India Edition 2003

Gates Hydraulic Hoses

Global Quality for Indian Needs

Gates® HYDRAULICS

TABLE OF CONTENTS

Note : Gates also offers several other hoses for special applications. Should you not find a hose suiting your requirements, please contact your nearest Gates representative.

Getting the Best Service Life

From Gates Hydraulic Hose and Assemblies

How long will a hydraulic hose assembly last? It depends on how it's used. This catalog and other Gates literature show the recommended limits for our assemblies (and also the hoses and fittings used to make assemblies). These limits include installation, maintenance, and conditions of use. These limits MUST be followed or the assembly can fail resulting in injury or damage. If you do not have this important information, you can get it at no cost from your local Gates distributor or Gates Field Representative.

Hose assemblies in use should be inspected regularly for leaks, kinks, cover blisters, gouges, abrasion and other damage. Damaged or worn assemblies must be replaced immediately. You can increase assembly life if you do the following:

Hose Assembly Installation – Hydraulic hose assembly installations should comply with hydraulic hose routing and plumbing standards per SAE J 1273 for the proper application of hose assemblies. SAE J 1273 Recommended Practice can be found in this catalog.

Choose the right coupling. Hose and couplings are designed together for the best interface. Gates designed couplings are used to rate the products performance.

Working Pressure-The hydraulic system pressure should not exceed the rated working pressure of the hose. Pressure surges or peaks exceeding the rated working pressure are destructive and must be taken into account when selecting a hose.

Minimum Burst Pressure-Burst pressures are pressures referred to in this catalog which were intended for destructive testing purposes and for design safety factors only.

Temperature Range*-Do not expose hose to internal or external temperatures exceeding the recommended limits. Consult additional technical data when hydraulic fluids contain emulsions or solutions. The fluid manufacturer's recommended maximum operating temperature for any given fluid must not be exceeded, regardless of hose temperature range.

Fluid Compatibility-The hydraulic assembly (tube, cover, reinforcement and couplings) must be fluid compatible. The correct hose must be used because phosphate ester and petroleum base hydraulic fluids have drastically different chemical characteristics. Many hoses are compatible with one or the other but not all fluids. For example, Gates eXtreme Heat G2XH hose is capable of handling phosphate ester and petroleum base hydraulic fluids.

Minimum Bend Radius-Do not bend or flex hose to a radius smaller than the minimum recommended and do not subject hose to tension or torque. This can place excessive stress on the reinforcement and severely reduce the ability of the hose to withstand pressure.

Hose Size-Hose size (inside diameter) must be capable of handling the required flow volume. Too small an I.D. for a given volume of flow results in excessive fluid pressure and heat generation which can result in tube damage.

Hose Routing-Restrain, protect or guide hose, with clamps if necessary, to minimize the risk of damage due to excessive flexing, whipping or contacting other moving parts or corrosives. Determine hose lengths and configurations that protect from abrasion, snagging or kinking and provide leak-resistant connections.

Hose Length-Correct hose length should include considerations for length changes under pressure, machine vibration and motion, and hose assembly routing.

Hose Applications-Select the proper hose for the application. Suction applications (Gates GMV or G4H) and special fluid or high temperature capabilities are among the applications requiring particular consideration and a specific hose. When additional information is required, contact your local Gates representative.

NOTE: Do not use Gates hydraulic hose in place of permanent piping.

*Actual service life at temperatures approaching the recommended limit will depend on the particular application and the fluid being used in the hose. Intermittent (up to 10% of operating time) refers to momentary temperature surges. Detrimental effects increase with increased exposure to elevated temperatures.

Hose Shelf Life

Storage environment, along with rubber materials can vary the shelf life limit. Shelf life is difficult to quantify as many variables affect the hose. Proper storage precautions can result in three to five years shelf life. Beyond this time there can be significant service life decrease, depending on storage environment variables. Some variables are:

- Temperature – Hose should be stored in a cool, dry area never exceeding +38°C. If stored below freezing, pre-warming may be required prior to handling, testing and placing into service.
- Direct sunlight, rain, heaters or being near electrical equipment
- Humidity and ozone
- Oil, solvents, corrosive materials or fumes
- Insects or rodents
- Radioactivity
- Space allowance and bends

Store hose in original container. Never stack hose too high, as its weight can crush hose at the bottom of the stack.

Gates recommends hose in extended storage be visually inspected and tested prior to use. Hose judged marginal should be replaced to avoid potential failure, property damage or bodily injury. Store hose on a first-in/first-out basis. Unusually long storage, or poor storage environment can deteriorate hose, reduce performance and may lead to premature failure.

WARNING

Never underestimate the power of a blown hydraulic assembly.

Serious injury, death and destruction of property can result from rupture or blow-apart of a hydraulic hose assembly that is:

- Damaged or worn out
- Assembled or installed incorrectly

For Safety's Sake

Avoid injury to yourself and others by following these important hose assembly steps:

1. **Receive hands-on training** with Gates recommended equipment.
2. Follow current Gates **operating manual and crimp data.**
3. **Use only new (unused)** Gates recommended hose and fittings with Gates crimpers.
4. **Wear safety glasses.**

Select and Install Assemblies With Care

1. **Select proper hose assemblies for the application.** Many factors and conditions affecting the inside and outside diameter of the hose must be taken into account.
2. Hose assembly routing **must not** create an injury hazard or damage to hose.
3. Select hydraulic components so that the application's temperature, pressure and bend radius **do not exceed** recommended component limits.
4. Hose **must not** be stretched, kinked, crushed or twisted during installation or use. Hose **must not** be bent to less than the minimum bend radius.
5. Use **only** C7SNC and C8SNC hose for **non-conductive** applications. For instance: cherry pickers. All other Gates hoses are electrically conductive.
6. **Do not** use hydraulic hose to transmit high pressure gases.

Follow Good Maintenance Practices

1. **Establish a program** of inspection, testing and replacement of hose assemblies from factors including:
   - Severity of application.
   - Frequency of equipment use.
   - Past performance of hose assemblies.
2. **Only** properly trained persons should inspect, test or service hose assemblies. Update training periodically.
3. **Document** maintenance, inspections and testing.
4. **AVOID FLUID INJECTION INJURIES**

   - **Fluid under pressure can cause serious injury.** It can be almost invisible escaping from a pinhole, and it can pierce the skin into the body.
   - Do not touch a pressurized hydraulic hose assembly with any part of your body.
   - If fluid punctures the skin, **even if no pain is felt,** a serious emergency exists. Obtain medical assistance immediately. Failure to do so can result in loss of the injured body part or death.
5. Stay out of hazardous areas while testing hose assemblies under pressure. **Use proper safety protection.**

Other Safety Information

Many factors affect the selection, making, installation and maintenance of hose assemblies. This catalog, Gates Corporation, the hydraulic equipment maker and The Society of Automotive Engineers Recommended Practice SAE J1273, have useful information about selecting, making, installing and servicing hydraulic hose assemblies. For further information, please contact your local Gates representative or call Gates Corporation.

Gates recommends hose and coupling combinations in this catalog only after completing extensive testing.

Evaluation of a hose and coupling combination requires considerable impulse testing and cannot be determined by a simple burst or pressure hold test. Gates disclaims all liability for any hose assembly made in violation of Gates recommendations, procedures and current crimp data. Crimp data are updated on average every year.

The consumer's exclusive remedy with respect to any claim shall be a refund of the purchase price or replacement of the product at the option of Gates. In no event shall Gates be liable for any incidental or consequential damages whatsoever.

Building on Innovation and Leadership

Gates Corporation is headquartered in Denver, Colorado, USA. Known worldwide for its belts & hose, Gates is a wholly owned subsidiary of Tomkins plc. Tomkins is an international group of companies focused on manufacturing, with leadership across three business groups : Industrial and Automotive, Air System Components, and Engineered and Construction Products.

Established in 1911 by Charles Gates, Gates Corporation is the only non-tyre rubber company with facilities in almost all parts of the world : Europe, Australia, Asia-Pacific and the Americas. In 1917, John Gates, brother of Charles invented the V-Belt. The company has continued its engineering leadership ever since.

From its modest beginnings in 1911, Gates Corporation has grown into one of the world's largest manufacturers and marketers of original equipment and aftermarket industrial and automotive belts, hoses and hydraulic products, plus a host of related products.

Gates operates over 70 facilities in 20 countries, including 43 manufacturing plants and 27 distribution centers, so the products needed are supplied on time or just-in-time.

Gates develops and manufactures products for a wide range of markets including the agricultural, transportation, construction, chemical, oil, manufacturing, mining, forestry, office equipment, computer, food processing and food handling markets.

Over the years Gates built its reputation by providing the highest-quality products and services. That dedication continues today. We thoroughly test every product we manufacture to ensure it meets the world's highest standards. And we're constantly developing innovative new products to meet the evolving needs of the markets we serve.

We back up everything we sell with extensive customer service. Whether you need answers to technical questions, product training sales assistance, help controlling inventory costs or other assistance, Gates has a trained, professional staff that can help.

With the addition of the Tomkins Industrial and Automotive brands, including Amflo®, Camel®, Edelmann®, Ideal®, LubriMatic®, Plews®, Schrader®, Stant®, Trico®, Tridon® and Tru-Flate®, the company is well positioned for success.

At Gates our goal is simple – To meet or exceed customer expectations with products, services and experiences that are superior to the competition.

Global Products for Global Markets

Every day customers around the world rely on Gates hydraulic products in an almost endless range of applications. From construction, mining and manufacturing to agriculture, transportation and beyond, Gates products are hard at work around the clock.

Gates products are designed to meet the needs of global customers. Our Global Hydraulic Hose line was specifically developed to meet all major global quality standards.

Small World, Isn't It?

Gates Global Hydraulics

Global Hose Identification

Spiral Hose	Wire Braid Hose	Textile High Temperature Hose	Return Line/Low Pressures Hose
Global Name	Global Name	Global Name	Global Name
G3K	M3K	GTH	GMV
G4K	M4K+		
G5K	G1		
G6K	G1H		
	G2		
	G2H		

Gates Global MegaSys® Pressure Hose Line*

Use the chart below for easy hose selection. Just find the required pressure and the chart will show you which hose meets that pressure in the applicable ID. "M" hoses are wire-braid construction and use Gates MegaCrimp® coupline. "G" hoses are spiral-wire construction and use Gates GlobalSpiral™ couplings.

ID		-4 (1/4")	-5 (5/16")	-6 (3/8")	-8 (1/2")	-10 (5/8")	-12 (3/4")	-16 (1")	-20 (1¼")	-24 (1½")	-32 (2")
PSI	6000	M6K		G6K	G6K	G6K	G6K	G6K	G6K	G6K	
	5000	M5K	M5K	M5K	G5K	G5K	G5K	G5K	G5K	G5K	G5K
	4000	M4K+		M4 K+	M4K+	M4K+/G4K	M4K+/G4K	G4K	G4K		
	3000	M3K	M3K	M3K	M3K	M3K	M3K	M3K	G3K	G3K	G3K

*Global MegaSys® pressure hoses are offered in standard and abrasion resistant MegaTuff® cover.

And we have couplings that meet EN/DIN and SAE standards. So whether your equipment was made in Japan, Germany, the United States or elsewhere, Gates has products to fit your application needs.

Our worldwide manufacturing operations allow us to supply customers with products locally, preventing expensive shipping and import charges. All Gates products, regardless of where they are made, meet exacting quality standards.

Gates MegaSys® and C1/C2 hoses bend and bend – to Half SAE Bend Radius

In fact, Gates MegaSys hoses bend to half the bend radius of other SAE 100R1, 100R2, 100R4, 100R9 and 100R12 type hoses. They're ideal for tight applications. And their incredible flexibility means you can use less hose for each application.

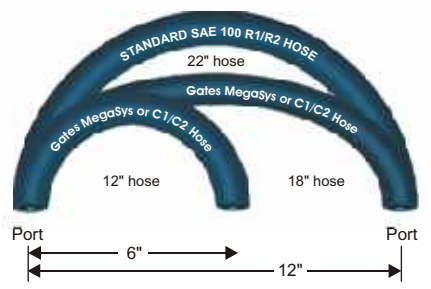


Illustration of 1" MegaSys / C1 / C2 Flexibility and Reduced Hose Length Requirements

Half Bend Radius Hose Benefits

- Reduces hose length requirements substantially
- Reduces inventory requirements
- Flexibility allows routing in small spaces
- Tight bend radius means fewer bent tube fittings
- Plumbs and bends easier than conventional hoses

Half Bend Radius Hose Features

- A full line of hoses designed for one-half SAE bend radius at full SAE pressure
- Longer life in applications where equipment movement causes sharp bends in hydraulic hose
- Increased flexibility for easier hose installation
- M3K, M4K+, M2T, C12M and M5K meet tough flex-impulse testing that flexes hose during impulse pressure testing; simulates severe equipment applications

And Hose Cover that takes the abuse ....

MegaTuff® Hose Cover

- Super-tough cover solves abrasion problems
- Replaces spring guard and protective sleeves in high-wear applications
- Resists cracking from UV rays
- **300 times** the abrasion resistance of standard hose covers

XtraTuff™ Hose Cover

- Mid-range abrasion-resistant cover
- Replaces spring guard and protective sleeves in high-wear applications
- **25 times** the abrasion resistance of standard hose covers

C12M MegaSpiral® Hose
- Half SAE 100R12 bend radius
- Abrasion-resistant synthetic rubber cover increases service life
- 3,000 to 4,000 psi working pressure
- Development tested to one million impulse cycles
- Abrasion-resistant MegaTuff® cover available

M4K+ Mega4000® Hose
- Half SAE 100R1, 100R2 and 100R9 bend radius
- SAE 100R9 performance on 1/2" sizes
- SAE100R12 pressure on 3/8" to 3/4" sizes
- All sizes have 4,000 psi working pressure
- Replaces spiral hose under certain conditions
- Development tested to 600,000 impulse cycles
- Abrasion-resistant XtraTuff™ and MegaTuff® cover available

M3K Mega3000® Hose
- Half SAE 100R1, 100R2 and 100R9 bend radius
- Meets new SAE 100R17 specifications
- SAE 100R9 performance on 3/4" and 1" sizes
- SAE 100R12 performance on 1¼" size
- All sizes have 3,000 psi working pressure
- Development tested to 600,000 impulse cycles
- Abrasion-resistant XtraTuff™ and MegaTuff® covers available

C1T (G1) Hose
- Half the bend radius of SAE 100R1.
- Meets performance requirements of DIN 20022 1SN / en 853 1SN.
- Meets Resistance Acceptance Designation "U.S. MSHA 2G".

C2AT(G2) Hose
- Half the bend radius of SAE 100R2.
- Meets performance requirements of DIN 20022 2SN / EN 853 1SN.
- Meets Resistance Acceptance Designation "U.S. MSHA 2G".

Superior Engineering & Service Support

Dedicated to Quality

At Gates, we design and manufacture our products to meet the highest quality standards. We talk to our customers to learn what they need now and in the future. And we're constantly looking for ways to make better and easier-to-use products.

This dedication to quality and customer satisfaction has resulted in a variety of revolutionary products including the MegaSys® line of highly flexible hoses; easy to use MegaCrimp® couplings; convenient one-stem, no-skive GlobalSpiral™ couplings; and corrosion-resistant TuffCoat™ coupling plating.

Rigorous testing for on-the-job reliability

Gates has one of the largest test labs in the industry where we put our hoses and couplings through tests that go far beyond SAE standards. The result? Products you can depend on to give you reliability others can't match. Every Gates hydraulic hose and coupling combination is designed and built to demanding specifications for optimum interface compatibility, then verified by the most rigorous tests in the industry. We supply a performance-proven hose assembly system, not just a piece of hose or a particular thread-end connector.

Products backed by professional service

Gates backs up its products with a full range of services. Our goal – to ensure your success. From field training and technical support to product testing and inventory control, Gates has the services you need to meet the needs of your customers.

- **Hydraulic Field Specialists.** Gates provides training and sales support assistance when and where you need it...in the field. Contact your nearest Gates representative or call Gates Customer Care.
- **Answers to your engineering questions.** Our Hydraulic Field Team relies on Gates Product Application Engineers for expert support. So can you! Answers to your toughest technical questions are only a phone call away. Contact your nearest Gates representative or call Gates Customer Care.
- **Distribution.** We'll get you the products you need — when you need them and where you need them. Gates dealers spread all over the country stock a full inventory of Gates hydraulic products ready for immediate shipping.
- **Inventory Control.** Concerned about inventory costs? Our inventory control programs can help you stock the products your customers require.
- **Technical centres :** Gates technical centres respond quickly and effectively to customer needs, in many cases electronically linking Gates to customers via compatible engineering technologies.

Training & Education

Knowledge of today's hose and connector applications and the Gates products that make them work better is one of your most valuable sales tools. Gates offers extensive, world-class training and education to meet the needs of distributor associates at various levels, covering virtually every aspect of hoses and connectors – from the basics to expert topics.

Hydraulic Safety

Proper hydraulic preventive maintenance is important for hydraulic equipment operators. Improper maintenance can result in premature assembly failure and blowouts, equipment downtime, possible equipment damage, personal injury and even death. Gates has developed an in-depth hydraulic preventive maintenance training program titled Safe Hydraulics: a Guide to Preventive Maintenance & Safety for Hydraulic Hose & Couplings that provides the information you and your customers need to maintain hydraulic equipment.

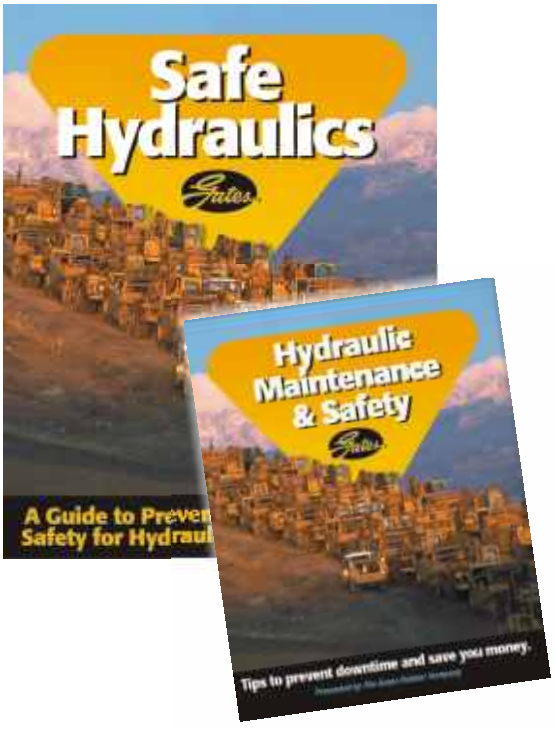
This free program is taught by a Gates Hydraulic Training Specialist. The seminar provides information on

- worker safety
- effective inspection techniques
- hose and coupling selection
- troubleshooting
- and participants receive a preventive maintenance manual.

To arrange a seminar for your organization, contact your nearest Gates representative or call Gates Customer Care.

website at www.gates.com/safehydraulics.

A complete Safe Hydraulics Manual is provided free to every attendee of a Gates Safe Hydraulics Seminar



This new 16 page pocket guide is now available free from Gates to help promote the Safe Hydraulics program.

Visit our website

With technology expanding at ever increasing rates, get the most up-to-date information from our website. Features to look for include:

- New product announcements
- Updated hydraulic information
- Downloadable current catalogs
- Email updates on new products/promotions
- Electronic crimp data **www. gates.com/ecrimp**
- Safe Hydraulics training
- Distributor & Field representative locator
- Electronic product literature

Check out what's new at

www. gatesind.com

Gates in India

Gates is India's most advanced and complete hose manufacturer. As the Indian subsidiary of **Gates Corporation, USA,** it has established itself firmly in the Indian hose market. Equipped with the latest technology, the manufacturing facility of **Gates India** is spread over an area of 40 acres at Lalru, near Chandigarh. **Gates India** is the one of the newest Gates facilities, manufacturing hydraulic & industrial hoses and is backed by sufficient captive power generation.

Today, we have to our credit a distinguished client list in the construction, mining & earthmoving industries. Our products are also reaching foreign shores through markets in the **U.S., Europe, South Africa, Japan, Singapore** & other countries.

Quality Solutions

At **Gates India,** we always strive to provide quality solutions to our customers. Our stringent quality practices ensure that any **Gates** Global Hydraulic Hose meets the industry's highest production standards, regardless of where it is made. We are perhaps the only hose plant in India producing long length hoses without using harmful lead in the manufacturing process.

Marketing Network

Our All-India Distribution Network brings with it numerous years of experience and knowledge to better serve our customers. Our representatives are strategically located in the major cities throughout India, so as to provide the vital interface between the organisation and the customers.

Indian Clients

The high quality standards maintained by Gates India is reflected in its client list, which reads like a who's who of the industry. Our quality products are approved by Directorate General of Mines & Safety (DGMS) and Directorate General of Quality Assurance (DGQA), Ministry of Defence. Our prominent Indian clients include:

Global Recognition

Gates India has been regularly honoured for Export achievements by bodies like CAPEXIL & AIRIA (All India Rubber Industries Association) amongst others.

- **Construction & Heavy Equipment Manufacturers** viz. Caterpillar India, Claas-India, Escorts Construction, Greaves, Gujarat Apollo, JCB-India, L&T-Case, Schwing Stetter, TIL ...
- **Other OEMs** such as Ashok Leyland, Cummins India, ELGI, Ferromatik-Milacron, Godrej, Inductotherm-India, Kirloskar Oil Engines, Midco, Tata Motors, UT Ltd., Voltas, Wipro Fluid Power, amongst others.
- **Mining Sector** such as Eimco Elecon, Simplex, various subsidiaries of Coal India Ltd. and Singareni Collieries Company Ltd.
- **Government Sector** such as Indian Railways, BPCL, HPCL, IBP, IOCL, ONGC...
- **Steel Manufacturers** viz. SAIL Bhilai, SAIL Bokaro, TISCO, Vizag Steel Plant, Ispat, Jindal...
- **Cement Plants** like ACC, Birla Cements, Century Cement, Gujarat Ambuja, India Cements, and more.

Global Clients

Case New Holland, Caterpillar, Chrysler, DitchWitch, Ford, GM, Hitachi, Ingersoll Rand, JCB, John Deere, JLG, Komatsu, Nissan, Toyota and Vermeer amongst others.

Switch To Gates C1T Hose

Advantages Of C1T Over SAE R5 Hose

More Flexible : Half Bend Radius Hose

Gates C1T hoses are impulse tested at half the SAE bend radii.
Our construction is optimised for better performance at tighter bend radii.

SIZE GATES C1T	BEND RADIUS (mm)		SIZE SAE R5
	GATES C1T	SAE R5	
1/4"	51	86	1/4"
5/16"	56	102	5/16"
1/2"	89	117	13/32"
1/2"	89	140	1/2"
5/8"	102	165	5/8"
1"	153	187	7/8"
1-1/4"	204	229	1-1/8"
1-1/2"	254	267	1-3/8"
2"	318	337	1-13/16"
2"	318	610	2-3/8"

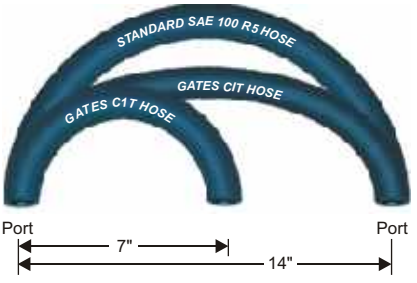


Illustration of GATES 1/2" C1T hose Bend Radius & Reduced Hose Length Requirements

Higher Pressure : Better Performance

Our standard working pressure are much above
the standard SAE requirements. They also meet performance requirements of DIN/EN.

GATES C1T

SAE R5

Illustration of GATES 1/2" C1T hose working pressure over Std. SAE R5 hose

SIZE GATES C1	WORKING PRESSURE (psi)		SIZE SAE R5
	GATES C1	SAE R5	
1/4"	3275	3000	1/4"
5/16"	3125	2250	5/16"
1/2"	2325	2000	13/32"
1/2"	2325	1750	1/2"
5/8"	1900	1500	5/8"
1"	1275	800	7/8"
1-1/4"	925	625	1-1/8"
1-1/2"	725	500	1-3/8"
2"	600	350	1-13/16"
2"	600	350	2-3/8"

Better Impulse Performance

SIZE GATES C1	IMPULSE (CYCLES)		SIZE SAE R5
	GATES C1T	SAE R5	
1/4"	4,50,000 CYCLES AT 100°C	1,50,000 CYCLES AT 93°C	1/4"
5/16"			5/16"
1/2"			13/32"
1/2"			1/2"
5/8"			5/8"
1"			7/8"
1-1/4"		1,00,000 CYCLES AT 93°C	1-1/8"
1-1/2"			1-3/8"
2"			1-13/16"
2"			2-3/8"

Re-usable Fittings can also be used

C1T (G1) One Wire Braid Hose – SAE 100R1 Type AT

Meets performance requirements of DIN 20022 1SN / EN 853 1SN
Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Medium Pressure

Made in India for Domestic & Global Markets

Recommended For : Medium pressure hydraulic oil lines. Meets or exceeds the requirements of SAE 100R1 Type AT and performance requirements of DIN 20022 1SN / EN 853 1SN. **Provides tighter than standard minimum bend radius and greater flexibility for easier plumbing.** Suitable for use with non-skive ferrules.

Tube : Oil-resistant synthetic rubber (Nitrile).

Reinforcement : One braid of high-tensile steel wire.

Cover : Oil and abrasion-resistant synthetic rubber (Modified Nitrile).

Temperature Range : For Hydraulic Oil Lines -40°C to +100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
4C1T(G1)	1/4	6.4	0.53	13.5	0.44	11.3	3,275	226	13,100	904	2.00
5C1T(G1)	5/16	7.9	0.59	15.1	0.52	13.2	3,125	216	12,500	864	2.25
6C1T(G1)	3/8	9.5	0.69	17.1	0.59	15.0	2,600	180	10,400	720	2.50
8C1T(G1)	1/2	12.7	0.82	20.3	0.72	18.2	2,325	160	9,300	640	3.50
10C1T(G1)	5/8	15.9	0.94	23.5	0.84	21.3	1,900	131	7,600	524	4.00
12C1T(G1)	3/4	19.0	1.10	27.6	1.00	25.4	1,525	105	6,100	420	4.75
16C1T(G1)	1	25.4	1.41	35.4	1.31	33.3	1,275	88	5,100	352	6.00
20C1T(G1)	1¼	31.8	1.72	43.7	1.59	40.4	925	64	3,700	256	8.25
24C1T(G1)	1½	38.1	1.96	49.8	1.85	46.8	725	50	2,900	200	10.00
32C1T(G1)	2	50.8	2.52	64.0	2.37	60.3	600	41	2,400	164	12.50
1-Wire *	2½	63.5	2.88	77.5	2.88	73.2	390	27	1,560	108	30.00
1-Wire *	3	76.4	3.44	92.6	3.45	87.6	315	22	1,260	88	33.00

*Gates Proprietary Hose. Not covered under SAE/DIN/EN Stds., Half Bend Radius Feature.

C1A One Wire Braid Hose – SAE 100R1A

Meets Flame Resistance Acceptance Designation "US. MSHA 2G"

Medium Pressure

Made in India for Domestic & Global Markets
Skiving Required

Recommended For : Medium pressure hydraulic lines. Meets or exceeds the requirements of SAE 100R1A and performance requirements of DIN 20022 1ST/EN 853 1ST

Tube : Black, oil resistant synthetic rubber (Nitrile).

Reinforcement : One braid of high-tensile steel wire.

Cover : Black, oil and abrasion-resistant synthetic rubber (Modified Nitrile). (-24 and -32 sizes are Neoprene).

Temperature Range : -40°C to +100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
4C1A	1/4	6.4	0.63	16.0	0.44	11.3	3,275	226	13,100	904	4.00
5C1A	5/16	7.9	0.70	17.8	0.52	13.2	3,125	216	12,500	864	4.50
6C1A	3/8	9.5	0.78	19.8	0.59	15.0	2,600	180	10,400	720	5.00
8C1A	1/2	12.7	0.91	23.1	0.72	18.2	2,325	160	9,300	640	7.00
10C1A	5/8	15.9	1.03	26.2	0.84	21.3	1,900	131	7,600	524	8.00
12C1A	3/4	19.0	1.19	30.2	1.00	25.4	1,525	105	6,100	420	9.50
16C1A	1	25.4	1.50	38.1	1.31	33.3	1,275	88	5,100	352	12.00

Medium Pressure

C1TH (G1H) High Temp 1-Wire Braid Hose SAE 100R1 Type AT

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Made in India for Domestic & Global Markets

Recommended For : Medium pressure hydraulic oil lines. Meets or exceeds the requirements of SAE 100R1 Type AT. **Provides tighter than standard minimum bend radius and greater flexibility for easier plumbing.**

Tube : Black, oil-resistant synthetic rubber (Nitrile).

Reinforcement : One braid of high-tensile steel wire.

Cover : Black, oil and abrasion-resistant synthetic rubber (Hypalon).

Temperature Range : -40°C to +135°C constant and +149°C intermittent (upto 10% of operating time). For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
4C1TH (G1H)	1/4	6.4	0.53	13.5	0.44	11.1	2,750	190	11,000	760	2.00
5C1TH (G1H)	5/16	7.9	0.59	15.1	0.52	13.2	2,500	172	10,000	688	2.25
6C1TH (G1H)	3/8	9.5	0.69	17.5	0.59	15.0	2,250	155	9,000	621	2.50
8C1TH (G1H)	1/2	12.7	0.80	20.3	0.72	18.2	2,000	138	8,000	552	3.50
10C1TH (G1H)	5/8	15.9	0.94	23.9	0.84	21.3	1,500	103	6,000	415	4.00
12C1TH (G1H)	3/4	19.0	1.09	27.8	1.00	25.4	1,250	86	5,000	345	4.75
16G1H	1	25.4	1.41	35.7	1.31	33.3	1,000	69	4,000	275	6.00
20G1H	1¼	31.8	1.72	43.7	1.59	40.4	625	43	2,500	172	8.00
24G1H	1½	38.1	1.96	49.8	1.85	46.8	725	50	2,900	200	10.00
32G1H	2	50.8	2.52	64.0	2.37	60.3	600	42	2,400	165	12.50

High Pressure

C2AT (G2) Two Wire Braid Hose – SAE 100R2 Type AT

Meets performance requirements of DIN 20022 2SN / EN 853 2SN
Meets Flame Resistance Acceptance Designation "US. MSHA 2G"

Made in India for Domestic & Global Markets

Recommended For : High pressure hydraulic oil lines. Meets or exceeds the requirements of SAE 100R2 Type AT and performance requirement of DIN 20022 2SN / EN 853 2SN. **Provides tighter than standard minimum bend radius and greater flexibility for easier plumbing.** Suitable for use with non-skive ferrules.

Tube : Oil resistant synthetic rubber (Nitrile).

Reinforcement : Two braids of high-tensile steel wire.

Cover : Oil and abrasion resistant thin synthetic rubber (Modified Nitrile).

Temperature Range : For Hydraulic Oil Lines -40°C to +100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
4C2AT (G2)	1/4	6.4	0.58	15.0	0.50	12.8	5,800	400	23,200	1,600	2.00
5C2AT (G2)	5/16	7.9	0.65	16.5	0.57	14.4	5,100	352	20,400	1,408	2.25
6C2AT (G2)	3/8	9.5	0.73	18.8	0.65	16.6	4,800	331	19,200	1,324	2.50
8C2AT (G2)	1/2	12.7	0.86	21.8	0.78	19.7	4,000	276	16,000	1,104	3.50
10C2AT (G2)	5/8	15.9	0.98	25.1	0.91	23.0	3,625	250	14,500	1,000	4.00
12C2AT (G2)	3/4	19.0	1.14	29.0	1.06	26.9	3,100	214	12,400	856	4.75
16C2AT (G2)	1	25.4	1.48	37.6	1.37	34.8	2,400	166	9,600	664	6.00
20C2AT (G2)	1¼	31.8	1.87	47.5	1.75	44.5	1,825	126	7,300	504	8.25
24C2AT (G2)	1½	38.1	2.15	54.6	2.00	50.8	1,300	90	5,200	360	10.00
32C2AT (G2)	2	50.8	2.65	67.3	2.50	63.5	1,175	81	4,700	324	12.50
40C2A	2½†	63.5	3.24	82.5	3.00	76.2	1,000	69	4,000	276	30.00
2-Wire	3*	76.4	3.80	96.7	3.59	91.3	650	45	2,600	180	33.00

†The Hose is suitable for hot air applications only. Not covered under Half Bend Radius Feature.
*Gates Proprietary Hose. Not covered under SAE/DIN/EN Stds., Half Bend Radius Feature.

C2A Two-Wire Braid Hose - SAE 100R2A

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

High Pressure

Recommended For : High pressure hydraulic oil lines. Meets or exceeds the requirements of SAE 100R2A and performance requirements of DIN 20022 2ST/EN 853 2ST.

Tube : Black, oil-resistant, synthetic rubber (Nitrile).

Reinforcement : Two braids of high-tensile steel wire.
Cover : Black, oil and abrasion resistant synthetic rubber (Modified Nitrile).

Temperature Range : -40°C to +100°C constant. For water emulsions, etc., see page 24.

Made in India for Domestic & Global Markets

Skiving Required

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
4C2A	1/4	6.4	0.69	17.5	0.50	12.8	5,800	400	23,200	1,600	4.0
5C2A	5/16	7.9	0.75	19.1	0.57	14.4	5,075	352	20,400	1,408	4.5
6C2A	3/8	9.5	0.84	21.3	0.65	16.6	4,800	331	19,200	1,324	5.0
8C2A	1/2	12.7	0.97	24.6	0.78	19.7	4,000	276	16,000	1,104	7.0
10C2A	5/8	15.9	1.09	27.7	0.91	23.0	3,625	250	14,500	1,000	8.0
12C2A	3/4	19.0	1.25	31.8	1.06	26.9	3,100	214	12,400	856	9.5
16C2A	1	25.4	1.56	39.6	1.37	34.8	2,400	166	9,600	664	12.0

Global G2H High-Temp Two Wire Braid Hose SAE 100 R2 Type AT

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

High Pressure

Recommended For : High pressure hydraulic oil lines. Meets or exceeds the requirements of SAE 100R2AT.

Tube : Black, oil resistant, synthetic rubber (Nitrile).

Reinforcement : Two braids of high-tensile steel wire.
Cover : Black, oil resistant use, synthetic rubber (Hypalon).

Temperature Range : -40°C to +135°C constant and +149°C intermittent use (up to 10% of operating time). For water emulsions, etc., see page 24.

Made in India for Domestic & Global Markets

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Braid O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in.	mm	psi	bar	psi	bar	in.
20G2H	1¼	31.8	1.87	47.5	1.75	44.5	1,825	126	7,300	504	16.5
24G2H	1½	38.1	2.15	54.6	2.00	50.8	1,300	90	5,000	362	20.0
32G2H	2	50.8	2.65	67.3	2.50	63.5	1,175	81	4,500	324	25.0

High Pressure & High Temp

eXtreme Heat G2XH Hose

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Recommended For : High-pressure hydraulic applications where pressure or temperature requirements exceed SAE 100R2, or where resistance to either petroleum-base or phosphate ester fluids is required. Meets performance requirements of DIN 20022 2SN and EN853 2SN.

Tube : Oil and chemical resistant synthetic rubber (CPE).

Reinforcement : Two braids of high tensile steel wire.

Cover : Oil and abrasion resistant thin synthetic rubber. (CPE). Flame resistance - U.S.MSHA 2G.

Temperature Range : Petroleum-base fluids -40°C to +149°C. Phosphate ester fluids as recommended by the fluid manufacturer, but within a range of -40°C to +100°C.

For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
16G2XH	1	25.4	1.48	37.6	2500	172	10000	688	12.0

* Sizes 1/4", 3/8", 1/2", 5/8" and 3/4" are under technical development at the time of going in for print and will be available shortly.

Medium Pressure

C6 One Fiber Braid Hose – SAE 100R6

Meets performance requirements of EN 854

Made in India for Domestic & Global Markets

Recommended For : Hydraulic oil lines, heavy-duty transmission oil, anti-freeze solutions. Meets or exceeds requirements of SAE 100R6 / EN 854.

Tube : Specially compounded, oil-resistant, synthetic rubber (Nitrile).

Reinforcement : One braid of high tenacity synthetic textile yarn.

Cover : Oil and abrasion resistant synthetic rubber. (Modified Nitrile)-Black.

Temperature Range : For Hydraulic Oil Lines -40°C to +100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Vacuum	Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in Hg	psi	bar	psi	bar	in.
4C6	1/4	6.4	0.50	12.7	28	400	28	1,600	112	2.6
5C6	5/16	7.9	0.56	14.2	28	400	28	1,600	112	3.0
6C6	3/8	9.5	0.63	16.0	28	400	28	1,600	112	3.0
8C6	1/2	12.7	0.78	19.7	18	400	28	1,600	112	4.0
10C6	5/8	15.9	0.91	23.0	15	350	24	1,400	97	5.0
12C6	3/4	19.0	1.06	26.9	15	300	21	1,200	83	6.0
16C6*	1	25.4	1.38	34.9	15	200	14	800	56	7.0

*Branded as low pressure hydraulic hose. Not covered under SAE Std.

GTH High Temp 1-Fibre Braid Hose-SAE 100R6

Meets performance requirements of EN 854

Medium Pressure & High Temp

Made in India for Domestic & Global Markets

Recommended For : Hydraulic oil lines, heavy-duty transmission oil cooler lines and glycol anti-freeze solutions. Meets or exceeds requirements of SAE 100R6/EN 854. Specially resistant to Diesel permeation.

Tube : Black, specially compounded, synthetic rubber (Nitrile).

Reinforcement : One fiber braid.

Cover : Black, oil and abrasion resistant, synthetic rubber (Neoprene).

Temperature Range : For hydraulic oil lines -40°C to +135°C constant and +149°C intermittent (up to 10% of operating time). For water emulsions, etc., see page 24

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Vacuum	Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	in Hg	psi	bar	psi	bar	in.
4GTH	1/4	6.4	0.50	12.7	28	400	28	1,600	110	2.5
5GTH	5/16	7.9	0.56	14.2	28	400	28	1,600	110	3.0
6GTH	3/8	9.5	0.63	16.0	28	400	28	1,600	110	3.0
8GTH	1/2	12.7	0.78	19.8	18	400	28	1,600	110	4.0
10GTH	5/8	15.9	0.91	23.1	15	350	24	1,400	97	5.0
12GTH	3/4	19.0	1.06	26.9	15	300	21	1.200	83	5.5
16GTH*	1	25.4	1.32	33.5	10	250	17	1000	69	6.5

*Gates proprietary hose. Not covered under SAE Std.

C3 Two Fiber Braid Hose – SAE 100R3

Meets performance requirements of EN 854

Medium Pressure

Made in India for Domestic & Global Markets

Recommended For : Hydraulic oil lines, anti-freeze solutions or water. Meets or exceeds requirements of SAE 100R3/EN854.

Tube : Black, synthetic rubber (Nitrile).

Reinforcement : Two braids of high tenacity synthetic textile yarn.

Cover : Modified Nitrile.

Temperature Range : For Hydraulic Oil Lines : -40°C to + 100°C.

For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Vacuum	Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in Hg	in.
4C3	1/4	6.4	0.56	14.5	1,250	86	5,000	345	28	3.0
5C3	5/16	7.9	0.69	17.5	1,200	83	4,800	332	28	4.0
6C3	3/8	9.5	0.75	19.1	1,125	78	4,500	312	28	4.0
8C3	1/2	12.7	0.94	23.9	1,000	69	4,000	276	28	5.0
10C3	5/8	15.9	1.06	27.0	875	61	3,500	244	28	5.5
12C3	3/4	19.0	1.25	31.8	750	52	3,000	208	28	6.0
16C3	1	25.4	1.50	38.1	565	39	2,250	156	20	8.0

Medium Pressure & High Temp

G3H High Temp

Meets performance requirements of EN 854

Made in India for Domestic & Global Markets

Recommended For : Hydraulic oil lines, heavy-duty transmission oil cooler lines and glycol anti-freeze solutions. Meets or exceeds requirements of SAE 100R3/EN 854. Specially resistant to Diesel permeation.

Tube: Black, specially compounded, synthetic rubber (Nitrile).

Reinforcement: Two fiber braid.

Cover: Black, oil and abrasion resistant, synthetic rubber (Neoprene).

Temperature Range: For hydraulic oil lines -40°C to +135°C constant and +149°C intermittent (up to 10% of operating time). For water emulsions, etc., see page 24

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Vacuum	Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in Hg	in.
4G3H	1/4	6.4	0.57	14.5	1,250	86	5,000	345	28	3.0
5G3H	5/16	7.9	0.69	17.5	1,200	83	4,800	332	28	4.0
6G3H	3/8	9.5	0.75	19.1	1,125	78	4,500	312	28	4.0
8G3H	1/2	12.7	0.94	23.8	1,000	69	4,000	276	28	5.0
10G3H	5/8	15.9	1.06	27.0	900	61	3,600	248	28	6.0
12G3H	3/4	19.0	1.25	31.8	750	52	3,000	208	28	6.0
16G3H	1	25.4	1.50	38.1	563	39	2,250	156	20	8.0
20G3H	1¼	32.0	1.75	44.5	375	26	1,500	103	15	10.0
24G3H*	1½	38.0	2.01	51.0	300	21	1,200	83	15	12.0

*Gates proprietary hose. Not covered under SAE Std.

Extremely High Pressure

DGMS Approved

Mining Hose

Meets BCS 174 : 1992 Performance
Meets Flame resistance acceptance designation "US MSHA 2G"

Revolutionary design tailored to markets served.
Exceeds 2,00,000 (Two Lakh) impulse cycles under BCS 174 : 1992 conditions when tested at DRDO, R&De, Dighi, Ministry of Defence Test Lab.

Recommended for : High pressure hydraulic lines in longwall mining equipment and roof-support systems/petroleum based or water emulsion fluids.

Tube : Black, oil-resistant synthetic rubber (Nitrile)

Reinforcement : Two braids of high tensile steel wire.

Cover : Black, Oil, abrasion and flame resistant synthetic rubber (Modified Nitrile)

Temperature Range : - 40ºC to + 100ºC

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure				Minimum Burst Pressure		Minimum Bend Radius
					Dynamic		Static				
	in.	mm	in.	mm	psi	bar	psi	bar	psi	bar	in.
DN6 Mining Hose	1/4	6.3	0.67	17.0	6,525#	450	11,050†*	761	26,100	1,800	4.0
DN10 Mining Hose	3/8	9.5	0.85	21.5	5,500#	380	9,525†*	656	22,000	1,520	5.1
DN12 Mining Hose	1/2	12.7	1.04	26.5	5,250#	362	6,400†	441	21,000	1,448	6.0
DN20 Mining Hose	3/4	19.8	1.33	33.7	4,000#	276	4,950†	341	16,000	1,104	9.1
DN25 Mining Hose	1	25.3	1.60	40.7	3,125#	215	3,775†	260	12,500	861	12.0
DN32 Mining Hose	1¼	32.0	1.87	47.5	2,500#	172	2,900†	200	10,000	689	15.1
DN40 Mining Hose	1½	38.0	2.16	54.0	2,118#	146	2,541†	175	8,472	584	18.0
DN50 Mining Hose	2	51.0	2.40	67.0	1,625#	112	1,900†	131	6,500	448	24.0

BCS 174: 1992 qualification requires 100,000 Impulse Cycles at 133% of the dynamic working pressure and 35 ± 5 cycle per minute.

*Meets BCS 174:1992 Powered Roof Support Leg yield circuit specification.

†Where pressure surges are minimal, e.g. Power Roof Support application.

Coal Power/Longwall Mine Hose
CPS Coal Power – 4- and 6- Spiral Wire

Meets Performance Requirement of SAE 100 R13
Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

DGMS Approved

Extremely High Pressure

Recommended for : High Pressure lines in longwall mining equipment and roof-support system; petroleum- based or water emulsion fluids.

Tube : Black, oil-resistant synthetic rubber. (Neoprene)

Reinforcement : Four layers of alternated, spiraled High tensile steel wire over a layer of fabric on 3/4" and 1" size; six layers of alternated spiraled, high tensile steel wire over a layer of fabric on 1¼", 1 ½" and 2" sizes.

Cover : Black, oil and abrasion resistant Synthetic rubber (Neoprene). Yellow layline stripe. Also available with abrasion resistant MegaTuff® cover.

Temperature Range : -40ºC + 121ºC

Gates Proprietary Hose
Revolutionary design tailored to markets served.

Exceeds one million impulse cycles under SAE 100 R13 Test conditions when tested at DRDO, R&De, Dighi, Ministry of Defence Test Lab.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Rated Working Pressure				Minimum Burst Pressure		Minimum Bend Radius
					Dynamic		Static				
	in.	mm	in.	mm	psi	bar	psi	bar	psi	bar	in.
12 CPS	3/4	19.05	1.27	32.3	5,000#	345	6,700†	462	20,000	1379	9.5
16 CPS	1	25.40	1.53	38.9	5,000#	345	6,000†	414	20,000	1379	12.0
20 CPS	1¼	31.75	1.97	50.0	5,000#	345	6,000†	414	20,000	1379	16.5
24 CPS	1½	38.10	2.28	57.9	5,000#	345	6,000†	414	20,000	1379	20.0
32 CPS	2	50.80	2.81	71.4	5,000#	345	6,000†	414	20,000	1379	25.0

SAE 100 R13 qualification requires 5,00,000 (Half Million) Impulse Cycle at 121°C Fluid Temp.
Meets or Exceeds the DIN (Deutsche Industries Norm) 20023/Jan.1985 dynamic working pressure.
†Where pressure surges are minimal, e.g. Power Roof support applications.

Global M3K Mega3000® Hose – SAE 100R17

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

High Pressure

Recommended For : High pressure hydraulic oil lines. Meets SAE 100R17 requirements and performance requirements of EN 857 1SC. M3K hose has smaller exterior dimensions and **significantly tighter bend radius than other SAE 100R1 and 100R2 hose.** Recomended for use with patented Gates MegaCrimp ® Couplings.
Tube : Black, oil resistant synthetic rubber (Nitrile).
Reinforcement : Braided high tensile steel wire. -4,-5,-6 and -8 sizes are one braid; -10, -12 and -16 sizes are two-braid.
Cover : Black, oil, abrasion and weather reistant, synthetic rubber (Modified Nitrile).
Temperature Range : -40°C to + 100°C. For water emulsions, etc., see page 24.

Sizes ¼", ⅜", ½", & ⅝" meet SAE 100R2 impulse performance and 3/4", 1" sizes meet SAE 100R9 impulse performance

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
4M3K	1/4	6.4	0.47	11.9	3,000	207	12,000	828	2.0
5M3K	5/16	7.9	0.59	15.0	3,000	207	12,000	828	2.2
6M3K	3/8	9.5	0.62	15.6	3,000	207	12,000	828	2.5
8M3K	1/2	12.7	0.78	19.8	3,000	207	12,000	828	3.5
10M3K	5/8	15.9	0.98	24.9	3,000	207	12,000	828	4.0
12M3K	3/4	19.0	1.14	29.0	3,000	207	12,000	828	4.8
16M3K	1	25.4	1.48	37.6	3,000	207	12,000	828	6.0

Also available with abrasion resistant MegaTuff® and XtraTuff™ covers.

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*
*XtraTuff ™ hose lasts up to **25 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

High Pressure

Global M4K+ Mega4000® Hose

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Recommended For : High pressure hydraulic applications. **Provides tighter than standard minimum bend radius and greater flexibility for easier plumbing.** Recomended for use with patented Gates MegaCrimp® Couplings.

Tube : Black, oil resistant, synthetic rubber.

Reinforcement : Two braids of high tensile steel wire.

Cover : Black, oil abrasion and weather resistant, synthetic rubber (Modified Nitrile).

Temperature Range : -40°C to + 100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
4M4K+	1/4	6.4	0.54	13.7	4,000	276	16,000	1,104	2.0
6M4K+	3/8	9.5	0.69	17.5	4,000	276	16,000	1,104	2.5
8M4K+	1/2	12.7	0.86	21.8	4,000	276	16,000	1,104	3.5
10M4K+	5/8	15.9	0.98	24.9	4,000	276	16,000	1,104	4.0
12M4K+	3/4	19.0	1.14	29.0	4,000	276	16,000	1,104	4.8

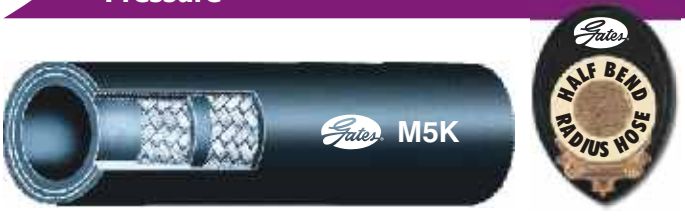
Also available with abrasion resistant MegaTuff® and XtraTuff™ covers.

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*
*XtraTuff™ hose lasts up to **25 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

High Pressure

Global M5K Mega5000® Hose

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"



Recommended For : High pressure hydraulic applications. **Provides tighter than standard minimum bend radius and greater flexibility for easier plumbing.** Recommended for use with patented Gates MegaCrimp® Couplings.

Tube : Black, oil resistant, synthetic rubber (Nitrile)

Reinforcement : Two braids of high tensile steel wire.

Cover : Black, oil, abrasion and weather resistant, synthetic rubber (Modified Nitrile).

Temperature Range : -40°C to +100°C. For water emulsions etc., see page 24

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
4M5K	1/4	6.4	0.54	13.7	5,000	345	20,000	1,380	2.0

Global G6K Spiral Wire Hose – SAE 100R15

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Extremely High Pressure

Recommended For : Extremely high pressure, high impulse applications such as hydrostatic transmissions. G6K is designed to meet all requirements of SAE 100R15 specifications and performance requirements of EN 856 4SH (-8) and EN 856 4SP (-12 and -16) and SAE 100 R15. Recommended for use with Gates GS Couplings.

Revolutionary design : Makes designing and plumbing of extremely high pressure hydraulic systems easy and efficient. 5/8" to 1-1/2" sizes are available in 121' and 200' continuous lengths.

Tube : Black, oil resistant, synthetic rubber (Neoprene).

Reinforcement : Four (six for -20 and -24) alternating layers of spiralled, high tensile steel wire and fabric.

Cover : Black, oil resistant, synthetic rubber (Neoprene*). Dual gold stripe layline. Available with unique abrasion-resistant Megatuff® cover.

Temperature Range : -40°C to + 121°C. For water emulsions etc., see page 24

Meets the performance requirements of SAE 100R15 specifications & performance requirements of EN 856 4SH (-8) and EN 856 4SP (-12 and -16). Having excellent impulse life. All sizes exceed 1,000,000 cycles.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
6G6K	3/8	9.5	0.80	20.3	6,000	414	24,000	1,656	5.0
8G6K	1/2	12.7	0.95	22.7	6,000	414	24,000	1,656	7.0
10G6K	5/8	15.9	1.09	27.7	6,000	414	24,000	1,656	8.0
12G6K	3/4	19.0	1.24	31.5	6,000	414	24,000	1,656	9.0
16G6K	1	25.4	1.53	38.9	6,000	414	24,000	1,656	12.0
20G6K	1¼	31.8	1.97	50.0	6,000	414	24,000	1,656	16.5
24G6K	1½	38.1	2.26	57.4	6,000	414	24,000	1,656	20.0

Also available with abrasion resistant MegaTuff® cover.

For sizes upto – 20 (1¼"), Eco-Friendly (EF') grades are available

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

BM6K MegaSpiral Plus

Meets performance requirements of DIN 20023 4SH/EN, SAE 100 R13

Extremely High Pressure

Recommended For : Ultra high-pressure and high-impulse hydraulic applications. Designed for hydrostatic transmissions and other severe operating conditions. Recommended for use with Gates GS Couplings.

Tube : CR (Neoprene).

Reinforcement : Four layers of alternated, spiralled, high tensile steel wire on -10, -12 and -16 sizes; six layers of alternated spiraled, high tensile steel wire on -20, -24, and -32 sizes.

Cover : CR (Neoprene).

Temperature Range : -40°C to + 120°C. For water emulsions etc., see page 24

Standards: Gates proprietary, meets or exceeds pressure requirements of DIN 20023 4SH; SAE 100R13.

Characteristics/benefits: Extremely flexible and improved impulse life.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
10BM6K	5/8	15.9	1.10	28	6,100	420	24,400	1,680	10.0
12BM6K	3/4	19.0	1.22	31	6,100	420	24,400	1,680	13.0
16BM6K	1	25.4	1.53	39	6,100	420	24,400	1,680	13.5
20BM6K	1¼	31.8	1.97	50	5,800	400	23,200	1,600	18.0
24BM6K	1½	38.1	2.26	57	5,075	350	20,300	1,400	22.0
32BM6K	2	50.8	2.80	71	5,075	350	20,300	1,400	25.4

Extremely High Pressure

Global G5K Spiral Wire Hose – SAE 100R13

Meets performance requirements of DIN 20023 4SH/EN
Meets Flame Resistance Acceptance Designation " U.S. MSHA 2G"

Exceeds one million impulse cycles under SAE100 R13 conditions

Exceeds pressure performance requirements of DIN 20023 4SP/EN for sizes ¾" and above and DIN 20023 4SH/EN for 1¼" and above

Recommended For : Extremely high-pressure hydraulic applications. G5K is designed to meet all requirements of SAE 100R13 specifications and performance requirements of EN 856 4SH (-20, -24 and -32) and EN 856 4SP (-10 and -12). 5/8" to 2" sizes are available in 121' to 200' continuous lengths. Recommended for use with Gates GS Couplings.
Tube : Black, oil resistant synthetic rubber (Neoprene).
Reinforcement : Four layers of alternated spiraled, high tensile steel wire on -10, -12 and -16 sizes; six layers of alternated spiraled, high tensile steel wire on -20, -24, and -32 sizes.
Cover : Black, oil resistant synthetic rubber (Neoprene). Dual red stripe layline.
Temperature Range : -40°C to +121°C.
For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
8G5K	1/2	12.7	0.94	23.9	5,000	345	20,000	1,380	7.0
10G5K	5/8	15.9	1.11	28.2	5,000	345	20,000	1,380	8.5
12G5K	3/4	19.1	1.26	32.0	5,000	345	20,000	1,380	9.5
16G5K	1	25.4	1.53	38.9	5,000	345	20,000	1,380	12.0
20G5K	1¼	31.8	1.97	50.0	5,000	345	20,000	1,380	16.5
24G5K	1½	38.1	2.26	57.4	5,000	345	20,000	1,380	20.0
32G5K	2	50.8	2.80	71.1	5,000	345	20,000	1,380	25.0

EFG5K Hose is available for Biodegradable Hydraulic Fluids (sizes -12, -16, -20)

Also available with abrasion resistant MegaTuff® cover.
*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

Extremely High Pressure

GLOBAL G4K Spiral Wire Hose

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Exceeds pressure performance requirements of DIN 20023 4SP/EN

Recommended For : Extremely high pressure, high impulse applications. Exceeds all performance requirements for SAE 100R12. and performance requirement of EN 856 4SP (-16). Available in 121' and 200' continuous lengths. Recommended for use with Gates GS Couplings.
Tube : Black, oil resistant synthetic rubber (Neoprene).
Reinforcement : Four alternating layers of spiralled, high tensile steel wire.
Cover : Black, oil resistant synthetic rubber (Neoprene). Dual white stripe layline.
Temperature Range : -40°C to + 121°C.
For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
10G4K	5/8	15.9	1.11	28.2	4,000	276	16,000	1,104	4.0
12G4K	3/4	19.1	1.21	32.0	4,000	276	16,000	1,104	4.8
16G4K	1	25.4	1.50	38.9	4,000	276	16,000	1,104	6.0
20G4K	1¼	31.8	1.85	50.0	4,000	276	16,000	1,104	16.5

EFG4K is available for Biodegradable Hydraulic Fluids (sizes -12, -16, -20)

Also available with abrasion resistant MegaTuff® cover.
*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

Global G3K Spiral Wire Hose

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Extremely High Pressure

Recommended For : Extremely high pressure, high impulse applications. Exceeds all performance requirements for SAE 100R11 and SAE 100R12. Available in 121' and 200' continuous lengths. Recommended for use with Gates GS Couplings.

Tube : Black, oil resistant synthetic rubber (Neoprene).

Reinforcement : Four alternating layers of spiraled, high tensile steel wire.

Cover : Black, oil resistant, synthetic rubber (Neoprene). Dual white stripe layline.

Temperature Range : -40°C to + 121°C.

For water emulsions, etc., see page 24.

Exceeds pressure performance requirements of DIN 20023 4SP/EN

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
20G3K	1¼	31.8	1.85	47.0	3,000	207	12,000	828	16.5
24G3K	1½	38.1	2.11	53.6	3,000	207	12,000	828	20.0
32G3K	2	50.8	2.63	66.8	3,000	207	12,000	828	25.0

Also available with abrasion resistant MegaTuff® cover.

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

C12 and C12M Four Spiral Wire Hose – SAE 100R12

Meets Flame Resistance Acceptance Designation "U.S. MSHA 2G"

Very High Pressure

Recommended For : Very high-pressure hydraulic applications. Exceeds all performance requirements for SAE 100R12 and performance requirements of EN 856 4SP (-16). C12 hose provides excellent impulse life. Recommended for use with Gates GS Couplings.

Tube : Black, oil resistant, synthetic rubber (Neoprene).

Reinforcement : Four layers of alternated, spiraled high tensile steel wire.

Cover : Black, oil resistant, synthetic rubber (Neoprene).

Temperature Range : -40°C to +121°C. For water emulsions, etc., see page 24.

C12M exceeds one million impulse cycles when tested at 121°C at half the minimum bend radius specified by SAE 100R12 at 133% of rated working pressure.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
6C12M	3/8	9.5	0.80	20.3	4,000	276	16,000	1,104	2.5
8C12M	1/2	12.7	0.94	23.9	4,000	276	16,000	1,104	3.5
12C12M	3/4	19.0	1.21	30.7	4,000	276	16,000	1,104	4.8
16C12M	1	25.4	1.50	38.1	4,000	276	16,000	1,104	6.0
20C12M	1¼	31.8	1.85	47.0	3,000	207	12,000	828	8.3
24C12	1½	38.1	2.11	53.6	2,500	172	10,000	690	20.0
32C12	2	50.8	2.63	66.8	2,500	172	10,000	690	25.0

Also available with abrasion resistant MegaTuff® cover.

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

Medium Pressure & High Temp

MegaTech™ ACR Hot Oil/Air Return Line Hose

Recommended For : Pressurised hot oil return lines and rotary oil/air compressor lines.

Tube : Black. Specifically compounded for temperature and chemical resistance (CPE).

Reinforcement : One braid of high tensile steel wire.

Cover : Black, Oil & abrasion resistance polyester braid. Flame resistant US MSHA 2G.

Temperature Range : Petroleum based fluids -40°C to + 149°C. Phosphate ester fluids as recommended by the fluid manufacturer but within a range of -40°C to + 100°C. For water emulsions, etc., see page 24.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
4 ACR	1/4	6.4	.52	13.2	1000	69	4000	276	2.00
6 ACR	3/8	9.5	.67	17.0	1000	69	4000	276	2.50
8 ACR	1/2	12.7	.76	19.3	1000	69	4000	276	3.50
10 ACR	5/8	15.9	.95	24.1	1000	69	4000	276	4.00
12 ACR*	3/4	19.0	1.04	26.4	1000	69	4000	276	4.75
16 ACR	1	25.4	1.30	33.0	1000	69	4000	276	6.00
20 ACR*	1¼	31.8	1.58	40.1	1000	69	4000	276	8.50
24 ACR	1½	38.1	1.95	49.5	500	35	2000	140	15.00
32 ACR	2	50.8	2.48	63.0	500	35	2000	140	18.00
40 ACR	2½	63.5	2.97	75.4	500	35	2000	140	22.00
48 ACR	3	76.4	3.50	88.9	500	35	2000	140	24.00

*– 12 and –20 are currently in preproduction stage at the time of going into print and will be available shortly.

High Pressure

J2AT Two Wire Braid Jack Hose

Recommended For : Hydraulic Jack applications. Meets Material Handling Institute specification IJ 100 for hydraulic hose and assemblies used with jacking systems.

Tube : Black, oil resistant, synthetic rubber (Nitrile).

Reinforcement : Two braids of high tensile steel wire.

Cover : Black, oil and abrasion resistant, synthetic rubber (Modified Nitrile).

Temperature Range : -40°C to + 49°C.

SPECIFICATIONS

Description	Hose I.D.		Hose O.D.		Working Pressure		Minimum Burst Pressure		Minimum Bend Radius
	in.	mm	in.	mm	psi	bar	psi	bar	in.
4J2AT	1/4	6.4	0.58	14.7	10,000†	690	20,000	1,380	4
6J2AT	3/8	9.5	0.74	18.8	10,000†	690	20,000	1,380	5

† Static (non-impulse) pressure rating for hydraulic jack applications only.

Also available with abrasion resistant MegaTuff® cover.

*MegaTuff® hose lasts up to **300 times** longer than standard hose during hose-to-hose and hose-to-metal abrasion tests per ISO 6945.*

Gates Hydraulic Hose Selection Guide

Standard Industry Specification	Description	Construction (Reinforcement)	Use	Stock	
				Tube	Cover
				Name	Name
SAE 100R15	G6K	4&6-spiral, wire	Extremely High Pressure	Neoprene	Neoprene
SAE 100R13	G5K	4&6-spiral, wire	Extremely High Pressure Petrol, Oils	Neoprene	Neoprene
SAE 100R12	G4K	4-spiral, wire	Extremely High Pressure Petrol, Oils	Neoprene	Neoprene
	G3K	4-spiral, wire	Extremely High Pressure Petrol, Oils	Neoprene	Neoprene
	C12	4-spiral, wire	Extremely High Pressure Petrol, Oils	Neoprene	Neoprene
	C12M	4-spiral, wire	High Pressure, Tight Bends, Petrol, Oils	Neoprene	Neoprene
SAE 100R13 DIN 20023 4SH/EN	BM6K	4&6-spiral, wire	Extremely High Pressure Petrol, Oils	Neoprene	Neoprene
SAE 100R2Type AT, EN 853Type2SN	G2 (C2AT)	2-braid, wire	Petroleum Oils	Nitrile	NBR/PVC
Gates Proprietary	M5K	2-braid, wire	Tight Bend, High Flexibility	Nitrile	NBR/PVC
Gates Proprietary	M4K+	2-braid, wire	Tight Bend, High Flexibility	Nitrile	NBR/PVC Neoprene
SAE 100R17	M3K	1&2-braid, wire	Tight Bend, High Flexibility	Nitrile	NBR/PVC
SAE 100R2 Type AT EN 853 Type 2SN	G2H	2-braid, wire	High Temperature	Nitrile	Hypalon
SAE 100R2 Type A	G2XH	2-braid, wire	Multi-Fluid, High Temperature	CPE	CPE
IJ 100	J2AT	2-braid, wire	Industrial Jack Hose	Nitrile	NBR/PVC
SAE 100R1 Type AT, EN 853 Type 1SN	G1 (C1T)	1-braid, wire	Petroleum Oils	Nitrile	NBR/PVC
SAE 100R1 Type AT, EN 853 1SN	G1H (C1TH)	1-braid, wire	High Temperature	Nitrile	Hypalon
SAE 100R3 EN 854 Type R3	C3	2-braid, Textile	Petrol. Oils, Antifreeze, Water	Nitrile	NBR/PVC
SAE 100R3 EN 854 Type R3	G3H	2-braid, Textile	Petrol. Oils, Antifreeze, Water, High Temperature	Nitrile	Neoprene
SAE 100R6 EN 854 Type R6	C6	1-braid, Textile	Petrol. Oils, Antifreeze, Water	Nitrile	NBR/PVC
SAE 100R6 EN 854 Type R6	GTH	1-braid, Textile	Petrol. Oils, Antifreeze, Water, High Temperature	Nitrile	Neoprene
BCS : 174 SAE 100R13	Mining	2-braid, wire	Longwall Mining Equipment	Nitrile	NBR/PVC
	CPS	4&6-spiral, wire	Roots Support System	Neoprene	Neoprene
Gates Proprietary Hose	MegaTech™ ACR	1-braid, wire	Hot Oil, Air Return Line	CPE	Textile

Note : Gates also offers several other hoses for special applications. Should you not find a hose suiting your requirements, please contact your nearest Gates representative.

Gates Hydraulic Hose Selection Guide Contd.

Description	Temp. Range (°C)	Dash Size vs. Rated Working Pressure (psi)																Hose Page
		-2	-3	-4	-5	-6	-8	-10	-12	-16	-20	-24	-32	-40	-48	-50	-64	
G6K	-40 +121					6,000	6,000	6,000	6,000	6,000	6,000	6,000						18
G5K	-40 +121						5,000	5,000	5,000	5,000	5,000	5,000	5,000					19
G4K	-40 +121							4,000	4,000	4,000	4,000							19
G3K	-40 +121										3,000	3,000	3,000					20
C12	-40 +121					4,000	4,000		4,000	4,000	3,000	2,500	2,500					20
C12M	-40 +121					4,000	4,000		4,000	4,000	3,000	2,500	2,500					20
BM6K	-40 +121							6,100	6,100	6,100	5,800	5,075	5,075					18
G2 (C2AT)	-40 +100			5,800	5,100	4,800	4,000	3,625	3,100	2,400	1,825	1,300	1,175					11
M5K	-40 +100			5,000														17
M4K+	-40 +100			4,000		4,000	4,000	4,000	4,000									17
M3K	-40 +100			3,000	3,000	3,000	3,000	3,000	3,000	3,000								16
G2H	-40 +135										1,825	1,300	1,175					12
G2XH	-40 +149									2,500								13
J2AT	-40 +49			10,000		10,000												21
G1 (C1T)	-40 +100			3,275	3,125	2,600	2,325	1,900	1,525	1,275	925	725	600					10
G1H (C1TH)	-40 +135			2,750	2,500	2,250	2,000	1,500	1,250	1,000	625	725	600					11
C3	-40 +100			1,250	1,200	1,125	1,000	875	750	565								14
G3H	-40 +135			1,250	1,200	1,125	1,000	900	750	563	375	300						15
C6	-40 +100			400	400	400	400	350	300	200								13
GTH	-40 +135			400	400	400	400	350	300									14
Mining	-40 +100					6,525		5,500	5,250		4,000	3,125	2,500	2,118		1,625		15
CPS	-40 +121								5,000	5,000	5,000	5,000	5,000					16
MegaTech™ ACR	-40 +100			1,000		1,000	1,000	1,000		1,000		500	500	500	500			21

Note : Gates also offers several other hoses for special applications. Should you not find a hose suiting your requirements, please contact your nearest Gates representative.

Additional Temperature Limits For Gates Hydraulic Hoses

Caution : Water, water/oil emulsions and water/glycol solutions must be kept below the temperatures listed in the table below, relative to line pressures.

Low pressure applications, i.e., in return lines, require lower maximum temperatures as shown.

Maximum Temperature Limits For Water, Water/Oil Emulsions and Water/Glycol Solutions

Hose	Pressure Lines	Return Lines
G6K, BM6K, G5K, G4K, G3K, C12, C12M, C2AT, C2A, Mining Hose CPS, M2T, C1T, C1A, M3K, M4K+, M5K, C3, C6,	+93°C	+82°C
C2ATH/G2H, C1TH/G1H, ACR G2XH, G3H, C6H	+107°C	+82°C

Caution :The fluid manufacturer's recommended maximum operating temperature for any given fluid must not be exceeded. If different than the above listed hose temperatures, the lower limit must take precedence.

Actual service life at temperatures approaching the recommended limit will depend on the particular application and the fluid being used in the hose. Intermittent (up to 10% of operating time) refers to momentary temperature surges. Detrimental effects increase with increased exposure to elevated temperatures.

Do NOT expose hose to maximum temperature and maximum rated working pressure at the same time.

Dash Numbers

Dash No.	Hose I.D. (Inches)			
	All Except C5 Series, C14 and AC134a		C5 Series, C14 and AC134a	
	Inches	Millimeters	Inches	Millimeters
-3	3/16	4.8	–	–
-4	1/4	6.4	3/16	4.8
-5	5/16	7.9	1/4	6.4
-6	3/8	9.5	5/16	7.9
-8	1/2	12.7	13/32	10.3
-10	5/8	15.9	1/2	12.7
-12	3/4	19.0	5/8	15.9
-14	7/8	22.2	–	–
-16	1	25.4	7/8	22.2
-20	1 1/4	31.8	1 1/8	28.6
-24	1 1/2	38.1	1 3/8	34.9
-32	2	50.8	1 13/16	46.0
-40	2 1/2	63.5	2 3/8	60.3
-48	3	76.2	–	–
-56	3 1/2	88.9	–	–
-64	4	101.6	–	–

Agency Specifications and Hose Selection Guide

INDUSTRY AGENCIES

ABC American Bureau of Shopping
DIN Deutsch Industry Norm, Germany
DNV Det Norske Veritas for North Sea
EN European Norm/ Standard
IJS Industrial Jack Specifications
GL Germanischer Lloyds
SAE Society of Automotive Engineers

GOVERNMENT AGENCIES

MSHA U.S. Mine Safety and Health Administration
USCG U.S. Coast Guard
DGMS Directorate General of Mines & Safety, India
DGQA Directorate Gneral of Quality Assurance, Ministry of Defence, India

Meets These Agency Specifications

Hose Type	ABS	DIN	DNV	EN	German-ischer Lloyds	IJS	DGMS	SAE	MSHA	USCG	
										FUEL	Power
G6K	X	20023	X	EN 856				100R15	X		X
G5K	X	20023	X	EN 856				100R13	X		X
G4K		20023		EN 856				100R12	X		
G3K	X	20023		EN 856				100R12	X		
C12M	X	20023	X	EN 856				100R12	X		X**
C12	X	20023		EN 856				100R12	X		X***
M5K					X						
M4K+	X				X				X		
G2XH		20022		EN 853				100R2	X		
G2(C2AT)		20022		EN 853	X			100R2 Type AT	X		X
G2H			X	EN 853				100R2 Type AT	X	X	X
J2AT						X			X		
M3K	X		X		X			100R17	X		X
M3K - 12 - 16	X		X		X			100R17	X	X	X
G1(C1T)		20022	X	EN 853	X			100R1 Type AT	X		X
G1H			X	EN 853				100R1 Type AT	X	X	
Mining			X				X(BCS 174)		X		
CPS				20023		X	X	100R13			
C3				EN854				100R3			
G3H				EN854				100R3			
C6				EN854				100R6			
GTH				EN854				100R6			

** Except 3/8" & 1/2"
*** Except 1/4",1, 1 1/4"

Nomographic Chart

Indicating
Flow Capacity of Hose Assemblies
at
Recommended Flow Velocities

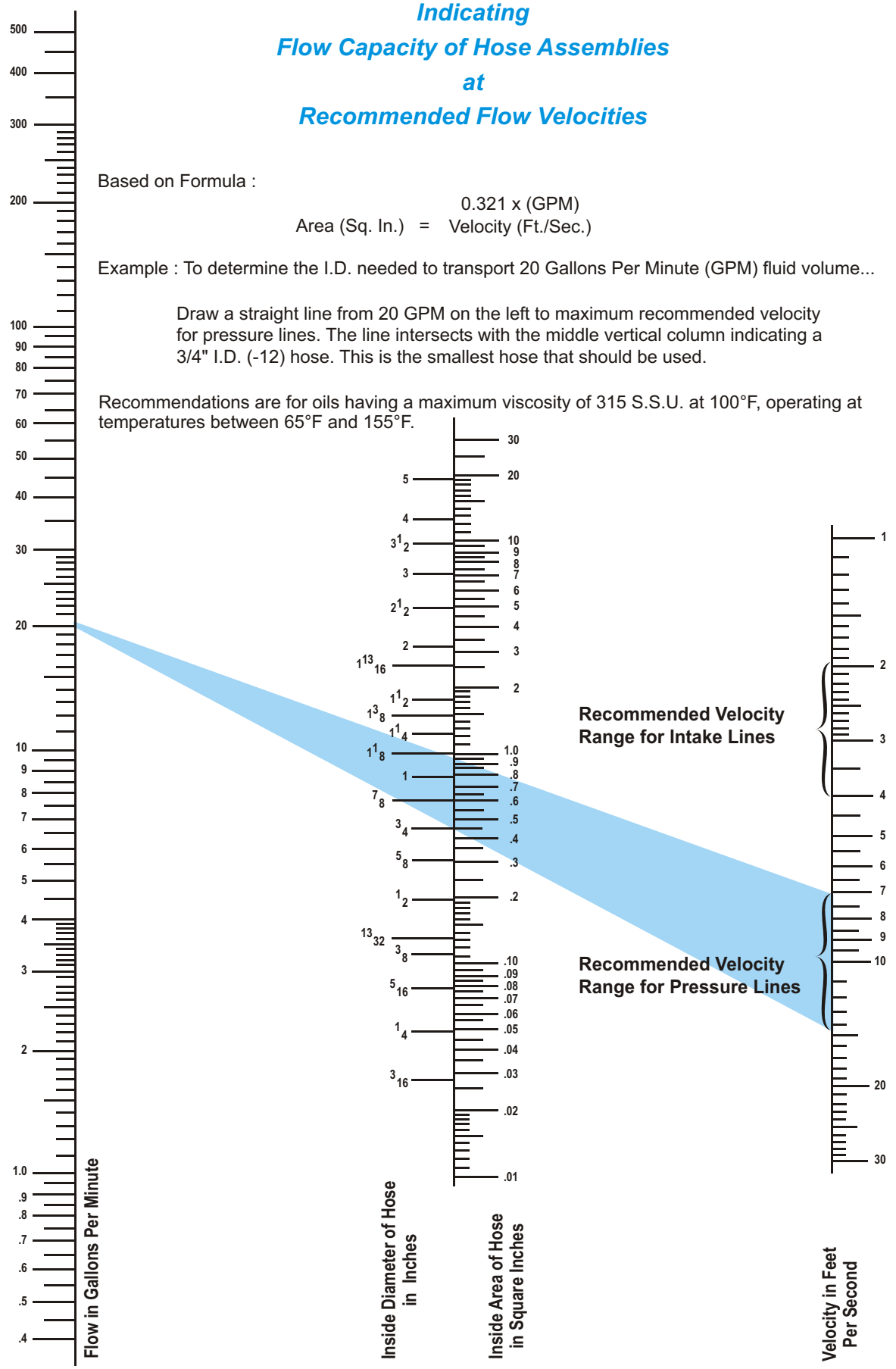
Based on Formula :

$$\text{Area (Sq. In.)} = \frac{0.321 \times \text{(GPM)}}{\text{Velocity (Ft./Sec.)}}$$

Example : To determine the I.D. needed to transport 20 Gallons Per Minute (GPM) fluid volume...

Draw a straight line from 20 GPM on the left to maximum recommended velocity for pressure lines. The line intersects with the middle vertical column indicating a 3/4" I.D. (-12) hose. This is the smallest hose that should be used.

Recommendations are for oils having a maximum viscosity of 315 S.S.U. at 100°F, operating at temperatures between 65°F and 155°F.



Hydraulic System Pressure Drop

What Is Pressure Drop ?

As related to our business, pressure drop is the difference between the pressure of a fluid as it enters one end of a hydraulic hose assembly and the pressure of that fluid as it leaves the other end. There will be a difference in pressure, and it will be less. How much less depends on what is between the beginning and end of the hose assembly. Here are some examples of things that can influence the amount of pressure drop.

1. FRICTION – This is the rubbing of fluid against the inside walls of the hose assembly.
2. TYPE OF FLUID – Different fluids behave differently under pressure. Thicker fluids are moved with greater difficulty and will exhibit greater pressure drop.
3. TEMPERATURE OF THE FLUID – Warming fluids thins them so they are moved more easily, as with automotive oil.
4. LENGTH OF HOSE ASSEMBLY – The longer it is, the more surface there is for friction to decrease pressure.
5. SIZE (I.D.) OF HOSE – Affects the fluid velocity for a given flow rate. Higher velocities result in greater pressure drop. Therefore, a larger I.D. hose will produce less pressure drop.
6. TYPE OF COUPLINGS & ADAPTERS – Any change in bore or change in direction (such as with 45° or 90° elbows) can increase the amount of pressure drop.
7. FLOW RATE – Pressure drop increases with flow rate for same size hose.

Who Cares About Pressure Drop ?

Suppose you need 4,000 psi of output from a hose assembly for hydraulic equipment to run efficiently. There will be some pressure drop and you must allow for it in helping to plumb the system with Gates hose, couplings and adapters. This means that the input pressure to the hose assembly must be equal to the output plus the amount of pressure drop. If the pressure drop in this example is 150 psi, then you will need 4,150 psi of input.

How Can You Determine The Amount Of Pressure Drop ?

That's the easy part of it. Contact your local Gates representative who is trained and equipped to quickly solve such problems for you.

He will need input variable and fittings used from you as shown (see below). A Gates Pressure Drop analysis printed below will then be provided for your application.

Input Variables :

Flow Rate : 15 (GPM)
Viscosity : 20.0 (Centistokes)
Specific Gravity : 0.85
Free Hose Length : 20.0 (ft.)

Sample Pressure Drop Analysis Fittings Used :

1.Standard Straight Fitting
2.90-degree Angle Coupling

Dash Size (1/16©)	Velocity (Ft/Sec)	Hose Pressure Drop (psi/Ft)	Total Pressure Drop-Hose & Fittings (psi)	(1) Reynolds Number	(2) Heat Gain (BTUH)	(3) Horsepower Loss
5	62.8	28.8	789.6	7584	17483	6.87
6	43.6	12.2	399.1	6320	8838	3.47
8	24.5	3.2	81.3	4740	1801	0.71
*10	15.7	1.1	31.2	3792	691	0.27
12	10.9	0.5	12.7	3160	280	0.11
16	6.1	0.1	2.6	2730	58	0.02
20	3.9	0.0	0.8	1896	18	0.01

*Recommended hose size, based on velocity, pressure drop, heat gain and hp loss.

(1) ***Reynolds Number*** $= \frac{\text{inertia flow forces}}{\text{friction forces (or viscosity)}}$ indicates the type of flow.

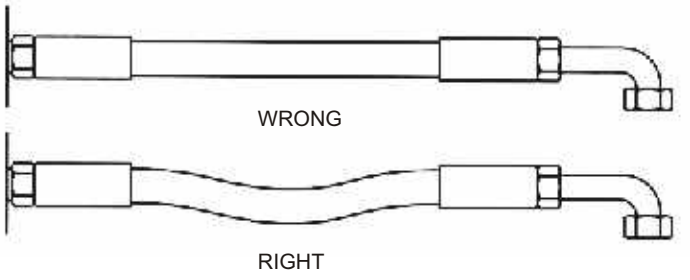
Reynolds No. Range	Type of Flow
0-2000	laminar
2000-3000	transient
3000 +	turbulent

(2) ***Heat Gain*** is the total amount of energy converted to heat energy which will raise the fluid temperature if it is not dissipated.
(3) ***Horsepower Loss*** is a measure of the conversion of mechanical energy to heat energy and is related to system heat gain.

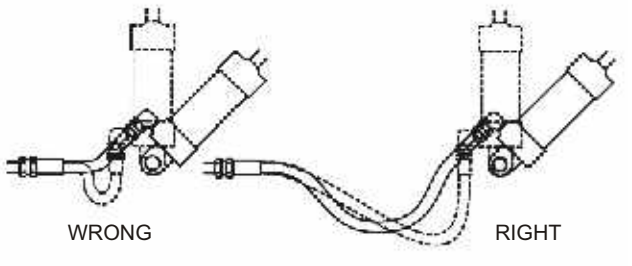
Hose Assembly Routing Tips

Proper hose installation is essential for satisfactory performance. If hose length is excessive, the appearance of the installation will be unsatisfactory and unnecessary cost of equipment will be involved. If hose assemblies are too short to permit adequate flexing and changes in length due to expansion or contraction, hose service life will be reduced.

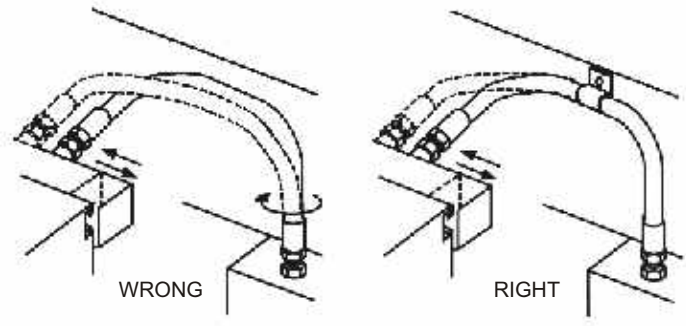
The following diagrams show proper hose installations which provide maximum performance and cost savings. Consider these examples in determining length of a specific assembly.



When hose installation is straight, allow enough slack in hose line to provide for length changes which will occur when pressure is applied.

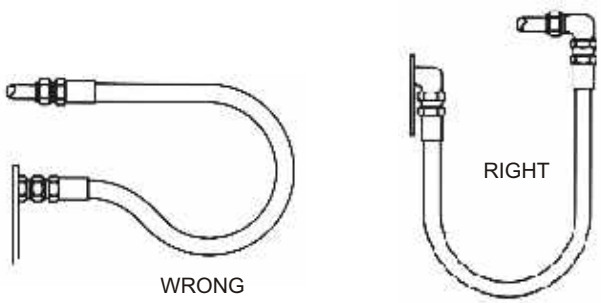


Adequate hose length is necessary to distribute movement on flexing applications and to avoid abrasion.

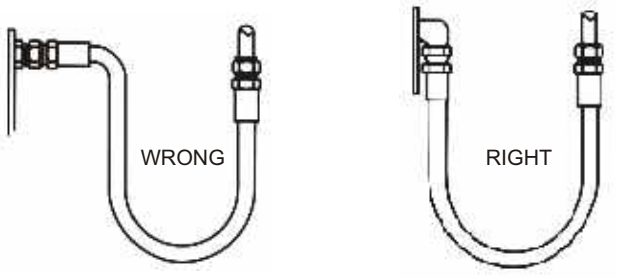


Avoid twisting of hose lines bent in two planes by clamping hose at change of plane.

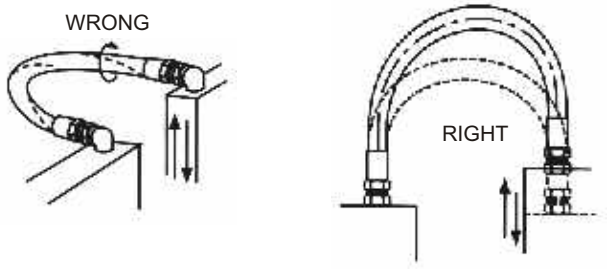
Reduce number of pipe thread joints by using hydraulic adapters instead of pipe fittings.



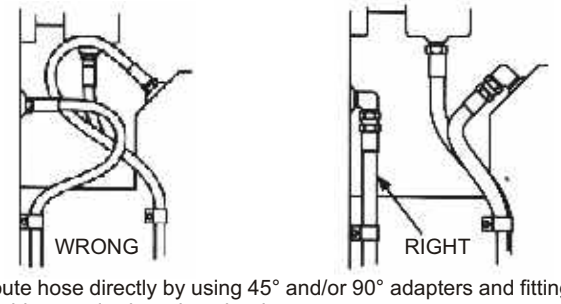
When radius is below the required minimum, use an angle adapter to avoid sharp bends.



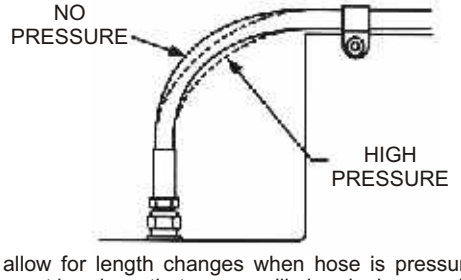
Use proper angle adapters to avoid tight or bend in hose.



Prevent twisting and distortion by bending hose in same plane as the motion of the port to which hose is connected.

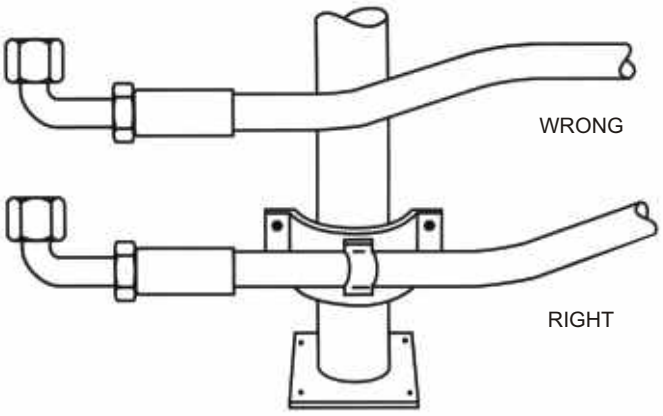


Route hose directly by using 45° and/or 90° adapters and fittings. Avoid excessive hose length to improve appearance.

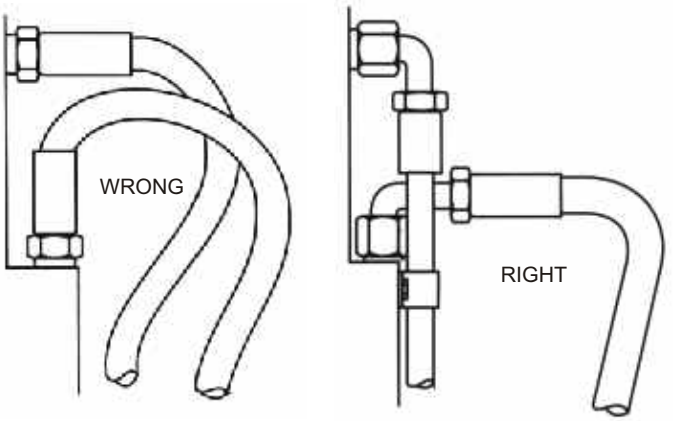


To allow for length changes when hose is pressurized, do not clamp at bends so that curves will absorb changes. Do not clamp high and low pressure lines together.

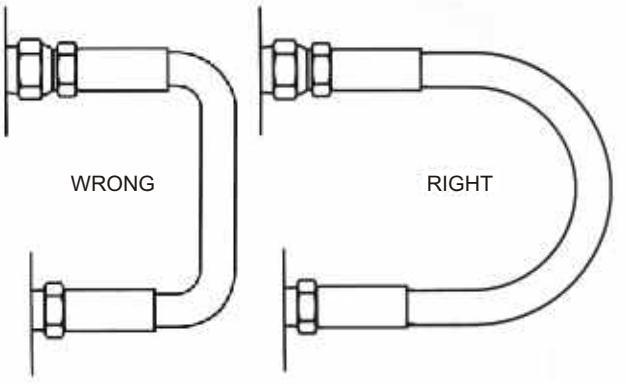
Hose Assembly Routing Tips ...contd.



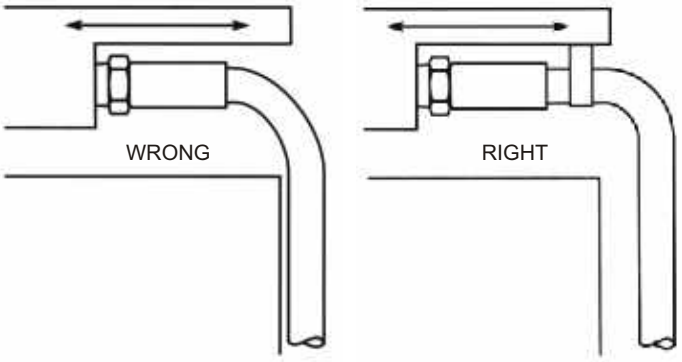
High ambient temperatures shorten hose life, so make sure hose is kept away from hot parts. If this is not possible, insulate hose.



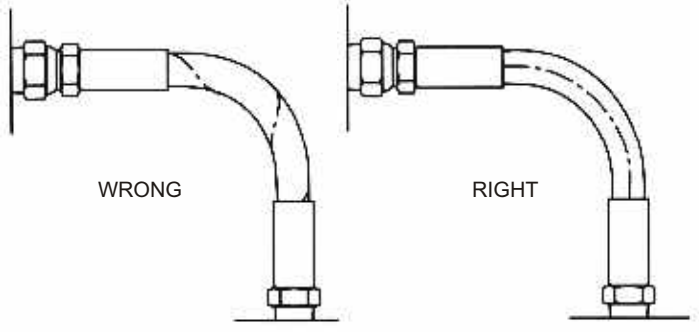
Elbows and adapters should be used to relieve strain on the assembly, and to provide neater installations which will be more accessible for inspection and maintenance.



To avoid hose collapse and flow restriction, keep hose bend radii as large as possible. Refer to hose specifications tables for minimum bend radii.



Run hose in the installation so that it avoids rubbing and abrasion. Often, clamps are required to support long hose runs or to keep hose away from moving parts. Use clamps of the correct size. A clamp too large allows hose to move inside the clamp and causes abrasion.



When installing hose, make sure it is not twisted. Pressure applied to a twisted hose can result in hose failure or loosening of connections.

Seven Easy Steps To Selecting The Proper Hose

An effective way to remember hose selection criteria is to remember the word...

STAMPED

S	=	Size
T	=	Temperature
A	=	Application
M	=	Material to be conveyed
P	=	Pressure
E	=	Ends or couplings
D	=	Delivery (volume and velocity)

1. Hose Size (Dash Numbers)

The inside diameter of the hose must be adequate to keep pressure loss to a minimum and avoid damage to the hose due to heat generation or excessive turbulence.

To determine the replacement hose size, read the layline printing on the side of the original hose. If the original hose layline is painted over or worn off, the original hose must be cut and inside diameter measured for size. NOTE : ***Before cutting*** an original hose assembly, measure the overall assembly length. This measurement will be required to build the replacement assembly.

The hydraulics industry has adopted a measuring system called Dash Numbers to indicate hose and coupling size. The number which precedes the hose or coupling description is the dash size. This industry standard number denotes hose I.D. in sixteenths of an inch. (The exception to this is the SAE100R5 hoses C5C, C5D, C5E, C5M, C14 and AC 134a, refrigerant hoses, where dash sizes denote hose I.D. equal to equivalent tube O.D.)

Hose O.D. can be a critical factor when hose routing clamps are used or hoses are routed through bulkheads. Check individual hose specification tables for O.D.'s.

2. Temperature

When selecting a replacement assembly, two areas of temperature must be considered. These are fluid temperature and ambient temperature. The hose selected must be capable of withstanding the minimum and maximum temperature seen by the system. Care must be taken when routing near hot manifolds and in extreme cases a heat shield may be advisable.

3. Application

Determine where or how the replacement hose or assembly is to be used. Most often only a duplicate of the original hose will have to be made. To fulfill the requirements of the application, additional questions may need to be answered... such as :

Where will hose be used ?	Fluid and/or Ambient Temperature ?	Hose Construction ?
Equipment Type ?	Fluid Compatibility ?	Thread End Connection Type ?
Working and Surge Pressures ?	Environmental Conditions ?	Permanent or Field Attachable Couplings ?
Suction Application ?	Routing Requirements ?	Thread Type ?
Government and Industry Standards	Unusual Mechanical Loads ?	Minimum Bend Radius ?
Being Met ?	Non-Conductive Hose Required ?	Excessive Abrasion ?

4. Material to be Conveyed

Some applications require specialized oils or chemicals to be conveyed through the system. Hose selection must assure compatibility of the hose tube, cover, couplings and "O" rings with the fluid used. Additional caution must be exercised in hose selection for gaseous applications such as refrigerants and LPG. NOTE : All block type couplings contain nitrile "O" rings which must be compatible with the fluids being used.

5. Pressure

Most important in the hose selection process is knowing system pressure, including pressure spikes. Published working pressures must be equal to or greater than the system pressure. Pressure spikes greater than the published working pressure will shorten hose life and must be taken into consideration. Gates DOES NOT recommend using hoses on applications having pressure spikes greater than published working pressures of the hose.

6. Ends of Couplings

Once thread ends have been identified, consult the appropriate section of the catalog for specific part number selection.

7. Delivery (Vacuum and Velocity)

System is new or altered, determine the hose I.D. needed to transport required fluid volume flow by using the Nomographic Chart (ref. page 26).

CHARACTERISTICS AND RESISTANCE INFORMATION FOR HOSE TUBE AND COVER COMPOUNDS

These ratings are for normal or usual range of the specified compounds.
Many are also modified to meet the needs of specific applications.
See notes below.

Elastomer	Acrylonitrile and Butadiene	Poly Chloroprene	Natural Rubber or Styrene Butadiene	Chloro-sulfonated Polyethylene	Ethylene Propylene Diene	Chlorinated Polyethylene	Isobutylene and Isoprene	Fluoro-carbon Fluoro-elastomer	Polyvinyl Chloride (plasticized)	Cross Linked Ploye thylene	Teflon®	Poly-urethane	Polyamide Resins	Ultra High Molecular Weight Polyethylene
Common Name or Trade Name	Buna-N Nitrile	Neoprene	Gum Rubber; Buna-S	Hypalon®	EPDM	CPE	Butyl	FKM Viton Fluorel	PVC	Gatron®	Teflon	Urethane	Nylon	UHMWPE
ASTM	NBR	CR	NR or SBR	CSM	EPDM	CM	IIR	FKM	—	XLPE	FEP/PTFE	EU	PA	UHPE
Physical Strength	Good	Good	Excellent	Good to Excellent	Good	Good	Fair to Good	Good	Fair to Good	Good	Very Good	Excellent	Good	Very Good
RESISTANCE TO: Abrasion	Fair to Good	Good to Excellent	Excellent	Good to Excellent	Good	Good	Fair to Good	Good to Excellent	Good to Excellent	Good	Excellent	Excellent	Good to Excellent	Excellent
Weather/Ozone	Poor	Good to Excellent	Poor to Fair	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Fair to Good	Excellent	Good
Gas Permeation	Good to Excellent	Good	Good	Good to Excellent	Fair to Good	Good	Excellent	Good	Good	Good	Excellent	Fair to Good	Excellent	Excellent
Petroleum Oils	Excellent	Excellent	Poor	Good to Excellent	Poor	Good	Poor	Excellent	Good to Excellent	Excellent	Excellent	Good	Excellent	Excellent
Gasolines	Excellent	Fair to Good	Poor	Fair	Poor	Good	Poor	Excellent	Fair	Excellent	Excellent	Fair	Excellent	Excellent
High Temperatures	Good to Excellent	Good	Fair	Good to Excellent	Excellent	Excellent	Excellent	Excellent	Poor	Good	Excellent	Fair	Good	Fair
Low Temperatures	Fair to Good	Fair to Good	Good	Fair	Fair to Good	Good	Good	Good	Poor	Fair to Good	Good	Excellent	Excellent	Fair

Gates System Of Constant Pressure Hoses

DIN Specifications — MegaSys Pressure Matrix

	04	05	06	08	10	12	16	20	24	32
210bar/3K	M3K	M3K	M3K	M3K	M3K	M3K	M3K	G3K	G3K	G3K
280bar/4K	M4K+		M4K+	M4K+	M4K+/G4K	M4K+/G4K	G4K	G4K		
350bar/5K	M5K	M5K	M5K	G5K	G5K	G5K	G5K	G5K	G5K	G5K
420bar/6K	M6K		G6K	G6K	G6K	G6K	G6K	G6K	G6K	
560bar/8K										

: 1SN/1SC +

: 2SN/2SC +

: 4SP +

: 4SH +

SAE Specifications — MegaSys Pressure Matrix

	-4	-5	-6	-8	-10	-12	-16	-20	-24	-32
3000 PSI	M3K	M3K	M3K	M3K	M3K	M3K	M3K	G3K	G3K	G3K
4000 PSI	M4K+		M4K+	M4K+	M4K+	G4K	G4K	G4K		
5000 PSI	M5K	M5K	M5K			G5K	G5K	G5K	G5K	G5K
6000 PSI	M6K		G6K	G6K	G6K	G6K	G6K	G6K	G6K	
8000 PSI										

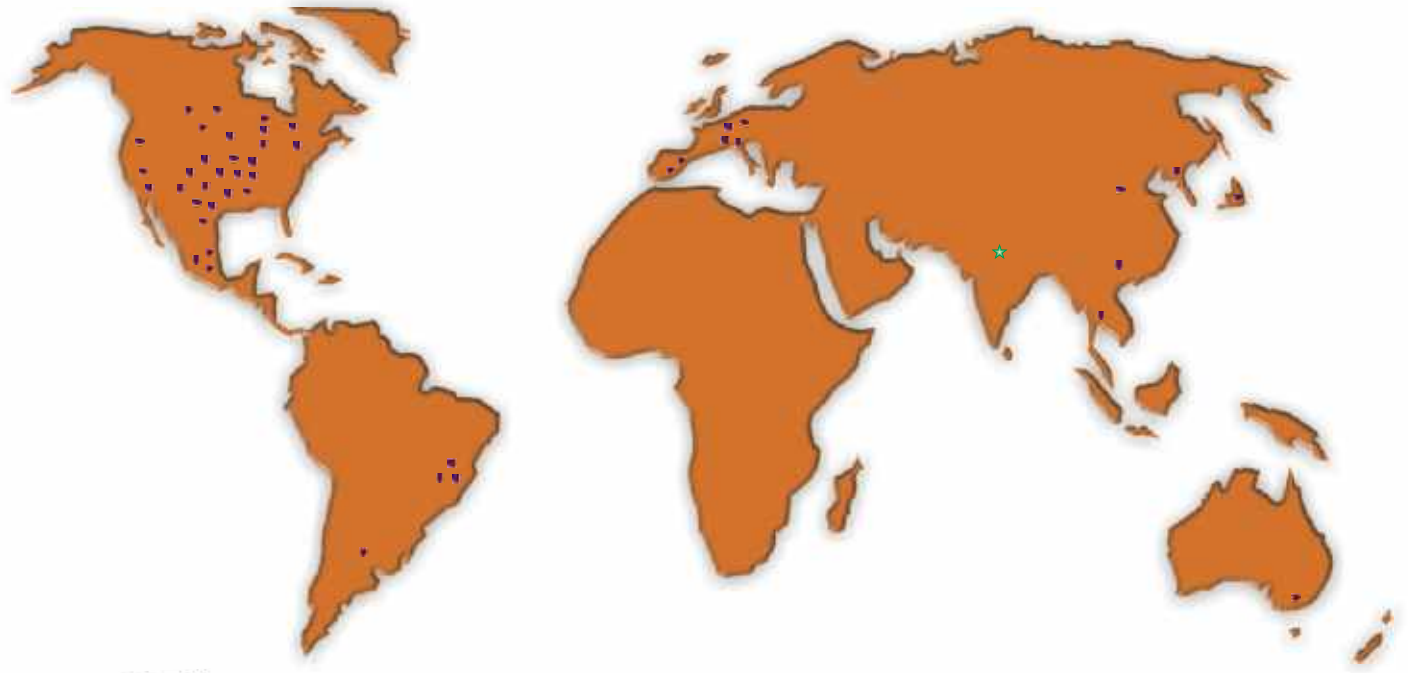
: SAE 100R1 +

: SAE 100R2 +

: SAE 100R12 +

: SAE100R13 +

: SAE 100R15 +



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