbon lined to deal with any unwanted electrical discharge and has an optional extruded thermoplastic cover to provide extra protection from abrasion, stone impact and Corrosion.

Contact your KA Fluid Systems' Sales Department for Specifications, Drawings and information on other products with 'zero flare'!





► Thermal-Lite Fluid Hose

- Compatible with ALL racing fluids including fuels.
- Construction: Conductive PTFE liner, non-absorbent insulation layers, light weight UV resistant Aramid yarn braid.
- Built in insulation can mean precious extra minutes in the event of a thermal incident.
- Tested according to SAE J15727 Sec 6 with the external surfaces of the hose allowing for temperatures in excess of 1200°F or 648°C, the fuel inside the hose remained stable without any rupture under five minutes.
- Also available with a stainless steel braid for additional kink resistance.

Other autosport hoses are available, both smooth and convoluted, from 2mm to 25mm bore with various braid and cover options.

Please contact KA Fluid Systems for further details.

Autosport Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TSHV2.0B01	TSHV2.0B01	2.0mm HEAVY WALL	0.90	0.035	4.80	0.189	0.50	0.020	2.00	0.079	0.25	0.010	4,833	333	14,500	1,000	25	0.984
TSSL2.9B01	TSSL2.9B01	2.9mm LIGHT WALL	0.51	0.020	5.03	0.198	0.50	0.020	2.90	0.114	0.25	0.010	4,833	333	14,500	1,000	25	0.984
60-12043-03	TSHV3.4B01	1/8" HEAVY WALL	0.89	0.035	6.17	0.243	0.50	0.020	3.40	0.134	0.25	0.010	4,660	321	14,000	965	38	1.496
60-12040	TSHV3.4B01C01	1/8" HEAVY WALL PVC	0.89	0.035	7.11	0.280	0.50	0.020	3.40	0.134	0.25	0.010	4,660	321	14,000	965	38	1.496
T1835-06	T1835-06	3/8" THERMAL-LITE	-	-	18.54	0.730	-	-	10.29	0.405	-	-	1,250	86	3,750	258	63.5	2.500
T1835-08	T1835-08	1/2" THERMAL-LITE	-	-	21.84	0.860	-	-	13.34	0.525	-	-	1,000	69	3,000	206	88.9	3.500
T1835-10	T1835-10	5/8" THERMAL-LITE	-	-	24.77	0.975	-	-	15.88	0.625	-	-	750	52	2,250	155	101.6	4.000
T1835-12	T1835-12	3/4" THERMAL-LITE	-	-	28.45	1.120	-	-	19.05	0.750	-	-	500	35	1,500	103	114.3	4.500

► T1700/T2000

Lightweight High Pressure PTFE Hoses

These lightweight, high pressure hoses are specially constructed for applications requiring strength, reliability and long term performance. Add to this the wide operating temperature range within which Teflon®/PTFE performs and KA Fluid Systems have provided another No.1 choice for conveying hot oils, adhesives, sealants, phosphates and chemicals.

Low volumetric expansion ensures precise product delivery for robotic and injection moulding systems. Now available up to Dash 24 size, the range offers the largest smoothbore hose of its kind. T1700 is post sintered for the lowest effusion levels for industrial gas applications. T2000 is non-post sintered for more general applications where particularly searching gases are not conveyed.

► T1561/T1710

Heavy Duty High Pressure PTFE Hoses

With the most rugged of constructions this hose is designed to perform in high shock and high vibration applications, especially where the hose may be subject to external abuse. This product is ideal for pressure impulse and cycling such as reaction injection moulding. Hydraulic fluids, oils, acids and corrosive chemicals are no problem for this hose.

T1561 hose is designed with a smoothbore conductive PTFE liner (T1710 has a post-sintered core), over braided with multiple layers of stainless steel wire. Sizes 1/4" and 3/8" consist of an inner braid, four spiral layers and an outer braid. Sizes 1/2" through to 1" have an inner braid, six spiral layers and an outer braid. For suitability of specific operating conditions please contact KA Fluid Systems.

T1700/T2000 Light Weight High Pressure Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
T1700 / 2000-04	T1700 / 2000-04	1/4" Light Weight HP	1.03	0.041	9.53	0.375	0.38	0.015	5.64	0.222	0.25	0.010	5,000	345	16,000	1,103	38	1.500
T1700 / 2000-06	T1700 / 2000-06	3/8" Light Weight HP	1.03	0.041	12.01	0.473	0.38	0.015	7.82	0.308	0.25	0.010	5,000	345	16,000	1,103	64	2.500
T1700 / 2000-08	T1700 / 2000-08	1/2" Light Weight HP	1.17	0.046	15.24	0.600	0.44	0.018	10.19	0.401	0.25	0.010	5,000	345	16,000	1,103	74	2.900
T1700 / 2000-10	T1700 / 2000-10	5/8" Light Weight HP	1.30	0.051	18.03	0.710	0.46	0.018	12.57	0.495	0.25	0.010	5,000	345	16,000	1,103	84	3.300
T1700 / 2000-12	T1700 / 2000-12	3/4" Light Weight HP	1.30	0.051	24.64	0.970	0.51	0.020	15.67	0.617	0.38	0.015	5,000	345	16,000	1,103	102	4.000
T1700 / 2000-16	T1700 / 2000-16	1" Light Weight HP	1.30	0.051	31.75	1.250	0.51	0.020	22.02	0.867	0.37	0.015	5,000	345	16,000	1,103	127	5.000
T1700 / 2000-20	T1700 / 2000-20	1 1/4" Light Weight HP	1.80	0.071	40.64	1.600	1.02	0.040	28.58	1.125	0.64	0.025	4,000	276	16,000	1,103	305	12.000
T1700 / 2000-24	T1700 / 2000-24	1 1/2" Light Weight HP	1.80	0.071	48.77	1.920	1.02	0.040	34.93	1.375	0.64	0.025	4,000	276	12,000	827	356	14.000

Notes: Working pressures should be down-rated for impulse applications

T1561 Heavy Duty High Pressure Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
T1561-04 / T1710-04	T1561-04 / T1710-04	1/4" Heavy Duty HP	1.04	0.041	12.32	0.485	0.25	0.010	5.84	0.230	0.13	0.005	6,000	414	24,000	1,655	76	3.000
T1561-06 / T1710-06	T1561-06 / T1710-06	3/8" Heavy Duty HP	1.04	0.041	15.07	0.594	0.29	0.012	7.68	0.303	0.19	0.008	6,000	414	24,000	1,655	127	5.000
T1561-08 / T1710-08	T1561-08 / T1710-08	1/2" Heavy Duty HP	1.30	0.051	18.61	0.733	0.32	0.013	10.16	0.400	0.25	0.010	6,000	414	24,000	1,655	146	5.750
T1561-10 / T1710-10	T1561-10 / T1710-10	5/8" Heavy Duty HP	1.30	0.051	23.11	0.910	0.51	0.020	13.46	0.530	0.25	0.010	4,000	276	12,000	827	159	6.250
T1561-12 / T1710-12	T1561-12 / T1710-12	3/4" Heavy Duty HP	1.30	0.051	26.80	1.055	0.51	0.020	16.64	0.655	0.25	0.010	4,000	276	12,000	827	197	7.750
T1561-16 / T1710-16	T1561-16 / T1710-16	1" Heavy Duty HP	1.30	0.051	33.66	1.325	0.64	0.025	22.54	0.888	0.44	0.018	4,000	276	12,000	827	245	9.630

Notes: Working pressures should be down-rated for impulse applications



► High Performance Gas Hose

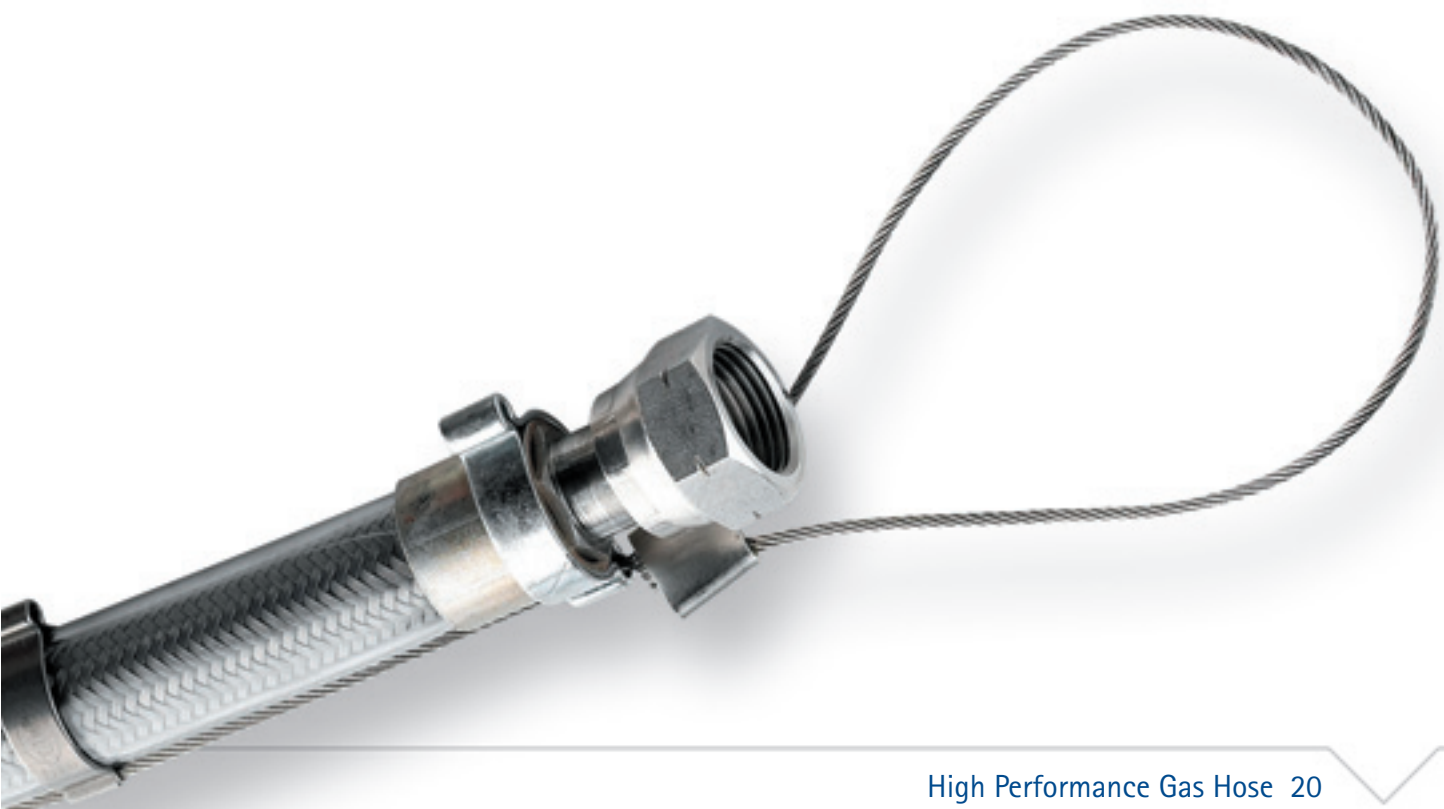
- KA Fluid Systems high performance gas hoses are specially processed to minimise permeation.
- A variety of braid and cover options are available.
- Suitable for applications such as charging lines for aerosols, gas bank/bottle charging, dehydration lines, breathing equipment.
- Assemblies and specialised liners, such as ETFE, PFA, FEP, are available. Please contact our Sales Team for further details.
- Gas quality hoses in sizes other than those shown below are available upon request, as are alternative braid packages (eg. one-wire braid).

Gas Hose Aramid Yarn Braid 1 Wire Braid + Polyester Cover Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TSGV6.6B23C42	TSGV6.6B23C42	1/4" GAS (1KB, 1WB, H)	1.02	0.040	12.60	0.496	0.50	0.020	6.60	0.260	0.30	0.012	6,000	414	24,000	1654	76	2.992
TSGV8.1B23C42	TSGV8.1B23C42	5/16" GAS (1KB, 1WB, H)	1.02	0.040	14.00	0.551	0.50	0.020	8.05	0.317	0.30	0.012	5,500	379	22,000	1516	102	4.016
TSGV10.3B23C42	TSGV10.3B23C42	13/32" GAS (1KB, 1WB, H)	1.02	0.040	17.15	0.675	0.50	0.020	10.30	0.406	0.30	0.012	4,500	310	18,000	1241	133	5.236

Gas Hose 2 Wire Bunch Braid Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
TSGV6.6B04	TSGV6.6B04	1/4" GAS 2WB BUNCH	1.02	0.040	11.43	0.450	0.60	0.024	6.35	0.250	0.40	0.016	4,640	320	18,560	1280	76	2.992
TSGV10.3B04	TSGV10.3B04	13/32" GAS 2WB BUNCH	1.02	0.040	15.50	0.610	0.60	0.024	10.15	0.400	0.40	0.016	3,000	207	12,000	828	133	5.236



Chlorine Transfer Hose Assemblies

► Chlorine/Bromine Transfer Hose

Liquid Chlorine transfer is one of the most difficult handling problems in the chemical industry today. At ordinary temperatures, Chlorine is a gas possessing an intense odour. When the gas is cooled at atmospheric pressure, it liquefies, forming clear amber liquid. Teflon® is the Ideal transfer medium due to its unique properties; it is the only hose that can adequately transfer Chlorine in a safe manner.

KA Fluid Systems' Chlorine transfer hose meets or exceeds the Chlorine Institute specification on operating and test characteristics. KA Fluid Systems' exclusive design resists rugged handling and collapse. In addition, the low profile helical convolutions facilitate easy draining. Each assembly is also serialised for traceability.

- INNERCORE:** Convoluted, heavy wall PTFE with an integral fibreglass cover.
- BRAID:** Two layers of Kynar reinforcement braid.
- FITTINGS:** Fittings include male pipe, flange retainer and hose crimped collars, all precision machined from monel type R. The 1/2" male pipe fitting is lined with PFA Teflon.
- COVER:** CPE abrasion jacket consisting of 1/8" drilled holes. A moulded label every 3 feet or 1 metre states the KA Fluid Systems Logo, Chlorine service, part number, maximum operating pressure and temperature.
- CRIMPED COLLAR:** The Crimped 304 Stainless Steel collar holds the CPE cover in place with a lock to the fitting behind the wrenching area.

Medium Pressure Chlorine Transfer Range

USA Part Number	Part Number	Description	Tube Wall Thickness Nom.		Braid OD Nominal		Tolerance +/-		Braid ID Nominal		Tolerance +/-		Max. Working Pressure		Min. Burst Pressure		Min. Bend Radius	
			(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(psi)	(bar)	(psi)	(bar)	(mm)	(in)
60-10298-08Z	60-10298-08Z	1/2"	-	-	23.37	0.920	0.76	0.030	13.72	0.540	0.38	0.015	500	34	2,000	138	38	1.500
60-10298-16Z	60-10298-16Z	1"	-	-	35.20	1.386	0.76	0.030	26.54	1.045	0.76	0.030	375	26	1,875	129	152	6.000

Notes: Not available as bulk hose
Hoses are only available as part of an assembly supplied by KA Fluid Systems
Temperature range -40 to +120°F



▶ Extruded Sleeving

Hytrell

- Offers the best combination of abrasion resistance, ease of cleaning and sanitary handling.
- Combines maximum bend radius with increased hoop strength and greater kink resistance.
- High durometer cover provides up to eight times the abrasion resistance of natural rubber,
- Greatly increases the average hose life
- Extruded on to numerous hoses and available in various colours with several print options.

Silicone

- Provides heat protection in critical applications such as marine, automotive engine compartments and autoclaves.
- Designed to handle 400°F or 204°C.
- This integral cover adds hoop strength and kink resistance to most standard sized PTFE hose.
- Colour options available on request.

Santoprene

- Endless colour permutations.
- Increases hose hoop strength to help prevent kinking.
- Excellent resistance to UV, ozone and most acids and alkalis
- Easily cleanable
- Print options available

TPE

- Protects against stone impact and sand ingress.
- Easily removed to allow metal to metal crimp.
- Elastomeric, aiding hose flexibility

PVC

- Endless colour permutations including 'glass' clear colour.
- Easily cleaned for aesthetic appearance
- Print options available
- Ideal for enhancing the aesthetics of hoses in prominent applications, such as aftermarket motorcycle brake lines.

Please contact your KA Fluid Systems' Sales Department for further information on hose covers and print options available, also due to the varying grades of cover materials available working temperatures of the covers can only be confirmed by your local KA Fluid Systems' Sales Department upon enquiry.

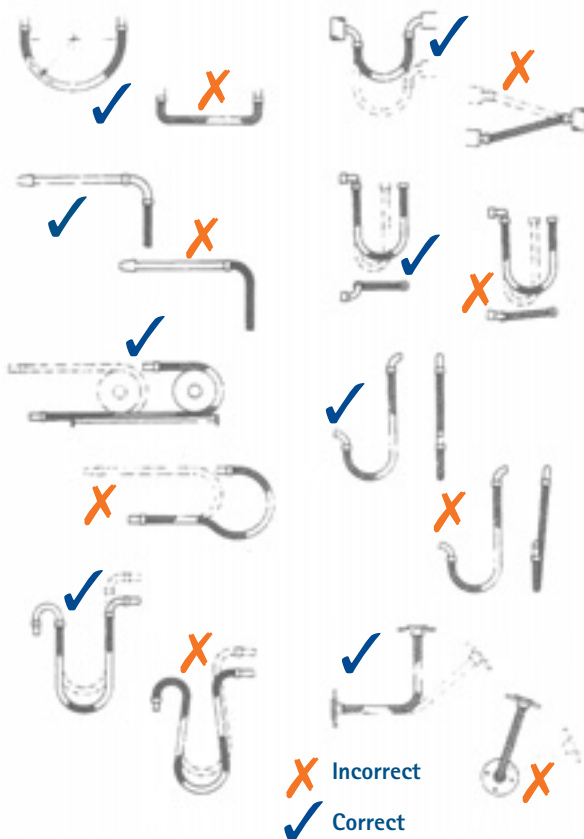
► Hose Routing and Maintenance

- Correct hose installation can have a dramatic effect on hose life. Here are some basic guidelines to follow when selecting a hose assembly.
- Where appropriate secure the hose to the equipment in such a way as to protect the hose assembly from being damaged. Following the framework of the equipment is generally best. Try to secure the hose away from points of abrasion or wear. If this is not possible, use an appropriate abrasion-resistant sleeve or protective cover.
- When routing, do not exceed the minimum bend radius of the hose. If hoses of various ID's are bundled together, the largest ID hose will dictate the minimum bend radius. If the hose pivots, rotates, flexes or reciprocates during operation, be sure to allow enough length for free movement at all points in the cycle. Even in a stationary application, be sure to allow for length change during pressure cycles.

- Where extreme heat cannot be avoided, especially when conveying flammable substances, always use fire sleeving.
- Hose is a good compensator in multi-plane flexing applications, but it will fail quickly if subjected to torquing or twisting. In these applications route the hose so as to avoid torque or twist, or use a rotary joint or fitting. Always avoid torquing the hose assembly when attaching the second end.
- If the hose is subject to frequent handling, be sure to do so safely and appropriately. Observe minimum bend radius guidelines. Abuse is the number one cause of shortened hose life and hose failure. When replacing a failed hose, be sure it was properly installed in the first place. Look for areas of wear and kinks. Never assume the hose was properly installed to begin with.

For more information on hose routing and maintenance, please refer to our website.

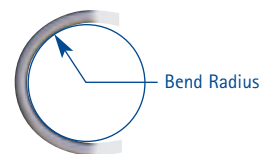
► Installation



► Definitions

Bend Radius:

The radius of a bent section of hose, measured to the innermost surface of the curved portion (see below)



Minimum Bend Radius:

The maximum amount to which a hose can be bent before causing kinking or damage.

Follow the formula below to determine the minimum length of hose to make the angle of bend required. NOTE: The bend should take effect over the entire minimum length, not just a portion of it.

General Formula

$$\text{angle of bend} \div 360 \times 2 \times r = \text{minimum length of hose to make bend}$$

$$r = \text{given bend radius of hose}$$

$$\pi = \text{approximately } 3.14$$

Example:

To make a 90° bend with TCMW1B1 38mm ID

$$r = 120\text{mm}$$

$$\text{angle of bend} = 90^\circ$$

$$90 \div 360 \times 2 \times 3.14 \times 120 = 188.4\text{mm}$$

188.4mm is the minimum length to make a bend without damage.

Note: The minimum bend radius listed in the catalogue is for a static bend at ambient temperature. Dynamic bending, especially at elevated temperatures will increase the minimum bend radius accordingly. Always consult KA Fluid Systems with specific applications.

Applications		
AIR CONDITIONING	Dehydration lines for steam purging prior to filling with refrigerant	Hot gas
BAKERIES	Heating supply lines to batter mixing kettles	Steam
BOTTLE MAKING	Power lines, hot bottle stacking machine	Air
BREATHING APPARATUS	Cylinder to pressure gauge or demand valve	Compressed air or oxygen
CANNING	Beer can sealant lines, Charging line for pressurising aerosols, Coolant lines to can , support racks, automatic soldering machine	Hot adhesive, nitrous oxide, water,
CAR, BUS, AND TRUCK	Brake lines, Brake clutch, fuel and sump hoses for high performance cars, (rally and racing models), Radiator hoses, Turbocharger installation, Alternative fuel vehicles	Hydraulic brake fluid, clutch and brake fluid, fuel and oil, cooling water, oil drain, CNG/LPG
CARTON MAKING	Supply lines on milk carton manufacturing machines	Hot waxes and adhesives (non-toxic)
CHEMICAL	Chemical transfer hoses	Various acids alkalis, solvents, hydrocarbons etc.
COSMETICS	Transfer hose	Powders and oils
DISTILLING	Barrel filling	Whiskey
ELECTRONICS	Coolant lines for electronic racks and equipment	Water
FOOD	Deep frying oil and fat recirculating racks and systems, Transfer lines for corn syrup processing, Heat supply lines, individual jam packaging machines	Hot edible animal and vegetable oils and fats, glutamates, steam
INDUSTRIAL GASES	Cylinder charging hoses often "cleaned" for H.P. oxygen	Oxygen / nitrogen / argon / acetylene / helium etc.
LAUNDRY / DRY CLEANING	Steam line on laundry presses and irons	Steam
LIGHT BUOYS / LIGHTHOUSES	Flexible feed lines cylinders / light burner	Acetylene
MARINE	Hydraulic control and power systems (steering gear etc), Condensate lines	Fire resistant and water emulsion hydraulic fluids, steam
MOTORCYCLES	Hydraulic clutch, brake and oil	Clutch and brake fluid, oil transfer
OIL	Transfer hose	Crude oil, salt water
PACKAGING INDUSTRY	Adhesive lines for sealing	Industrial solvents
PAINTBALL	Gas lines for guns	CO2 gas
PAINT SPRAYING	Supply lines, airless spraying systems	Paint, lacquers, organic solvents
PAPER AND CARDBOARD MAKING	Heating lines to drum type and surface finishers and rollers on, corrugated box board formers	Steam
POWER STATIONS	Feed lines to burners	Fuel oil
PRESS AND INJECTION MOULDING MACHINES	Heating and cooling lines to platen presses, and injection moulding heads	Alternating steam and cold water
PROCESS PLANT	Transfer hose cooling and/or heating hose, ventilation pipe	Slurry, distillates, plating solutions, water, oil,, air, partial vacuum
REFRIGERATION	Plate freezers, chiller cabinets, capillary lines	Brine, refrigerant fluids
SHOE MAKING	Supply lines on sole cementing machine	Hot adhesives and cement
TELEVISION / RADIO	Non-conductive cooling hoses on transmitters	Water, steam, air
TEST RIGS	Highly flexible large bore transfer hose	Water, air, hydraulic oil, vacuum
TEXTILES (PROCESS PLANT)	Heating lines on dryers, (similar to paper making industry)	Steam
TYRE AND TUBE MANUFACTURING	Heating lines on tyre press machines	Steam
TYRE REMOULDING	Heating lines on retreading machines	Steam
URETHANE FOAM MANUFACTURING	Supply lines on foam making machines	Hot resins and activators, at high pressures

NOTE: The following data is obtained at a fluid temperature of +21°C (+70°F), higher temperatures may affect suitability.
All the information should be treated as a general guide only and testing under actual service conditions is strongly recommended.

Key:

- A = Excellent
- B = Good
- C = No information available
- X = Unsuitable

Hose End Fitting Material

Chemical	PTFE	CS	304SS	316SS	Brass
Acetaldehyde	A	A	A	A	A
Acetic Acid, Glacial	A	C	B	B	C
Acetic Acid 30%	A	X	B	B	X
Acetic Anhydride	A	X	B	B	X
Acetone	A	A	A	A	A
Acetylene	A	C	A	A	B
Acrylonitrile	A	A	A	A	C
Alum, Ammonium or Potassium	A	X	B	B	X
Aluminium Acetate	A	C	A	A	X
Aluminium Bromide	A	X	B	B	X
Aluminium Chloride	A	X	B	B	X
Aluminium Fluoride	A	X	B	B	X
Aluminium Hydroxide	A	C	A	A	A
Aluminium Nitrate	A	X	A	A	C
Aluminium Salts	A	C	B	B	C
Aluminium Sulphate	A	X	X	B	X
Ammonia Anhydrous	A	A	A	A	C
Ammonia, Aqueous	A	C	A	A	X
Ammonium Carbonate	C	A	A	A	C
Ammonium Chloride	A	C	B	B	X
Ammonium Hydroxide	A	B	A	A	X
Ammonium Metaphosphate	A	A	A	A	C
Ammonium Nitrate	A	A	A	A	X
Ammonium Nitrite	C	C	A	A	C
Ammonium Persulphate	C	C	A	A	C
Ammonium Phosphate	A	X	B	A	C
Ammonium Sulphate	A	A	A	A	X
Ammonium Thiocyanate	A	A	A	A	C
Amyl Acetate	A	X	A	A	A
Amyl Alcohol	A	A	A	A	A
Amyl Chloride	A	C	A	A	C
Amyl Chloronaphthalene	A	C	A	A	C
Amyl Naphthalene	A	C	A	A	C
Aniline	A	B	A	A	X
Aniline Dyes	A	X	A	A	C
Aniline Hydrochloride	A	C	X	X	X
Animal Fats	A	A	A	A	C
Aqua Regia	A	C	X	X	C
Arsenic Acid	A	B	C	A	C
Askarel	C	A	A	A	A
Asphalt	A	A	A	A	B
Barium Carbonate	A	B	A	A	A
Barium Chloride	A	X	A	A	B
Barium Hydroxide	A	B	A	A	C
Barium Sulphate	A	A	A	A	B
Barium Sulphide	A	X	A	A	X
Beer	A	B	A	A	A
Beet Sugar Liquors	A	A	A	A	C
Benzene	A	A	A	A	A
Benzenesulphonic Acid	C	X	C	B	C
Benzaldehyde	A	A	C	C	C
Benzine	A	A	A	A	A
Benzyl Alcohol	A	A	A	A	C
Benzyl Benzoate	A	A	A	A	C
Benzyl Chloride	A	A	C	C	C
Bismuth Carbonate	A	A	A	A	C
Black Sulphate Liquor	A	A	A	A	C
Blast Furnace Gas	A	A	A	A	A
Borax	A	B	A	A	B
Bordeaux Mixture	A	C	A	A	C
Borac Acid	A	X	B	A	X
Bunker Oil	A	A	A	A	A
Butadiene	A	C	A	A	A
Butane	A	A	A	A	A
Butter Oil	A	A	A	A	A
Butyric Acid	A	X	A	A	B
Butyl Acetate	A	B	A	A	A
Butyl Alcohol	A	A	A	A	A
Butyl Amine	C	A	A	A	A
Butyl Carbitol	A	A	A	A	A
Butyl Stearate	A	A	A	A	A
Butyl Mercaptan	A	C	A	A	C

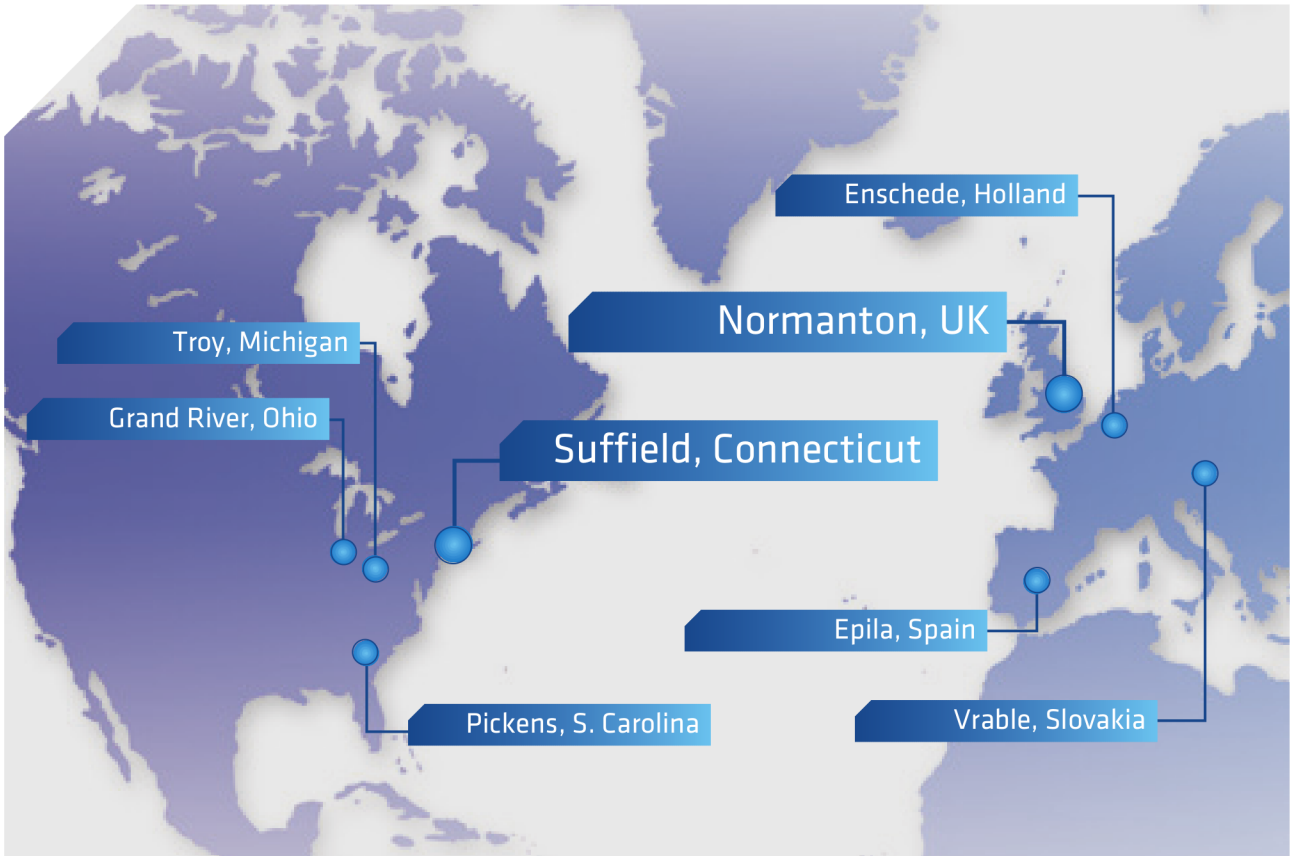
Chemical	PTFE	CS	304SS	316SS	Brass
Butyraldehyde	A	C	C	C	A
Calcium Acetate	A	A	A	A	A
Calcium Bisulphate	A	C	B	A	X
Calcium Bisulphite	A	C	A	A	C
Calcium Carbonate	A	A	A	A	A
Calcium Chlorate	A	C	B	A	C
Calcium Chloride	A	X	B	A	B
Calcium Hydroxide	A	X	X	A	B
Calcium Hypochlorite	A	C	X	B	X
Calcium Nitrate	A	A	A	A	A
Calcium Silicate	A	A	A	A	A
Calcium Sulphate	A	A	A	A	A
Calcium Sulphide	A	A	A	A	C
Cane Sugar Liquors	A	A	A	A	B
Carbolic Acid	A	X	A	A	X
Carbon Dioxide	A	A	A	A	A
Carbon Disulphide	C	B	A	A	B
Carbonic Acid	A	X	A	A	X
Carbon Monoxide	A	A	A	A	A
Carbon Tetrachloride	A	X	B	B	B
Castor Oil	A	A	A	A	A
Caustic Soda	A	B	A	A	X
Cellosolve, Acetate	A	A	A	A	C
Cellosolve, Butyl	A	A	A	A	C
Cellulube	A	A	A	A	A
Chlorine, Gaseous, Dry	A	B	X	X	B
Chlorine, Gaseous, Wet	A	X	X	X	X
Chlorine, Trifluoride	C	X	C	C	C
Chloroacetic Acid	A	X	X	X	B
Chlorobenzene	A	A	A	A	A
Chlorobromomethane	A	A	A	A	A
Chloroform	A	A	A	A	A
O-Chloronaphthalene	A	A	A	A	A
Chlorotoluene	A	A	A	A	A
Chromic Acid	A	X	X	B	X
Citric Acid	A	X	X	A	X
Cod Liver Oil	A	A	A	A	A
Coke Oven Gas	A	A	A	A	C
Copper Chloride	A	X	X	A	X
Copper Cyanide	A	C	A	A	X
Copper Sulphate	A	X	A	A	X
Corn Oil	A	A	A	A	A
Corn Syrup	A	A	A	A	C
Cottonseed Oil	A	A	A	A	A
Creosote	A	B	A	A	X
Cresol	A	B	A	A	C
Crude Wax	A	A	A	A	A
Cutting Oil	A	A	A	A	A
Cyclohexane	A	A	A	A	A
Cyclohexanone	A	C	A	A	C
Cymene	A	C	C	C	A
Decalin	A	C	C	C	A
Denatured Alcohol	A	A	A	A	A
Diacetone	A	A	A	A	A
Diacetone Alcohol	A	A	A	A	A
Dibenzyl Ether	A	A	A	A	A
Dibutyl Ether	A	A	A	A	A
Dibutyl Phthalate	A	A	A	A	A
Dibutyl Sebacate	A	C	C	C	A
Dichlorobenzene	A	C	A	A	A
Diesel Oil	A	A	A	A	A
Diethylamine	A	C	A	A	A
Diethyl Ether	A	A	A	A	A
Diethylene Glycol	A	A	A	A	A
Diethyl Phthalate	A	C	A	A	A
Diethyl Sebacate	A	C	A	A	A
Di-Isobutylene	C	C	A	A	A
Di-Isopropyl Ketone	A	C	A	A	A
Dimethyl Aniline	A	C	C	C	A
Dimethyl Formamide	C	A	A	A	C
Dimethyl Phthalate	A	C	C	C	A
Diocetyl Phthalate	A	A	A	A	A
Dioxane	A	A	A	A	A
Dipentene	A	A	A	A	A
Ethanolamine	A	A	A	A	A
Ethyl Acetate	A	A	A	A	A
Ethyl Acetoacetate	A	A	A	A	A
Ethyl Acrylate	C	A	A	A	C
Ethyl Alcohol	A	A	A	A	B
Ethyl Benzene	A	A	A	A	A
Ethyl Cellulose	A	A	A	A	A
Ethyl Chloride	A	B	A	A	B
Ethyl Ether	A	B	A	A	A
Ethyl Mercaptan	A	B	C	C	C
Ethyl Pentochlorobenzene	A	B	A	A	A
Ethyl Silicate	A	A	A	A	A
Ethylene Chloride	A	B	A	A	B
Ethylene Chlorohydrin	A	C	C	C	C
Ethylene Diamine	A	C	C	C	A
Ethylene Glycol	A	B	A	A	A
Fatty Acids	A	C	A	A	C
Ferric Chloride	A	X	X	X	X
Ferric Nitrate	A	X	A	A	C

Chemical Resistance

Chemical	PTFE	CS	304SS	316SS	Brass	Chemical	PTFE	CS	304SS	316SS	Brass
Ferric Sulphate	A	X	A	A	X	Oxalic Acid	A	X	B	A	X
Ferrous Chloride	A	X	A	B	B	Oxygen, Gaseous	A	A	A	A	A
Ferrous Nitrate	A	C	A	A	C	Ozone	A	A	A	A	A
Ferrous Sulphate	A	X	A	A	B	Paint	A	C	A	A	A
Fluoroboric Acid	A	C	A	A	C	Palmitic Acid	A	A	B	A	X
Formaldehyde	A	C	A	A	A	Peanut Oil	A	A	A	A	A
Formic Acid	A	X	B	A	B	Perchloric Acid	A	C	B	A	C
Freon 12	B	X	A	A	C	Perchloroethylene	A	A	A	A	A
Freon 114	B	X	A	A	C	Petroleum	A	A	A	A	A
Fuel Oil	A	B	B	B	A	Phenol	A	X	A	A	X
Fumaric Acid	C	C	A	A	C	Phorone	A	A	A	A	A
Furan Furfuran	A	A	A	A	A	Picric Acid	A	X	A	A	X
Furfural	A	B	A	A	A	Pinene	A	A	A	A	A
Gallic Acid	A	X	A	A	C	Pine Oil	A	A	A	A	C
Gasoline	A	B	A	A	A	Plating Solution, Chrome	A	C	X	X	C
Glauber's Salt	C	A	A	A	C	Potassium Acetate	A	C	A	A	C
Glucose	A	A	A	A	A	Potassium Chloride	A	B	B	A	X
Glue	A	B	A	A	X	Potassium Cyanide	A	B	A	A	X
Glycerin	A	B	A	A	A	Potassium Dichromate	A	C	A	A	C
Glycols	A	A	A	A	A	Potassium Hydroxide, 30%	A	X	A	A	X
Green Sulphate Liquor	A	A	A	A	C	Potassium Nitrate	A	X	A	A	B
n-Hexaldehyde	A	A	A	A	A	Potassium Sulphate	A	B	A	A	B
Hexane	A	A	A	A	A	Propane	A	A	A	A	A
Hexene	A	A	A	A	A	Propyl Acetate	C	A	A	A	A
Hexyl Alcohol	A	A	A	A	B	Propyl Alcohol	A	A	A	A	B
Hydraulic Oil, Petroleum	A	A	A	A	A	Pyridine, 50%	A	C	A	A	A
Hydrochloric Acid, 15%	A	X	X	X	X	Red Oil	A	B	B	A	B
Hydrochloric Acid, 37%	A	X	X	X	X	Salicylic Acid	C	C	A	A	C
Hydrocyanic Acid	A	X	A	A	X	Salt Water	A	B	A	A	X
Hydrofluoric Acid, Concentrated	A	X	X	X	X	Sewage	A	X	A	A	A
Hydrofluosilicic Acid	A	C	X	X	X	Silicone Greases	C	A	A	A	A
Hydrogen, Gaseous	A	A	A	A	A	Silicone Oils	C	A	A	A	A
Hydrogen Peroxide, 70%	A	X	B	A	X	Silver Nitrate	A	B	A	A	B
Hydrogen Sulphate, Gaseous	A	X	B	A	X	Skydrol 500 Et 7000	A	A	A	A	C
Hydroquinone	C	C	A	A	C	Soap Solutions	A	A	A	A	A
Isobutyl Alcohol	A	A	A	A	B	Soda Ash	C	A	A	A	B
Iso Octane	A	A	A	A	A	Sodium Acetate	A	A	A	A	A
Isopropyl Acetate	A	A	A	A	A	Sodium Bicarbonate	A	B	A	A	B
Isopropyl Alcohol	A	A	A	A	B	Sodium Bisulphate	A	A	A	A	C
Isopropyl Ether	A	A	A	A	A	Sodium Borate	A	A	A	A	C
Kerosene	A	A	A	A	A	Sodium Chloride	A	B	B	A	X
Lacquers	A	X	X	A	A	Sodium Cyanide	A	B	A	A	X
Lacquer Solvents	A	X	X	A	A	Sodium Hydroxide, 40%	A	B	A	A	X
Lactic Acid	A	X	B	A	B	Sodium Hypochlorite	A	X	X	B	X
Lard	A	A	A	A	X	Sodium Metaphosphate	A	X	A	A	X
Lead Acetate	A	B	A	A	A	Sodium Nitrate	A	A	B	B	B
Lead Nitrate	C	A	A	A	C	Sodium Perborate	A	X	A	A	X
Lime Bleach	C	X	B	A	C	Sodium Peroxide	A	X	A	A	X
Linoleic Acid	A	C	C	C	C	Sodium Phosphate	A	C	A	A	X
Linseed Oil	A	B	A	A	B	Sodium Thiosulphate	A	X	A	A	X
Lubricating Oils, Petroleum	A	A	A	A	A	Soybean Oil	A	A	A	A	C
Magnesium Chloride	A	X	B	A	B	Stannic Chloride	A	X	C	C	X
Magnesium Hydroxide	A	A	A	A	C	Steam	A	A	A	A	B
Magnesium Sulphate	A	B	A	A	A	Stearic Acid	A	X	B	A	X
Malic Acid	A	B	B	A	C	Stoddard Solvent	A	B	A	A	A
Mercuric Chloride	A	X	A	A	X	Styrene	A	B	C	B	B
Mercury	A	A	A	A	X	Sucrose Solution	A	A	A	A	C
Mesityl Oxide	A	A	A	A	A	Sulphur, 200°F	A	B	B	A	X
Methyl Acetate	A	A	A	A	A	Sulphur Chloride	A	X	X	B	X
Methyl Acrylate	C	A	A	A	A	Sulphur Dioxide	A	B	A	A	A
Methyl Alcohol	A	A	A	A	B	Sulphur Trioxide	A	B	B	B	C
Methyl Bromide	A	A	A	A	A	Sulphuric Acid, 10%	A	X	X	B	X
Methyl Butyl Ketone	C	A	A	A	A	Sulphuric Acid, 98%	A	B	X	B	X
Methyl Chloride	A	A	A	A	A	Sulphuric Acid, Fuming	A	B	C	A	X
Methylene Chloride	A	A	A	A	A	Sulphuric Acid, 10%	A	X	B	A	X
Methyl Ethyl Ketone (MEK)	A	A	A	A	A	Sulphuric Acid, 75%	A	X	X	B	X
Methyl Formate	A	A	A	A	A	Tannic Acid, 10%	A	B	A	A	X
Methyl Isobutyl Ketone	A	A	A	A	A	Tar, Bituminous	A	A	A	A	B
Methyl Methacrylate	A	A	A	A	C	Tartaric Acid	A	C	B	B	C
Methyl Salicylate	A	A	A	A	A	Terpineol	A	C	C	C	C
Milk	A	X	A	A	X	Titanium Tetrachloride	C	A	B	B	X
Mineral Oil	A	A	A	A	A	Toluene	A	A	A	A	A
Monochlorobenzene	A	A	A	A	A	Toluene Diisocyanate	C	C	C	C	C
Monoethanolamine	C	A	A	A	A	Transformer oil	A	A	A	A	A
Naphtha	A	B	A	A	A	Transmission Fluid, Type A	A	A	A	A	A
Naphthalene	A	C	A	A	C	Tributoxyethyl Phosphate	A	A	C	C	C
Naphthenic Acid	A	C	B	A	C	Tributyl Phosphate	A	A	C	C	C
Natural Gas	A	A	A	A	B	Trichloroethylene	A	X	C	A	A
Nickel Acetate	A	A	A	A	A	Tricresyl Phosphate	A	A	C	B	C
Nickel Chloride	A	X	B	B	X	Tung Oil	A	A	A	A	A
Nickel Sulphate	A	C	B	A	X	Turpentine	A	C	A	A	B
Niter Cake	C	X	B	A	C	Urea Solution, 50%	A	A	A	A	C
Nitric Acid, All Concentrations	A	X	B	B	X	Varnish	C	B	A	A	B
Nitric Acid, Red Fuming	A	X	B	B	X	Vegetable Oils	A	A	A	A	C
Nitrobenzene	A	A	A	A	A	Versilube	A	A	A	A	A
Nitroethane	A	C	A	A	A	Vinegar	A	X	B	A	X
Nitrogen, Gaseous	A	A	A	A	A	Vinyl Chloride	A	B	A	A	X
Nitrogen Tetroxide	C	C	C	B	C	Water	A	B	A	A	A
n-Octane	C	A	A	A	A	Whiskey, Wines	A	X	B	A	X
Octyl Alcohol	A	A	A	A	B	Xylene	A	B	B	B	C
Oil, SAE	A	A	A	A	A	Zinc Acetate	A	A	A	A	A
Oleic Acid	A	B	B	A	B	Zinc Chloride	A	X	B	A	X
Olive Oil	A	B	B	A	B	Zinc Sulphate	A	X	B	A	X



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