

From the Daily Mirror, Saturday, April 23, 2005

**"Engineer' tests for gas.. with a lighter'**

'A HEATING engineer was fined £2,000 with £1,000 costs yesterday after being secretly filmed using his cigarette lighter to check for gas leaks.'

'Tony Adams, 55, from Epsom, Surrey, lit the flame more than 10 times. But the horrified housewife who had called him out was in fact a Trading Standards officer operating a sting to catch out dodgy tradesmen, Guildford crown court heard.'

Leakage of gas may occur in any part of the 'system' but, especially, at joints. It is, of course, essential that gas control equipment and associated systems are routinely checked for gas leaks. An appropriate method of leak testing is, of course, required (see above). In most cases, the two following methods are appropriate:

1. Timed Pressure Drop Test: pressurise the equipment and system with the purge or service gas (depending upon operating procedure) and then isolate the supply. Assuming that the isolation is effective and that there is a [functional] pressure gauge, any decrease in system pressure indicates a leak - all we then need to do is to find it.

This method is widely employed - from the annual testing of manifold supplied gas lines to checking if the Bodok washer is providing an adequate seal on medical regulators or anaesthetic trolleys.

2. An 'Approved Leak Detection Solution':

The application of small amount of leak detection spray reveals quite tiny leaks - quickly and safely. If a leak is discovered, the equipment should be de-pressurised and the leak corrected - DO NOT ATTEMPT TO RE-TIGHTEN A JOINT WHILST IT IS PRESSURISED. If no leakage is discovered then liquid should be wiped off using a clean cloth or paper towel.



PIN-INDEX VALVE WITH BODOK WASHER



Bodok washers should be checked regularly and replaced when necessary: Part No. 99-102

LEAK DETECTION SPRAY

Oxygen-safe, Non-corrosive, For use with all compressed gases  
Part No. 99-130 (400 ml can for up to 1,000 applications)

## SEALS & SEALING IN GAS EQUIPMENT & SYSTEMS

Leakage of gas is, in many cases, an indication of components failing to 'seal' or 'seat' effectively rather than under-tightening. Under no circumstances should joints be over-tightened. Gas fittings and connections seal in the following ways:

### 1. Nipple and Cone



Take a look into this cylinder valve outlet - at the bottom of the thread is a 60 degree 'cone' (referred to as a 'gas cone' this confers the description 'G' to the dimensions of the fitting e.g. 5/8" BSPG).

A gas-tight seal is created by successfully seating the corres- [male] nipple (e.g. the regulator inlet stem) into this cone. The connection nut 'holds' the connection together. Clearly, then, if either surface is scratched or damaged then a gas-tight joint will not be made.

Over-tightening can damage either, or both, the cone or nipple and make the leak worse. With brass valves and fittings, it is quite easy to 'stretch' or 'swage' the thread by enthusiastic tightening. In either case, the damage can be permanent.

Normal regulator outlets are 3/8" BSPG - male threaded with internal 60 degree gas cone.

**BOTH THE MALE AND FEMALE THREADS ARE PARALLEL.**

### 2. Face-Seal

If you imagine a carbon dioxide cylinder valve connection (BS 341 No. 8), or any other BS cylinder valve connection (apart from No. 3 & No. 4), the gas-tight joint is created using a washer which is mounted on a flat face. Typically, the washer is retained on the regulator inlet by a raised nipple. Naturally, the sealing washer should be regularly checked for damage or deterioration and they must be replaced as and when necessary.

Always use sealing washers which are compatible with the service gas and the system pressure.

In fact, even the pressure gauges which are fitted to most modern regulators seal at the bottom of the gauge port on an aluminium or copper washer (hopefully not with acetylene though in the case of copper!)

**BOTH THE MALE AND FEMALE THREADS ARE PARALLEL.**

**OR THERE IS NO THREAD - SEE PIN-INDEX VALVE WITH BODOK WASHER ON PREVIOUS PAGE - THE JOINT IS HELD TOGETHER WITH A WING-CLAMP.**

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### 3. SEALING ON THE THREAD



The picture, above, shows a proprietary [twin-ferrule] tube connector. The male thread is, clearly, 'tapered' - where there is no 'face' or 'cone' or washer or 'O' ring then a seal can be created on a thread.

#### THE MALE THREAD IS TAPERED AND THE FEMALE THREAD IS PARALLEL

To obtain a seal some form of sealant must be applied to the male thread prior to assembly. Otherwise the gas will leak out via spiral between the crest and root of the two threads.

PLEASE ensure that the PTFE tape used for these connections is [AGAIN] 'SUITABLE FOR USE WITH OXYGEN':

PART NUMBER: 99-135 'PTFE TAPE OXYGEN GRADE' £1.50 + VAT/ROLL

ALSO, PLEASE DON'T MIX THREAD-FORMS

BSP = BRITISH STANDARD PIPE: Based on a Whitworth thread

NPT = NATIONAL PIPE TAPER: American Standard

These two have differing tpi's (threads per inch) and especially at small diameters (e.g. 1/4") are easily (and often!) confused.

IF YOU ARE UNSURE THEN PLEASE ASK FOR GUIDANCE OR ASSISTANCE

THE GAS MAY BE INTRINSICALLY HAZARDOUS (FLAMMABLE OR TOXIC, SAY) BUT YOU ARE ALSO TRYING TO CONTAIN THE PRESSURE (OR STORED ENERGY) OF THE GAS TOO

BETTER SAFE THAN SORRY...

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