Dormont: The World's Most Trusted Name in Gas Hoses

Superior Construction

comes as STANDARD. Dormont standard hoses are specifically designed and engineered for the commercial food service environment and application.

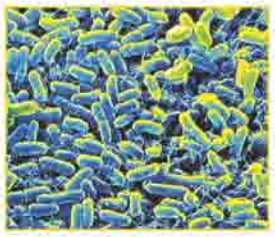
Using patented technology and materials proprietary to Dormont,

STANDARD Dormont hoses

are trusted worldwide for their proven performance, superior quality and exclusive design features. Exclusive manufacturing processes afford you the safest, longest lasting gas hose with unique design features like the 'No-Neck' design, antimicrobial PVC coating, annealing and helical corrugation. On the whole, you have the most flexible and superior constructed hose, explaining why Dormont has become the leading gas hose brand worldwide! **Model number: NPVF**

NEW & Unique

New and unique Antimicrobial Coating, exclusive to Dormont hoses, improves hygiene and safety since materials resist contamination and inhibit the growth of mildew, mould and odour-causing bacteria on the hose.



"Increasingly, plumbers, builders and architects are being asked to help prevent the spread of germs through good design...(and) using products infused with bacteria-resistant materials can help resist bacterial growth in warm, humid conditions found in bathing, showering and catering environments."
(Courtesy of HVP magazine, March 2003)

Dipped **PVC** coating provides a **permanent, wrinkle-free, heat and crack-resistant smooth surface** preventing places where dirt and debris can lodge facilitating cleaning and **better hygiene.** PVC coating also increases service life and will not hold a flame in the event of a fire.


Dormont smooth surface


Others wrinkled surface

Each fully annealed **304 stainless steel** hose has an exclusive **helical** corrugation design (one continuous spiral corrugation) to increase strength and flexibility.

Only Dormont uses an **annealing process** to increase the strength, ductility and corrosion resistance of the stainless steel after corrugation.

Flared mechanical end fittings provide longer-lasting service life at critical twisting points versus welded fittings.

Suitable for all 3 gas types: Town Gas, Natural Gas and Liquid Petroleum Gas (LPG).

Unique to Dormont, a **Thermal Shut-Off fusible link** feature inside the fitting shuts the gas off when temperatures in the kitchen exceed 170°C (350°F), in the event of a fire.

Exclusive push-to-connect, quick-disconnect coupling unit for easy, one-handed operation with a unique **flat face** to prevent the ingress of debris and liquids.

360° axial rotation.

BSI/Kitemarked and worldwide accreditation.

Straight restraining cable.

Demand the Difference

MECHLINE
Bright ideas for professional kitchens

Safety System™

Combine the Dormont braided hose and exclusive safety fittings – Safety Quik, SwivelMAX and coiled restrainer to build the Dormont Safety System Plus. It's a complete system of products engineered to make safe and proper gas equipment installations.

What is the Dormont Safety System?

It's when you combine Dormont's braided hose, 2 SwivelMax, 1 Safety Quik and 1 coiled restrainer—making for one of the safest gas installations available.

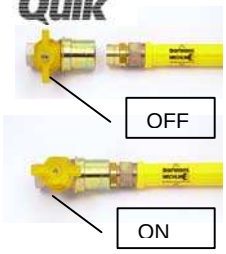
Pictured: *complete hose assembly with 2 SwivelMax, 1 Safety Quik, 1 coiled restrainer and close up of braiding on hose.*

Upgrading to Dormont's braided hose increases reliability with every installation. Braided hoses resist the wear & tear that can stretch other hoses and cause the hose to deteriorate over time. Use braided hoses to create the Dormont Safety System & enjoy a lifetime warranty* on the hose for the life of the original appliance to which it is connected.

**Braided hoses are guaranteed for the life of the original appliance to which they are connected. For more details on conditions of warranty, contact Mechline.*

Safety Quik (formerly Cimfast) – Name: CF
Model Numbers: CF 50, CF 75, CF100

Safety Quik™



With Safety Quik, the hose can only be disconnected when the valve is turned to the OFF position. Still providing simple, one-handed disconnect functionality, be confident that the gas hose cannot be disconnected until the gas flow is shut off. Likewise, the valve cannot be opened until the gas hose is correctly re-attached. Can be used with unbraided or braided hoses.

SwivelMax (formerly Super Swivel) – Name: S
Model Numbers: S50, S75, S100, S125

SwivelMAX™

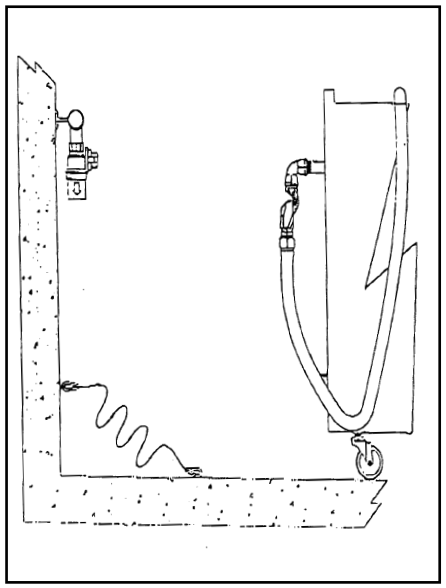
SwivelMAX provides unique multi-plane rotational movement to increase aisle space in the kitchen; decrease stress on the hose and thereby increase the service life of the hose. Maximise performance, mobility, space and safety.

Coiled Restrainer – Name: RC
Model Numbers: RC36, RC48, RC60

Add the Coiled Restrainer to maximise space and safety so equipment can move closer to the wall without impeding foot traffic or equipment's mobility.

Recommended Operating Instructions: Cleaning Behind Equipment

I. Disconnecting the gas hose:



1. Turn the control knobs of the appliance to the "off" position.
2. Carefully pull the appliance away from the wall, stopping when the restraining device cable is taut.
3. Turn off the gas supply at the local gas isolation valve. Turn off the electrical supply, and unplug any electrical leads.
4. Pull back the sleeve on the female half of the quick-disconnect coupling, and withdraw the nipple which is connected to the gas hose. Do not allow the gas hose to drop onto the floor, which may damage the hose. Protect both halves of the quick-disconnect coupling.
5. Unclip the restraining device at one end.
6. Carefully move the appliance away from the wall.
7. Carry out the cleaning process, making sure no cleaning solution or foreign substance comes into contact with either half of the quick-disconnect coupling or the gas hose.

II. Reconnecting the gas hose:

1. Ensure that the appliance control knobs and the local gas isolation valve are turned off.
2. Reconnect the two halves of the quick-disconnect coupling by pushing the nipple into the female half.
3. Reattach the restraining device.
4. Reconnect any electrical supply cables.
5. Turn the local gas isolation valve to the "on" position.
6. Carefully push the appliance back into position, ensuring that the gas hose is not twisted or kinked.
7. Make sure that the gas hose does not fall under the appliance casters.

Dormont Engineering Support

The Dormont technical department is available to advise on all aspects of gas hose sizing, installation, and Standards. Call 01908 261511.

Dormont MANUFACTURING COMPANY
6015 Enterprise Drive • Export, PA 15632 USA
(724) 733-4800 • FAX (724) 733-4808
1-800-DORMONT (367-6668)

MECHLINE Developments Ltd.
Unit 18 Potters Lane
Kiln Farm, Milton Keynes • MK11 3HF
Tel: 01908 261511 • Fax: 01908 261522

DM441A, Rev. 6, 05/04

Dormont Flexible Gas Hose Installation and Operating Instructions

To be left with the operator after installation

ISO 9001 REGISTERED
BSI REGISTERED
KM39643

Dormont Flexible Gas Hose Installation and Operating Instructions

WARNING

Please read the following instruction booklet carefully. Failure to fully comply with the enclosed instructions could result in severe injury or death.

WARNING

1. The installation **MUST BE** in compliance with BS 6173-Installation of gas-fired catering appliances for use in all types of catering establishments (1st, 2nd and 3rd family gases).
2. Installation and testing **MUST BE** carried out by a CORGI approved installation engineer.
3. Cleaning solutions and chemicals must not come into contact with any part of the gas hose. This includes acids, solvents, fluxes, chlorinated chemicals etc. In the event of contact with the gas hose, rinse immediately with clean water and dry thoroughly.
4. Contact with sharp objects, wiring etc. and surfaces at temperatures in excess of 105 degrees celsius shall be avoided.
5. Bending and flexing of hoses should be limited to movement required to carefully push and pull appliance into and out of position for cleaning and maintenance.
6. Gas hoses are for use with 1st, 2nd, and 3rd family gas operating at a pressure not in excess of 50mbar.
7. End fittings are bonded into the ends of the gas hose, and no attempt should be made to remove them.
8. Once fitted, gas hoses must not be reused on another appliance or at another location.
9. **WARNING: THE HOSE ASSEMBLY MUST BE FITTED SO THAT GAS ENTERS THE FEMALE HALF OF THE QUICK-DISCONNECT COUPLING AND EXITS THE MALE (NIPPLE) HALF. DIRECTION ARROWS ARE PERMANENTLY MARKED ON THE QUICK-DISCONNECT COUPLING.**
10. Never insert screwdrivers, probes etc. into the quick-disconnect coupling. This will damage the valve assembly.
11. Never allow the gas hose to be kinked, twisted, torqued or pinched when installed.
12. Ensure that only the restraining device supplied with the Dormont hose is fitted. The restraining device must be fitted at all times when the appliance is in use, and should be inspected as part of the regular maintenance and safety procedures.
13. Use only one gas hose per appliance.
14. For installations where greater mobility is required, Dormont SwivelMAX™ gas hose assemblies are recommended.
15. Quick-disconnect coupling must be disconnected prior to maximum movement of appliance to avoid over extending the gas hose. Whenever the appliance is moved for cleaning or maintenance, the instructions contained within this booklet must be followed.

Design Certifications

UK

Certified to BS 669-2:1997
Kitemark License # KM39643

BSI **CORGI** Technical Bulletin 54

USA

Canadian Standards Association

ANSI Z21.24 —	Connectors For Gas Appliances
ANSI Z21.69 —	Connectors For Moveable Gas Appliances.
ANSI Z223.1–	National Fuel Gas Code Fire Prevention Association – N.F.P.A. #54
ANSI Z21.15–	Manually Operated Gas Valve For Appliances, Appliance Connector Valves And Hose End Valves.
ANSI Z21-75 —	Connectors For Outdoor Gas Appliances and Manufactured Homes.
ANSI Z21.90 —	Gas Convenience Outlets and Optional Enclosures.
ANSI Z21.41 —	Quick Disconnect Devices For Use With Gas Fuel.

UL Design certified to ANSI/U.L. 567, Pipe Connectors For Flammable And Combustible Liquids And LP-Gas. For Use With Natural Gas And Propane.

NSF "Component" National Sanitation Foundation Criteria C-2.

City of New York — MEA #376-92-M and 379-92-M.

Approved by the Commonwealth of Massachusetts Board of State Examiners of Plumbers and Gas Fitters.

CANADA

Canadian Standards Association

C.G.A. 6.10 —	Connectors For Gas Appliances.
CSA - 6.16	Connector For Moveable Gas Appliances.
CAN/C.G.A - 6.9	Quick-Disconnect Devices For Use With Gas Fuel.
CAN/C.G.A. B149.1 —	Natural Gas and Propane Installation Code.

BELGIUM

Association Royale Des Gaziers Belges Societe Technique De L'Industrie Du Gaz En Belgique A.S.B.L.
Test Reports LDG/95/2166-2170
December 1995

AUSTRALIA STANDARDS AUSTRALIA

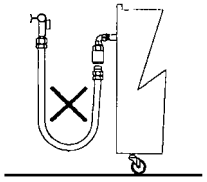
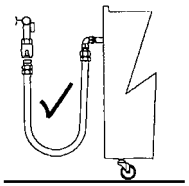
AS 1869-1991
Hose and hose assemblies for liquefied petroleum gases (LPG), natural gas and town gas.

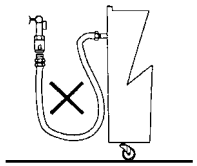
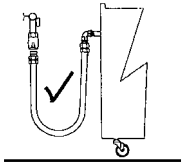
Type 2
AS1869/B-WP7kPa
1650-12.5 mm
1675-19 mm
16100-25 mm
16125-31 mm

ISO 9001 REGISTERED

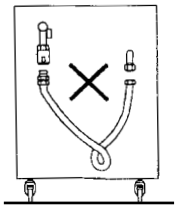
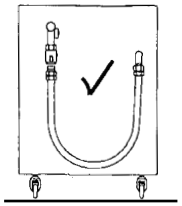
BSI REGISTERED
KM39643

Installation Correct/Incorrect Examples

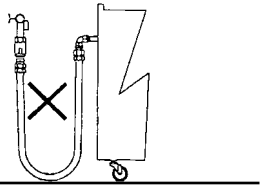
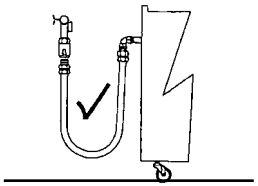
INCORRECT	CORRECT
	
Q.D. AT APPLIANCE END	*Q.D. AT SUPPLY END*

INCORRECT	CORRECT
	

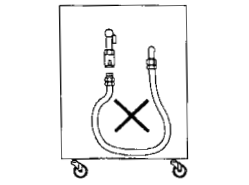
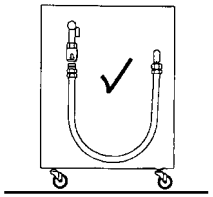
AVOID SHARP BENDS–THE CORRECT WAY TO INSTALL METAL HOSE FOR VERTICAL TRAVERSE IS WITH A SINGLE NATURAL LOOP. AVOID SHARP BENDS THAT STRAIN AND TWIST THE METAL HOSE

INCORRECT	CORRECT
	

AVOID TWISTING THE HOSE

INCORRECT	CORRECT
	

DO NOT ALLOW THE HOSE TO DRAG ON THE FLOOR DURING USE

INCORRECT	CORRECT
	

AVOID FATIGUE, MAINTAIN A CONSTANT LOOP/DIAMETER

Restraining Device Installation Instructions

The restraining device must always be connected when the appliance is in service. **Installation of the restraining device must be in accordance with BS 6173.**

Refer to figure 3.

1. The restraining device must be installed parallel, and in line with the gas hose.
2. Attach the staple bracket (A) securely to the wall using the plastic wall plugs (B), and screws (C) supplied, or an appropriate alternative.
3. Locate a sufficiently strong part of the rear appliance frame. Carefully drill a 5mm diameter hole taking care not to damage internal appliance components.
4. Thread hex nut (D) and washer (E) onto the eye bolt (F). Slide the eye bolt through the 5mm drilled hole and place other washer (E) and nylon lock nut (G) onto the eye bolt on the inside of the appliance panel frame. Tighten securely.
5. Attach one of the restraining device snap hooks (H) to the staple bracket (A) on the wall, and the other to the eye bolt (F).

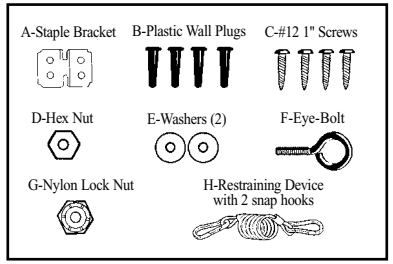
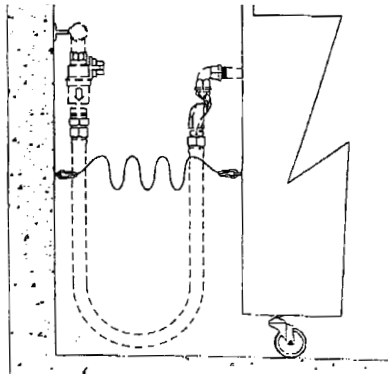


Figure 3



Note: The restraining devices are designed to be shorter than the length of the gas hose, and can withstand a minimum tensile load of 500kg. The restraining device must be fitted to prevent damage to gas hose assembly, and must not be attached to gas supply pipes, to the gas hose assembly, or to any point which is insufficiently anchored.

BTU Capacities

Flow rating BTU @ 0.55 sp. gr. natural gas, 0.58 mbar pressure drop, 37.96 MJ/m3

Length (mm)	1000 mm	1250 mm	1500 mm
Hose I.D. inches			
1/2"	66,000	59,000	56,000
3/4"	152,000	142,000	136,000
1"	246,000	236,000	214,000
1 1/4"	490,000	455,000	430,000

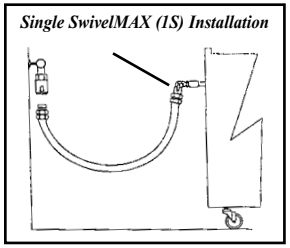
The BTU capacities given here were determined under the test conditions specified in BS669 part 2 1997. The BTU capacities given here are for braided and unbraided gas hoses fitted with standard quick-disconnect fittings or Safety Quik™. For sizes/lengths other than those given, or for hoses fitted with SwivelMAX™ fittings, or without quick-disconnect couplings, contact Mechline for advice.

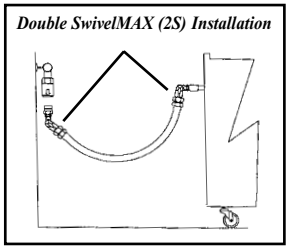
Other Gas Hose Installation Products Available From Dormont

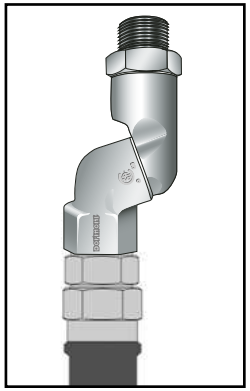
SwivelMAX™ Maximum Movement Swivel

Design-certified for use with Dormont gas hoses only, the SwivelMAX™ is supplied fitted as part of the Dormont gas hose assembly when ordered with an "S" suffix. "2 S" suffix denotes double swivel assembly.

Installation of SwivelMAX™ Dormont gas hose assemblies should be carried out in the same method as detailed in this booklet.







Note: SwivelMAX does not currently fall within the scope of the Kitemark license.

Safety Quik™ Quick-Disconnect Protection Valve

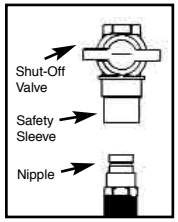
The Safety Quik™ is designed as a combined quick-disconnect coupling/shut off valve, and can be used in place of the female half of the standard quick-disconnect coupling. Installation should be carried out in the same method as detailed in this booklet.

How to use:

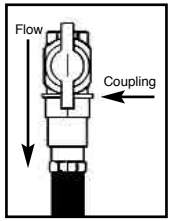
To disconnect

1. Turn the blue isolation handle to the 'off' position - horizontal to the gas hose.
2. Push the outer safety sleeve up toward the blue handle. This will cause the nipple/gas hose assembly to disconnect.

Note: The nipple/gas hose cannot be disconnected until the valve is in the 'off' position.



Off position

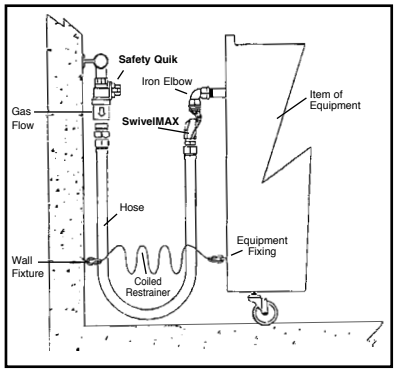


On position

To reconnect:

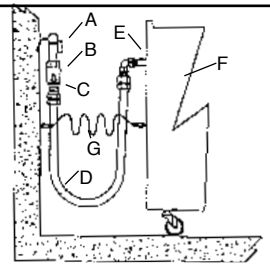
1. Firmly push the quick-disconnect nipple/gas hose assembly into the Safety Quik™ body. This will allow the outer safety sleeve to return to the original position.
2. Turn the blue isolation handle to the 'on' position - in line with gas hose.

Note: The valve cannot be turned to the on position until the nipple/gas hose is fully attached.



Installation Instructions (refer to figure 1. below)

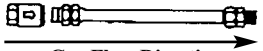
1. Before commencing with the installation, carefully read all sections of this instruction booklet, including the WARNING section and the installation correct/incorrect section. Installation work should only be carried out in accordance with BS 6173 by a CORGI registered engineer.
2. The accessible manually operated shut-off valve shall be installed in accordance with BS 6173: 1990. This gas isolation valve (A) must be in the 'off' position. If there is no local gas isolation valve fitted, the main gas isolation valve must be turned off. Do not commence with installation unless the gas supply is fully isolated.
3. Remove the Dormont gas hose and fittings from the bag/box.
4. The location of the gas connection point on site in relation to the gas connection point on the appliance can vary greatly. It is not possible to illustrate every possible installation combination, and these instructions illustrate a few examples. The installation engineer must take great care to ensure that the gas hose is not kinked, twisted or taut when installed, and that the end fittings of the gas hose are not subjected to sharp bends. The installation shall be such as to avoid excessive flexing, bending or vibration in service. Please refer to section of this manual for correct and incorrect installations. For installation situations where sharp bends are a possibility, or are unavoidable, Dormont SwivelMAX™ fittings are recommended.
5. It is recommended that the connection point for the hose at the installation end is fixed at 600mm – 770mm AFFL and is facing downward. This is dependent upon the length of hose to be used and the gas connection position on the appliance. The gas outlet, to which the hose is to be connected, shall be located in the same room as the appliance. The gas hose assembly must not be concealed within, or run through any wall, floor, or partition. The gas hose must not come into contact with the floor during use.



Side View

Figure 1

A. Local gas isolation valve
B. Female half of quick-disconnect coupling
C. Male (nipple) half of quick-disconnect coupling
D. Dormont gas hose
E. Connection point into appliance
F. Appliance
G. Restraining device


Gas Flow Direction

6. To facilitate moving of the appliance as close to the wall as possible, the two ends of the gas hose should be offset from each other (refer to figure 2).
7. Warning: The quick-disconnect coupling must be fitted so that the gas enters the female half (valved) of the coupling and exits the male (nipple) half. Follow the gas flow direction arrows permanently marked on the coupling.

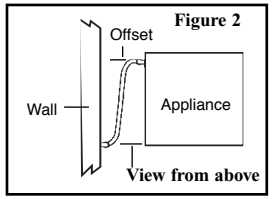


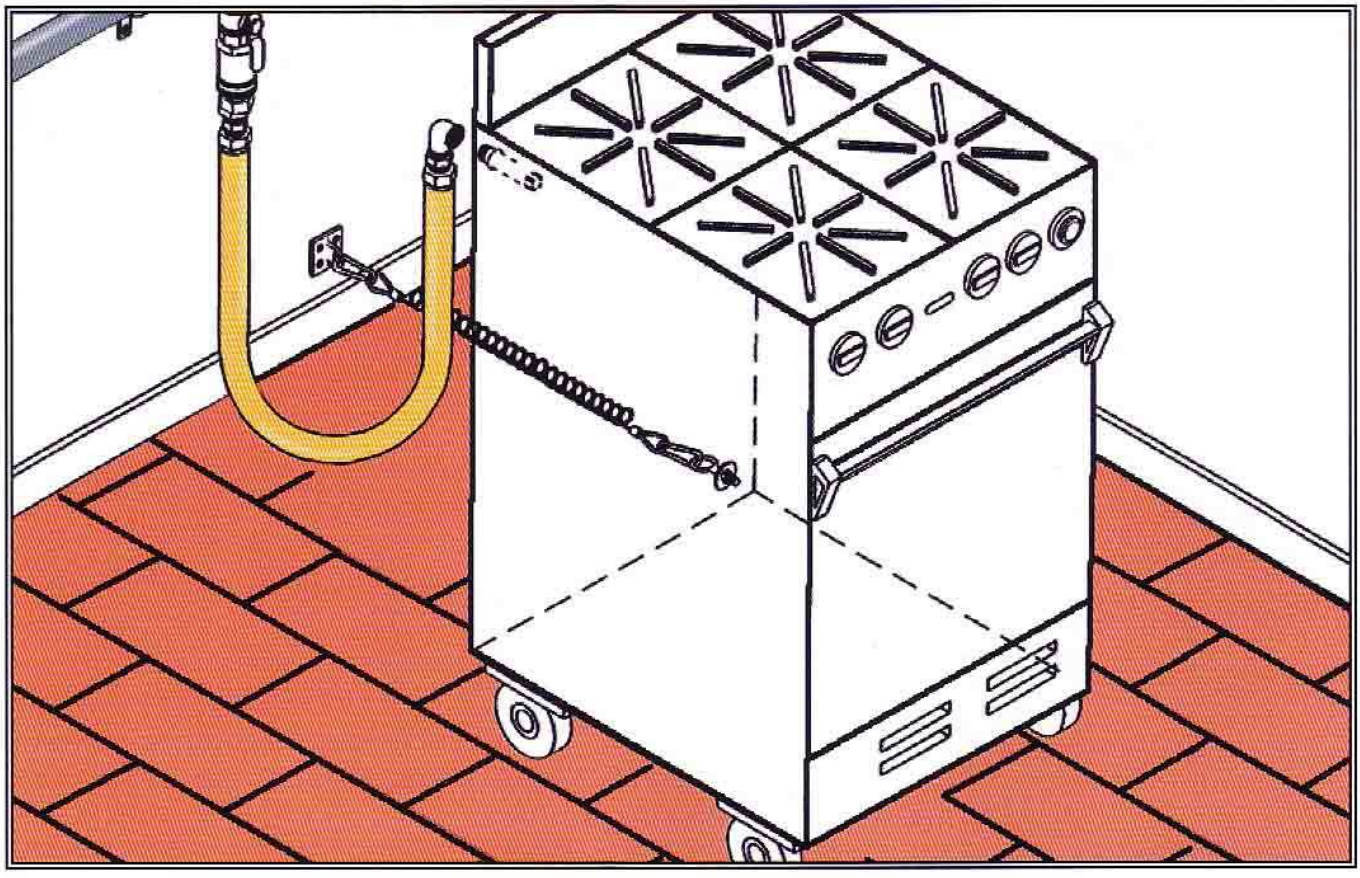
Figure 2
View from above

APPLIANCE SIDE:

8. In order to achieve correct curvature of gas hose, it may be necessary to fit a 90 degree elbow to the appliance connection point (E) fig.1. Apply appropriate thread jointing compound and tighten into position required.
9. End fittings are supplied bonded into the ends of the Dormont gas hose. Apply appropriate thread jointing compound to the end fitting threads, and wind the end fitting/gas hose (D) assembly into the appliance connection point.(E.)
10. Ensure that the gas supply and all the appliance control knobs are turned off before connecting to the gas supply.

GAS SUPPLY (INSTALLATION) SIDE:

11. Separate the female half of the quick-disconnect coupling (B) from the male (nipple) half (C) that is bonded into the end of the gas hose.
12. Apply appropriate thread jointing compound, and thread the female half of the quick-disconnect coupling onto the supply pipe from the gas isolation valve (A.) Tighten into position.
13. Connect the quick-disconnect nipple (C) into the quick-disconnect female (B.)
14. On completion, the final assembly shall be tested for leaks at all joints. Leak test in accordance with accepted procedures. Leak test solutions can cause corrosion, so thoroughly rinsing with water is required. Caution: A naked flame shall not be used for this purpose.
15. When installation of the gas hose is complete, carefully push the appliance back into the required operating position. Check that the hose is not kinked, over bent, caught under the appliance casters, or touching the floor. Ensure that the appliance controls are in the off position before turning on the gas supply.



Certifications

USA

American Gas Association

ANSI Z21.24 — Metal Connectors for Gas Appliances

ANSI Z22.45 — Flexible Connectors for other than all metal construction.

ANSI Z223.1 — National Fuel Gas Code-National. Fire Prevention Association — N.F.P.A. #54

ANSI Z21.69 — Metal Connectors for Moveable Gas Appliances.

A.G.A. Rqmt. No. 3-87 — For gas connectors for connection of fixed appliances for outdoor installation to the gas supply.

A.G.A. Rqmt. No. 7-90 — Requirement for Gas Convenience Outlets

ANSI Z21.41 — Quick Disconnect devices for use with gas fuel.

UL — **Design certified to ANSI/U.L. 567,** Pipe Connectors for Flammable and Combustible Liquids and LP-Gas. For use with natural gas and propane.

NSF — **National Sanitation Foundation** Criteria C-2.

City of New York — MEA #376-92-M and 379-92-M.

Approved by the **Commonwealth of Massachusetts** Board of State Examiners of Plumbers & Gas Fitters.

CANADA

Canadian Gas Association

CAN/C.G.A. 6.10 — Metal Connectors for Gas Appliances.

CAN/C.G.A - 6.16 Connector for Moveable Gas Appliances.

CAN/C.G.A - 6.9 Quick-disconnect devices for use with gas fuel.

CAN/C.G.A. B149.1 — Natural Gas Installation Code.

CAN/C.G.A. B149.2 — Propane Installation Code.

UK

BSI — Dormont Hoses have been Tested By BSI, and Meet with and Exceed the Essential Safety and Performance Requirements of BS669 Part 1 and Part 2.

CORGI Technical Bulletin 54

BELGIUM

Association Royale Des Gaziers Belges
Societe Technique De L'Industrie
Du Gaz En Belgique A.S.B.L.
Test Reports LDG/95/2166-2170
December 1995

AUSTRALIA STANDARDS AUSTRALIA

AS 1869-1991
Hose and hose assemblies for liquefied petroleum gases (LPG), natural gas and town gas.

Type 2
AS1869/B-WP7kPa
1650 - 12.5 mm
1675 - 19 mm
16100 - 25 mm
16125 - 31 mm

DENMARK

Danish Government Gas Institute
type-examination certificate no. 3419-3422

Spec Sheet #297

ISO 9001 Registered

FM No 24914

Dormont Manufacturing Co.
Registered to ISO 9001
Certificate # A1696

Dormont MANUFACTURING COMPANY

Mechline Developments Limited Unit 18 Potters Lane Kiln Farm Milton Keynes MK11 3HF Tel: (01908) 261511

GAS POINT

March 1997 / ISSUE 3 Vol 1 /£3

Commercial Bulletin: Ventilation & Commercial Gas Hose

Stanley Cast Iron Central Heating Cookers

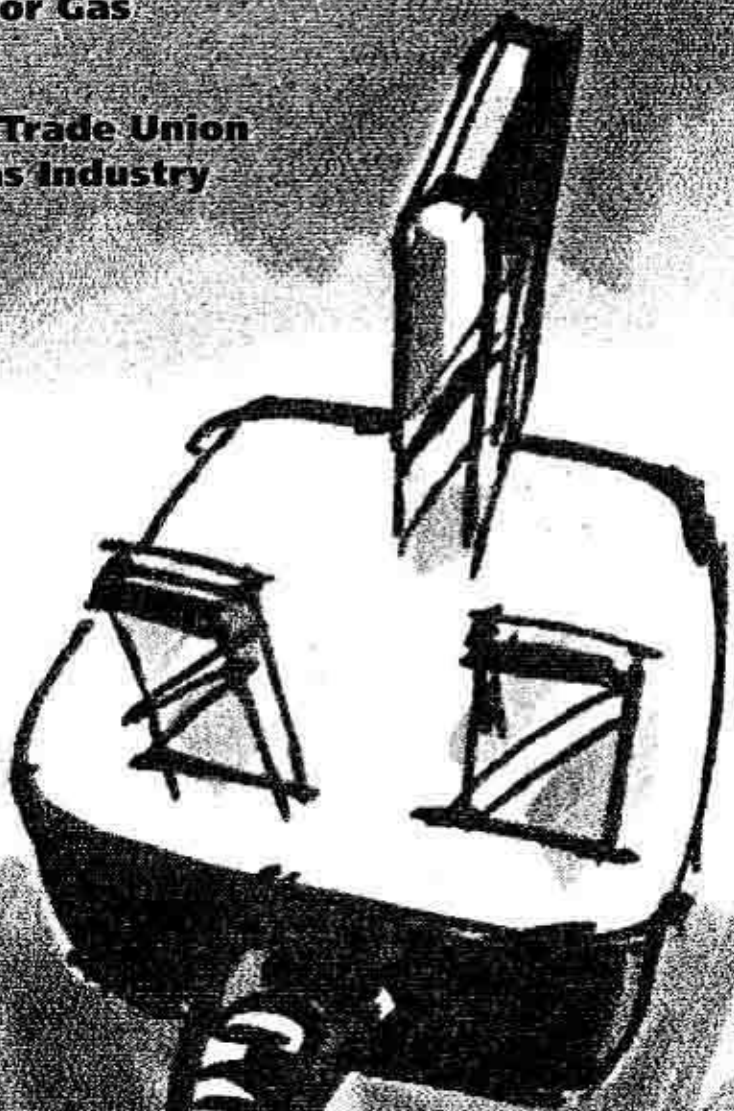
E6 Electronic Gas Meters

Electrics for Gas Installers

GMB The Trade Union for the Gas Industry

GAS POINT

Technical views news and information for Gas Installers



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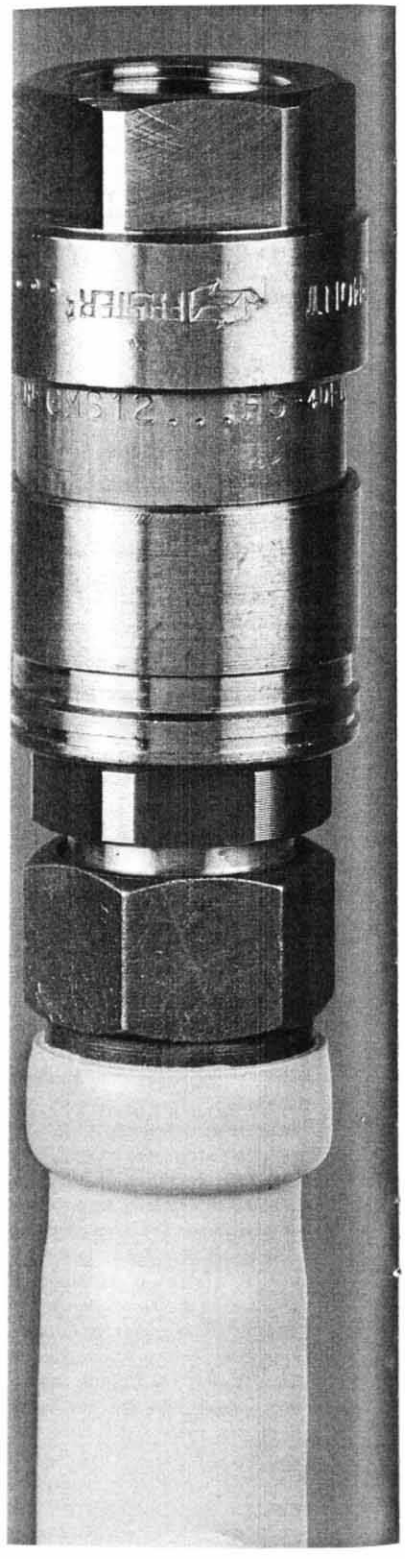


Peter Sage-Passant of Mechline Developments Ltd provides a comprehensive technical specification of the Dormont Flexible Gas Hose.

Commercial Gas Hose Construction

Materials

Stainless steel is a material that is used world wide for an increasing variety of demanding applications. When used correctly it provides durability, corrosion resistance, and safety. Stainless steel is commonly used as a material for pipe and tubing construction that is designed to carry a vast range of substances from water to industrial chemicals. As with any material, it is essential that the correct grade/type of stainless steel is used for the application.

The use of stainless steel to manufacture flexible gas hose (gas connectors) was pioneered by The Dormont Manufacturing Co in Pittsburgh USA. Dormont invented the first stainless steel gas connector in the early 1970s to answer industry's requirement for a tough, reliable gas connector for mobile appliances in both commercial and domestic applications. Since then, 304 grade stainless steel has become the most popular choice of material for commercial gas hose construction, providing safe gas connection all over the World, and Dormont is the World's largest manufacturer of gas flexible hoses.

The demands on a commercial gas hose can be great, as the commercial kitchen provides a working environment unlike any other. As well as having to satisfy tough physical demands, the hose must also satisfy the demands of the kitchen operator and be easy to use, and be easy to clean.

Corrugations

There are two main types of construction that are used today, in both methods, the stainless steel (usually austenitic 304, 316 or 321 grade) is taken in strip form, formed into a tube, and welded along the seam (Fig 1). Both methods of construction require corrugations to be introduced along the length of the hose, in order to make it flexible. One of the primary differences in the methods of construction, is in the method of producing the corrugations. Corrugations can either be annular (Fig 2) or helical (Fig 3). Annular corrugations are usually formed by hydraulic expansion into a die, but can also be formed using a rotating die. Helical corrugations are usually formed using a rotating die. The aim is to produce a hose with a relatively consistent wall thickness (minimum 0.20mm for ID 8-20mm and minimum 0.25mm for ID 25-32mm). Helical winding by rotating die can minimise localised wall thinning.

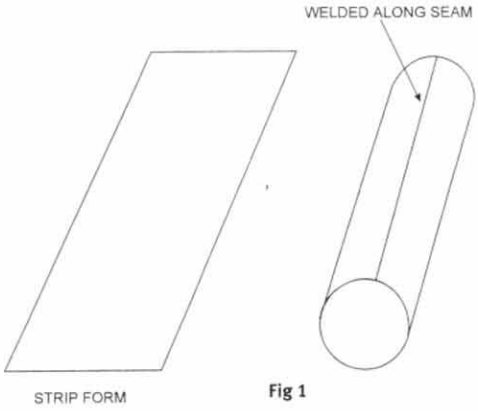


Fig 1

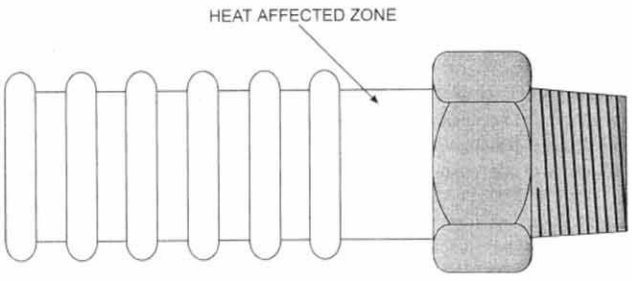
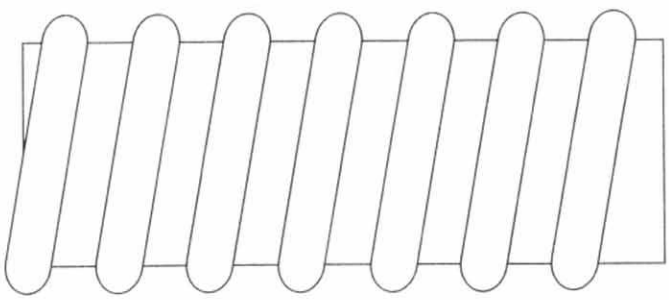


Fig 2



HELICAL Fig 3

Annealing

Taking flat stainless steel (regardless of grade or type) and working it to the extent described here, will result in the metal having a heavily cold worked microstructure. At this stage, the heavily worked stainless steel will have lost ductility, and toughness and will be harder than it was in its original form. Obviously, when manufacturing a flexible gas connector, it is not desirable to leave the metal in this condition and it is important that the hose is annealed after forming. A full solution anneal at 2000°F in a protective, reducing environment ie. oxygen free, nitrogen/hydrogen mix, followed by rapid cooling is ideal.

Bright annealing in this way preserves the surface of the stainless steel and helps maintain the corrosion resistance. The full solution annealing treatment improves the microstructure by dissolving some precipitate particles that may have formed during welding, recrystallizes the cold worked microstructure, and fully relieves the stresses that were locked into the structure during cold working. Annealing also significantly reduces the risk of stress corrosion cracking that is present in all grades of austenitic stainless steel (304, 316, 321 etc).

The plant and equipment required to carry out bright annealing on a production basis is extremely expensive, and only companies with a large production volume can justify introducing this equipment.

Hoses that receive no further treatment after cold forming are less ductile than annealed hoses. The ability to survive the relatively large movement that is demanded of a commercial gas hose on a regular basis, requires the highest ductility.

End Fittings

Having produced the flexible metallic hose, it cannot be used without having end fittings attached to enable it to be connected to the gas supply/appliance. There are two main methods used for achieving this. Most industrial metal hoses are manufactured in small batch quantities. To facilitate this process, the conventional assembly method is to use bulk metal hose, usually a 316 or 321 grade stainless steel, that is not annealed. The tubing is cut to length, and end fittings are welded to the tube.

The method used by manufacturers for this small batch process is to weld the end fittings onto the end of the corrugated tube. Welding an end fitting onto corrugated tubing with a very thin wall (0.20mm) in this way will create a 'heat affected zone' immediately adjacent to the weld, (Fig 2) and can introduce residual tensile stress in the tubing which is particularly undesirable in a gas hose. This is the point of the hose that is subject to the most stress and strain during use and is the area of the hose most prone to coming into contact with chlorides from cleaning chemicals and as a consequence can be prone to stress corrosion cracking. This can be a particular problem if the assembly is not annealed after welding. The strength of any fabrication, including gas hose, is limited to its weakest link.

A more advanced method of construction, is the 'flared or mechanical end fitting' (Fig 4). This is a 'metal to metal' sealing system that is commonly used in high pressure safety applications such as the fire protection systems used on aeroplanes. The main advantage of the flared end fitting system is that it totally eliminates the requirement for a weld at the end of the hose, and therefore eliminates the 'heat affected zone'. The stainless steel from the corrugated section of the hose is continued to the end fitting without break, and therefore produces a stronger gas hose.

Hose Covering

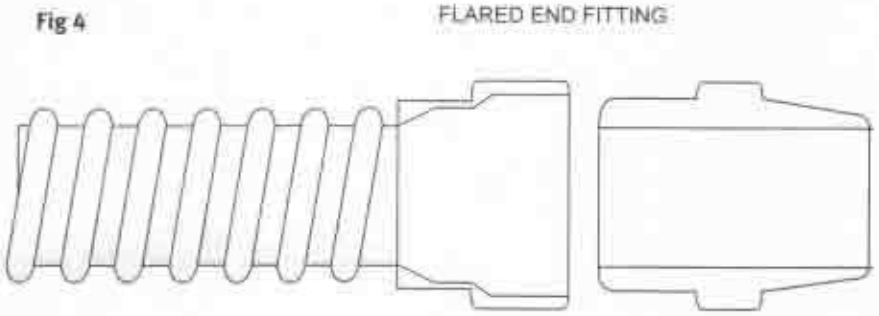
Kitchens present the gas hose with a particularly challenging working environment, including possible contact with cleaning chemicals and it is important that the stainless steel gas hose is properly protected. Hygiene is essential in the kitchen, and the hose must be easy to clean. There are two main types of hose covering used, Polyolefin, and PVC. Polyolefin is a shrink sleeve which is placed around the hose and shrunk to fit on the hose. This type of covering can deteriorate in the harsh working environment of the kitchen, and can split or crack, and can wrinkle which creates dirt traps. This is a particular problem in the kitchen, as the sleeve does not bond to the surface of the hose (Fig 5) so any chemicals or dirt that enter the crack can travel unimpeded along the full length of the hose, and will remain there creating a dirt trap and attacking the stainless steel.

PVC dip coating is a more advanced method of covering gas hose that has been used for many years. It provides a thicker coating than polyolefin, and closely follows the contours of the hose surface (Fig 6) thus preventing the possible problems outlined above, and makes the coating far less likely to pull away from and expose the end fittings during use. PVC also provides a smoother outer surface that is easier for the kitchen staff to clean. As with the annealing process, and flared end fittings, the plant and equipment required for safe PVC dipping is expensive, and is only viable for large production volumes.

Quick Disconnect Couplings

The gas hose has to be disconnected to enable the kitchen appliance to be removed for cleaning, therefore an easy to use quick disconnect coupling that enables the kitchen staff to carry out this operation without tools is essential. Standard couplings commonly used are based on industrial designs that were developed in the 1940s. The more advanced couplings (Fig 7) have features such as a thermal shut off device or fusible link that will shut off the gas supply in the event of a fire, 'one hand push to connect' operation, and a flat face when disconnected to prevent the intrusion of dirt and, this is particularly important in todays hygiene sensitive kitchen.

Fig 4



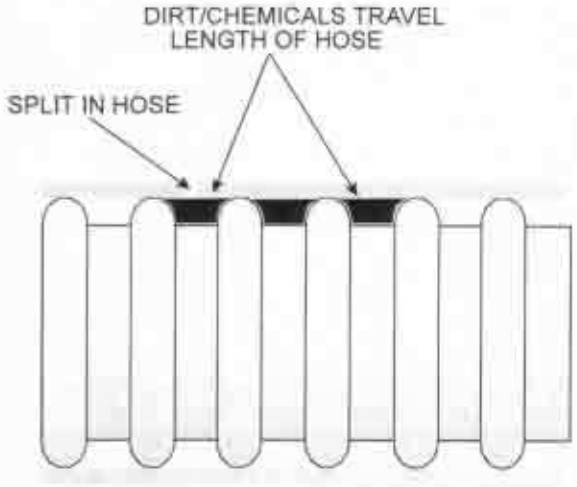


Fig 5

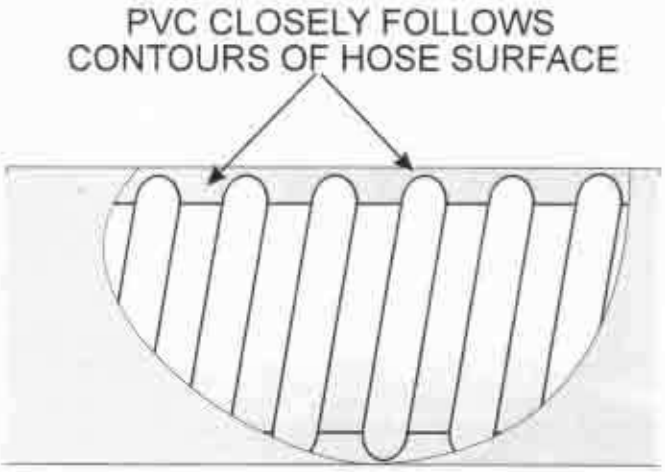


Fig 6

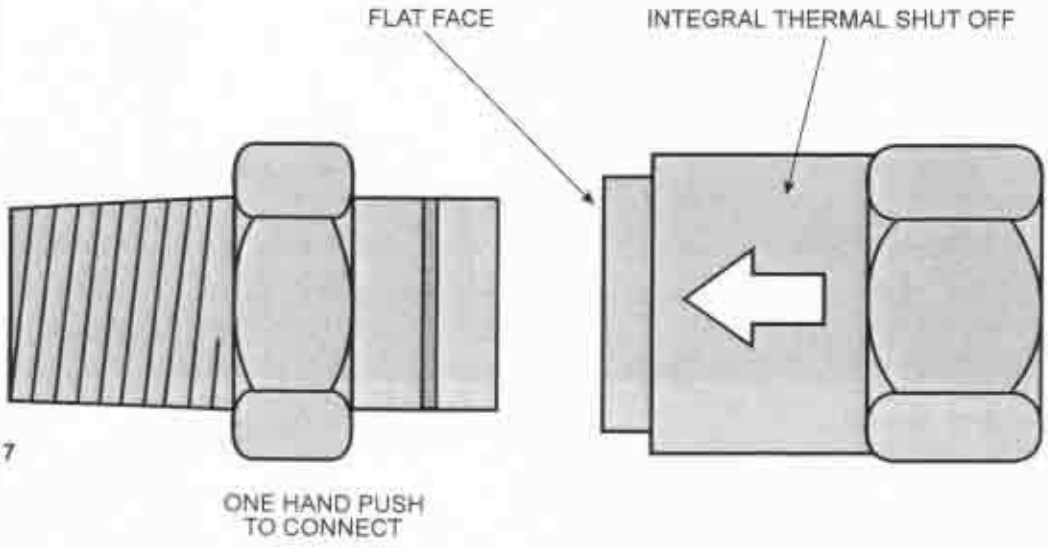


Fig 7