



The Right Connection™

# Technical & Safety Information

Hose & Hose Coupling Safety Information *pages 380-389*

---

Hose & Coupling Pressure Recommendations *pages 390-394*

---

Corrosion Resistance Guide *pages 395-400*

---

Measurement & Conversion Information *pages 401-404*

---

Coupling, Flange & Thread Information *pages 405-420*

---

Valve Information *page 421*

---

Regulations: OSHA & MSHA *pages 422-423*

---

Glossary of Terms *pages 424-426*

---

Warranty *page 427*

---

## Hose and Hose Coupling Safety

**"The very properties that make compressed gases useful in almost every area of modern life can also make them dangerous when mishandled. Years of experience with compressed gases have led to practices and equipment which, if employed, result in complete safety."\*\***

Dixon hose couplings have been carefully engineered to meet specific requirements. If hose or couplings are not used in correct applications or are incorrectly applied, accidents and downtime can result. It is up to the end user to inform the distributor of the application and pressures involved when ordering hose assemblies and it is up to the distributor to supply the right hose and coupling for that application. When in doubt, Dixon is here to help you with a proper coupling recommendation.

### 1. Air hose couplings

This form of energy can be one of the most dangerous because it is used in so many applications and, when mishandled, can have more serious results than fluids. Air, as a gas, is compressible (fluids press only against hose or vessel walls and lose little volume under pressure). When pressurised air releases suddenly, it does so with explosive force and can cause rapid hose whip, which can do serious physical harm to personnel or damage to nearby objects. This is why the selection of proper hose and couplings for air lines is so important, along with their proper installation and maintenance. Never take for granted that a coupling is installed properly or a clamp fully tightened on an air hose - check it regularly and use safety devices (see paragraph 4).

### 2. Steam and gas

The same rules apply for steam and gas, but, because these are inherently more hazardous materials, personnel tend to treat hose and couplings on these lines with more respect and care. Checking clamp tightness is very important with steam hose, where it is not unusual for clamps to loosen in service, in which case they *must be retightened!* Safety devices should also be used (see paragraph 4).

### 3. Fluid hose couplings

Again, nothing should be taken for granted - in particular, check clamps for tightness each time the lines are used - especially when petroleum products or other hazardous liquids are involved. Large diameter hose, when suspended, can also be quite dangerous if it drops unexpectedly due to a coupling "pull-out" or sudden disconnection. A heavy fitting or clamp, plus the weight of the hose itself falling from any significant height, can cause injuries or damage. Be sure to use safety devices (see paragraph 4).

### 4. All hose assemblies

All hose assemblies should be treated with respect as potential hazards. Worn-out fittings should be replaced. Retaining devices such as clips, cables or chains should be used. Clamps should be checked regularly. Under no circumstances should any coupling be disconnected while under pressure, unless the coupling is specifically designed to do so. Disconnecting couplings under pressure could result in serious injury or death, and destruction of property and equipment.

**\*\*"Handbook of Compressed Gases"**

## General Safety Information

### Pressure Ratings

Pressure ratings for couplings, as stated in this catalogue, are based upon ambient temperature (21°C or 70°F) applications with true hose I.D., new Dixon supplied couplings, new Dixon supplied clamps, new quality hose, and proper installation by a qualified assembler using Dixon procedures and equipment. In addition, temperature can affect coupling retention. For temperatures other than ambient (21°C or 70°F) contact the hose manufacturer or call Dixon.

### Product Selection

Many of the products in this catalogue are used in hose assemblies in a variety of applications. The safety of any hose assembly rests on the proper selection, installation, testing and use of each product. The safe use of any product in this catalogue is dependent upon the correct selection of the hose, fittings and method of attachment. To ensure such a proper selection, the user must inform the distributor of the application and pressure involved when ordering hose assemblies. The use of S.T.A.M.P.E.D. (Size, Temperature, Application, Media, Pressure, Ends, Dixon) will help in the proper selection of hose assembly components (see next page). The selection of couplings and clamping devices is the responsibility of the purchaser or user, based upon the hose manufacturer's recommendations. If the purchaser or user is uncertain about the use or application of a product, Dixon stands ready to provide information, including test results (if available), coupling and clamping recommendations and other data to help resolve those matters.

### Installation

To achieve a safe and reliable assembly, proper installation procedures must be followed. Each component of the assembly has a part in determining these procedures. The purchaser or user must follow proper procedures. If the purchaser or user has any questions regarding installation, please contact Dixon.

### Testing

Dixon recommends that all hose assemblies be tested in accordance with the hose manufacturer's recommendations.

### Re-testing and inspection

Dixon recommends inspection and re-testing of hose assemblies on a regular and consistent basis in accordance with the hose manufacturer's recommendations. The application determines the regularity of the inspection and retesting schedule. Any worn-out fittings, damaged hoses or missing safety devices should be replaced immediately. Bolt-style clamps must be checked and retightened on a regular and consistent basis.

---

## Proper selection, care, use and maintenance of hose couplings and accessory items

All hose assemblies should be viewed as potential hazards. This document is designed to inform and educate anyone who manufactures, specifies, supplies, purchases, assembles, uses, maintains or tests any hose assembly or its component parts. The proper selection and maintenance of hose, couplings, attachment devices and accessories are imperative. It is the end users responsibility to identify to the distributor the application and any special conditions that the hose assembly must meet. It is the distributors responsibility to supply the proper assembly for the intended application. Accidents and down time may occur if hose assemblies are not properly selected for the specific application. The performance and safety of the assembly is affected by the quality of the individual components. The use of the acronym S.T.A.M.P.E.D. (Size, Temperature, Application, Media, Pressure, Ends, Dixon) will help in the proper selection of the hose assembly components (see following page).

### **WARNING!**

**Failure to use these procedures can result in serious injury or death, and destruction of property and equipment.**

If anyone is uncertain about the use or application of a product, Dixon can provide test results, coupling and clamping recommendations and other data to help resolve those matters please call Dixon.

---

## S.T.A.M.P.E.D.

When fabricating and specifying hose assemblies ask the following questions:

**Size:** What is the I.D. (Inside Diameter) of the hose? What is the O.D. (Outside Diameter) of both ends of the hose? What is the overall length of the assembly required?

**Temperature:** What is the temperature range of the media (product) that is flowing through the hose assembly? What is the temperature range of the environment that surrounds the outside of the hose assembly?

**Application:** How is the hose assembly actually being used? Is it a pressure application? Is it a vacuum (suction) application? Is it a gravity flow application? Are there any special requirements that the hose assembly is expected to perform? Is the hose being used in a horizontal or vertical position? Are there any pulsations or vibrations acting on the hose assembly?

**Media:** What is the media/material that is flowing through the hose assembly? Being specific is critical. Check for: Abrasive materials, chemical compatibility, etc..

**Pressure:** What is the maximum pressure including surges (or, maximum vacuum) that this hose assembly will be subjected to? Always rate the maximum working pressure of your hose assembly by the lowest rated component in the system.

**Ends:** What couplings have been requested by the user? Are they the proper fittings for the application and hose selected?

**Dixon:** Dixon recommends that, based on the hose, fittings and attachment method used, all assemblies be permanently marked with the designed working pressure and intended media. Do not use other manufacture's fittings or ferrules with Dixon products due to the differences in dimensions and tolerances. We also recommend that all hose assemblies be tested frequently.

*Be Safe: Any questions on application, use or assembly please call Dixon.*

## B.E.S.A.F.E.

We encourage you to share this information with anyone who may be effected by the selection, installation, maintenance or use of any hose assembly. Always use quality products to B.E.S.A.F.E.

Hose assemblies must be inspected prior to each use. Worn out fittings, attachment devices, hose and accessory items must be replaced. Retaining devices (safety devices) such as clips, cables or chains must be used. Clamps must be checked regularly to the specified torque found in the Dixon literature. Under no circumstance should any coupling be disconnected while under pressure unless the coupling is specifically designed to do so. Disconnecting couplings under pressure could result in serious injury or death, and destruction to property and equipment.

### For all hose assemblies in use:

- Beware** hose assemblies when used improperly or in the wrong application can be dangerous. The maximum working pressure shown on the hose is not an indication of the working pressure of the assembly. Based on the hose, fittings and attachment method used all assemblies should be permanently marked with the designed working pressure and the intended media. The assembly working pressure should be permanently displayed. Hose assemblies must be used for the intended service only. Never alter manufactured product or substitute component parts.
- Eliminate** hazardous conditions by inspecting, maintaining and testing hose assemblies. Dixon recommends that all hose assemblies be tested in accordance with the hose manufacturer's specifications. The application determines the regularity of the re-testing schedule.
- Secure** and inspect hose, fittings, clamping devices and safety accessories before each use. Never take for granted that the coupling or attachment devices are properly installed.
- Always** inspect and re-tighten the bolts of any bolt style clamping device to the manufacturer's torque specifications.
- Fittings** hose and clamping devices that are worn out or damaged must be removed from service.
- Educate** your employees about the proper use, care and potential hazards of hose assemblies. Take advantage of Dixon's free Hose Assembly Safety Programme and the follow up Training Seminar to aid you in setting up your own inspection programme. Any questions on applications, use or assembly call our technical support team.

## Dixon Hose Assembling

To provide a complete service to its customer's Dixon has made considerable investment in its extensive in-house hose assembling capabilities, under pinned with a traceable Quality System in accordance with BSEN ISO 9001:2000 and compliance with PED 97/23/EC. The assembling is supported by a huge inventory of couplings to produce hose assemblies utilising the following methods:

### Rubber, PTFE\* and Composite\*\*

- Internal Expansion (IX) 25mm to 305mm nominal bore
- External Crimp (EC) 6mm to 102mm nominal bore
- External Swage (ES) 25mm to 102mm nominal bore

\* EC only, \*\*EC & ES only

### Rubber and PVC

- Heavy Duty Double Bolt Clamps
- Band & Pre-formed Band Clamps
- Heavy Duty T-Bolt Clamps
- Hi-Torque Clamps
- Compression Rings
- BSEN 14420-3:2004 Safety Clamps (formerly DIN 2817 etc)

### Metal

- Welding procedures are in accordance with ASME IX, and BSEN 288
- Welders Qualifications to ASME IX, and BSEN 287

### Test procedures and additional services

- Our pressure testing facilities include:
  - Pneumatic Leak Test (Air under Water)
  - Hydrostatic Proof and Burst tests up to 380 bar (5510 psig)
  - Hydrostatic Proof and Burst test certification can be supplied with a Chart Recorder read-out if requested at time of order placement
  - Assemblies can also be Hydrostatically tested using de-mineralised water (Maximum Chloride content of 30mg/l) when requested
  - Liquid Penetrant Inspection to ASME V Article 6 & ASME B31.3 Table 341.3.2
  - Liquid Penetrant Technicians qualified to PCN Level 2
  - Sub-Contract X-Ray in accordance with ASME V Article 6 with acceptance level to ASME B31.3 Table 341.3.2
  - Endoscope

Registered supplier to the UK Ministry of Defence.

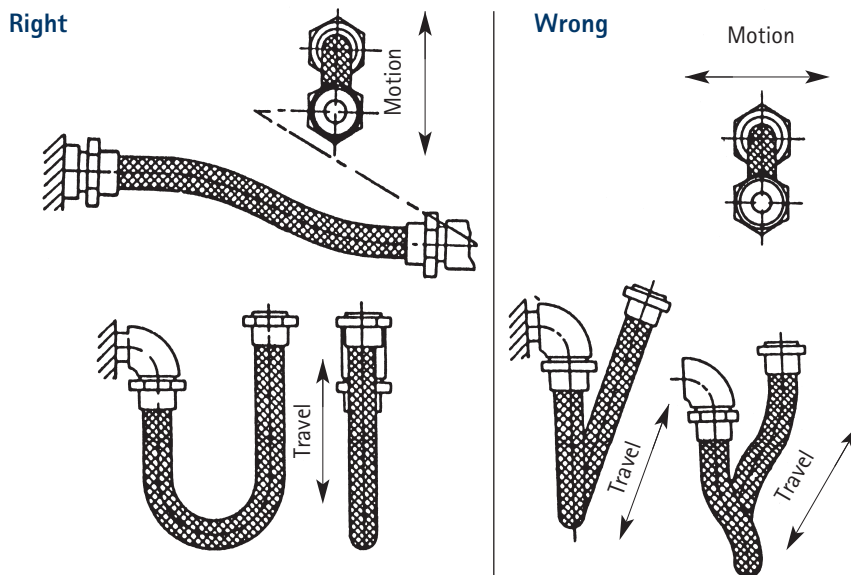
## Installation & Safety

When installed correctly within the design parameters of the hose to be used, Stainless Steel hose assemblies can give many years of satisfactory life. To help maximise the working life the following rules should be observed.

**Torque** - Stainless Steel hose assemblies should never be subject to torque.

Hose is subjected to torque by:

1. Twisting during installation. This can be minimised by the use of a swivel joint at one end, where the fixed fitting is tightened up first. Two spanners should be used on union fittings.
2. Twisting when flexed. The hose should be installed so that flexing takes place in one plane only and the direction of motion must be perpendicular to the centre line of the hose. Pipework must be anchored and guided at each change of direction where a hose is used to absorb pipework movement.



**Rubbing** - Any signs of external damage should cause the hose to be replaced. Damage to the braid will cause the pressure capacity of the hose to be compromised, possibly endangering personnel.

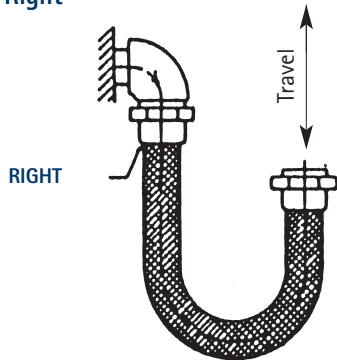
**Pressure** - Always refer to the maximum working pressure of the hose before installation. Always take into account the other working conditions such as temperature and pulsation.

**Pulsation or Shock Pressures** - These can be caused by the fast opening or closing of valves etc. and can cause premature failure through metal fatigue. Where this cannot be avoided the maximum working pressure of the hose should be reduced by 50%. Installation should be in a straight line with no slack on the braid.

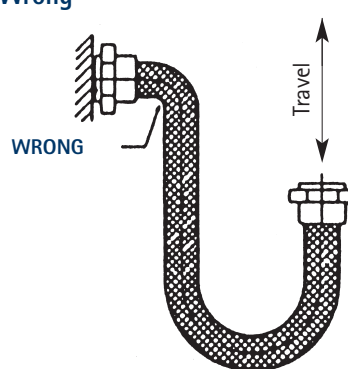
## Installation & Safety

**Small Radii** - Small radii should be avoided and the minimum centre line bend radius of the hose should always be observed. Be aware of the different bend radii for dynamic (i.e. constantly moving) and static (i.e. anti vibration) applications. The use of Parrap hose or solid elbows should be considered. If the application causes the hose to flex below the minimum bend radius near the ferrule, the use of a hose 'bend limiter' can be considered.

### Right



### Wrong



**Flow Velocity** - The convolutions can effect high flow velocities in one of two ways:

1. Turbulence. Velocities above 150 Ft/Sec for Gas or 75 Ft/Sec for Liquid can cause turbulence within the hose convolutions leading to metal fatigue.  
To overcome this, the use of the next size of hose, with or without a liner, can be effective.  
For hoses bent through 90° the above flows should be reduced by 50%, for 45° reduce by 25%.
2. Pressure Loss. As a rough guide it can be assumed that the pressure loss in a Convulated Stainless Steel hose is twice that for new, welded steel pipe.  
This means that an increase in the bore size of 15% will reduce the pressure loss to that of the steel pipe.

### Temperature:

When operating at elevated temperatures, a 'correction' factor should be applied to reflect the changed state of the hose material.

#### STAINLESS STEEL CORE GRADE 321 (1.4541)

TEMP °C	-200	-150	-100	-50	0	50	100	150	200	250
FACTOR	1	1	1	1	1	0.93	0.83	0.78	0.74	0.70
TEMP °C	300	350	400	450	500	550	600	650		
FACTOR	0.66	0.64	0.62	0.60	0.59	0.58	Enquire	Enquire		

#### STAINLESS STEEL CORE GRADE 316 (1.4404)

TEMP °C	-200	-150	-100	-50	0	50	100	150	200	250
FACTOR	1	1	1	1	1	0.90	0.73	0.67	0.61	0.58
TEMP °C	300	350	400	450	500	550	600	650		
FACTOR	0.53	0.51	0.50	0.49	0.47	0.47	Enquire	Enquire		

The above information is intended as a guide only, and as such the above specifications cannot be held to be mandatory. Dixon reserves the right to change and modify designs and specification without notice.

## Pressure Equipment Directive 97/23/EC

---

The Pressure Equipment Directive 97/23/EC was embraced by the European Parliament and the Council of Ministers on 29 May 1997, enforced a further 2 years later on 29 November 1999 but with a 3 year grace, whereby compliance to its requirements were elective until 29 May 2002.

Failure to comply could result in prosecution by way of a fine, prison sentence or both.

On the whole the PED is legislation across the European Environment Agency (EEA), which requires that all pressure equipment must be fully compliant with regards to particular aspects such as material selection, design, manufacturing techniques, personnel qualification, testing requirements, product marking and user liability.

The Directive covers pressure equipment and assemblies with a maximum allowable pressure PS greater than 0.5 bar and includes such equipment as reaction vessels, industrial pipe-work, pressurised storage containers, heat exchangers, pressure accessories and safety devices. The PED's interpretation of an assembly being several pieces of pressure equipment assembled to form an integrated system.

PED accreditation, where applicable, allows for the active placing of the CE mark on pressure equipment and is a given passport to free trade within the EEA, without the need for statutory inspection by current Member States.

As a result, Dixon Group Europe have revised their manufacturing methodology and integrated an already efficient ISO 9001 quality management system with the Essential Safety Requirements of the PED, accredited by Lloyds Register, Notified Body Number 0038.

For further information on how this can benefit your business, please contact us on 01772 323529

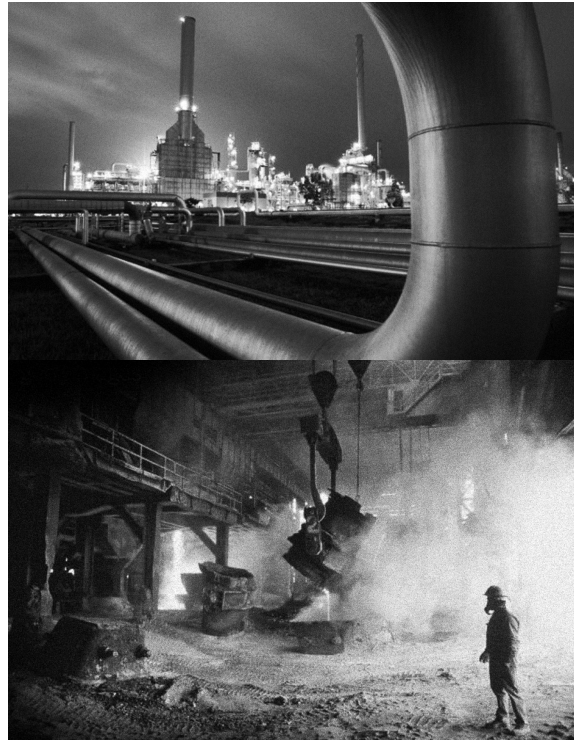
## Hose & Coupling Site Safety Survey

At Dixon we recognise the need for onsite safety and how understanding the importance this holds and helps generate a stronger relationship with your customer.

As a result Dixon now offers hose and coupling safety surveys.

Today, plant safety is an ongoing endeavour where it is impossible to be an expert in every field. The use of damaged or misapplied hose couplings and related items occurs. To the untrained eye these hazards may continue to exist until an accident happens threatening not only plant machinery but also the well being of personnel.

Dixon can assist in your efforts to make the facilities you service as safe, efficient and productive as possible.



### OUR PROGRAM INCLUDES:

- A visual inspection of hose assemblies and related accessories
- A professionally written report detailing our observations and recommendations for corrective action.
- The safety survey report is completely confidential and will only be shown to authorised parties.

### DON'T FORGET:

Hoses from Dixon are Certified to PED 37/23/EC Module D1 by Lloyds Register Quality Assurance.

**When it's got to be right, it's got to be Dixon**

For more information contact Dixon today on

**01772 323529** or [enquiries@dixoneurope.co.uk](mailto:enquiries@dixoneurope.co.uk)



## Hose Assembly Safety Program

Dixon is pleased to offer a hose and coupling safety survey of your plant, at no cost to you, to assist in your efforts to make your facility as safe, efficient and productive as possible.

Today, plant safety is an enormous, ongoing endeavour in which it is impossible to be an expert in every field.

The use of damaged or misapplied hose couplings and related items occurs. To the untrained eye, these hazards may continue to exist until an accident happens, threatening not only plant machinery but also the well-being of plant personnel.

Our programme includes a visual inspection of hose assemblies and related accessories in your plant by trained technicians. A professionally written report containing our observations and recommendations for corrective action is subsequently provided to augment your own ongoing safety programme. If desired, photographs of the areas of concern can be supplied with the report. As a follow-up, the programme offers an educational hands-on seminar directly relating to the safety concerns in your facility.

Plant safety is coming under increasing scrutiny by various regulatory agencies. Let Dixon's trained personnel assist you in establishing and maintaining safety compliance in your plant.

The safety survey report is completely confidential and will only be shown to authorised plant personnel. Again, there is no cost to you for this service. For more information, please contact our technical support team.

---

## Safety Products In This Catalogue

### Safety is everyone's concern!

Dixon provides many safety products designed to protect personnel and property. Recommendations and safety warnings are also included for your review.

- Hose and coupling safety
- S.T.A.M.P.E.D.
- EZ Boss-Lock cam and groove
- Cam and groove safety clips
- Air King - not to be used for steam
- The importance of whip hose
- King cable safety cables
- Safety shut-off valves, OSHA REG. 1926.302
- 30 psi safety blow guns
- Safety vented ball valves
- Safety tags and safety tape
- Pressure recommendations

## Hose & Coupling Pressure Recommendations

---

**Mark hose assembly with pressure from this chart or hose working pressure, whichever is lower all pressure recommendations are in pounds per square inch (psi)**

1. This chart is intended as a guide only. It only applies to metal couplings as shown, for ambient temperature (21°C or 70°F) applications with true I.D. hose. It assumes new Dixon supplied couplings, new Dixon supplied clamps, new quality hose and proper installation by a qualified assembler using Dixon procedures and equipment.  
Temperature can affect the coupling retention. For questions relating to temperatures other than ambient (21°C or 70°F) contact the hose manufacturer or Dixon.
2. This chart does not apply to non-Dixon products, with used hose, in non-approved or unsupported applications or in non-standard assemblies.
3. *Do not* use this chart if it conflicts with the hose manufacturer's recommendations.
4. All hose assemblies should be pressure tested to hose manufacturers or Rubber Manufacturers Association (R.M.A.) specifications prior to being put into service.
5. Our test experience indicates that coupling retention can vary with changes in hose design. For pressure ratings other than those listed and shown, or if questions arise, please call our technical support team for assistance.
6. All hose assembly components must be compatible with the materials and environments with which they are to come in contact.
7. Dixon recommends that all hose assemblies be marked with the assembly working pressure and media of the intended application. Under no circumstances should the assembly working pressure exceed the working pressure of the lowest rated component (coupling, clamp, ferrule or hose).
8. For further safety information, refer to 'The Proper Selection, Care, Use & Maintenance of Hose Couplings & Accessory Items' pamphlet.  
Contact Dixon to request a copy of this literature.
9. To convert the following pressure recommendations that are stated in psi Divide the psi figure by 14.5 to convert to (bar).

*\*Procedures can be found at [www.dixoneurope.co.uk](http://www.dixoneurope.co.uk)*

---

### Trademarks

Delrin<sup>®</sup>, Kevlar<sup>®</sup>, Teflon<sup>®</sup> and Zytel<sup>®</sup> are registered trademarks of E.I. duPont Nemours and Company.  
Kalrez<sup>®</sup> and Viton<sup>®</sup> are registered trademarks of DuPont Dow Elastomers.

All other trademarks appearing in Dixon's Illustrated Price List are the property of their respective owners.

## Pressure Recommendations

Mark hose assembly with pressure from this chart or hose working pressure, whichever is lower all pressure recommendations are in pounds per square inch (psi).

1. This chart is intended as a guide only. It only applies to metal couplings as shown, for ambient temperature (70°F) applications with true I.D. hose. It assumes new Dixon supplied couplings, new Dixon supplied clamps, new quality hose and proper installation by a qualified assembler using Dixon procedures and equipment. Temperature can affect the coupling retention. For questions relating to temperatures other than ambient (70°F) contact Dixon.
2. This chart does not apply to non-Dixon products, with used hose, in non-approved or unsupported applications or in non-standard assemblies.

Hose (rubber covered)	Couplings	DPL Sect.	Clamps & Ferrules	*Assembly* Procedure	1/4"	3/8"	1/2"	5/8"	3/4"
<b>Air textile reinforced rubber lined</b>	Air king Universal		Preformed Band Clamp	2102			150	150	150
	Machined - Short Shank		Crimp	2304	200	150	150	100	100
	Machined - Short Shank		Preformed Band Clamp	2100-2101			150	100	100
	Reusable - Brass		N/A	2305	250	250	250		
	king Machined - Medium Shank		Preformed Band Clamp	2100-2101			250	200	200
	king Machined - Long Shank		Preformed Band Clamp	2100-2101			300	300	300
<b>Air textile or wire reinforced rubber lined</b>	Air king Universal		Air king or Boss Interlocking Clamp	2000		150	150		150
	Air king Universal		Swage/Crimp	See DPL			150		150
	Boss Couplings		Boss Interlocking Clamp	2000-2004	600	600	600		600
	Holedall Swage/Crimp		Swage/Crimp	See Ram Manual	600	600	600		600
<b>Asphalt and Hot Tar</b>	Boss Couplings		Boss Interlocking Clamp	2001-2002					
<b>Chemical plastic lined for liquid service</b>	king Machined - Medium Shank		Preformed Band Clamp	2100-2101			125		125
	king Machined - Medium Shank		Band & Buckle	2104					
	king Machined - Long Shank		Preformed Band Clamp	2100-2101			150		150
	king Machined - Long Shank		Band & Buckle	2104					
	Boss-Lock Cam & Groove		Preformed Band Clamp	2100-2101			150		250
	Boss-Lock Cam & Groove		Band & Buckle	2104			150		150
	Boss-Lock Cam & Groove		Swage/Crimp	See Ram Manual					250
	Holedall Swage/Crimp		Swage/Crimp	See Ram Manual			600		600
<b>Chemical rubber lined for liquid service</b>	king Machined - Medium Shank		Preformed Band Clamp	2100-2101			125		125
	king Machined - Medium Shank		Band & Buckle	2104					
	king Machined - Long Shank		Preformed Band Clamp	2100-2101			150		150
	king Machined - Long Shank		Band & Buckle	2104					
	Boss-Lock Cam & Groove		Preformed Band Clamp	2100-2101			150		250
	Boss-Lock Cam & Groove		Band & Buckle	2104					
	Boss-Lock Cam & Groove		Swage/Crimp	See Ram Manual					250
	Boss Couplings		Boss Interlocking Clamp	2000-2004			600		600
	Holedall Internal Expansion		Internal Expansion	See Ram Manual					
Holedall Swage/Crimp		Swage/Crimp	See Ram Manual			600		600	
<b>Food Grade conforming to 3A</b>	Flow Chief Sanitary		Internal Expansion	See Ram Manual					
<b>Food Grade rubber lined</b>	king Machined - Medium Shank		Preformed Band Clamp	2100-2101			125		125
	king Machined - Medium Shank		Band & Buckle	2104					
	Boss-Lock Cam & Groove		Preformed Band Clamp	2100-2101			150		250
	Boss-Lock Cam & Groove		Band & Buckle	2104					
	Boss-Lock Cam & Groove		Swage/Crimp	See Ram Manual					250
	Holedall Internal Expansion Holedall		Internal Expansion	See Ram Manual					
	Swage/Crimp		Swage/Crimp	See Ram Manual			600		600
<b>Layflat</b>	Flat Seal		Flat Seal Clamps	2202					

For assembly procedure see [www.dixonvalve.com](http://www.dixonvalve.com)

# TECHNICAL & SAFETY INFORMATION

- Do not use this chart if it conflicts with the hose manufacturer's recommendations.
- All hose assemblies should be pressure tested to hose manufacturers or Rubber Manufacturers Association (R.M.A.) specifications prior to being put into service.
- Our test experience indicates that coupling retention can vary with changes in hose design. For pressure ratings other than those listed and shown, or if questions arise, please call Dixon Group Europe Limited on +44 (0)1772 323529 for assistance.
- All hose assembly components must be compatible with the materials and environments with which they are to come in contact.
- Dixon recommends that all hose assemblies be marked with the assembly working pressure and media of the intended application. Under no circumstances should the assembly working pressure exceed the working pressure of the lowest rated component (coupling, clamp, ferrule or hose).

\*Procedures can be found at [www.dixoneurope.co.uk](http://www.dixoneurope.co.uk) or by calling 01772 323529.

Hose (rubber covered)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	Special Notes
Air textile reinforced rubber lined	100									(2) bands on 5/8" or larger Must use mating Dixon Air King fittings with safety clip installed.
	100									
	100									(2) bands on 1/2" to 1"
	150									
	300									
Air textile or wire reinforced rubber lined	150									Must use mating Dixon Air King fittings with safety clip installed.
	150									Coupling and Ferrule are sold assembled. Must use mating Dixon Air King fittings with safety clip installed.
	600	600	600	600	450	450	250		250	
	600	600	600	600	600	600	500	450	400	
Asphalt and Hot Tar	200	200	200	200	200	200	200			Consult factory
Chemical plastic lined for liquid service	125	125	125	75	75	50	50			(3) bands on 3" & 4"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
		125	125	75	75	50	50			(3) bands on 3" & 4"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
	150	150	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on 1-1/4" & 1 1/2"; (2) bands on the rest; except for KHN & KRN nipples
		150	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on the rest; except for KHN & KRN nipples
	250	250	250	250	150	125	100			
		250	250	250	150	125	100			Requires properly matched Stem and Ferrule.
Chemical rubber lined for liquid service	125	125	125	75	75	50	50			(3) bands on 3" & 4"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
		125	125	75	75	50	50			(3) bands on 3" & 4"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
	150	150	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on 1 1/4" & 1 1/2"; (2) bands on the rest; except for KHN & KRN nipples
		150	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on the rest; except for KHN & KRN nipples
	250	250	250	250	150	125	100			
		250	250	250	150	125	100			
	250		250	250		125	100			Requires properly matched Stem and Ferrule.
	600	600	600	600	450	450	250			
800	800	800	800	600	600	500			Consult factory for ratings on IXF48-3 to IXF48-5 & IXF64-2 to IXF64-5 ferrules.	
600	600	600	600	600	600	500				
Food Grade conforming to 3A			250	250		250				Use Stainless Steel Food Grade Ferrule ONLY.
Food Grade rubber lined	125	125	125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
		125	125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
	250	250	250	250	150	125	100	75	75	
		250	250	250	150	125	100	75	75	
	250		250	250		125	100			Requires properly matched Stem and Ferrule.
	250		250	250	250	250	200			
Layflat			300	300	300	300	225		150	To be used as a set ONLY. * Cam & Groove couplings are rated to psi.

For assembly procedure see [www.dixonvalve.com](http://www.dixonvalve.com)

## Pressure Recommendations

Hose (rubber covered)	Couplings	DPL Sect.	Clamps & Ferrules	*Assembly* Procedure	1/4"	3/8"	1/2"	5/8"	3/4"	
<b>Material Handling rubber lined</b>	Cast Short Shank	D	Preformed Band Clamp	2100-2101						
	Cast Short Shank	D	Band & Buckle	2104						
	King Machined - Medium Shank	D	Preformed Band Clamp	2100-2101						
	King Machined - Medium Shank	D	Band & Buckle	2104						
	King Machined - Long Shank	D	Preformed Band Clamp	2100-2101						
	King Machined - Long Shank	D	Band & Buckle	2104						
	Boss-Lock Cam & Groove	A	Preformed Band Clamp	2100-2101						
	Boss-Lock Cam & Groove	A	Band & Buckle	2104 See Ram						
	Boss-Lock Cam & Groove	A	Swage/Crimp	Manual						
	Holedall Swage/Crimp	I	Swage/Crimp	see Ram Manual						
<b>Material Handling no helical wire rubber lined</b>	Holedall Internal Expansion	I	Internal Expansion	see Ram Manual						
	Cast Short Shank	D	Double Bolt Clamp	2201						
	King Machined - Medium Shank	D	Double Bolt Clamp	2201						
<b>Material Handling cement rubber lined</b>	King Machined - Long Shank	D	Double Bolt Clamp	2201						
	Boss Couplings	B	Boss Interlocking Clamp	2000-2004						
	Holedall Swage/Crimp	I	Swage/Crimp	see Ram Manual						
<b>Petroleum Transfer</b>	Holedall Internal Expansion	I	Internal Expansion	see Ram Manual						
	King Machined - Medium Shank	D	Preformed Band Clamp	2100-2101			125		125	
	King Machined - Medium Shank	D	Band & Buckle	2104						
	King Machined - Long Shank	D	Preformed Band Clamp	2100-2101			150		150	
	King Machined - Long Shank	D	Band & Buckle	2104						
	Boss-Lock Cam & Groove	A	Preformed Band Clamp	2100-2101			150		250	
	Boss-Lock Cam & Groove	A	Band & Buckle	2104						
	Boss-Lock Cam & Groove	A	Swage/Crimp	see Ram Manual					250	
<b>Air Craft Refuelling conforming to API 1529</b>	Holedall Internal Expansion - Petroleum	I	Internal Expansion - Petroleum	see Ram Manual						
	Holedall Swage/Crimp		Swage/Crimp	see Ram Manual			600		600	
<b>Push On</b>	Push Ons	E	N/A	2001-2002	175	175	175	175	175	
<b>Steam</b>	Boss Coupling	B	Boss Interlocking Clamp	2000-2004			250		250	
<b>Water</b>	Air King Universal	C	Preformed Band Clamp	2100-2101			150	150	150	
	Air King Universal	C	Air King or Boss Interlocking Clamp	2000-2001		150	150		150	
	Machined - Short Shank	D	Preformed Band Clamp	2100-2101			150	100	100	
	Machined - Short Shank	D	Crimp	2304	200	150	150	100	100	
	Cast Short Shank	D	Preformed Band Clamp	2100-2101			150	100	100	
	Cast Short Shank	D	Band & Buckle	2104						
	King Machined - Medium Shank	D	Preformed Band Clamp	2100-2101			250	200	200	
	King Machined - Long Shank	D	Preformed Band Clamp	2100-2101			300	300	300	
	Boss-Lock Cam & Groove	A	Preformed Band Clamp	2100-2101			150		250	
	Boss-Lock Cam & Groove	A	Band & Buckle	2104						
	Boss-Lock Cam & Groove	A	Swage/Crimp	see Ram Manual					250	
	Boss Couplings	B	Boss Interlocking Clamp	2000-2002	600	600	600		600	
	Holedall Swage/Crimp	I	Swage/Crimp	see Ram Manual	600	600	600		600	
	<b>Water ne helical wire</b>	Cast Short Shank	D	Double Bolt Clamp	2201					
		King Machined - Medium Shank	D	Double Bolt Clamp	2201					
King Machined - Long Shank		D	Double Bolt Clamp	2201						

For assembly procedure see [www.dixonvalve.com](http://www.dixonvalve.com)

## Pressure Recommendations

Hose (rubber covered)	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	Special Notes
<b>Material Handling rubber lined</b>			75	75	50	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"
			75	75	50	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"
			125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; except for KHN, KRN & PF nipples
			125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; except for KHN, KRN & PF nipples
			150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on the rest; except for KHN & KRN nipples
			150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on the rest; except for KHN & KRN nipples
			250	250	150	125	100	75	75	
			250	250	150	125	100	75	75	
			250	250	150	125	100			Requires properly matched Stem and Ferrule.
			600	600	600	600	600	500	450	400
<b>Material Handling no helical wire rubber lined</b>			75	75	50	50	50	25	25	(3) double bolt clamps on 5" & 6"; (2) double bolt clamps on 3" to 4"; (1) double bolt clamp on the rest
			125	75	75	50	50	25	25	(3) double bolt clamps on 5" & 6"; (2) double bolt clamps on 3" to 4"; (1) double bolt clamp on the rest; except for KHN, KRN & PF nipples
			150	125	100	75	75			(3) double bolt clamps on all sizes; except for KHN & KRN nipples
<b>Material Handling cement rubber lined</b>	600	600	600	600	450	450	250		250	Cement will erode I.D.
	600	600	600	600	600	600	500	450	400	
	800	800	800	800	600	600	500		400	Cement will erode I.D. Consult factory for ratings on IXF48-3 to IXF48-5 & IXF64-2 to IXF64-5 ferrules.
<b>Petroleum Transfer</b>	125	125	125	75	50	50	50	25	25	
		125	125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
	150	150	150	125	100	75	75			
		150	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on the rest; except for KHN & KRN nipples
	250	250	250	250	150	125	100	75	75	
		250	250	250	150	125	100	75	75	
	250		250	250		125	100			
	800	800	800	800	600	600	500		400	Consult factory for ratings on IXF48-3 to IXF48-5 & IXF64-2 to IXF64-5 ferrules.
600	600	600	600	600	600	500	450	400		
<b>Air Craft Refuelling conforming to API 1529</b>	300	300	300	300	300	300	300			
<b>Push On</b>										Push-On fittings should ONLY be used on Push-On hose.
<b>Steam</b>	250	250	250	250	250	250	250		250	
<b>Water</b>	150									(2) bands on 5/8" or larger; Must use mating Dixon Air King fittings with safety clip installed.
	150									Must use mating Dixon Air King fittings with safety clip installed.
	100									
	100									
	100	75	75	75	50	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest
		75	75	75	50	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest
	150	150	125	75	75	50	50	25	25	(4) bands on 6"; (3) bands on 3" to 5"; (2) bands on 1 1/2" to 2 1/2"; (1) band on the rest; except for KHN, KRN & PF nipples
	300	300	150	125	100	75	75			(5) bands on 3" & 4"; (4) bands on 2" & 2 1/2"; (3) bands on 1 1/4" & 1 1/2"; (2) bands on the rest; except for KHN & KRN nipples
	250	250	250	250	150	125	100	75	75	
		250	250	250	150	125	100	75	75	
250		250	250		125	100			Requires properly matched Stem and Ferrule.	
600	600	600	600	450	450	250		250		
600	600	600	600	600	600	500	450	400		
<b>Water no helical wire</b>			75	75	50	50	50	25	25	(3) double bolt clamps on 5" & 6"; (2) double bolt clamps on 3" to 4"; (1) double bolt clamp on the rest
			125	75	75	50	50	25	25	(3) double bolt clamps on 5" & 6"; (2) double bolt clamps on 3" to 4"; (1) double bolt clamp on the rest; except for KHN, KRN & PF nipples
			150	125	100	75	75			(3) double bolt clamps on all sizes; except for KHN & KRN nipples

For assembly procedure see [www.dixonvalve.com](http://www.dixonvalve.com)

## Corrosion Resistance Guide

### Caution

The following data has been compiled from generally available sources and should not be relied upon without consulting and following the specific recommendations of the manufacturer regarding particular coupling materials.

### Ratings

Metal	Non-Metal	Gasket/Seal Material
1 - Excellent 2 - Good 3 - Fair X - Not Recommended -- Contact Factory	A - Acceptable X - Not Recommended -- Contact Factory	T - Teflon® V - Viton® E - EPDM, EPR N - Neoprene B - Buna N

### Note:

- (1) Ratings given are based at 20°C or 70°F. Chemical compatibility varies greatly with temperature. For applications at temperatures other than 20°C or 70°F, contact the Factory for recommendations.
- (2) Gasket / seal materials are not necessarily listed in order of preference.
- (3) Chemical resistance of a material does not necessarily indicate the suitability of a fitting in a given application due to variables such as improper clamp and coupling application, special hose construction, gasket material, etc.

Special caution should be taken when handling hazardous materials.

# TECHNICAL & SAFETY INFORMATION

AGENT	Aluminum	Brass	Bronze	Hastelloy, C-276	Malleable Iron Carbon Steel	Monel	Stainless Steel,304	Stainless Steel,316	Nylon	Polypropylene	Seal Material
Acetate Solvents (Crude)	1	X	X	1	2	2	1	1	A	X	T
Acetate Solvents (Pure)	1	1	1	1	X	1	1	1	A	X	T
Acetic Acid (80%)	3	X	X	1	X	1	1	1	X	X	TEVNB
Acetic Acid (50%)	2	X	X	1	X	2	2	1	X	X	TEVNB
Acetic Acid (20%)	2	X	X	1	X	2	2	1	X	X	TEVNB
Acetic Acid (10%)	2	X	2	1	X	2	1	1	X	X	TEVNB
Acetic Anhydride	2	X	2	1	2	2	2	2	X	X	TNB
Acetone	1	2	2	1	2	1	1	1	A	X	TE
Acetylene	1	X	X	2	2	2	1	1	X	X	TEVNB
Alcohols											
Amyl Alcohol	2	2	2	2	2	1	2	2	A	A	TEVNB
Benzyl Alcohol	2	2	2	2	2	1	1	1	X	A	TVB
Butyl Alcohol	1	2	1	2	2	1	1	1	A	A	TEVN
Diacetone Alcohol	1	1	2	1	2	1	2	2	X	A	TE
Ethyl Alcohol	1	2	2	1	2	2	2	2	X	A	TEVNB
Hexyl Alcohol	-	-	-	1	-	-	-	-	A	-	-
Isobutyl Alcohol	-	-	-	-	-	-	-	-	A	-	-
Isopropyl Alcohol	2	2	2	2	2	2	2	2	A	A	TEVNB
Methyl Alcohol (Methanol)	2	2	2	1	2	2	2	2	A	A	TENB
Octyl Alcohol	-	-	-	-	-	-	-	-	A	-	-
Propyl Alcohol	2	2	2	1	2	2	1	1	X	A	TEVNB
Aluminum											
Aluminum Chloride (Aqu.)	X	X	X	1	X	X	X	X	A	A	TEVNB
Aluminum Fluoride (Sat.)	2	-	-	-	X	2	X	2	X	A	TEVNB
Aluminum Nitrate (Sat.)	3	X	-	-	X	-	2	2	A	A	TEVNB
Aluminum Potassium Sulphate (Alum)	2	2	2	2	X	2	X	2	X	A	TEVNB
Aluminum Sulphate (Sat.)	X	X	2	2	X	2	-	2	A	A	TEVNB
Ammonia											
Ammonia Anhydrous	1	X	X	2	1	1	2	1	A	X	TENB
Ammonia Gas	X	X	X	1	1	X	1	1	A	X	TENB
Ammonia Nitrate	-	-	-	-	-	-	-	-	X	-	-
Ammonium											
Ammonium Bifluoride	-	X	-	2	X	2	-	-	X	A	TEVB
Ammonium Carbonate (Sat.)	2	X	X	2	2	2	2	2	A	A	TEVNB
Ammonium Casenate	-	-	-	-	-	-	-	-	A	-	-
Ammonium Chloride (Sat.)	X	X	2	2	X	2	X	X	A	A	TEVNB
Ammonium Hydroxide (Sat.)	2	X	X	2	1	X	2	2	A	A	TEVNB
Ammonium Nitrate	2	X	X	-	X	X	-	-	A	A	TENB
Ammonium Phosphate (10-40%)	X	X	X	-	X	2	1	2	A	A	TEVNB
Ammonium Sulphate (10-40%)	X	X	3	2	X	2	X	2	A	A	TEVNB
Aniline	-	X	2	2	X	2	1	1	X	X	TV
Arsenic Acid	X	X	2	2	X	X	2	2	X	A	TEVNB
Asphalt	-	-	-	-	2	-	-	2	X	X	TV
Barium											
Barium Carbonate (Sat.)	X	2	2	2	2	2	2	2	A	A	TEVNB
Barium Chloride (Sat.)	-	2	2	1	-	2	X	-	A	A	TEVNB
Barium Hydroxide (Sat.)	X	2	X	2	2	1	2	2	A	A	TEVNB
Barium Sulphate	2	2	2	-	X	2	2	2	A	A	TEVNB
Barium Sulphide	X	X	X	-	2	X	2	2	A	A	TEVNB
Beer	1	2	2	1	2	1	1	1	A	A	TEVNB
Benzaldehyde	2	2	2	2	X	2	2	2	X	X	TE
Benzene, Benzol	1	2	2	2	2	2	2	2	A	X	TV
Benzine	-	-	-	-	-	-	-	-	A	X	-
Benzoic Acid	2	2	2	-	X	2	2	2	X	X	TVN
Black Liquor	X	X	X	X	-	2	2	2	X	A	TEVNB
Bleach (12.5% Active Chlorine)	X	-	-	1	X	-	-	X	X	A	TEVN
Borax	X	2	2	1	2	1	1	1	X	A	TEVNB
Boric Acid	1	X	2	1	X	2	-	-	X	A	TEVNB
Brine Acid	-	2	2	1	-	-	-	-	X	A	TEVNB
Bromic acid	X	X	X	-	-	X	-	-	X	A	TEVN
Bromine Liquid	2	-	-	-	-	-	X	X	X	X	TV
Butadiene, Butylene	2	2	2	2	2	1	2	2	X	X	TVNB
Butane	2	2	2	2	1	1	2	2	X	X	TV
Butyl Acetate	1	2	2	2	2	2	2	2	A	X	T
Butyric Acid	2	2	X	1	X	2	2	2	A	A	TV

AGENT	Aluminum	Brass	Bronze	Hastelloy, C-276	Malleable Iron Carbon Steel	Monel	Stainless Steel,304	Stainless Steel,316	Nylon	Polypropylene	Seal Material
<b>Calcium</b>											
Calcium Bisulphate	X	-	X	-	X	X	X	2	X	A	T
Calcium Bisulphide	-	-	-	-	-	2	-	2	A	A	TVB
Calcium Bisulphite	X	X	2	2	X	X	-	2	X	A	TVNB
Calcium Bromide	X	G	G	-	X	G	E	X	X	X	T
Calcium Carbonate	X	2	2	2	2	2	1	2	A	A	TEVB
Calcium Chloride (Sat.)	-	2	-	1	2	2	-	-	A	A	TEVNB
Calcium Hydroxide (Sat.)	X	2	X	-	2	2	2	2	A	A	TEVNB
Calcium Hypochlorite (Sat.)	X	X	X	-	X	X	X	2	X	A	TEV
<b>Carbon</b>											
Carbon Bisulphide	1	X	2	2	2	X	2	2	A	X	TV
Carbon Dioxide (Dry)	1	1	2	1	2	1	2	2	A	A	TENB
Carbon Dioxide (Wet)	1	X	-	2	3	-	2	2	X	A	TENB
Carbon Disulphide	1	X	2	2	2	X	2	2	A	X	TV
Carbon Monoxide	1	1	1	1	2	1	1	1	A	A	TEVNB
Carbon Tetrachloride	X	-	1	1	2	1	1	-	A	X	TV
Carbonic Acid	1	2	2	1	2	3	2	2	X	A	TEVNB
Castor Oil	2	2	2	1	2	1	2	2	X	A	TEVNB
Caustic Potash	X	-	-	1	X	-	-	2	A	A	TEVNB
<b>Caustic Soda (see Sodium Hydroxide)</b>											
Cellosolves	2	2	2	2	2	2	2	2	X	A	TE
Chlorine (Liquid)	-	-	-	1	2	2	-	3	X	X	TV
Chloroform	-	-	-	2	X	1	-	-	X	X	TV
Chlorosulphonic Acid	-	X	X	1	2	2	X	X	X	X	T
Clorox (Bleach, 5.5% CL)	X	-	-	-	X	-	-	2	X	-	TEVB
Chromic Acid (50%)	2	X	X	2	X	X	3	-	X	X	TVNB
Citric Acid	3	X	X	1	X	2	-	-	X	A	TEVNB
Coke Oven Gas	2	3	3	-	2	2	2	2	X	X	TEVN
<b>Copper</b>											
Copper Chloride	X	X	X	2	X	X	X	X	A	A	TEVNB
Copper Cyanide	X	X	X	1	-	X	2	2	X	-	TEVNB
Copper Sulphate	X	X	X	1	X	X	-	2	A	A	TEVNB
Crylic Acid (Conc.)	2	2	X	-	2	3	2	2	X	X	TEV
Cyclohexane	2	2	2	2	2	1	2	2	A	X	TVB
Detergents	2	2	2	1	2	-	1	2	A	A	TEVNB
Dextrose	2	-	-	2	-	2	-	-	A	A	TEVNB
Diesel Fuels	1	1	1	2	2	-	1	1	A	X	TVB
Diethylamine	2	-	X	-	X	1	2	2	X	A	TN
Disodium Phosphate	-	-	-	-	1	-	-	1	A	A	TEV
Ethers	2	2	2	2	2	2	1	1	A	X	TB
<b>Ethyl</b>											
Ethyl Acetate	-	-	2	2	2	2	2	2	A	X	T
Ethyl Chloride	-	-	2	2	2	2	-	1	A	X	TEVB
<b>Ethylene</b>											
Ethylene Chloride	-	-	-	-	2	2	-	-	A	X	TV
Ethylene Dichloride	-	2	X	2	2	1	2	2	A	X	TV
Ethylene Glycol	1	2	2	1	2	2	2	2	A	X	TEVNB
Ethylene Oxide	1	X	X	1	2	2	2	2	X	X	T
Fatty Acids	1	3	3	1	X	2	-	1	A	A	TVNB
<b>Ferric</b>											
Ferric Chloride	X	X	2	2	X	X	X	X	X	A	TEVNB
Ferric Hydroxide	-	-	-	1	-	2	1	1	A	-	TEVNB
Ferric Nitrate (10-50%)	X	X	X	-	X	X	2	2	X	A	TEVNB
Ferric Sulphate	X	X	X	-	X	2	-	-	X	A	TEVNB
<b>Ferrous</b>											
Ferrous Chloride (Sat.)	X	X	2	2	-	X	X	X	X	A	TEVNB
Ferrous Sulphate	2	2	2	2	X	2	2	-	X	A	TEVNB
Fluoroboric Acid	X	-	-	1	1	2	-	-	X	A	TEVNB
Formaldehyde (50%)	-	2	2	2	X	2	1	1	X	A	TEN
Formic Acid (Anhyd.)	1	X	2	1	X	2	-	-	X	A	TEVN
<b>Freon</b>											
Freon 11	2	2	2	-	X	1	2	2	X	X	TVNB
Freon 12	2	2	2	1	X	2	2	2	X	X	TVNB
Freon 22	2	2	2	2	X	2	2	2	X	X	TN
Fruit Juices	2	2	3	1	X	1	2	2	A	A	TVNB
Fuel Oil	2	2	2	2	2	2	2	2	A	X	TVNB
Furfural	2	2	2	2	2	2	2	2	A	X	TEN

# TECHNICAL & SAFETY INFORMATION

AGENT	Aluminum	Brass	Bronze	Hastelloy, C-276	Malleable Iron Carbon Steel	Monel	Stainless Steel,304	Stainless Steel,316	Nylon	Polypropylene	Seal Material
<b>Gasoline</b>											
Refined Gasoline	2	2	2	2	2	2	2	2	A	X	TVNB
Sour Gasoline	X	2	2	2	2	X	2	2	A	X	TVNB
Gelatin	2	2	2	-	X	2	2	2	A	A	TEVNB
Glucose	2	2	2	-	2	2	2	2	A	A	TEVNB
Glue	2	2	2	1	2	2	-	2	-	A	TEVNB
Glycerine	1	1	2	1	2	1	1	1	A	A	TEVNB
Glycols	2	2	2	-	2	2	2	2	A	A	TEVNB
Green Liquor	-	-	-	-	2	-	-	-	-	A	TEVNB
Heptane	2	2	2	1	2	2	2	2	A	X	TVNB
Hexane	2	2	2	1	2	2	1	1	A	X	TVNB
Hydrobromic Acid (50%)	X	X	X	2	X	X	X	X	X	A	TEV
Hydrobromic Acid (20%)	X	X	X	1	X	X	X	X	X	A	TEV
Hydrochloric Acid (20%)	X	X	X	1	X	3	X	X	X	A	TEVNB
Hydrochloric Acid (38%)	X	X	X	1	X	X	X	X	X	A	TEVN
Hydrocyanic Acid	2	X	X	2	2	2	2	2	X	A	TEVN
Hydrofluorosilicic Acid (10-50%)	X	2	X	2	X	2	X	2	X	-	TEVNB
<b>Hydrogen</b>											
Hydrogen Peroxide (50%)	-	X	X	2	X	2	-	-	X	A	TEV
Hydrogen Sulphide (Aq.)	-	-	-	2	-	2	X	2	X	A	TE
Hydrogen Chloride (Dry Gas)	X	2	-	1	2	1	-	-	X	A	TEVN
Hydrogen Gas	1	1	1	1	-	1	1	1	X	A	TEVNB
Hypochlorous Acid	X	X	X	2	X	X	X	X	X	X	TEV
Iodine	1	X	X	-	X	1	X	X	X	A	TEV
Isopropyl Ether	-	2	2	-	-	2	1	2	A	X	T
Jet Fuel (JP4, JP5)	2	1	2	1	2	2	2	2	X	X	TV
Kerosene	2	2	2	2	2	2	2	2	X	X	TVNB
Ketones	2	2	2	1	2	2	2	2	A	X	T
Lactic Acid (25%)	3	2	2	1	X	X	-	-	A	A	TEVN
Lactic Acid (80%)	2	2	X	2	X	-	-	-	A	A	TEVN
Lard Oil	2	-	2	1	3	2	2	2	A	A	TVB
<b>Lead</b>											
Lead Acetate	X	X	X	2	X	2	2	2	X	A	TENB
Lead Chloride	X	-	-	2	-	-	2	2	X	-	TVNB
Lead Sulphate	X	-	-	2	X	2	2	2	X	-	TEVNB
Lime Sulphur	X	X	X	-	X	2	2	2	X	A	TEVN
Linoleic Acid	2	X	3	2	X	2	2	2	X	A	TVB
Linseed Oil	2	2	2	2	2	2	2	2	A	A	TVNB
Lubricants (Oil)	2	1	-	-	2	2	2	2	A	X	TVNB
<b>Magnesium</b>											
Magnesium Carbonate	2	-	-	-	-	2	2	2	X	A	TEVNB
Magnesium Chloride	X	X	2	1	-	-	-	-	X	A	TEVNB
Magnesium Hydroxide	2	2	2	1	2	2	1	1	X	A	TEVNB
Magnesium Nitrate	2	2	2	1	2	2	2	2	X	A	TEVNB
Magnesium Oxide	-	-	-	-	-	-	-	-	X	-	-
Magnesium Sulphate	2	-	2	-	-	1	2	2	X	A	TEVNB
Maleic Acid	-	2	3	2	X	-	-	2	X	A	TEV
<b>Mercuric</b>											
Mercuric Chloride	X	X	X	-	X	X	X	-	X	A	TEVB
Mercuric Cyanide	X	X	X	2	X	2	2	2	X	A	TEVB
Mercury	X	X	X	1	2	-	1	1	A	A	TEVNB
Methane	1	1	2	1	2	1	1	1	A	X	TEVNB
Methanol	2	2	2	1	2	2	2	2	A	A	TENB
<b>Methyl</b>											
Methyl Bromide	X	-	-	-	2	-	2	2	X	X	TV
Methyl Ethyl Ketone	2	2	2	2	2	2	2	2	A	X	TE
Methyl Isobutyl Ketone	2	2	2	2	2	2	2	2	A	X	T
Methyl Methacrylate	2	-	-	-	X	-	2	2	X	A	T
Methylene Chloride	-	2	2	X	2	-	-	-	A	X	T
Milk	1	X	X	1	2	X	1	1	A	A	TEVNB
Mineral Oil	2	1	-	-	2	1	1	2	A	A	TVNB
Muriatic Acid	X	-	-	1	-	X	X	X	X	A	TV
Napthalene	2	2	2	2	2	2	1	1	A	A	TV
Naptha	2	2	2	2	2	2	2	2	A	X	TVB

AGENT	Aluminum	Brass	Bronze	Hastelloy, C-276	Malleable Iron Carbon Steel	Monel	Stainless Steel,304	Stainless Steel,316	Nylon	Polypropylene	Seal Material
Nickel											
Nickel Chloride	X	X	X	-	X	2	-	-	X	A	TEVNB
Nickel Sulphate	X	X	-	2	-	-	2	2	X	A	TEVNB
Nitric											
Nitric Acid (100%)	1	X	X	2	X	X	2	-	X	X	TV
Nitric Acid (50%)	X	X	X	1	X	X	2	-	X	X	TV
Nitric Acid (30%)	X	X	X	1	X	X	1	-	X	X	TV
Nitrobenzene	1	2	2	-	2	2	2	2	A	A	T
Oils											
Castor Oil	2	2	2	1	2	1	2	2	A	A	TEVNB
Coconut Oil	2	-	2	-	3	2	2	2	A	A	TVB
Corn Oil	2	2	2	-	2	2	-	2	A	A	TVNB
Cotton Seed Oil	2	2	2	-	2	1	2	2	A	A	TVNB
Fuel Oil	2	2	2	2	2	2	2	2	A	X	TVNB
Linseed Oil	2	2	2	2	2	2	2	2	A	A	TVNB
Mineral Oil	2	1	-	-	2	1	1	2	A	A	TVNB
Silicon Oil	2	1	2	-	2	-	2	2	A	A	TEVB
Vegetable Oil	2	2	2	1	2	1	1	1	A	X	TVNB
Oleic Acid	2	3	2	2	2	1	-	1	A	X	TB
Oleum	2	X	X	-	2	X	2	2	X	X	TV
Oxalic Acid (Sat.)	2	-	2	2	X	2	X	X	X	A	TEV
Oxygen	2	2	2	-	2	2	2	2	X	X	TEVNB
Palmitic Acid (Sat.)	2	3	2	-	3	2	2	2	X	A	TVB
Paraffin	2	2	2	2	2	2	2	2	A	A	TVNB
Perchloroethylene	2	2	2	2	2	1	-	-	X	X	TV
Petrolatum	2	-	2	-	3	2	2	2	A	-	TVNB
Phenol (Carbolic Acid)	1	1	X	1	2	1	-	1	X	X	TV
Phosphoric Acid											
Phosphoric Acid (25-50%)	X	X	2	1	X	X	-	-	X	A	TEVN
Phosphoric Acid (50-85%)	X	X	X	1	X	3	-	-	X	A	TEV
Photographic Solutions	-	-	-	-	X	1	1	1	X	X	TVNB
Phthalic Anhydride	-	2	2	1	2	1	1	1	X	X	TEV
Picric Acid	1	X	X	2	X	X	2	2	X	-	TEVNB
Plating Solutions											
Brass Plating Solution	-	-	-	1	-	-	-	2	X	A	TEVNB
Cadmium Plating Solution	-	-	-	1	-	-	-	2	X	A	TEVNB
Chrome 40% Plating Solution	X	2	2	1	X	X	2	2	X	A	TEVN
Copper (Cyanide) Plating Solution	-	-	-	1	-	-	-	-	X	A	TEVNB
Gold Plating Solution	-	-	-	1	-	-	-	1	X	A	TEVNB
Iron Plating Solution	-	-	-	-	-	-	-	-	X	A	TEVB
Lead Plating Solution	-	-	-	-	-	-	1	1	X	A	TEVNB
Nickel Plating Solution	-	-	-	1	-	-	1	1	X	A	TEVNB
Silver Plating Solution	-	-	-	1	-	-	1	1	X	A	TEVNB
Tin Plating Solution	-	-	-	1	-	-	-	3	X	A	TEVNB
Zinc Plating Solution	-	-	-	1	-	-	-	-	X	A	TEVNB
Potassium											
Potassium Acetate	X	X	X	-	2	-	-	-	A	A	TEVB
Potassium Bicarbonate (30%)	X	2	-	2	2	2	1	1	A	A	TEVNB
Potassium Carbonate (50%)	X	2	X	2	2	2	1	1	A	A	TEVNB
Potassium Chlorate (30%)	2	X	X	-	2	2	2	1	X	A	TEVNB
Potassium Chloride (30%)	X	X	2	-	2	1	-	-	A	A	TEVNB
Potassium Chromate (30%)	2	2	2	2	-	2	2	2	X	A	TEVB
Potassium Cyanide Solution (30%)	X	X	X	2	2	2	2	2	X	A	TEVNB
Potassium Dichromate (30%)	1	2	2	2	2	2	1	1	X	A	TEVB
Potassium Hydroxide (90%)	X	X	X	2	-	2	X	-	X	A	TENB
Potassium Nitrate (80%)	1	2	2	2	2	2	2	2	X	A	TEVNB
Potassium Permanganate (20%)	2	2	2	1	2	2	2	2	X	A	TEVN
Potassium Sulphate (10%)	1	2	2	1	2	1	1	1	A	A	TEVNB
Propane	1	1	1	2	2	1	2	2	X	X	TVB
Propylene Glycol	2	2	2	2	2	2	2	2	A	A	TVNB
Propylene Oxide (90%)	-	-	-	-	-	-	1	1	X	X	TE
Pyridine	2	2	2	-	2	2	2	2	A	X	T
Pyrogalllic Acid	2	2	2	2	2	2	2	2	X	X	TVNB
Silver Nitrate	X	X	X	-	X	X	2	1	X	A	TEVNB
Soap Solutions	2	2	2	1	2	2	2	2	A	A	TEVNB

# TECHNICAL & SAFETY INFORMATION

AGENT	Aluminum	Brass	Bronze	Hastelloy, C-276	Malleable Iron Carbon Steel	Monel	Stainless Steel,304	Stainless Steel,316	Nylon	Polypropylene	Seal Material
Sodium											
Sodium Acetate	1	2	2	-	X	2	2	2	A	A	TEN
Sodium Bicarbonate (20%)	2	2	2	1	3	1	1	1	A	A	TEVNB
Sodium Bisulphate	X	-	2	2	2	-	-	-	A	A	TEVNB
Sodium Bisulphite	X	2	X	2	X	-	-	-	A	A	TEVNB
Sodium Borate	2	2	2	2	3	2	2	2	A	A	TEVNB
Sodium Perborate (10%)	2	X	2	2	2	2	2	2	X	A	TEVNB
Sodium Carbonate	X	2	-	2	2	1	-	2	A	A	TEVNB
Sodium Chlorate (50%)	2	2	2	1	X	1	2	2	X	A	TEVNB
Sodium Cyanide	X	X	X	2	2	X	-	-	A	A	TEVNB
Sodium Dichromate	2	X	X	1	2	-	2	2	X	A	TE
Sodium Hydroxide (70%)	X	X	X	1	3	1	2	2	X	A	TENB
Sodium Hydroxide (50%)	X	X	3	1	3	1	1	-	X	A	TENB
Sodium Hydroxide (30%)	X	2	3	2	2	1	1	1	X	A	TENB
Sodium Chloride (30%)	X	2	2	2	2	1	-	-	X	A	TEVNB
Sodium Hypochlorite	X	X	X	-	X	X	-	-	X	A	TEV
Sodium Metaphosphate	X	X	2	-	X	2	2	2	X	X	TEVNB
Sodium Nitrate (40%)	1	2	-	-	2	2	1	1	A	A	TENB
Sodium Perborate (10%)	2	X	2	2	2	2	2	2	X	A	TEVNB
Sodium Peroxide (10%)	2	X	X	2	2	2	2	2	X	A	TEVNB
Sodium Silicate	1	2	2	2	2	2	2	2	A	A	TEVNB
Sodium Sulphate	-	2	2	2	2	-	-	1	A	A	TEVNB
Sodium Sulphide (50%)	X	X	X	2	2	2	-	2	X	A	TEVNB
Sodium Thiosulphate	2	X	X	2	X	2	2	2	A	A	TEVNB
Stannic Chloride	X	X	X	-	X	X	X	X	X	A	TEVNB
Stannous Chloride	X	X	X	2	X	-	X	-	X	X	TEVNB
Steam	-	-	-	-	-	-	-	-	X	-	-
Stearic Acid	2	3	2	1	3	3	2	1	A	A	TVNB
Stoddard's Solvent	2	2	2	1	2	2	2	2	X	A	TVB
Sugar Liquors (Cane)	1	2	1	-	2	2	2	2	A	A	TEVNB
Sugar Liquors (Beet)	1	2	1	-	2	1	1	1	A	A	TEVNB
Sulphate Liquors	2	X	X	2	3	2	-	2	X	A	TVNB
Sulphite Liquors	X	X	-	1	X	X	2	2	X	X	TVNB
Sulphur Chloride	X	-	X	2	X	X	-	-	X	X	TV
Sulphur Dioxide (Dry)	2	2	2	2	1	2	-	2	X	A	TE
Sulphur Trioxide	2	2	X	2	2	2	-	2	X	X	TEV
Sulphuric Acid (TO 10%)	X	2	X	1	X	X	X	X	X	A	TEVNB
Sulphuric Acid (100%)	X	X	X	1	2	X	-	-	X	X	TV
Sulphurous Acid	2	2	X	-	X	X	X	-	X	A	TV
Tannic Acid	X	-	X	-	X	2	2	2	X	A	TEVNB
Tanning Liquors	1	-	2	1	-	-	1	1	X	A	TVNB
Tartaric Acid	-	-	2	2	-	-	1	1	A	A	TVNB
Titanium Tetrachloride	X	X	X	2	2	2	-	2	X	X	TV
Toluene	1	1	1	1	1	1	1	1	A	X	TVB
Tetrahydrofuran	X	-	2	1	1	-	1	2	A	X	T
Tomato Juice	2	-	3	2	3	2	2	2	X	A	TEVNB
Trichloroethylene	1	-	2	1	2	-	-	-	A	X	TV
Triethanolamine	2	X	2	2	2	2	2	2	A	X	TEVN
Triethylamine	-	-	-	-	-	2	2	2	A	X	TVB
Trisodium Phosphate (10%)	X	2	-	1	2	2	1	1	A	A	TVNB
Turpentine	2	X	2	2	2	1	1	1	X	X	TVB
Urea (50%)	2	-	2	-	2	2	2	2	A	A	TEVNB
Urine	-	-	-	-	2	-	1	1	X	A	TEVNB
Vinegar	2	X	2	2	2	2	2	2	X	A	TEVN
Water Acid (Mine)	X	X	X	1	X	-	-	-	X	A	TEVNB
Water (Distilled)	X	2	2	1	X	X	2	2	A	A	TEVNB
Water (Sea)	2	2	2	1	X	2	2	2	A	A	TEVNB
Whiskey	X	2	2	1	2	2	1	1	X	A	TEVNB
White Liquor (Pulp)	2	-	X	2	X	X	2	2	X	A	TEVNB
Wine	X	2	2	1	X	2	1	1	X	A	TEVNB
Xylene	2	2	2	1	2	2	2	2	A	X	TV
Zinc											
Zinc Chloride	X	X	X	2	X	-	X	2	A	A	TEVNB
Zinc Nitrate	-	-	-	-	-	-	2	2	X	A	TEVNB
Zinc Sulphate (50%)	X	2	2	2	X	2	1	1	X	A	TEVNB

## Measurement & Conversion Information

### Measures of Pressure

1 Pound Per Square Inch = 144 Pounds Per Square Foot = 0.068 Atmosphere = 2.042 Inches of Mercury at 62°F = 27.7 Inches of Water at 62°F = 2.31 Feet of Water at 62°F.

1 Atmosphere = 30 Inches of Mercury at 62°F = 14.7 Pounds Per Square Inch = 2116.3 Pounds Per Square Foot = 33.95 Feet of Water at 62°F.

1 Foot of Water at 62°F = 62.355 Pounds Per Square Foot = 0.433 Pounds Per Square Inch.

1 Inch of Mercury at 62°F = 1.132 Feet of Water = 13.58 Inches of Water = 0.491 Pounds Per Square Inch.

Column of Water 12 Inches High, 1 Inch in Diameter = 0.341 Pounds.

### Length Conversion Constants

Millimetres x .039370 = Inches

Meters x 39.370 = Inches

Meters x 3.2808 = Feet

Meters x 1.09361 = Yards

Kilometres x 3,280.8 = Feet

Kilometres x .62137 = Statute Mile

Kilometres x .53959 = Nautical Miles

Inches x 25.4001 = Millimetres

Inches x .0254 = Meters

Feet x .30480 = Meters

Yards x .91440 = Meters

Feet x .0003048 = Kilometres

Statute Miles x 1.60935 = Kilometres

Nautical Miles x 1.85325 = Kilometres

### Weight Conversion Constants

Grams x .03527 = Ounces (Avd.)

Grams x .033818 = Fluid Ounces (Water)

Kilograms x 35.27 = Ounces (Avd.)

Kilograms x 2.20462 = Pounds (Avd.)

Ounces (Avd.) x 28.35 = Grams

Fluid Ounces (Water) x 29.57 = Grams

Ounces (Avd.) x .02835 = Kilograms

Pounds (Avd.) x .45359 = Kilograms

### Pressure Conversions

100 psi = 6.9 bars

250 psi = 17.25 bars

600 psi = 41.4 bars

5 bars = 72.5 psi

10 bars = 145 psi

25 bars = 362.5 psi

### Fraction - Decimal Conversion Chart

	<u>INCHES</u>	<u>MILLIMETRES</u>		<u>INCHES</u>	<u>MILLIMETRES</u>
	$\frac{1}{64}$ .015625	.3969		$\frac{33}{64}$ .515625	13.0969
$\frac{1}{32}$	.03125	.7938	$\frac{17}{32}$	.53125	13.4938
	$\frac{3}{64}$ .046875	1.1906		$\frac{35}{64}$ .546875	13.8907
$\frac{1}{16}$	.0625	1.5875	$\frac{9}{16}$	.5625	14.2876
	$\frac{5}{64}$ .078125	1.9844		$\frac{37}{64}$ .578125	14.6844
$\frac{3}{32}$	.09375	2.3813	$\frac{19}{32}$	.59375	15.0813
	$\frac{7}{64}$ .109375	2.7781		$\frac{39}{64}$ .609375	15.4782
$\frac{1}{8}$	.125	3.1750	$\frac{5}{8}$	.625	15.8751
	$\frac{9}{64}$ .140625	3.5719		$\frac{41}{64}$ .640625	16.2719
$\frac{5}{32}$	.15625	3.9688	$\frac{21}{32}$	.65625	16.6688
	$\frac{11}{64}$ .171875	4.3656		$\frac{43}{64}$ .671875	17.0657
$\frac{3}{16}$	.1875	4.7625	$\frac{11}{16}$	.6875	17.4626
	$\frac{13}{64}$ .203125	5.1594		$\frac{45}{64}$ .703125	17.8594
$\frac{7}{32}$	.21875	5.5563	$\frac{23}{32}$	.71875	18.2563
	$\frac{15}{64}$ .234375	5.9531		$\frac{47}{64}$ .734375	18.6532
$\frac{1}{4}$	.250	6.3500	$\frac{3}{4}$	.750	19.0501
	$\frac{17}{64}$ .265625	6.7469		$\frac{49}{64}$ .765625	19.4470
$\frac{9}{32}$	.28125	7.1438	$\frac{25}{32}$	.78125	19.8438
	$\frac{19}{64}$ .296875	7.5406		$\frac{51}{64}$ .796875	20.2407
$\frac{5}{16}$	.3125	7.9375	$\frac{13}{16}$	.8125	20.6376
	$\frac{21}{64}$ .328125	8.3344		$\frac{53}{64}$ .828125	21.0345
$\frac{11}{32}$	.34375	8.7313	$\frac{27}{32}$	.84375	21.4313
	$\frac{23}{64}$ .359375	9.1282		$\frac{55}{64}$ .859375	21.8282
$\frac{3}{8}$	.375	9.5250	$\frac{7}{8}$	.875	22.2251
	$\frac{25}{64}$ .390625	9.9219		$\frac{57}{64}$ .890625	22.6220
$\frac{13}{32}$	.40625	10.3188	$\frac{29}{32}$	.90625	23.0188
	$\frac{27}{64}$ .421875	10.7157		$\frac{59}{64}$ .921875	23.4157
$\frac{7}{16}$	.4375	11.1125	$\frac{15}{16}$	.9375	23.8126
	$\frac{29}{64}$ .453125	11.5094		$\frac{61}{64}$ .953125	24.2095
$\frac{15}{32}$	.46875	11.9063	$\frac{31}{32}$	.96875	24.6063
	$\frac{31}{64}$ .484375	12.3032		$\frac{63}{64}$ .984375	25.0032
$\frac{1}{2}$	.500	12.7001	$\frac{1}{1}$	1.000	25.4001

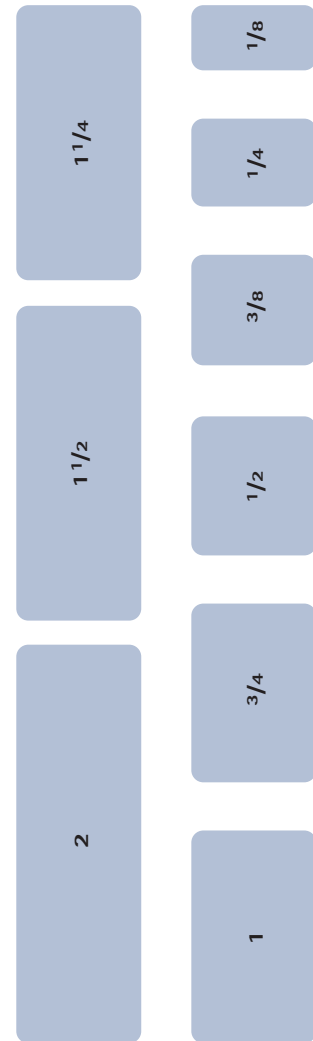
## Temperature Conversions

Look up reading in middle column (shaded). If in degrees Centigrade, read Fahrenheit equivalent in right-hand column; if in degrees Fahrenheit, read Centigrade equivalent in left-hand column.

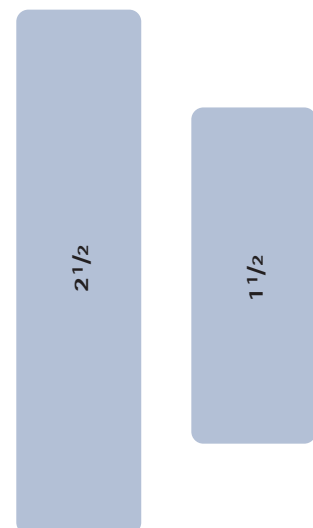
°C	°F	°C	°F	°C	°F	°C	°F		
-73	-100	-148		5.0	41	105.8	33.3	92	197.6
-68	-90	-130		5.6	42	107.6	33.9	93	199.4
-62	-80	-112		6.1	43	109.4	34.4	94	201.2
-57	-70	-94		6.7	44	111.2	35.0	95	203.0
-51	-60	-76		7.2	45	113.0	35.6	96	204.8
-46	-50	-58		7.8	46	114.8	36.1	97	206.6
-40	-40	-40		8.3	47	116.6	36.7	98	208.4
-34	-30	-22		8.9	48	118.4	37.2	99	210.2
-29	-20	-4		9.4	49	120.2	37.8	100	212.0
-23	-10	14		10.0	50	122.0			
-17.8	0	32		10.6	51	123.8	43	110	230
-17.2	1	33.8		11.1	52	125.6	49	120	248
-16.7	2	35.6		11.7	53	127.4	54	130	266
-16.1	3	37.4		12.2	54	129.2	60	140	284
-15.6	4	39.2		12.8	55	131.0	66	150	302
-15.0	5	41.0		13.3	56	132.8	71	160	320
-14.4	6	42.8		13.9	57	134.6	77	170	338
-13.9	7	44.6		14.4	58	136.4	82	180	356
-13.3	8	46.4		15.0	59	138.2	88	190	374
-12.8	9	48.2		15.6	60	140.0	93	200	392
-12.2	10	50.0		16.1	61	141.8	99	210	410
-11.7	11	51.8		16.7	62	143.6	100	212	413.6
-11.1	12	53.6		17.2	63	145.4	104	220	428
-10.6	13	55.4		17.8	64	147.2	110	230	446
-10.0	14	57.2		18.3	65	149.0	116	240	464
-9.4	15	59.0		18.9	66	150.8	121	250	482
-8.9	16	60.8		19.4	67	152.6	127	260	500
-8.3	17	62.6		20.0	68	154.4	132	270	518
-7.8	18	64.4		20.6	69	156.2	138	280	536
-7.2	19	66.2		21.1	70	158.0	143	290	554
-6.7	20	68.0		21.7	71	159.8	149	300	572
-6.1	21	69.8		22.2	72	161.6	154	310	590
-5.6	22	71.6		22.8	73	163.4	160	320	608
-5.0	23	73.4		23.3	74	165.2	166	320	626
-4.4	24	75.2		23.9	75	167.0	170	338	640
-3.9	25	77.0		24.4	76	168.8	171	340	644
-3.3	26	78.8		25.0	77	170.6	177	350	662
-2.8	27	80.6		25.6	78	172.4	182	360	680
-2.2	28	82.4		26.1	79	174.2	186	366	691
-1.7	29	84.2		26.7	80	176.0	188	370	698
-1.1	30	86.0		27.2	81	177.8	193	380	716
-0.6	31	87.8		27.8	82	179.6	198	388	730
0	32	89.6		28.3	83	181.4	199	390	734
.6	33	91.4		28.9	84	183.2	204	400	752
1.1	34	93.2		29.4	85	185.0	208	406	763
1.7	35	95.0		30.0	86	186.8	210	410	770
2.2	36	96.8		30.6	87	188.6	216	420	788
2.8	37	98.6		31.1	88	190.4	221	430	806
3.3	38	100.4		31.7	89	192.2	227	440	824
3.9	39	102.2		32.2	90	194.0	232	450	842
4.4	40	104.0		32.8	91	195.8			

## Fittings Size Chart

### Male NPT Thread Sizes



### Male NST Thread Sizes



## Steam Temperature – Pressure Conversion Guide

Temperature °F      °C		Lbs. per Sq. Inch	Temperature °F      °C		Lbs. per Sq. Inch	Temperature °F      °C		Lbs. per Sq. Inch
212	100.0	0.0	286	141.1	39.4	336	168.9	97.1
214	101.1	0.6	287	141.7	40.3	337	169.4	98.7
216	102.2	1.2	288	142.2	41.1	338	170.0	100.2
218	103.3	1.8	289	142.8	42.0	339	170.6	101.8
220	104.4	2.5	290	143.3	42.9	340	171.1	103.3
222	105.6	3.2	291	143.9	43.8	341	171.7	105.0
224	106.7	3.9	292	144.4	44.7	342	172.2	106.5
226	107.8	4.6	293	145.0	45.6	343	172.8	108.2
228	108.9	5.3	294	145.6	46.5	344	173.3	109.8
230	110.0	6.1	295	146.1	47.5	345	173.9	111.5
232	111.1	6.9	296	146.7	48.4	346	174.4	113.1
234	112.2	7.7	297	147.2	49.4	347	175.0	114.8
236	113.3	8.5	298	147.8	50.3	348	175.6	116.5
238	114.4	9.4	299	148.3	51.3	349	176.1	118.2
240	115.6	10.3	300	148.9	52.3	350	176.7	119.9
242	116.7	11.2	301	149.4	53.4	352	177.8	123.5
244	117.8	12.1	302	150.0	54.4	354	178.9	127.1
246	118.9	13.1	303	150.6	55.4	356	180.0	130.8
248	120.0	14.1	304	151.1	56.4	358	181.1	134.5
250	121.1	15.1	305	151.7	57.5	360	182.2	138.3
252	122.2	16.2	306	152.2	58.6	362	183.3	142.3
254	123.3	17.3	307	152.8	59.7	364	184.4	146.2
256	124.4	18.4	308	153.3	60.7	366	185.6	150.3
258	125.6	19.6	309	153.9	61.9	368	186.7	154.4
260	126.7	20.7	310	154.4	63.0	370	187.8	158.7
261	127.2	21.4	311	155.0	64.2	372	188.9	163.0
262	127.8	22.0	312	155.6	65.3	374	190.0	167.4
263	128.3	22.6	313	156.1	66.5	376	191.1	171.9
264	128.9	23.2	314	156.7	67.6	378	192.2	176.4
265	129.4	23.9	315	157.2	68.8	380	193.3	181.1
266	130.0	24.5	316	157.8	70.0	382	194.4	185.8
267	130.6	25.2	317	158.3	71.3	384	195.6	190.6
268	131.1	25.8	318	158.9	72.5	386	196.7	195.6
269	131.7	26.5	319	159.4	73.7	388	197.8	200.6
270	132.2	27.2	320	160.0	75.0	390	198.9	205.7
271	132.8	27.9	321	160.6	76.3	392	200.0	210.9
272	133.3	28.6	322	161.1	77.5	394	201.1	216.2
273	133.9	29.3	323	161.7	78.8	396	202.2	221.5
274	134.4	30.0	324	162.2	80.1	398	203.3	227.0
275	135.0	30.8	325	162.8	81.5	400	204.4	232.6
276	135.6	31.5	326	163.3	82.8	402	205.5	238
277	136.1	32.3	327	163.9	84.2	404	206.7	244
278	136.7	33.0	328	164.4	85.6	406	207.8	250
279	137.2	33.8	329	165.0	87.0	408	208.9	256
280	137.8	34.5	330	165.6	88.4	410	210	262
281	138.3	35.3	331	166.1	89.8	412	211.1	268
282	138.9	36.1	332	166.7	91.2	414	212.2	275
283	139.4	36.9	333	167.2	92.7	416	213.3	281
284	140.0	37.7	334	167.8	94.1	418	214.4	288
285	140.6	38.6	335	168.3	95.6	420	215.6	294

## Coupling, Flange & Thread Information

It is important to identify the threads required before ordering couplings.

Identifying threads can sometimes be the most difficult and frustrating part of coupling selection. However, without the right combination of threads, you may not provide a functional or safe connection.

The diameters, threads per inch (TPI) and thread pitch, etc. are necessary to completely identify a thread. Ring, Plug and GO/NOGO gauges are required to accurately gauge or identify threads. In the field, in the absence of these gauges, thread leaf gauges can be used to identify the Threads Per Inch (TPI) and the thread pitch. On threads you have determined to be straight threads, a caliper can be used to measure the Outside Diameter of the Male (ODM) or the Inside Diameter of the Female (IDF). A caliper can also be used to take measurements of tapered thread diameters. However, these are more difficult to define because of the taper. Fortunately, there are few tapered threads to deal with and these can usually be identified from the nominal ODM and the TPI.

However, identifying the thread may not fully identify what is needed in a mating fitting. The application is the primary limiting factor on the thread type used. Dixon offers products with a wide variety of threads used with hose, pipe and hydraulics.

When attempting to choose a fitting, it is always advisable to first identify the thread to which it must connect. This may entail checking with a fitting or equipment manufacturer.

The fire hose thread specifications for some local municipal fire equipment and hydrants may vary according to local specifications. These can generally be most easily identified by contacting the local fire department responsible for the hydrant. The most common thread used on fire equipment is National Standard Thread (NST), also known as National Hose thread (NH).

### When it is not possible to identify the thread:

1) Determine the number of threads per inch by measuring the distance from peak of thread to peak of thread across the largest number of whole threads. Then divide the number of threads by the measurement (This will provide the TPI).

### 2) Check to see if the thread is straight or tapered.

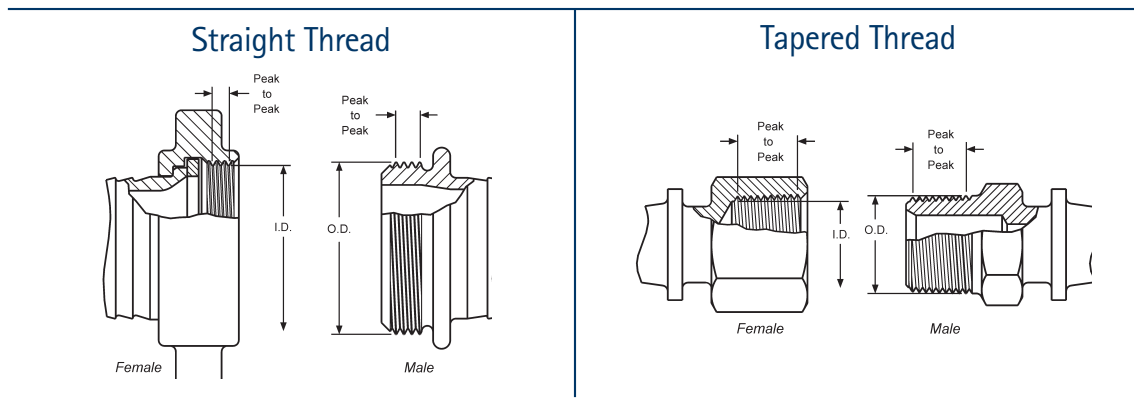
#### a) Straight Threads

Measure the Outside Diameter of the Male (ODM) or the Inside Diameter of the Female (IDF), from peak of thread to peak of thread.

#### b) Tapered Threads

Measure the Outside Diameter of the Male (ODM) at the large end and the small end, or the Inside Diameter of the Female (IDF) at the large end and the small end, from peak of thread to peak of thread. Then measure the Outside Diameter (OD) of the unthreaded pipe.

Once the application and these two pieces of information have been determined, the thread can generally be determined. When in doubt, contact the factory.

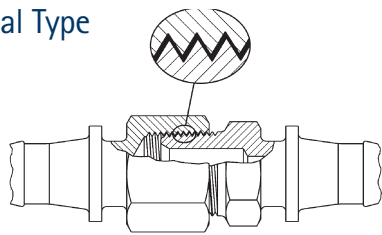


## Threading Information

Abbreviation	System Name	Compatibility	Seal Method
<b>BSPP</b>	British Standard Pipe Parallel	Male BSPP with Female BSPP Female BSPP with Male BSPP Female BSPP with Male BSPT <sub>r</sub>	Washer Washer Washer
<b>BSPT<sub>r</sub></b>	British Standard Pipe Taper	Male BSPT <sub>r</sub> with Female BSPT <sub>r</sub> Male BSPT <sub>r</sub> with Female BSPP Female BSPT <sub>r</sub> with Male BSPT <sub>r</sub> <i>Female BSPT<sub>r</sub> not compatible with Male BSPP</i>	Thread Washer Thread
<b>CHT</b>	American Standard Fire Hose Thread (1" National Hose Thread is Chemical Hose Thread, also known as Booster Hose Thread)	1" Male NH (NST) with 1" Female NH (NST) 1" Female NH (NST) with 1" Male NH (NST) 1" Thread is used on both ¾" hose and 1" hose. <i>Not compatible with other systems</i>	Washer Washer
<b>GHT</b>	Garden Hose Thread	Male GHT with Female GHT Female GHT with Male GHT Thread is same for all size hose <i>Not compatible with other systems</i>	Washer Washer
<b>IPS</b>	Iron Pipe Straight Thread	Generic Name for Straight Pipe Thread See NPSH for compatibility	Washer
<b>IPT</b>	Iron Pipe Thread	Generic Name for All Pipe Thread <i>More information require</i>	
<b>JIC</b>	Joint Industrial Committee	Used with other mating JIC threads	Mechanical
<b>NH or NST</b>	American Standard Fire Hose Coupling Thread (National Hose thread also known as National Standard Thread)		Washer Washer
<b>NPT</b>	American Standard Taper Pipe Thread (National Pipe Tapered)	Male NPT with Female NPT Male NPT with Female NPTF Male NPT with Female NPSM Male NPT with Female NPSH Female NPT with Male NPT Female NPT with Male NPTF Female NPT not compatible with Male NPSM or Male NPSH	Thread Thread Washer Washer Thread Thread
<b>NPTF</b>	American Standard Taper Pipe Fuel Dryseal Thread (National Pipe Tapered) (Dryseal)	Male NPTF with Female NPTF Male NPTF with Female NPT Male NPTF with Female NPSM Male NPTF with Female NPSH Female NPTF with Male NPTF Female NPTF with Male NPT <i>Female NPTF with Male NPSM or NPSH</i> <i>Note: NPTF with NPTF threads do not require sealant for the initial use. After that, sealant is required.</i>	Thread Thread Washer Washer Thread Thread <i>Not Compatible</i>
<b>NPSH</b>	American Standard Straight Pipe for Hose Couplings (National Pipe Straight Hose)	Male NPSH with Female NPSH Female NPSH with Male NPSH Female NPSH with Male NPT Female NPSH with Male NPTF Female NPSH with Male NPSM	Washer Washer Washer Washer Washer
<b>NPSM</b>	American Standard Straight Mechanical Joints (National Pipe Straight Mechanical)	Male NPSM with Female NPSM Male NPSM with Female NPSH Female NPSM with Male NPSM Female NPSM with Male NPT Female NPSM with Male NPTF	Seal can be either mechanical or washer. Mating fittings must be of same type.
<b>SIPT</b>	Straight Iron Pipe Thread	Generic name for Straight Pipe Thread	Washer
<b>TIPT</b>	Tapered Iron Pipe Thread	Generic name for Tapered Pipe Thread	Thread
<b>NYC</b>	NYC Fire Department	Straight Thread used in New York City	Washer
<b>Chicago</b>	Chicago Fire Department	Straight Thread used in Chicago	Washer

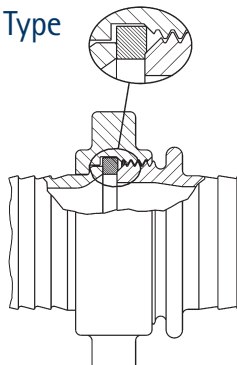
## Identifying Threads

### Thread Seal Type



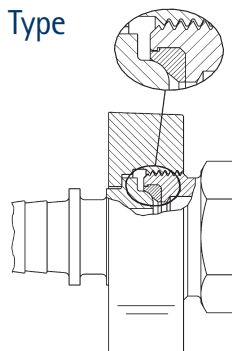
- A seal is obtained by applying a sealant to the male thread before engaging
- The sealant is used to prevent spiral leakage
- Thread tape or paste is the preferred sealant in this type of application
- Please refer to catalogue for thread tape options

### Washer Seal Type



- A seal is obtained when the male thread is tightened down onto the washer of the female assembly
- The washer should be inspected regularly and replaced as needed to prevent leakage
- Please refer to catalogue for replacement washers

### Mechanical Seal Type



- A seal is obtained through metal to metal contact or metal to seal contact, i.e. JIC couplings have a metal to metal seal. EZ-Boss Ground Joint couplings have a metal to seal contact, (shown above)
- The couplings should be retightened as needed to prevent leakage

### Thread Sealing Tips

Sealing N.P.T. threads can be an exasperating experience if certain techniques are not followed. The following tips will help alleviate many common problems in thread sealing:

1. Always use some type of sealant (tape or paste) and apply sealant to male thread only. If using a hydraulic sealant, allow sufficient curing time before system is pressurised.
2. When using tape sealant, wrap the threads in a clockwise motion starting at the first thread and, as layers are applied, work towards the imperfect (vanishing) thread. If the system that the connection being made to cannot tolerate foreign matter (i.e. air systems), leave the first thread exposed and apply the tape sealant as outlined above.
3. When using paste sealant, apply to threads with a brush, using the brush to work the sealant into the threads. Apply enough sealant to fill in all the threads all the way around.
4. When connecting one stainless steel part to another stainless steel part that will require future disassembly, use a thread sealant that is designed for stainless steel. This stainless steel thread sealant is also useful when connecting aluminum to aluminum that needs to be disconnected in the future. These two materials gall easily, and if the correct sealant is not used, it can be next to impossible to disassemble.
5. When connecting parts made of dissimilar metals (i.e. steel and aluminum), standard tape or paste sealant performs satisfactory.
6. For sizes 2" and below, tape or paste performs satisfactory. When using thread tape, four wraps (covering all necessary threads) is usually sufficient.
7. For sizes 2" and above, thread paste is recommended. If thread tape is used, eight wraps (covering all necessary threads) is usually sufficient. Apply more wraps if necessary.
8. For stubborn to seal threads, apply a normal coating of thread paste followed by a normal layer of thread tape.
9. For extremely stubborn to seal threads, apply a normal coating of thread paste followed by a single layer of gauze bandage followed by a normal layer of thread tape.

### Caution!

When this procedure is done, the connection becomes permanent. Extreme measures will be necessary to disconnect these components. All other measures to seal the threads should be explored prior to use of this technique.

10. Over-tightening threads can be just as detrimental as insufficient tightening. For sizes 2" and below, hand tighten the components and, with a wrench, tighten 3 full turns. For sizes 2" and above, hand tighten the components and, with a wrench, tighten 2 full turns.

## Thread Dimensions

### Nominal Dimensions of Standard Threads

ODM -- Outside Diameter of the Male

IDF -- Inside Diameter of the Female

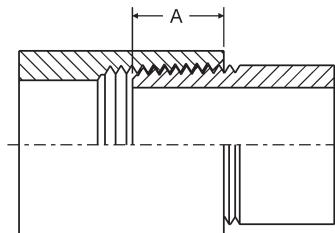
TPI -- Threads Per Inch

		Tapered Threads		Straight Threads											
		NPT	BSPT <sub>r</sub>	NPSH				NPSM			NST (NH)			BSPP	
Size	Pipe O.D.	TPI	TPI	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)
1/8"	.405	27	28				27	0.397	0.358					0.383	0.337
1/4"	.504	18	19				18	0.526	0.468					0.516	0.450
3/8"	.675	18	19				18	0.662	0.603					0.656	0.588
1/2"	.840	14	14	14	0.8248	0.7395	14	0.823	0.747					0.825	0.733
3/4"	1.050	14	14	14	1.0353	0.9500	14	1.034	0.958	8	1.375	1.2246		1.041	0.950
1"	1.315	11.5	11	11.5	1.2951	1.1921	11.5	1.293	1.201	8	1.375	1.2246	11	1.309	1.193
1 1/4"	1.660	11.5	11	11.5	1.6399	1.5369	11.5	1.638	1.546				11	1.650	1.534
1 1/2"	1.900	11.5	11	11.5	1.8788	1.7758	11.5	1.877	1.785	9	1.990	1.8577		1.882	1.766
2"	2.375	11.5	11	11.5	2.3528	2.2498	11.5	2.351	2.259				11	2.347	2.231
2 1/2"	2.875	8	11	8	2.8434	2.6930	8	2.841	2.708	7.5	3.068	2.9104	11	2.960	2.844
3"	3.500	8	11				8	3.467	3.334	6	3.623	3.5306	11	3.460	3.344
4"	4.500	8	11				8	4.466	4.333	4	5.010	4.7111		4.450	4.334
4 1/2"										4	5.760	5.4611	11		
5"	5.563	8	11				8	5.528	5.395	4	6.260	5.9602	11	5.450	5.359
6"	6.625	8	11				8	6.585	6.452	4	7.025	6.7252		6.450	6.359
8"	8.625	8													
10"	10.750	8													
12"	12.750	8													

GHT (3/4") -- 1.0625 ODM, 11-1/2 TPI

Note: Female NPT (Tapered Pipe) thread is not available on hose swivel nuts.

### Normal Engagement Length of NPT Thread in Inches ("A") \*



\* Dimensions given do not allow for variations in tapping or threading.

Thread Size	"A"	Thread Size	"A"
1/8"	1/4"	2 1/2"	15/16"
1/4"	3/8"	3"	1"
3/8"	3/8"	4"	1 1/8"
1/2"	1/2"	5"	1 1/4"
3/4"	9/16"	6"	15/16"
1"	11/16"	8"	17/16"
1 1/4"	11/16"	10"	15/8"
1 1/2"	11/16"	12"	13/4"
2"	3/4"		

## Pipe and Flange Dimensions

Dimensions of Seamless and Welded Steel Pipe  
 ASA-B36.10 and B36.19

Nominal Pipe Size	Outside Diameter	Pipe Schedule Wall Thickness												
		10	20	30	Stand	40	60	Extra Strong	80	100	120	140	160	XXX Strong
1/8"	0.405"	-----	-----	-----	0.068	0.068	-----	0.095	0.095	-----	-----	-----	-----	-----
1/4"	0.540"	-----	-----	-----	0.088	0.088	-----	0.119	0.119	-----	-----	-----	-----	-----
3/8"	0.675"	-----	-----	-----	0.091	0.091	-----	0.126	0.126	-----	-----	-----	-----	-----
1/2"	0.840"	-----	-----	-----	0.109	0.109	-----	0.147	0.147	-----	-----	-----	0.188	0.294
3/4"	1.050"	-----	-----	-----	0.113	0.113	-----	0.154	0.154	-----	-----	-----	0.219	0.308
1"	1.315"	-----	-----	-----	0.133	0.133	-----	0.179	0.179	-----	-----	-----	0.250	0.358
1 1/4"	1.660"	-----	-----	-----	0.140	0.140	-----	0.191	0.191	-----	-----	-----	0.250	0.382
1 1/2"	1.900"	-----	-----	-----	0.145	0.145	-----	0.200	0.200	-----	-----	-----	0.281	0.400
2"	2.375"	-----	-----	-----	0.154	0.154	-----	0.218	0.218	-----	-----	-----	0.344	0.436
2 1/2"	2.875"	-----	-----	-----	0.203	0.203	-----	0.276	0.276	-----	-----	-----	0.375	0.552
3"	3.500"	-----	-----	-----	0.216	0.216	-----	0.300	0.300	-----	-----	-----	0.438	0.600
3 1/2"	4.000"	-----	-----	-----	0.226	0.226	-----	0.318	0.318	-----	-----	-----	-----	-----
4"	4.500"	-----	-----	-----	0.237	0.237	-----	0.337	0.337	-----	0.438	-----	0.531	0.674
5"	5.563"	-----	-----	-----	0.258	0.258	-----	0.375	0.375	-----	0.500	-----	0.625	0.750
6"	6.625"	-----	-----	-----	0.280	0.280	-----	0.432	0.432	-----	0.562	-----	0.719	0.864
8"	8.625"	-----	0.250	0.277	0.322	0.322	0.406	0.500	0.500	0.594	0.719	0.812	0.906	0.873
10"	10.750"	-----	0.250	0.307	0.365	0.365	0.500	0.500	0.594	0.719	0.844	1.000	1.125	1.000
12"	12.750"	-----	0.250	0.330	0.375	0.406	0.562	0.500	0.688	0.844	1.000	1.125	1.312	1.000

### Dimensions of 150 LB. ASA Steel Flanges

Nominal Pipe Size	Flange O.D.	Thickness*	O.D. of Raised Face	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolt Holes	Diameter of Bolts
1"	4 1/2"	9/16"	2"	3 1/8"	4	5/8"	1/2"
1 1/2"	5"	1 1/16"	2 7/8"	3 7/8"	4	5/8"	1/2"
2"	6"	3/4"	3 5/8"	4 3/4"	4	3/4"	5/8"
2 1/2"	7"	7/8"	4 1/8"	5 1/2"	4	3/4"	5/8"
3"	7 1/2"	15/16"	5"	6"	4	3/4"	5/8"
4"	9"	15/16"	6 3/16"	7 1/2"	8	3/4"	5/8"
5"	10"	15/16"	7 5/16"	8 1/2"	8	7/8"	3/4"
6"	11"	1"	8 1/2"	9 1/2"	8	7/8"	3/4"
8"	13 1/2"	1 1/8"	10 5/8"	11 3/4"	8	7/8"	3/4"
10"	16"	1 3/16"	12 3/4"	14 1/4"	12	1"	7/8"
12"	19"	1 1/4"	15"	17"	12	1"	7/8"

\* 1/16" raised face is included in the thickness.

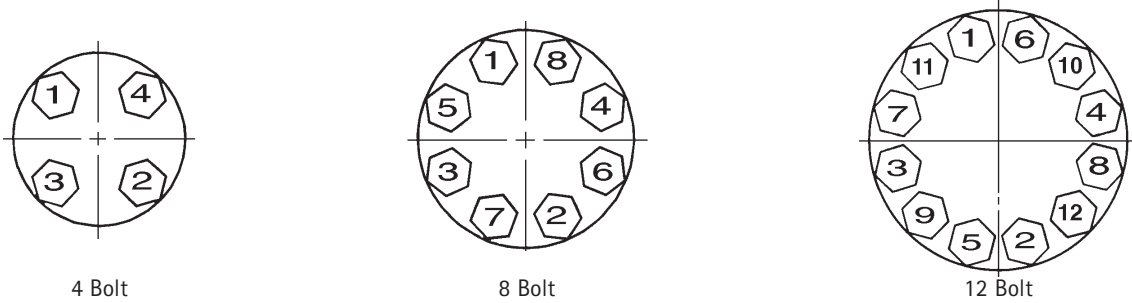
### Dimensions of Tank Truck Flanges (TTMA Drilling)

Nominal Pipe Size	Flange O.D.	Thickness*	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolt Holes	Diameter of Bolts
3"	5 5/8"	3/8"	4 7/8"	8	7/16"	3/8"
4"	6 5/8"	3/8"	5 7/8"	8	7/16"	3/8"
6"	8 7/8"	3/8"	8 1/8"	12	7/16"	3/8"

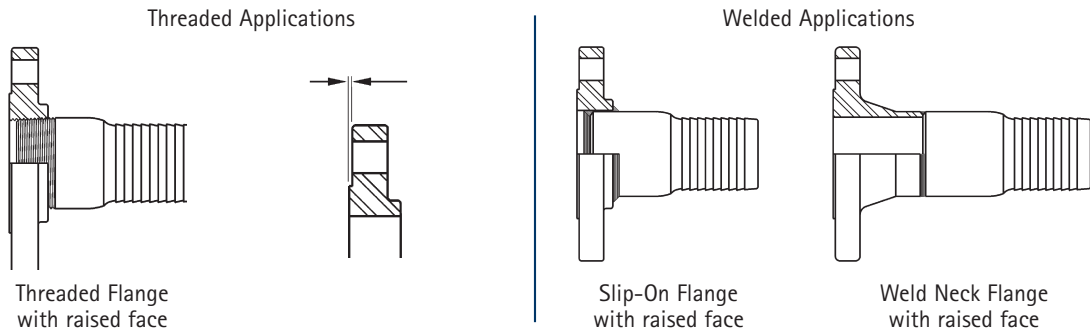
\* Listed thickness is for aluminum flanges

## Flange Information

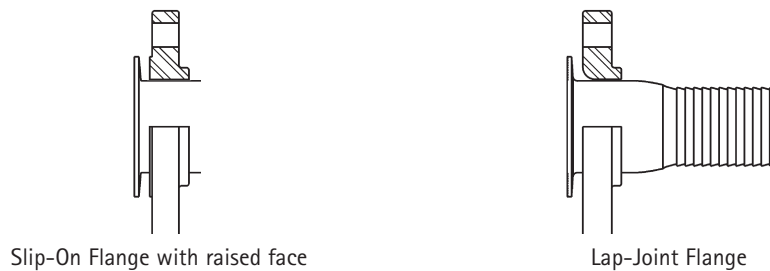
Flange Bolt Tightening Sequence (Use appropriate gaskets and bolts)



## Flange Diagrams



## Floating Applications (flange free to swivel)



## Pressure - Temperature Ratings

Pressure Class	150	300
Test Pressure	425	1100
Service Temperature	Pressure	
-20 to 100	275	720
150	255	710
200	240	700
250	225	690
300	210	680
350	195	675
400	180	665
450	165	650
500	150	625
550	140	590
600	130	555
650	120	515
700	110	470
750	100	425

Note: Ratings apply to all products covered by USA B16.5 valves conforming to the requirements of this standard must, in other respects, merit these ratings.

All ratings are maximum allowable non-shock pressures (psig) at the tabulated temperatures (degree Fahrenheit) and may be interpolated between temperatures shown. The primary service pressure ratings are shown in bold face type. Temperatures are those on the inside of the pressure retaining structure.

The use of these ratings requires gaskets conforming to the requirements of USA B16.5. The user is responsible for selecting gaskets of dimensions and materials to withstand the required bolt loading without injurious crushing, and suitable for the service conditions in all other respects.

## Maximum Recommended Air Flow (SCFM) Through ANSI Standard Weight Schedule 40 Pipe

The flow values in the table below are based on a pressure drop of 10% of the applied pressure per 100 feet of pipe for 1/8", 1/4", 3/8", and 1/2" pipe sizes; and a pressure drop of 5% of the applied pressure per 100 feet of pipe for 3/4", 1", 1 1/4", 2", 2 1/2", 3" pipe sizes. The table gives recommended flows for pipe sizes at listed pressures and should be used to determine appropriate piping for air systems.

Applied Pressure psi	Nominal Standard Pipe Size										
	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
5	0.5	1.2	2.7	4.9	6.6	13	27	40	125	135	240
10	0.8	1.7	3.9	7.7	11.0	21	44	64	215	200	370
20	1.3	3.0	6.6	13.0	18.5	35	75	110	385	350	600
40	2.5	5.5	12.0	23.0	34.0	62	135	200	560	640	1100
60	3.5	8.0	18.0	34.0	50.0	93	195	290	720	900	1600
80	4.7	10.5	23.0	44.0	65.0	120	255	380	900	1200	2100
100	5.8	13.0	29.0	54.0	80.0	150	315	470	900	1450	2600
150	8.6	20.0	41.0	80.0	115.0	220	460	680	1350	2200	3900
200	11.5	26.0	58.0	108.0	155.0	290	620	910	1750	2800	5000
250	14.5	33.0	73.0	135.0	200.0	370	770	1150	2200	3500	6100

### Water Discharge Table

This table is intended for general reference and general applicability only, and should not be relied upon as the sole or precise source of information available with respect to the subject covered. The user should also refer to and follow manufacturer's specific instructions and recommendations with regard to such information, where they exist.

### Flow of water through 100 foot lengths of hose, Straight-Smooth Bore - U.S. Gallons per minute

(psi) at Hose Inlet	Nominal Hose I.D. Diameters - Inches							
	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"
20	26	47	76	161	290	468	997	2895
30	32	58	94	200	360	582	1240	3603
40	38	68	110	234	421	680	1449	4209
50	43	77	124	264	475	767	1635	4748
60	47	85	137	291	524	846	1804	5239
75	53	95	154	329	591	955	2035	5910
100	62	112	180	384	690	1115	2377	6904
125	70	126	203	433	779	1258	2681	7788
150	77	139	224	478	859	1388	2958	8593
200	90	162	262	478	1004	1621	3455	10038

Figures are to be used as a guide since the hose inside diameter tolerance, the type of fittings used, and orifice restriction all influence the actual discharge. Thus, variations plus or minus from the table may be obtained in actual service.

### Conversion Table - Feet of Water to Inches of Mercury

Feet of Water	1	2	4	6	8	10	12	14	16	20	22	24	26	28	30	32	34
Inches of Mercury	0.9	1.8	3.5	5.3	7.1	8.8	10.6	12.4	14.1	17.7	19.4	21.2	23.0	24.8	26.5	28.3	30.0

## Force Chart

### Force (In Pounds)

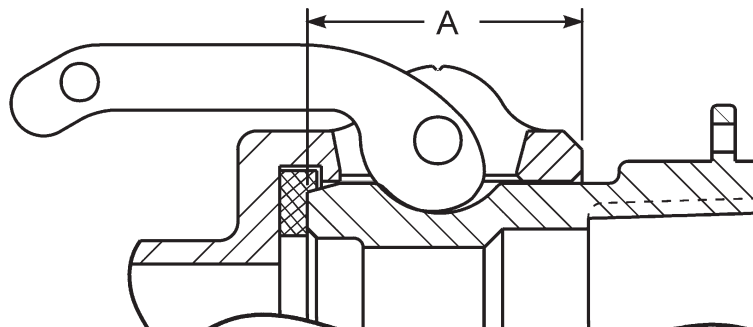
Hose I.D.	25 (psi)	50 (psi)	75 (psi)	100 (psi)	150 (psi)	200 (psi)	250 (psi)	300 (psi)	500 (psi)	1000 (psi)
1/4"	1	2	4	5	7	10	12	15	25	49
3/8"	3	6	8	11	17	22	28	33	55	110
1/2"	5	10	15	20	29	39	49	59	98	196
3/4"	11	22	33	44	66	88	110	133	221	442
1"	20	39	59	79	118	157	196	236	393	785
1 1/4"	31	61	92	123	184	245	307	368	614	1227
1 1/2"	44	88	133	177	265	353	442	530	884	1767
2"	79	157	236	314	471	628	785	942	1571	3142
2 1/2"	123	245	368	491	736	982	1227	1473	2454	4909
3"	177	353	530	707	1060	1414	1767	2121	3534	7069
4"	314	628	942	1257	1885	2513	3142	3770	6283	12566
5"	491	982	1473	1964	2945	3927	4909	5891	9818	19635
6"	707	1414	2121	2827	4241	5655	7069	8482	14137	28274
8"	1257	2513	3770	5027	7540	10053	12566	15080	25133	50266
10"	1964	3927	5891	7854	11781	15708	19635	23562	39270	78540
12"	2827	5655	8482	11310	16965	22620	28274	33929	56549	113098

Note: For hose I.D.'s from 1-1/4" to 12" the force in pounds is greater than the psi.

Force is the dynamic power which is exported longitudinally through a hose, towards the ends. To arrive at the number of pounds of force exerted, you merely multiply the area of the I.D. times the working pressure being used.

- Area of a circle:  $\pi \times r^2$  (Pi [3.1416] times radius squared)
- Force = Area x Pressure

### Cam and Groove Nominal Take-Up Lengths



Thread Size	"A"	Thread Size	"A"
1/2"	0.97"	3"	1.78"
3/4"	0.97"	4"	1.84"
1"	1.20"	5"	2.00"
1 1/4"	1.44"	6"	2.13"
1 1/2"	1.50"	8"	2.06"
2"	1.81"	8"	3.22"
2 1/2"	1.82"		

Boss-Lock  
Andrews

## Bolt Tightening Sequence for Dixon Boss Clamps

### Note:

1. The correct size Boss clamp must be used.
2. Bolts in Boss clamps are designed to bend as they are tightened. This allows the clamp to conform to the hose outside diameter.
3. Always tighten bolts to their specified torque value.
4. Periodic re-tightening of bolts is required due to "cold flow" phenomenon present in all rubber hoses.
5. Boss Clamps are for single use only! Once removed they are to be discarded.

### 2 Bolt Dixon Boss Clamp Bolt Tightening Sequence

Using a torque wrench, begin tightening the bolts as follows:

- a) First bolt (nut facing assembler) 1 full turn
- b) Second bolt (opposite first bolt) 1 full turn
- c) Repeat procedure "a" and "b" until both bolts have reached the recommended torque
- d) Remove assembly from vice

---

### 4 Bolt Dixon Boss Clamp Bolt Tightening Sequence

Using a torque wrench, begin tightening the bolts as follows:

- a) Back bolt (bolt with nut facing assembler that is furthest away from gripping finger) 1 full turn
- b) Front bolt (bolt with nut facing assembler that is closest to gripping finger) 1 full turn
- c) Snug by hand (if bolts are loose) nuts on opposite side of bolts just torqued
- d) Opposite side back bolt (bolt with nut facing assembler furthest away from gripping finger) 1 full turn
- e) Opposite side front bolt (bolt with nut facing assembler closest to gripping finger) 1 full turn
- f) Snug by hand (if bolts are loose) nuts on opposite side of bolts just torqued
- g) Repeat above procedure "a" through "f" until all of the bolts have reached the recommended torque
- h) Remove assembly from vice

---

### 6 Bolt Dixon Boss Clamp Bolt Tightening Sequence

Using a torque wrench, begin tightening the bolts as follows:

- a) Back bolt (bolt with nut facing assembler that is furthest away from gripping finger) having "X" near it one full turn
  - b) Front bolt (bolt with nut facing assembler that is closest to gripping finger) of same segment one full turn
  - c) Moving to clamp segment to the left of the one just tightened, snug bolts by hand (if bolts are loose)
  - d) Back bolt to one full turn
  - e) Front bolt one full turn
  - f) Moving to clamp segment to the left of the one just tightened, snug bolts by hand (if bolts are loose)
  - g) Back bolt one full turn
  - h) Front bolt one full turn
  - i) Repeat above procedure "a" through "h" until all of the bolts have reached the recommended torque
  - j) Remove assembly from vice.
-

## CFM vs PSI for Nozzles

Gauge (psi)	CFM Free Air Flow @ Nozzle Diameter (Inch)							
	1/64	1/32	3/64	1/16	3/32	1/8	3/16	1/4
1	.03	.11	.2	.4	1.0	1.7	3.9	6.8
5	.06	.24	.5	1.0	2.2	3.9	8.7	15.4
10	.08	.34	.8	1.4	3.1	5.4	12.3	21.8
15	.10	.42	.9	1.6	3.7	6.6	15.0	26.7
20	.12	.48	1.1	1.9	4.2	7.7	17.1	30.8
25	.13	.54	1.2	2.2	4.7	8.6	19.4	34.5
30	.16	.63	1.4	2.5	5.6	10.0	22.5	40.0
40	.19	.77	1.7	3.1	6.8	12.3	27.5	49.1
50	.22	.91	2.0	3.6	8.2	14.5	32.8	58.2
60	.26	1.05	2.3	4.2	9.4	16.8	37.5	67.0
70	.29	1.19	2.7	4.8	10.7	19.0	43.0	76.0
80	.33	1.33	3.0	5.3	11.9	21.2	47.5	85.0
90	.36	1.47	3.3	5.9	13.1	23.5	52.5	94.0
100	.40	1.61	3.7	6.4	14.5	25.8	58.3	103.0
110	.43	1.76	3.9	7.0	15.7	28.0	63.0	112.0
120	.47	1.90	4.30	7.6	17.0	30.2	68.0	121.0
130	.50	2.04	4.6	8.1	18.2	32.4	73.0	130.0
140	.54	2.17	4.9	8.7	19.5	34.5	78.0	138.0
150	.57	2.33	5.2	9.2	20.7	36.7	83.0	147.0
175	.66	2.65	5.9	10.6	23.8	42.1	95.0	169.0
200	.76	3.07	6.9	12.2	27.5	48.7	110.0	195.0

PSI = pounds/square inch; CFM = cubic feet/minute

### Water Data and Formulas

1 gallon water = 231 cubic inches = 8.333 pounds

1 pound of water = 27.7 cubic inches

1 cubic foot water = 7.5 gallons = 62.5 pounds (salt water weighs approximately 64.3 pounds per cubic foot)

Pounds per square inch at bottom of a column of water = height of column in feet x .434

1 miner's inch = 9 to 12 gallons per minute

### Horsepower to Raise Water

If pumping liquid other than water, multiply the gallons per minute below by the liquids specific gravity

$$\text{Horsepower} = \frac{\text{gallons per minute} \times \text{total head in feet}}{3960}$$

### Gallons Per Minute through a Pipe

GPM = .0408 x pipe diameter inches<sup>2</sup> x feet/minute water velocity

### Weight of Water in a Pipe

Pounds water = pipe length feet x pipe diameter inches<sup>2</sup> x .34

Distance (inches)	Gallons per Minute Discharge for a Given Nominal Pipe Diameter (inches)				
	5	6	8	10	12
5	163	---	---	---	---
6	195	285	---	---	---
7	228	334	580	---	---
8	260	380	665	1060	---
9	293	430	750	1190	1660
10	326	476	830	1330	1850
11	360	525	915	1460	2020
12	390	570	1000	1600	2220
13	425	620	1080	1730	2400
14	456	670	1160	1860	2590
15	490	710	1250	2000	2780
16	520	760	1330	2120	2960
17	550	810	1410	2260	3140
18	590	860	1500	2390	3330
19	620	910	1580	2520	3500
20	650	950	1660	2660	3700
21	685	1000	1750	2800	3890
22	720	1050	1830	2920	4060
23	750	1100	1910	3060	4250
24	---	1140	2000	3200	4440

## Formulas

### Air Velocity in a Pipe

Using the equation and typical values of V, D and L explained to the right approximate values of P are computed as follows:

Velocity Ft/Sec	Pipe Diameter in Inches, 10' long				
	1	2	4	6	10
1	.0004	.0002	.0001	.00007	.00004
2	.0016	.0008	.0004	.00030	.00016
5	.0100	.0050	.0025	.00170	.0010
10	.0400	.0200	.0100	.00670	.0040
15	.0900	.0450	.0225	.01500	.0090
20	.1600	.0800	.0400	.02700	.0160
25	.2500	.1250	.0625	.04170	.0250
30	.3600	.1800	.0900	.06000	.0360

$$V = \sqrt{\frac{25,000 DP}{L}}$$

V = air velocity in feet per second

D = pipe inside diameter in inches

L = length of pipe in feet

P = pressure loss due to air friction in ounces/square inch  
**formula from B.F.Sturtevant Company**

### Theoretical Horsepower to Compress Air

HP = compressed horsepower

CFM = air volume in cubic feet per minute

PSI = air pressure in pounds per square inch  
 (assumes atmospheric pressure = 14.7 psi, temperature = 60°F)

$$HP = CFM \times PSI \times .0007575$$

### Air Volume Discharged from Pipe

CFM = air volume in cubic feet per minute

V = air velocity in feet per second as determined in the equation at the top of this page

$$CFM = 60VA$$

A = cross section area of pipe in square feet

### Boyle's Law

If temperature is kept constant, the volume of a given mass of gas is inversely proportional to the pressure which is exerted upon it.

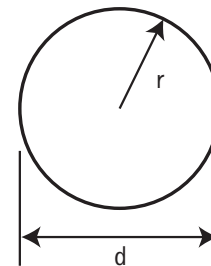
$$\frac{\text{Initial Pressure}}{\text{Final Pressure}} = \frac{\text{Final Volume}}{\text{Initial Volume}}$$

### Circumference of a Circle

If temperature is kept constant, the volume of a given mass of gas is inversely proportional to the pressure which is exerted upon it.

$$\text{Circumference} = 2 \pi r = \pi d = 3.14159 d$$

$$\text{Area} = \pi r^2 = \pi \frac{d^2}{4} = .78539d^2$$



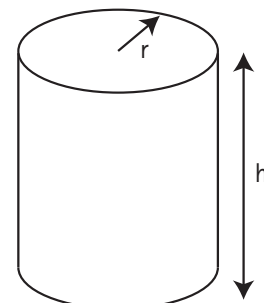
### Right Cylinder

r = radius  
 h = length

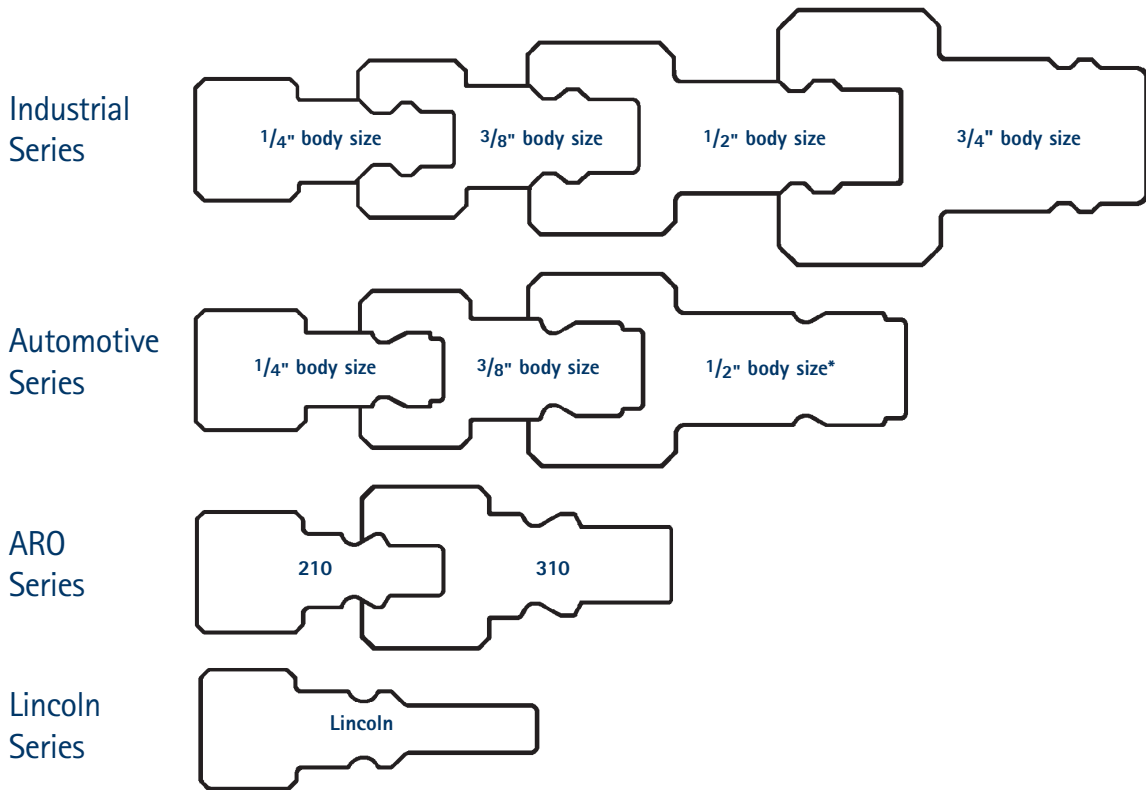
$$\text{Volume} = \pi r^2 h$$

$$\text{Surface Area} = 2 \pi r (r+h)$$

If end planes are parallel but not at 90° to h, the same formulas apply, but a slice at 90° through the cylinder must be used to determine r.



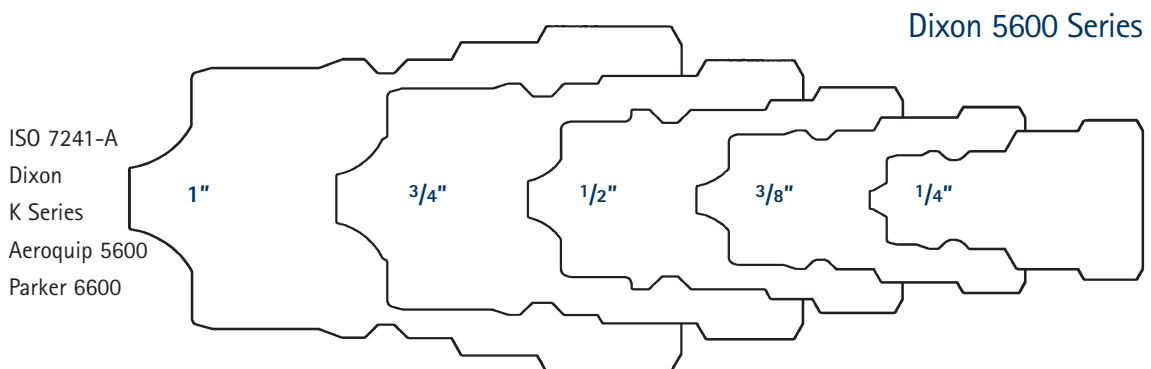
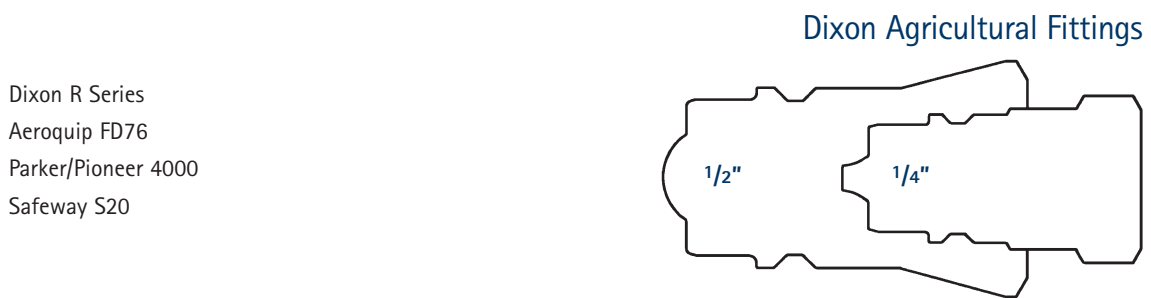
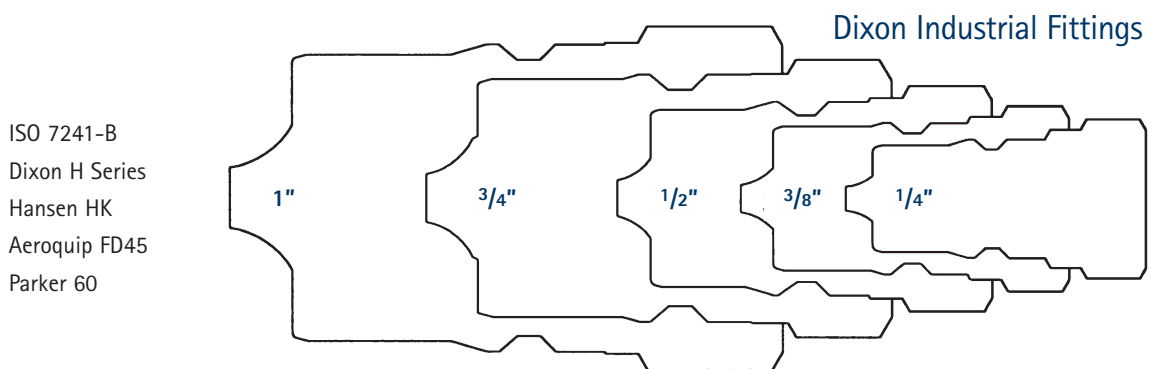
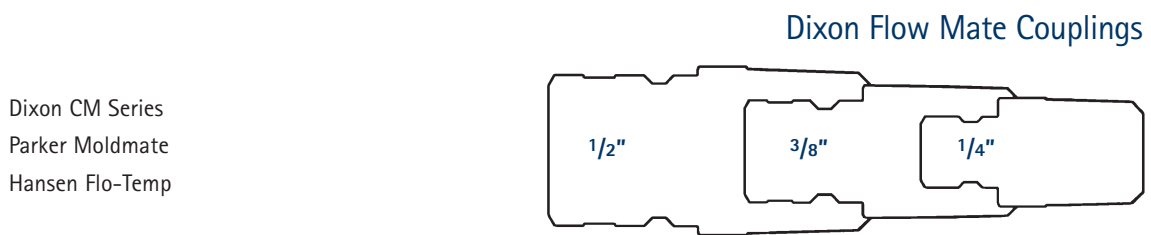
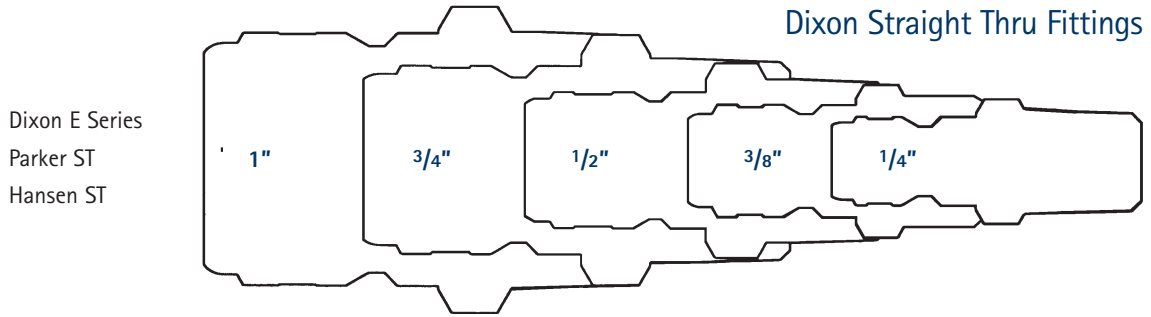
### Air Chief Actual Size Profile Chart



\*" Industrial Series may also interchange with "\*" Automotive Series.

## Hydraulic Plug Profile Chart

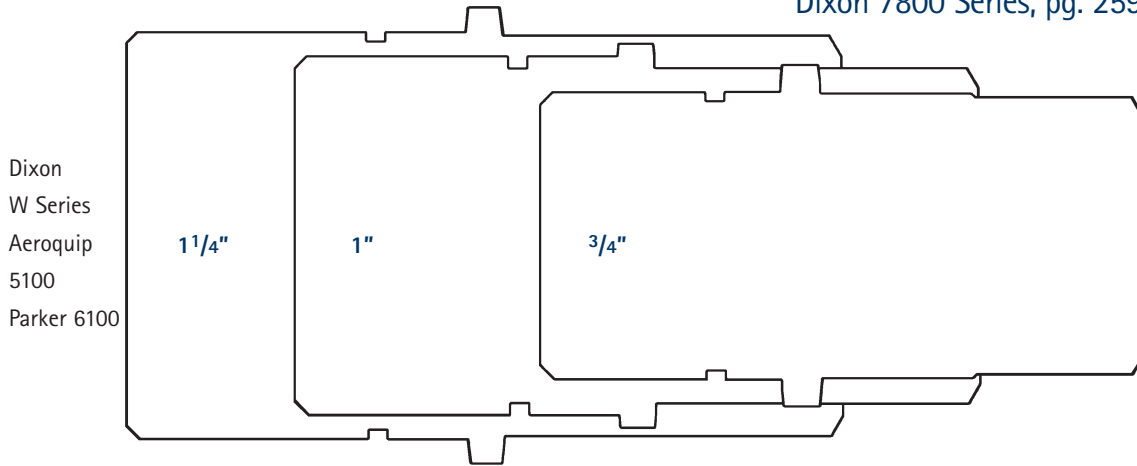
### INDUSTRY/COMPETITOR INTERCHANGE



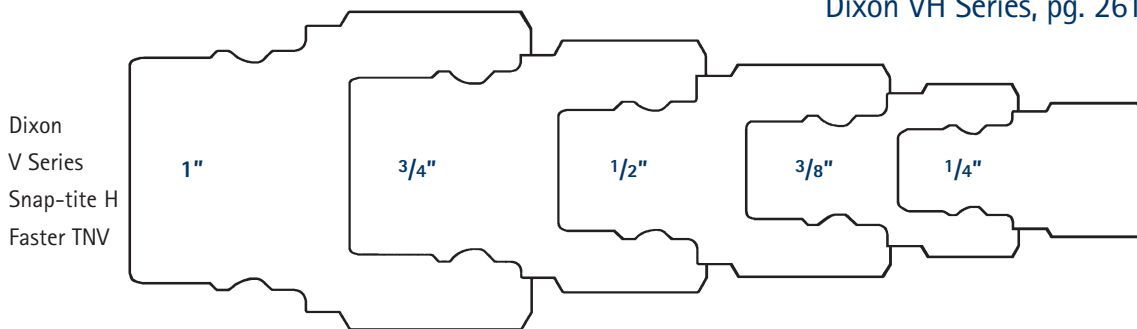
## Hydraulic Plug Profile Chart

### INDUSTRY/COMPETITOR INTERCHANGE

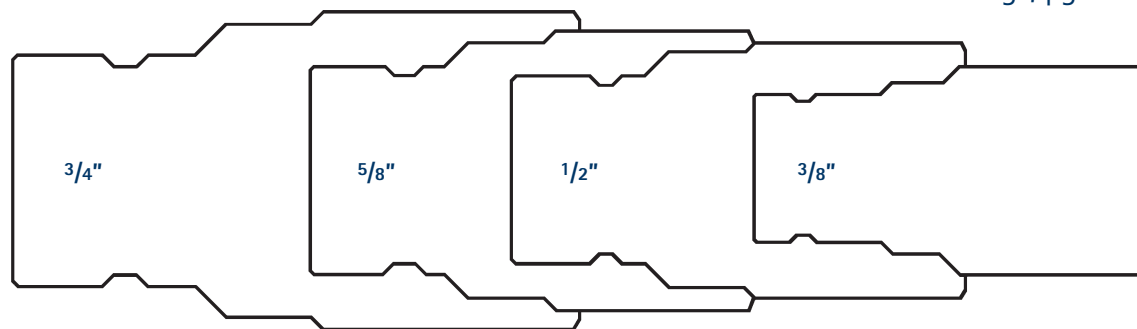
Dixon 7800 Series, pg. 259



Dixon VH Series, pg. 261

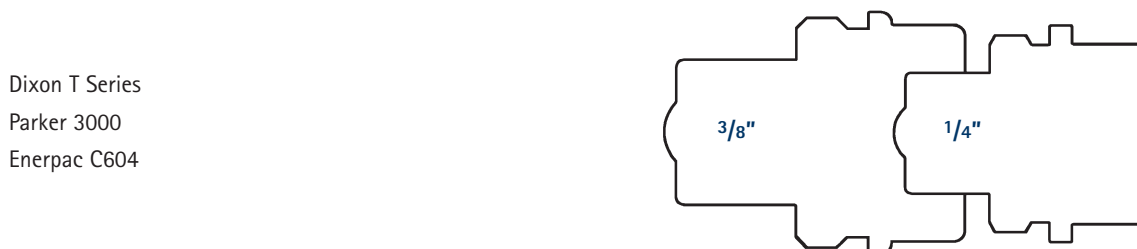


Dixon Flush Face Fittings, pg. 262



Dixon H Series Aeroquip FD49 HTMA Parker FF

Dixon 3000 Series, pg. 257



## Crimped Air King Recommendation Guide

The chart at the right is only a guide. It will not apply to every coupling situation. In some instances alternative dies and crimping dimensions must be employed to ensure safety. Experience has shown that variances in the construction of similar hoses and couplings may cause some assemblies to react differently when crimped. It is not uncommon to find hose with an outer diameter that fluctuates from one end to the other or from production lot to production lot. These inconsistencies coupled with the inherent differences between textile or wire braid, hard or soft wall, the presence or absence of an internal spiral wire and the differences in hose coverings make it difficult to establish hard and fast rules. Therefore, its imperative that hose dimensions are accurately measured, assemblies are tested, and documentation is maintained.

Hose Size	Part #	Fractional Hose O.D.	Swage Die Sizes	Die Part #	Crimp Diameter	% Reduction			
Size (I.D.): 1"	AM1WF	54/64	13/16 x 29/32	1 & 3/16 D4	0.906	18.3%			
		55/64	13/16 x 15/16	1 & 3/16 D5	0.937	13.2%			
		56/64							
		57/64	13/16 x 31/32	1 & 3/16 D3	0.968	12.1%			
		58/64							
		59/64	13/16 x 1	1 & 3/16 D	1.000	11.1%			
		60/64							
		61/64							
		62/64	13/16 x 11/32	1 & 3/16 D2	1.031	13.4%			
		63/64							
		1	13/16 x 11/16	1 & 3/16 D1	1.062	12.7%			
		11/64							
12/64	13/16 x 13/32	1 & 3/16 D6	1.093	12.0%					
14/64	11/2 x 15/32				1 & 1/2 D6	1.156	13.4%		
15/64				17.3%					
Size (I.D.): 3/4"	AM6WF and RAM6WF	16/64	11/2 x 13/16	1 & 1/2 D7	1.187	11.9%			
		17/64							
		18/64	11/2 x 17/32	1 & 1/2 D5	1.218	11.2%			
		19/64							
		110/64							
		111/64	11/2 x 11/4	1 & 1/2 D4	1.250	13.0%			
		112/64							
		113/64	11/2 x 19/32	1 & 1/2 D3	1.281	12.3%			
		114/64							
		115/64	11/2 x 15/16				1 & 1/2 D2	1.312	11.5%
		116/64							
		117/64							
		118/64	11/2 x 111/32	1 & 1/2 D	1.343	13.5%			
		119/64							
		120/64	11/2 x 13/8	1 & 1/2 D1	1.375	12.6%			
121/64									
122/64	11/2 x 113/32	1 & 1/2 D8	1.406	12.1%					
118/64	111/16 x 13/8				1 & 11/16 D4	1.375	16.7%		
119/64									
120/64	111/16 x 113/32	1 & 11/16 D5	1.406	15.0%					
121/64									
122/64	111/16 x 17/16	1 & 11/16 D8	1.437	13.7%					
123/64									
124/64	111/16 x 115/32				1 & 11/16 D6	1.468	12.8%		
125/64									
126/64	111/16 x 11/2	1 & 11/16 D	1.500	11.5%					
127/64									
128/64									
129/64	111/16 x 117/32				1 & 11/16 D2	1.531	13.9%		
130/64	17/8 x 117/32	1 & 7/8 D8	1.531	16.8%					
131/64	17/8 x 19/16				1 & 7/8 D5	1.562	12.8%		
132/64				15.4%					
133/64	17/8 x 119/32	1 & 7/8 D6	1.593	12.0%					
134/64							14.7%		
135/64	17/8 x 15/8	1 & 7/8 D7	1.625	11.1%					
136/64									
137/64									
138/64	17/8 x 121/32	1 & 7/8 D1	1.656	12.9%					
139/64									
140/64	17/8 x 111/16	1 & 7/8 D	1.687	12.4%					
141/64									
142/64	17/8 x 123/32	1 & 7/8 D2	1.718	11.8%					
143/64									
144/64	17/8 x 13/4	1 & 7/8 D4	1.750	11.3%					
145/64									
146/64									

# TECHNICAL & SAFETY INFORMATION

The charts below are only guides. They will not apply to every coupling situation. In some instances alternative dies and crimping dimensions must be employed to ensure safety. Experience has shown that variances in the construction of similar hoses and couplings may cause some assemblies to react differently when crimped. It is not uncommon to find hose with an outer diameter that fluctuates from one end to the other or from production lot to production lot. These inconsistencies coupled with the inherent differences between textile or wire braid, hard or soft wall, the presence or absence of an internal spiral wire and the differences in hose coverings make it difficult to establish hard and fast rules. Therefore, it's imperative that hose dimensions are accurately measured, assemblies are tested, and documentation is maintained.

## Crimped Dix-Lock and Dual-Lock Recommendation Guide

Part# QM3WF, QB3WF, QM22WF, QB22WF, QM33WF, QB33WF				
Hose I.D.	Measured Hose O.D.		Crimp Length	Dix-Lock Crimp O.D. + .005
	Fractional	Decimal		
1/2"	54/64"	0.844	1 1/8"	0.968
1/2"	55/64"	0.859	1 1/8"	0.968
1/2"	56/64"	0.875	1 1/8"	0.968
1/2"	57/64"	0.891	1 1/8"	1.000
1/2"	58/64"	0.906	1 1/8"	1.000
1/2"	59/64"	0.922	1 1/8"	1.031
1/2"	60/64"	0.938	1 1/8"	1.031
1/2"	61/64"	0.953	1 1/8"	1.062
1/2"	62/64"	0.969	1 1/8"	1.062
1/2"	63/64"	0.984	1 1/8"	1.062
1/2"	1"	1.000	1 1/8"	1.093
1/2"	1 1/64"	1.016	1 1/8"	1.093
1/2"	1 2/64"	1.031	1 1/8"	1.093

Part# QM4WF, QB4WF, QM23WF, QB23WF, QM44WF, QB44WF				
Hose I.D.	Measured Hose O.D.		Crimp Length	Dix-Lock Crimp O.D. + .005
	Fractional	Decimal		
3/4"	1 10/64"	1.156	1 1/4"	1.218
3/4"	1 11/64"	1.172	1 1/4"	1.218
3/4"	1 12/64"	1.188	1 1/4"	1.218
3/4"	1 13/64"	1.203	1 1/4"	1.250
3/4"	1 14/64"	1.219	1 1/4"	1.250
3/4"	1 15/64"	1.234	1 1/4"	1.281
3/4"	1 16/64"	1.250	1 1/4"	1.281
3/4"	1 17/64"	1.266	1 1/4"	1.281
3/4"	1 18/64"	1.281	1 1/4"	1.312
3/4"	1 19/64"	1.297	1 1/4"	1.312
3/4"	1 20/64"	1.313	1 1/4"	1.343
3/4"	1 21/64"	1.328	1 1/4"	1.343
3/4"	1 22/64"	1.344	1 1/4"	1.375

## Crimped 3500 Nipple Recommendation Guide

SMOD = 1/2"			
Hose O.D.	Die	Crimp Dia.	% Red
54/64"	1 1/16 x 29/32	.906	21.1
55/64"	1 1/16 x 29/32	.906	24.5
56/64"	1 1/16 x 15/16	.938	19.3
57/64"	1 1/16 x 15/16	.938	22.6
58/64"	1 1/8 x 31/32	.969	17.8

SMOD = 3/4"			
Hose O.D.	Die	Crimp Dia.	% Red
1 10/64"	13/8 x 13/16	1.188	24.1
1 11/64"	13/8 x 17/32	1.219	19.5
1 12/64"	13/8 x 17/32	1.219	22.4
1 13/64"	17/16 x 1 1/4	1.250	18.1
1 14/64"	17/16 x 1 1/4	1.250	20.9

SMOD = 1"			
Hose O.D.	Die	Crimp Dia.	% Red
1 30/64"	1 11/16 x 1 1/2	1.500	23
1 31/64"	1 11/16 x 1 17/32	1.531	19
1 32/64"	1 11/16 x 1 17/32	1.531	21.6
1 33/64"	1 11/16 x 1 9/16	1.563	17.9
1 34/64"	1 11/16 x 1 9/16	1.563	20.3

Dixon's couplings and retention devices are designed to work safely for their intended use. The selection of the proper hose, coupling, and retention devices; and the proper application of the coupling to the hose are of utmost importance. Users must consider the size, temperature, application, media, pressure, and hose and coupling manufacturer's recommendations when selecting the proper hose assembly components. Dixon recommends that all hose assemblies be tested in accordance with the Rubber Manufacturers Association's recommendations and be inspected regularly (before each use), to ensure that they are not damaged or have become loose.

Where safety devices are integral to the coupling, they must be working and utilised. The use of supplementary safety devices, such as safety clips and King Cable safety cables, are recommended. If any problem is detected, couplings must be removed from service immediately.

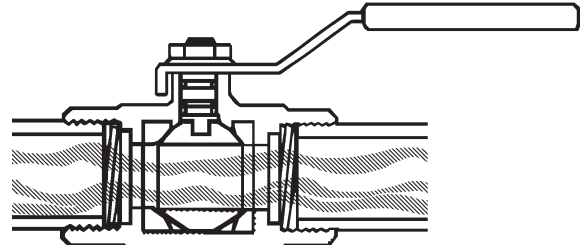
Dixon is always available for consultation concerning the couplings and accessories we sell. We will suggest the appropriate fittings, test those applications when necessary, and train distributors in assembly procedures. We strongly recommend that distributors and end users make use of these services.

## Valve Selection Guide

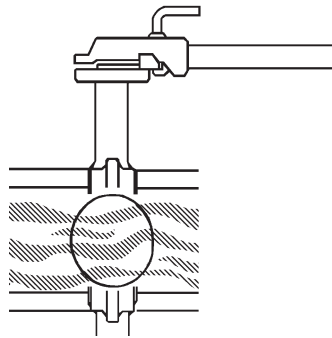
### Ball Valve



- Can be used for on and off service or throttling
- When positive shut-off is necessary
- Where a low valve profile is necessary
- Only 90° rotation from open to fully closed (quick opening)
- Handle position is a quick indication of whether valve is open or closed.
- Full port ball valves do not resist flow

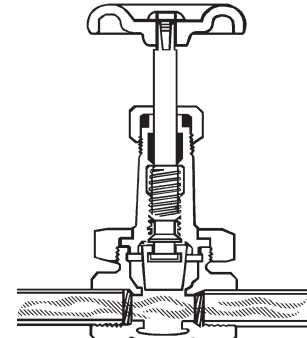


### Butterfly Valve



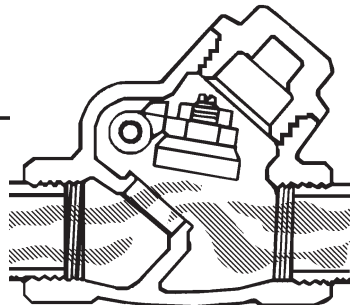
- Where positive shut-off is necessary
- Primarily for fully open or fully closed applications
- May be used for throttling
- Only 90° rotation from open to fully closed
- Lightweight
- Easy to install
- Less costly than an iron body gate valve

### Gate Valve



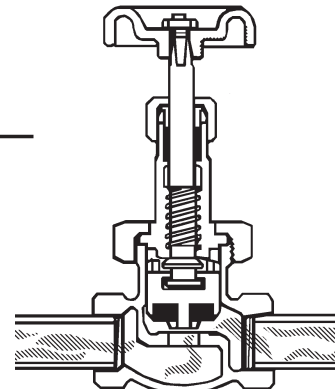
- For fully open or fully closed service - not for throttling
- For minimum line pressure drop
- For minimum fluid entrapment in the line
- For relatively infrequent operation

### Check Valve



- To control the direction of flow and for quick, automatic reactions to flow change. Swing check valves are used when a minimum resistance to flow is required.
- Swing check valves are recommended for use in conjunction with gate valves. They should not be used in a rapid recycling system such as reciprocating pumps or air compressor service where they could cause chatter and damaging vibration.

### Globe Valve



- For regulation (throttling) of flow
- For frequent operation; short stem travel reduces operator's time
- Where some line resistance is acceptable

## Regulations: OSHA & MSHA

### OSHA

#### Standards – 29 CFR, 1910.242 (partial):

- (b) Compressed air used for cleaning – Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

#### Standards – 29 CFR, 1915.131 (partial):

- (e) Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.

#### Standards – 29 CFR, 1926.302 (partial):

- (b)(1) Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- (b)(2) Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
- (b)(3) All pneumatically driven nailers, staplers and other similar equipment provided with automatic fastener feed, which operate at more than 100 psi pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
- (b)(4) Compressed air shall not be used for cleaning purposes except where reduced to 30 psi and then only with effective chip guarding and personal protective equipment which meets the requirements of Subpart E of this part. The 30 psi requirement does not apply for concrete form, mill scale and similar cleaning purposes.
- (b)(5) The manufacturer's safe operating pressure for hoses, pipes, valves, filters and other fittings shall not be exceeded.
- (b)(6) The use of hoses for hoisting or lowering tools shall not be permitted.
- (b)(7) All hoses exceeding 1/2" inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

#### Standards – 29 CFR, 1926.306

- (a) "General requirements"
- (a)(1) "Application." This section applies to compressed air receivers, and other equipment used in providing and utilising compressed air for performing operations such as cleaning, drilling, hoisting, and chipping. On the other hand, however, this section does not deal with the special problems created by using compressed air to convey materials nor the problems created when men work in compressed air as in tunnels and caissons. This section is not intended to apply to compressed air machinery and equipment used on transportation vehicles such as steam railroad cars, electric railway cars, and automotive equipment.
- (a)(2) "New and existing equipment."
- (a)(2)(i) All new air receivers installed after the effective date of these regulations shall be constructed in accordance with the 1968 edition of the A.S.M.E. Boiler and Pressure Vessel Code Section VIII.
- (a)(2)(ii) All safety valves used shall be constructed, installed and maintained in accordance with the A.S.M.E. Boiler and Pressure Vessel Code, Section VIII Edition 1968.
- (b) 1926.306(b) "Installation and equipment requirements"
- (b)(1) "Installation." Air receivers shall be so installed that all drains, handholes, and manholes therein are easily accessible. Under no circumstances shall an air receiver be buried underground or located in an inaccessible place.
- (b)(2) "Drains and traps." A drain pipe and valve shall be installed at the lowest point of every air receiver to provide for the removal of accumulated oil and water. Adequate automatic traps may be installed in addition to drain valves. The drain valve on the air receiver shall be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of excessive amounts of liquid in the receiver.
- (b)(3) "Gages and valves."
- (b)(3)(i) Every air receiver shall be equipped with an indicating pressure gage (so located as to be readily visible) and with one or more spring-loaded safety valves. The total relieving capacity of such safety valves shall be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent.
- (b)(3)(ii) No valve of any type shall be placed between the air receiver and its safety valve or valves.

#### Standards – 29 CFR, 1926.603 (partial):

- (a)(9) Steam hose leading to a steam hammer or jet pipe shall be securely attached to the hammer with an adequate length of at least 1/4-inch diameter chain or cable to prevent whipping in the event the joint at the hammer is broken. Air hammer hoses shall be provided with the same protection as required for steam lines.
- (a)(10) Safety chains, or equivalent means, shall be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected.

## MSHA (Mine Safety and Health Administration)

### 30 CFR Sections 56.13021 and 57.13021

Except where automatic shut-off valves are used, safety chains or other suitable locking devices shall be used at connections to machines of high-pressure hose line of 3/4" inside diameter or larger, and between high-pressure hose lines of 3/4" inside diameter or larger, where a connection failure would create a hazard.

### 30 CFR Section 75.1730

(e) Safety chains, suitable locking devices, or automatic cut-off valves shall be used at connections to machines of high-pressure hose lines of 3/4 of an inch inside diameter or larger, and between high-pressure hose lines of 3/4 of an inch inside diameter or larger, where a connection failure would create a hazard. For purposes of this paragraph, high-pressure means pressure of 100 psi or more.

### 30 CFR Section 77.412

(d) Safety chains or suitable locking devices shall be used at connections to machines of high-pressure hose line of 1-inch inside diameter or larger, and between high-pressure hose line of 1-inch inside diameter or larger, where a connection failure would create a hazard.

## Glossary of Terms

### A

<b>ANSI</b>	American National Standards Institute, Inc.
<b>API</b>	American Petroleum Institute
<b>ASME</b>	American Society of Mechanical Engineers
<b>ASTM</b>	American Society for Testing and Materials
<b>Anodize</b>	A process for aluminum, similar to zinc or chrome plating steel, in which an aluminum part is electrically charged then, dipped in various chemicals to produce various colours and/or surface hardness.

### B

<b>Burst Pressure</b>	The pressure at which rupture occurs.
-----------------------	---------------------------------------

### C

<b>Chamfer</b>	To cut an angle on the hose tube aid in stem insertion and to prevent the hose end from flaring when a stem is inserted.
<b>Clamp</b>	A metal fitting, band or wire used around the outside of a hose end to secure a coupling, fitting or nipple.
<b>Cold Flow</b>	Continued deformation or movement of rubber under stress.
<b>Compression Set</b>	The deformation that remains in rubber after it has been subjected to and released from stress such as a clamp. The longer the stress is maintained the more definitive the deformation.
<b>Coupling</b>	A device at the end or ends of a length of hose that allows a connection to be made.
<b>Crimping</b>	The act of forming the metal sleeve or ferrule of a hose fitting with a surrounding series of die segments to compress the hose within the fitting. The crimping process changes the shape of the entire circumference and length simultaneously. Often interchanged with the term "swaged".

### D

<b>Durometer</b>	An instrument for measuring the hardness of rubber.
<b>Durometer Hardness</b>	A numerical value which indicates the resistance to indentation of the blunt indenter of the durometer.

### E

<b>Elastomer</b>	Any of various elastic substances resembling rubber.
<b>Expansion Ring</b>	Typically refers to a type of fire hose couplings that are attached by expanding a sleeve (usually brass) outward to compress the hose against the wall of the bowl of the coupling.
<b>External Swage (Swaging)</b>	A ferrule is passed through a reducing die, usually split, to bring the ferrule O.D. down to a predetermined size (for proper coupling retention) forcing the hose tube down into the stem serrations.

### F

<b>Ferrule</b>	A collar placed over a hose end to attach the fitting to the hose. The ferrule may be crimped or swaged, forcing the hose against the shank of the coupling, or the shank may be expanded, forcing the hose out against the ferrule, or both.
----------------	---

<b>G</b>		
<b>Gripping Finger</b>		The part of the clamp that goes over and behind the stem collar to aid in clamp retention.
<b>H</b>		
<b>Hard Coat</b>		An anodising process in which the surface hardness of aluminum becomes similar to or greater than that of case hardened steel.
<b>I</b>		
<b>Internal Expansion (IX)</b>		A plug (or bullet) is pulled through a stem or a set of blades (fingers) increase the stem I.D. to the plug O.D. or a predetermined setting when using expansion blades (fingers). This forces the stem serrations into the hose tube and the hose cover into the serrations of the ferrule.
<b>J</b>		
<b>JIC</b>		Joint Industrial Committee
<b>JIC Thread</b>		Typically refers to the threads on hydraulic fittings having 37° conical sealing surfaces.
<b>M</b>		
<b>MSHA</b>		Mine Safety and Health Administration
<b>N</b>		
<b>Nipple</b>		The section of the fitting that is inserted into the hose. Also known as the shank of a coupling.
<b>Nominal</b>		A dimensional value assigned for the purpose of convenient designation.
<b>O</b>		
<b>Operating Pressure</b>		The pressure at which system functions. Also known as Working Pressure.
<b>P</b>		
<b>PSI</b>		Pounds per square inch
<b>PSIG</b>		Pounds per square inch gauge
<b>Permanent Fitting</b>		The type of fitting which, after it is applied, cannot be removed for reuse.
<b>Polymer</b>		A macromolecular material formed by the chemical combination of monomers having the same or different chemical composition.
<b>Proof Pressure</b>		A specified pressure which exceeds the hose assemblies rated working pressure to indicate its reliability at normal working pressure. Follow R.M.A.'s testing guidelines for specific pressures and duration's for various types of hose.
<b>PTFE</b>		Versatile polymer, polytetrafluoroethylene, commonly known as the DuPont brand name Teflon®
<b>R</b>		
<b>RMA</b>		Rubber Manufacturers Association
<b>Reusable Fitting</b>		The type of fitting that is designed to be removed from a hose and recoupled on another hose.
<b>S</b>		
<b>SAE</b>		Society of Automotive Engineers
<b>SAE Threads</b>		Similar to J.I.C. except 45° conical sealing surfaces.

**S**

---

<b>SCFM</b>	Standard Cubic Feet per Minute. Typically refers to the amount of compressed air a compressor can produce.
<b>Safety Factor</b>	A ratio used to establish the working pressure of a hose based upon the burst pressure. Typical Safety Factors are as follows: <ol style="list-style-type: none"><li>1. Water hose up to 150 psi WP: 3 to 1.</li><li>2. Hose for all other liquids, solid materials suspended in liquids or air and water hose over 150 psi WP: 4 to 1.</li><li>3. Hose for compressed air and other gases: 4 to 1.</li><li>4. Hose for liquid media that immediately changes into gas under standard atmospheric conditions: 5 to 1.</li><li>5. Steam hose: 10 to 1.</li></ol>
<b>Serration</b>	The part of the shank (stem) that grips the hose tube.
<b>Shank</b>	The section of the fitting or coupling that is inserted into the hose.
<b>Sintered</b>	Process in which powdered metal is formed in a mould under extreme pressure to form a finished part.
<b>Surge</b>	A rapid rise and decrease of internal pressure.

**T**

---

<b>Torque</b>	Amount of force required to turn an object. Usually measured in inch pounds (in. lbs.) or foot pounds (ft. lbs.)
<b>Tube</b>	The innermost part of the hose that's purpose is to contain the media being transported. Usually, rubber compounds or plastics are blended to give the tube specific properties so that it is compatible with certain media.

**U**

---

<b>UHMW</b>	Ultra High Molecular Weight. Next generation of chemical hoses after cross-linked polyethylene having a thin tube liner made from extremely dense material giving it excellent chemical resistance properties.
-------------	--

**V**

---

<b>Victaulic Groove</b>	A style of couplings that has a groove cut near the end of the stem where threads would typically be. The couplings are attached using a "C" shaped clamp that fits into the grooves on the stem.
-------------------------	---

**W**

---

<b>WOG</b>	Water, Oil, Gas. Pressure rating for valves handling these products. This does not include steam.
<b>WP</b>	Working Pressure
<b>Working Pressure</b>	The maximum pressure to which a hose assembly will be subjected to including pressure surges.

**X**

---

<b>XLPE</b>	Cross-Linked Polyethylene. Tube material that has good chemical resistance properties.
-------------	--

## Limited Warranty

Dixon Group Europe Ltd (herein called "Dixon") warrants the products described herein, and manufactured by Dixon to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Dixon under normal use and service. Its sole obligation under this warranty being limited to repairing or replacing, as hereinafter provided, at its option any product found to Dixon's satisfaction to be defective upon examination by it, provided that such product shall be returned for inspection to Dixon's factory within three (3) months after discovery of the defect. The repair or replacement of defective products will be made without charge for parts or labour. This warranty shall not apply to: (a) parts or products not manufactured by Dixon, the warranty of such items being limited to the actual warranty extended to Dixon by its supplier; (b) any product that has been subject to abuse, negligence, accident, or misapplication; (c) any product altered or repaired by others than Dixon; and (d) to normal maintenance services and the replacement of service items (such as washers, gaskets and lubricants) made in connection with such services. To the extent permitted by United Kingdom law, this limited warranty shall extend only to the buyer and any other person reasonably expected to use or consume the goods who is injured in person by any breach of the warranty. No action may be brought against Dixon for an alleged breach of warranty unless such action is instituted within one (1) year from the date the cause of action accrues. This limited warranty shall be construed and enforced to the fullest extent allowable by applicable United Kingdom law.

**OTHER THAN THE OBLIGATION OF DIXON SET FORTH HEREIN, DIXON DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY OTHER OBLIGATION OR LIABILITY. THE FOREGOING CONSTITUTES DIXON'S SOLE OBLIGATION WITH RESPECT TO DAMAGES, WHETHER DIRECT, INCIDENTAL OR CONSEQUENTIAL, RESULTING FROM THE USE OR PERFORMANCE OF THE PRODUCT.**

Some products and sizes may be discontinued when stock is depleted, or may require a minimum quantity for ordering.

NOTE: Reasonable care has been taken in preparing this Catalogue, however, errors may exist and information should be used as a guide only. Dixon Group Europe Ltd reserves the right to make corrections and price changes at any time.

Dixon Group Europe Ltd is committed to a policy of continuous development, and as such, the above detailed specification and may be subject to change without notice. Dixon Group Europe Ltd reserves the right to change and modify designs and specification without notice.