

# **John Guest**<sup>®</sup>

## *Cartridge Systems*

*A simple cost effective way of  
securing tubes within your product*



*May 2008*

The John Guest Group has a long established reputation as a world leading manufacturer of push-in fittings, tube and other fluid control products. A reputation built on producing consistently high quality products with an ongoing commitment to value engineering and product development.



# *Quality Manufacture*

**A commitment to quality is at the heart of the John Guest philosophy.**

The strictest control is maintained by virtue of the fact that design and manufacture is carried out in modern purpose built manufacturing centres in west London and at Maidenhead in Berkshire.

Maintaining control over the whole process from initial tool design and tool making through to final assembly and testing ensuring that only products of the highest quality are produced.

The company believe it is this commitment to quality that has led to it receiving prestigious awards from many of the world's leading testing and approvals organisations.

John Guest is a preferred supplier to many international companies.



Since 1989



# Cartridge Systems

John Guest Cartridge Systems are an easy and cost effective way of incorporating a push in connection into a wide range of original equipment.

Neat and compact, push in connections avoid the need for threaded ports, offer improved product appearance, easy tube connection and a reduced envelope size.

Cartridge Systems are easy to assemble, need only a low insertion level but offer a high burst pressure. They are offered with plastic, brass or stainless steel body for use with a wide variety of soft metal or plastic housing materials.

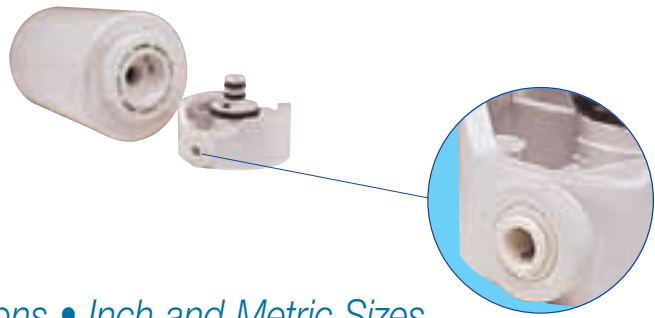
The systems are based on technology used in a wide range of industrial applications such as, Blown Fibre - Automotive - Drinks Dispense - Plumbing & Heating and Compressed Air



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# Plastic Half Cartridges

- For Pneumatics and Food Grade Applications • Inch and Metric Sizes
- For a wide range of plastic and soft metal housing materials
- Low assembly effort - high retention

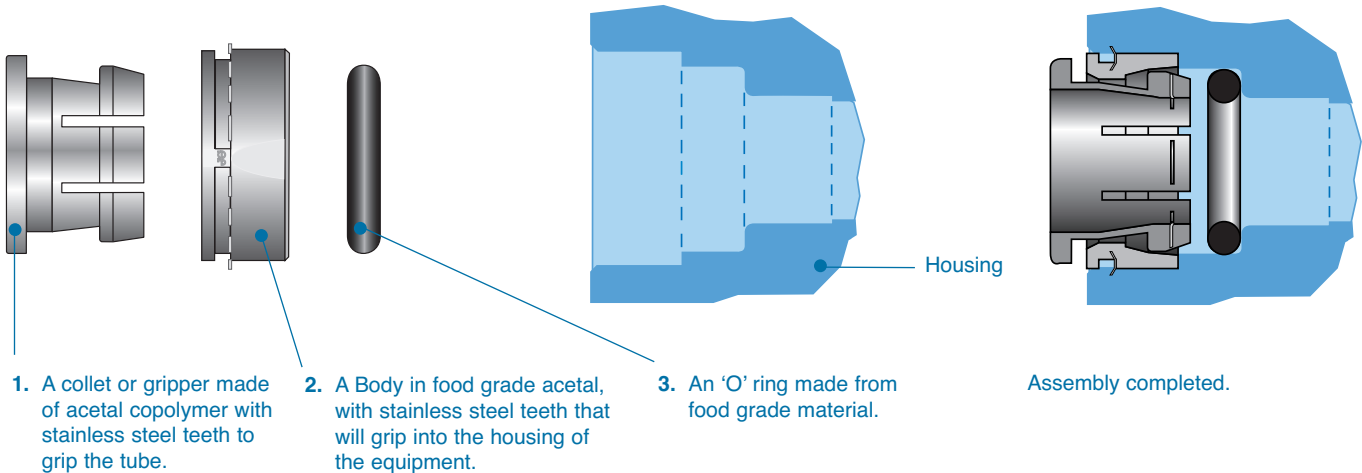
The John Guest Plastic Half Cartridge provides a quick, efficient and easy way of securing a Speedfit push-in connection into a wide variety of original equipment. As the cartridge requires low insertion loads it is suitable for many different housing materials.

The Half Cartridge is made up of three components; a collet or gripper, an 'O' ring of food grade material, and a plastic body with stainless steel teeth. With the body of the cartridge inserted, the stainless steel teeth grip the sides of the housing. As the system comes under pressure the teeth grip more

As with all Speedfit products, the push-in connection can be used with plastic or soft metal tubes in both inch and metric sizes. The cartridges are suitable for a very wide selection of original equipment including manifolds and multi-interconnection points, and, because they are produced in food grade materials, Drinks Dispense and Water Purification Equipment.

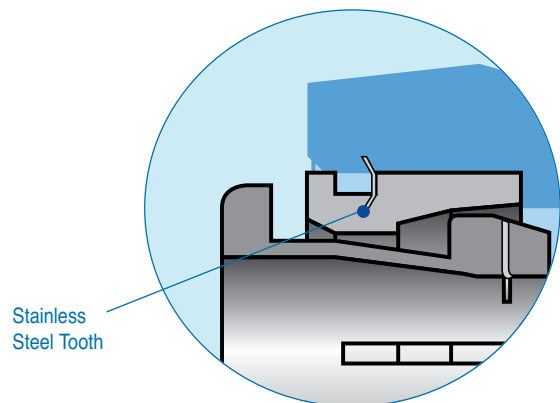
**As Plastic Half Cartridges are intended for use by Original Equipment Manufacturers they are only supplied in bulk quantities.**

The **John Guest** Plastic Cartridge is made up of three components:-



With the cartridge in its normal position the stainless steel teeth sink into the housing to a depth dependent upon the hardness of the housing material used.

When the system is under pressure the cartridge is held firmly in the body by the stainless steel teeth. These will sink in further as more pressure is applied.



**PLASTIC HALF CARTRIDGES - METRIC SIZE**



Black Acetal Collet,  
Black Acetal Body,  
Nitrile 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
PM2804E	4mm	PM2805E2	5mm
PM2805E	5mm	PM2806E2	6mm
PM2806E	6mm	PM2808E2	8mm
PM2808E	8mm	PM2810E2	10mm
PM2810E	10mm		
PM2812E	12mm		
PM2815E	15mm		



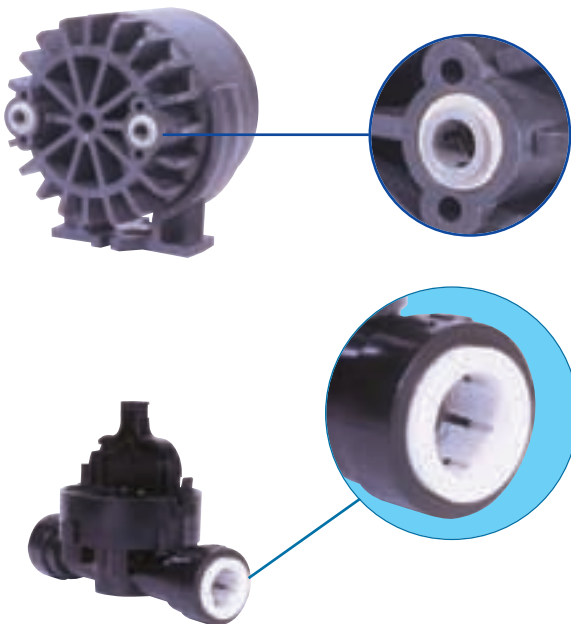
Black Acetal Collet,  
Black Acetal Body,  
EPDM 'O' Ring.

PART NO.	TUBE OD
PCM2806E	6mm
PCM2808E	8mm
PCM2810E	10mm
PCM2812E	12mm



White Acetal Collet,  
White Acetal Body,  
EPDM 'O' Ring.

PART NO.	TUBE OD
CM2815W	15mm
CM2822W	22mm



**PLASTIC HALF CARTRIDGES - IMPERIAL SIZE**



Grey Acetal Collet,  
Grey Acetal Body,  
Nitrile 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
PM2804S	5/32"	PI2806S2	3/16"
PI2806S	3/16"	PI2808S2	1/4"
PI2808S	1/4"	PM2808S2	5/16"
PM2808S	5/16"	PI2812S2	3/8"
PI2812S	3/8"	PI2816S2	1/2"
PI2816S	1/2"		



1/4", 5/16" and 3/8" Plastic Half Cartridges are available with grey or white body with red, white or blue collet. Minimum 5000 lots. These variations are also available with 2 'O' rings.



Grey Acetal Collet,  
Grey Acetal Body,  
EPDM 'O' Ring.

PART NO.	TUBE OD
PCI2812S	3/8"
PCI2808S	1/4"
PCM2808S	5/16"
PCI2816S	1/2"



White Polypropylene Collet,  
White Polypropylene Body,  
EPDM 'O' Ring.

PART NO.	TUBE OD
PP2808W	1/4"
PP2812W	3/8"

**PLASTIC HALF CARTRIDGES - IRISH SIZE**



Grey Acetal Collet,  
Grey Acetal Body,  
EPDM 'O' Ring.

PART NO.	TUBE OD
ECI2816W	1/2" IRISH
ECI2824W	3/4" IRISH

**PLASTIC HALF CARTRIDGE KIT - METRIC SIZE**

 Black Acetal Collet,  
Black Acetal Body.

PART NO.	TUBE OD
NC2008-05E	5mm
NC2008-06E	6mm
NC2008-08E	8mm
NC2008-10E	10mm
NC2008-12E	12mm

**PLASTIC HALF CARTRIDGE KIT - IMPERIAL SIZE**

 Grey Acetal Collet,  
Grey Acetal Body.

PART NO.	TUBE OD
NC2007-02S	1/4"
NC2007-03S	5/16"
NC2007-04S	3/8"

# Plastic Cartridge - Assembly Tool

**PLASTIC CARTRIDGE - ASSEMBLY TOOL**

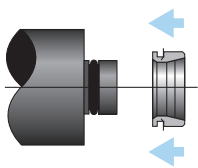

PART NO.	FOR CARTRIDGE SIZE
AST-3/16	3/16", 5/32", 4MM, 5MM
AST-1/2	1/2"
AST-12	12MM
AST-15	15MM

A special hand 'Assembly Tool' is available for each size of cartridge to ease the assembly process. These can be adapted by the customer to fit a simple bench press etc.

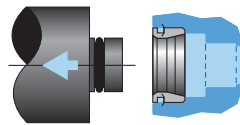
Typical Assembly Efforts and Retentions, when measured in acetal housing, are shown below. The figures are guidelines to performance and will vary depending on material, temperature and manufacturing tolerance.

	4mm 5/32"	5mm 3/16"	6mm 1/4"	8mm 5/16"	10mm 3/8"	12mm 1/2"	15mm	22mm
Expected assembly effort. (Cartridge into Polyacetal housing)	180N (40 lbf)	180N (40 lbf)	200N (45 lbf)	220N (50 lbf)	250N (56 lbf)	300N (67 lbf)	350N (79 lbf)	550N (125 lbf)
Expected retention. (Cartridge into Polyacetal housing)	450N (100 lbf)	450N (100 lbf)	650N (146 lbf)	700N (157 lbf)	750N (169 lbf)	1000N (224 lbf)	1200N (270 lbf)	1400N (318 lbf)

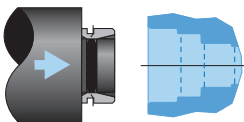
# Suggested Cartridge Body Assembly Technique



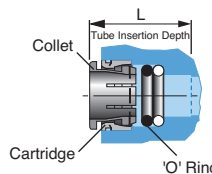
Push Cartridge onto Assembly Aid ensuring correct orientation. If correctly assembled the Cartridge will be retained on the spigot by the 'O' ring.



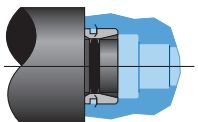
Withdraw the Assembly Aid, ensuring that the top of the Cartridge is flush with the housing. Assemble 'O' ring and collet.



Ensure cavity is clean and free from swarf, burrs, score marks etc. Centrally align housing.

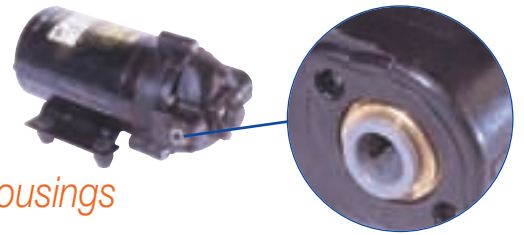


With collet in release position.



Push the Cartridge fully into housing ensuring that the Assembly Aid touches the housing.

# Metal Half Cartridges



- For Drinks Dispense and Potable Water Applications
- Inch and metric sizes
- For a wide variety of metal housings
- Brass or stainless steel body

John Guest Half Cartridges with metal body are designed to provide a simple cost effective way of securing tubes into taps, manifolds, flow direction splitters and many other types of components, which can be produced in a wide variety of materials.

When connections need to be installed into plastic products we recommend our new Plastic Half Cartridge shown on pages 03 to 04.

Half Cartridges are supplied with one 'O' ring as standard. In some instances it may be desirable to consider additional sealing and if space permits, the addition of a second 'O' ring will be worth considering.

**As Metal Short Cartridges are intended for use by Original Equipment Manufacturers they are only supplied in bulk quantities.**

## METAL HALF CARTRIDGES - METRIC SIZE



Grey Acetal collet 4 & 8mm,  
Black Acetal collet on 5, 6, 10, 12, 15 & 18mm.  
Brass Body,  
Nitrile 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
MM2804N	4mm	MM2804N2	4mm
MM2805N	5mm	MM2805N2	5mm
MM2806N	6mm	MM2806N2	6mm
MM2808N	8mm	MM2808N2	8mm
MM2810N	10mm	MM2810N2	10mm
MM2812N	12mm	MM2812N2	12mm
MM2815N	15mm	MM2815N2	15mm
MM2818N	18mm		

8mm also available with black collet, Part No. MM2808NE



Light Grey Acetal Collet 15, 18 & 22mm.  
Black Acetal Collet 4, 8, 10 & 12mm.  
Brass Body,  
EPDM 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
CM2804N	4mm	CM2804N2	4mm
CM2808N	8mm	CM2808N2	8mm
CM2810N	10mm	CM2815N2	15mm
CM2812N	12mm	CM2822N2	22mm
CM2815N	15mm		
CM2818N	18mm		
CM2822N	22mm		

## MINIATURE HALF CARTRIDGES - METRIC SIZE



Black Acetal Collet,  
Brass Body,  
Nitrile 'O' Ring.

PART NO.	TUBE OD
LM2804N	4mm

Miniature Half Cartridges have been designed to give an easy solution in providing a push in connection into miniature pneumatic equipment.

## METAL HALF CARTRIDGES - IMPERIAL SIZE



Grey Acetal Collet,  
Brass Body,  
Nitrile 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
MM2804N	5/32"	MM2804N2	5/32"
MI2806N	3/16"	MI2806N2	3/16"
MI2808N	1/4"	MI2808N2	1/4"
MM2808N	5/16"	MM2808N2	5/16"
MI2812N	3/8"	MI2812N2	3/8"
MI2816N	1/2"	MI2816N2	1/2"



1/4" and 3/8" sizes also available with red, blue or white collet (Suffix R, B or W respectively).

1/2" size also available with red collet, Suffix R.



Grey Acetal Collet,  
Stainless Steel Body,  
Nitrile 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
MI2806ST	3/16"	MI2806ST2	3/16"
MI2808ST	1/4"	MM2808ST2	5/16"
MM2808ST	5/16"	MI2812ST2	3/8"
MI2812ST	3/8"		



White Acetal Collet on 1/4 & 3/8"  
Black Acetal Collet on 5/32"  
Grey Acetal Collet on 5/8",  
Brass Body,  
EPDM 'O' Ring.

1 'O' RING		2 'O' RINGS	
PART NO.	TUBE OD	PART NO.	TUBE OD
CM2804N	5/32"	CM2804W2	5/32"
CI2808W	1/4"	CI2812W2	3/8"
CI2812W	3/8"		
CI2820N	5/8"		



1/4" and 3/8" size also available with red, blue or grey collet, (suffix R, B or N).

For dimensional information please see page 07.

# Port Measurements for Half Cartridges

## Imperial

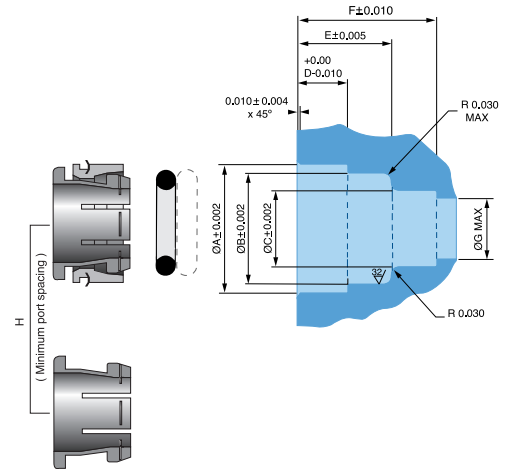
Tube OD	ØA	ØB	ØC	D	E1	E2	F1	F2	ØG	H
5/32" *	0.492	0.327	0.163	0.193	0.350	0.445	0.504	0.598	0.13	0.59
5/32" **	0.472	0.327	0.163	0.193	0.350	0.445	0.504	0.598	0.13	0.59
3/16"	0.472	0.348	0.193	0.193	0.340	0.440	0.490	0.590	0.16	0.59
1/4"	0.528	0.424	0.255	0.181	0.386	0.480	0.555	0.650	0.23	0.67
5/16"	0.544	0.470	0.320	0.215	0.400	0.500	0.590	0.690	0.29	0.67
3/8"	0.632	0.547	0.380	0.270	0.465	0.565	0.720	0.815	0.35	0.79
1/2"	0.777	0.671	0.506	0.304	0.561	0.659	0.797	0.896	0.48	0.93
5/8"	0.935	0.836	0.638	0.335	0.703	-	1.093	-	0.50	1.06

All dimensions in inches

\* - Metal Half Cartridges. \*\* - Plastic Half Cartridges.

E1 and F1 relate to one 'O' ring.

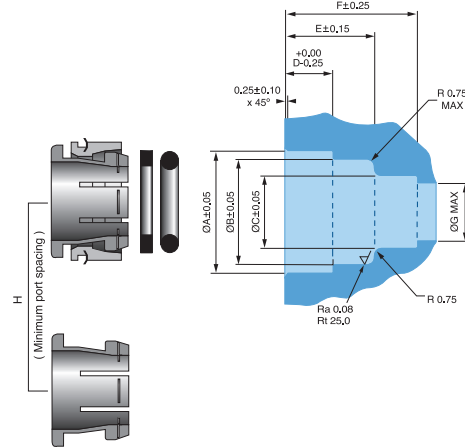
E2 and F2 relate to two 'O' rings.



## Imperial-Irish

Tube OD	ØA	ØB	ØC	D	E	F	ØG	H
1/2" IRISH (14.70MM OD)	22.86	20.32	14.90	9.50	17.50	26.90	14.20	27.00
3/4" IRISH (21.05MM OD)	31.05	26.85	21.35	10.85	21.10	31.60	19.70	34.50

All dimensions in mm



## Metric

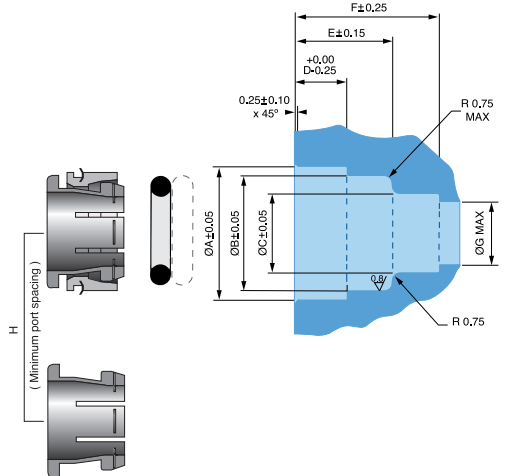
Tube OD	ØA	ØB	ØC	D	E1	E2	F1	F2	ØG	H
4mm *	12.50	8.30	4.14	4.90	8.90	11.30	12.80	15.20	3.30	15.0
4mm **	11.98	8.30	4.13	4.90	8.90	11.30	12.80	15.20	3.30	15.0
5mm	11.98	9.06	5.13	4.90	8.63	11.17	12.44	14.98	4.30	15.0
6mm	13.41	10.00	6.12	4.60	9.80	12.20	14.00	16.50	5.30	16.5
8mm	13.82	11.94	8.13	5.46	10.15	12.70	15.00	17.50	7.40	17.0
10mm	16.05	14.00	10.15	6.86	11.81	14.35	18.17	20.71	9.20	19.0
12mm*	19.10	16.54	12.15	8.65	15.50	19.00	23.50	27.00	11.20	22.0
12mm**	19.74	16.54	12.15	7.72	15.90	-	23.90	-	11.20	24.0
15mm	22.86	20.32	15.19	9.50	17.50	21.00	26.90	30.40	14.20	27.0
18mm	26.80	23.90	18.40	9.00	19.10	-	29.20	-	17.00	30.5
22mm	31.05	27.80	22.20	10.85	21.10	24.70	31.60	35.20	21.20	34.5

All dimensions in mm

\* - Metal Half Cartridges. \*\* - Plastic Half Cartridges.

E1 and F1 relate to one 'O' ring.

E2 and F2 relate to two 'O' rings.



## MINIATURE ONE 'O' RING

Tube OD	ØA	ØB	ØC	D	E	F	ØG	H
4mm+	8.0	7.1	4.14	3.9	7.55	10.5	3.3	9.8

+ Minimum wall thickness 1.0mm.

All dimensions in mm

# Full Cartridges

John Guest Full Cartridges are designed to provide a simple cost effective and trouble free way of securing tubes into a variety of metal products. The Cartridge is supplied with the 'O' Ring assembled and the collet loose. They are ideal for compressed air applications.



Note: For some applications additional bonding is required in the form of 'Loctite 601' or similar adhesive. When there is a need to install connections into plastic products we recommend our new Plastic Half Cartridge shown on pages 03 to 04 of this brochure.

**As John Guest Cartridges are intended for use by Original Equipment Manufacturers they are only supplied in bulk quantities.**

## FULL CARTRIDGES - METRIC SIZE



Black Acetal Collet,  
Brass body,  
Nitrile 'O' Ring.

PART NO.	TUBE OD	ØA	ØB	C	D	ØE	F
MM1404N	4mm	10.0	4.1	13.5	10.3	3.3	12.0
MM1405N	5mm	10.0	5.1	13.5	10.3	4.3	12.0
MM1406N	6mm	11.0	6.1	14.5	10.8	5.3	13.0
MM1408N	8mm	13.0	8.1	16.1	11.3	7.3	16.0
MM1410N	10mm	15.0	10.1	17.6	12.2	9.3	19.0
MM1412N	12mm	17.5	12.1	21.4	14.1	11.3	22.0

All dimensions in mm

Full cartridges have black collets as standard.

4mm size is also available with Green collet Part No. MM1404NG  
and Red collet Part No. MM1404NR

# Miniature Full Cartridges - 4mm

## MINIATURE FULL CARTRIDGES - METRIC SIZE

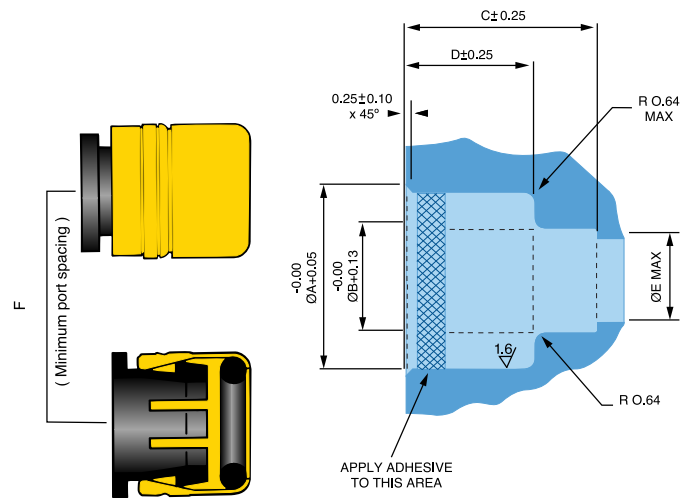


Black Acetal Collet,  
Brass body,  
Nitrile 'O' Ring.

PART NO.	TUBE OD	ØA	ØB	C	D	ØE	F
LM1404N	4mm	8.0	4.14	10.5	8.0	3.3	9.8

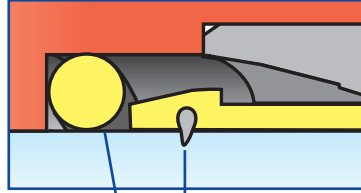
Minimum wall thickness 1.0mm

Complementing the existing Full Cartridge Range, this new product has been designed as an easy way of providing a push in connection in miniature pneumatic equipment.

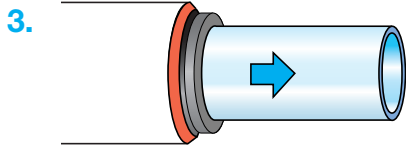
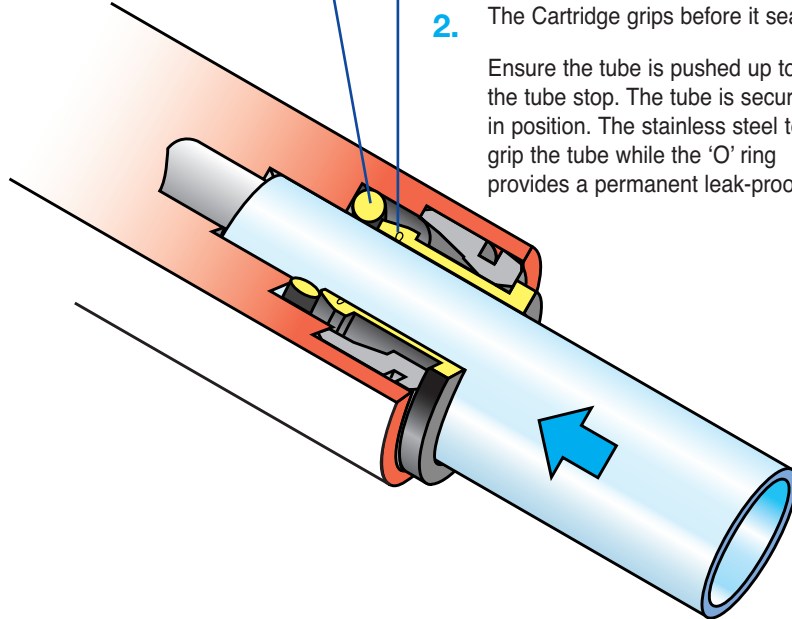


## Making a connection

1. Cut the tube square and push in up to the tube stop. For metal tube, remove burrs and chamfer tube end to prevent the 'O' ring seal being damaged. For soft or thin walled plastic tube we recommend the use of a tube insert.

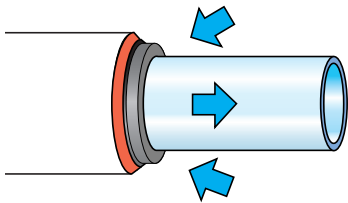


2. The Cartridge grips before it seals. Ensure the tube is pushed up to the tube stop. The tube is secure in position. The stainless steel teeth grip the tube while the 'O' ring provides a permanent leak-proof seal.



Pull the pipe to check it is secure. It is good practice to check the system before use.

## Disconnection is just as easy



Ensure the system is depressurised before removing the tube. Push in the collet against the face of the housing. With the collet held in this position the tube can be removed.

# Technical Specification

## Working Temperatures and Pressures

John Guest Cartridges and Half Cartridges are suitable for the following pressures and temperatures.

### Acetal Cartridges

Those Plastic Cartridges which have the prefix PI, PM, CI, CM, PCI PCM or ECI

Temperature	Pressure	
	5/32 - 5/16 4mm - 8mm	3/8 - 5/8 10mm - 22mm
<b>Air*</b>		
-20°C	16 Bar	10 Bar
<b>Potable Liquids and Air*</b>		
+1°C	16 Bar	10 Bar
+23°C	16 Bar	10 Bar
+65°C	10 Bar	7 Bar

\*Only cartridges with a Nitrile rubber 'O' ring should be used for air, these can be identified by part numbers with prefix PI or PM

### Polypropylene Cartridges

Those Plastic Cartridges which have the prefix PP

Temperature	Pressure	
	1/4" - 3/8"	
<b>Potable Liquids</b>		
+1°C	10 Bar	(150psi at 35°F)
+20°C	10 Bar	(150psi at 70°F)
+60°C	4 Bar	(60psi at 140°F)

The maximum operating temperatures and pressures are dependent on the housing material, wall thickness, vibration and pulsation, tube type and general operating conditions.

Customers are advised to carry out appropriate testing to ensure cartridges are suitable for their application.

## Housing Materials

Plastic Half Cartridges are only recommended for use with plastic and soft metal housing materials. Avoid any form of housing finish, such as chromium plating or anodising, which significantly increases surface hardness

## Tube Types

**Plastic Tube** - Polyethylene, nylon and polyurethane conforming to the tolerances shown below. For soft or thin walled tube we recommend the use of tube inserts.

**Metal Tube** (soft) - Brass, copper or mild steel conforming to the tolerances shown below.

**Metal Tube** (hard) - We do not recommend our cartridges for hard metal tubes.

It is essential that the outside diameter is free from score marks and that the tube be deburred before inserting into the cartridge.

## Tube Tolerances

Cartridges are offered for tubes with outside diameters to the following tolerances.

Size (inches)	5/32 - 3/16	1/4 - 5/8
Tolerance (inches)	+0.001/-0.003	+0.001/-0.004
Size (mm)	4mm - 5mm	6mm - 22mm
Tolerance (mm)	+0.05/-0.07	+0.05/-0.10

## Installation and System Testing

**Products should be kept clean and undamaged before use.**

All installations must be pressure tested after installation to ensure system integrity before handing over to the final user. See also "Making a connection".

## Cleaners and Sanitising of Acetal Fittings

John Guest Full Cartridges and Half Cartridges incorporate acetal parts. Our advice to customers is to use cleaners and sanitising agents that are above pH4 and low in hypochlorite level. Acetal fittings and parts that are cleaned and/or sanitised should be rinsed immediately with copious amounts of clean tap water to remove all traces of the cleaners.

## Product Design

John Guest has a policy of continuous research and development and reserves the right to amend without notice the specification and design of all products. Product descriptions and sizes are approximate and John Guest reserves the right to supply products which may have minor and negligible deviations from that printed in catalogues etc. (or from products previously supplied).

## Warranty

Whilst we give a warranty against defects in manufacture or materials, it is the responsibility of the specifier to ensure that fittings and related products are suitable for their application. The installation must be carried out correctly in accordance with our recommendations, complying with recognised codes of practice and relevant national standards, and be properly maintained. Please refer to our terms and conditions of sale.

## Product Selection

Due to the wide variety of operating conditions, applications and uses of our products, it is the user's / specifiers responsibility, through their own testing analysis, to ensure correct product selection for their applications.

Installers of John Guest Cartridges are fully responsible for the final product assembly, testing, quality and application.

## Side Loads

Connections should not be subject to excessive side loads or used as support brackets. Tubing and fittings should be adequately supported to prevent excessive side loading.

# John Guest International Limited



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## Product Selection and Installation

John Guest fittings and related products are specifically designed and manufactured by John Guest to the Technical Specifications set out in the John Guest Product Catalogues. All John Guest fittings and related products should be selected, installed, used and maintained in accordance with these Technical Specifications. It is the customer's / user's responsibility to ensure that John Guest fittings and related products are suitable for their intended applications, and are properly installed and maintained and are used in accordance with the Technical Specifications. It is also the customer's / user's responsibility to provide it's customers with any relevant technical information about John Guest products it supplies them.

The company has a policy of continuous research and development and reserves the right to amend without notice the specification and design of all products illustrated in this catalogue. John Guest reserve the right to change the colour and shape of products. Photographs are for illustration purposes only.

Subject to our Terms and Conditions of Sale available on request.

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