Partners for Progress

Specialist support for gas distribution engineering

ALH Systems Limited

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ALH Systems Limited

ALH Systems is one of the UK's leading specialists in the development, design and manufacture of equipment for safe and cost-effective maintenance of gas distribution networks. The company supplies equipment to more than 20 countries and offers a total distribution maintenance package, including flowstopping, leakage control and reinstatement. Recent innovations include the development of long handled tools for 'keyhole' operations in conjunction with established techniques for gas-free tapping, maintenance and repair operations.

Founded by a team of experienced gas engineers in 1976, ALH Systems Limited has an international reputation for efficiency, quality and service. The firm prides itself on providing a comprehensive service, including training, support and maintenance. All materials and equipment are designed and manufactured under quality controlled conditions at the company's purpose-built factory in Westbury and its subsidiary Flowstop Limited in Sheffield. These facilities comply with ISO9001/2008 and environmental management system ISO14001/2004.

Bagtube – Low pressure

Bagtube is a safe, easy-to-use and cost-effective flowstopping system for maintenance, repair and modification of distribution networks whilst preserving continuity of supply. The entire procedure is totally gas-free, carried out through an arrangement of valves.

ALH supplies the complete package, including drilling machines, plug insertion equipment and flowstopping bags. Due to its lightweight aluminium construction, the equipment is easily transported and loaded to the gas main.

355mm to 900mm diameter mains

The large diameter Bagtube system offers an alternative to squeeze-off on polyethylene (PE) mains and Iris Stop on metallic mains operating up to 75 mbar. The system employs the same semi-supported inflatable bag used as a gas-free secondary bag in the Iris Stop system (see page 6).

Range covered in three sets

Main diameter	Insertion hole (BSP)
350-450mm (14”-18”)	4”
450-600mm (18”-24”)	5”
600-900mm (24”-36”)	6”

The bags are inserted using the 10”-24” Iris Stop valve. On PE mains, bag insertion is via a fused branch saddle, which can be permanently plugged so that the entry valve can be removed after the operation.

80mm-300mm diameter mains

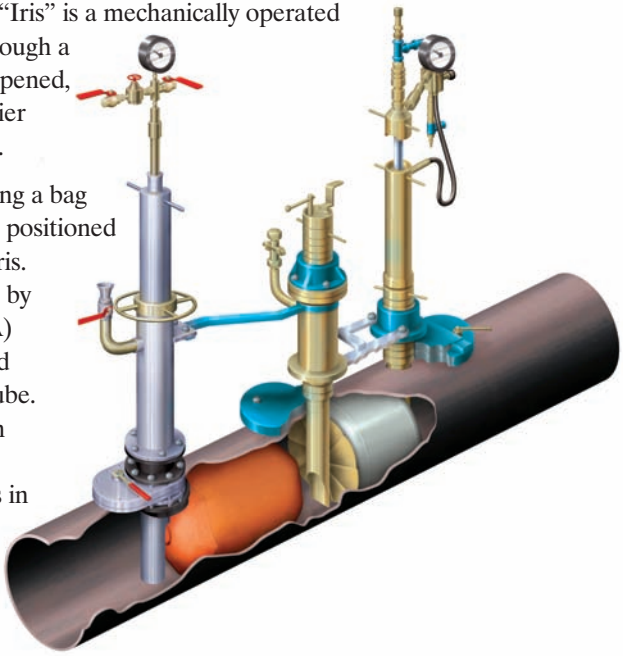
- Simple, easy-to-use and cost-effective
- Pressures up to 0.6 bar
- 2” BSP or NPT entry hole
- Supported and unsupported bag systems
- Can also be manufactured to suit individual requirements

Iris Stop – Medium pressure

Iris Stop is a technique for safe and reliable flowstopping of 100-1,200 mm (4”-48”) diameter live gas mains operating at pressures up to 2.0 bar (30 psi). The system has been proven in regular use for more than 30 years.

Iris Stop is based on the combination of structured barriers associated with high pressure pipeline working and small hole principle associated with low-pressure bagging-off operations. The “Iris” is a mechanically operated shutter, which is inserted through a small hole in the main and opened, providing the structural barrier across the pipe cross-section.

The seal is created by inserting a bag through a similar small hole, positioned on the pressure side of the Iris. A secondary seal is provided by a semi-supported bag (E20A) (see page 6) which is inserted gas-free using an ALH bagtube. Once the operation has been completed, the equipment is removed and the small holes in the pipe are plugged using ALH non-tap-plugs.



Hole sizes and design operating pressures

	Main size														
mm	100	150	200	230	250	300	380	450	560	600	690	710	760	900	1200
ins	4	6	8	9	10	12	15	18	20	24	27	28	30	36	48
Hole size	1¼”	1½”	2”	2½”	2½”	2½”	3”	4”	5”	6”	6”	6”	6”	6”	6”
Pressure (PSI/BAR)	30 2.00	30 2.00	30 2.00	30 2.00	30 2.00	25 1.67	18 1.2	10 0.67	10 0.67	10 0.67	3 0.20	3 0.20	3 0.20	2 0.13	0.5 0.035

Some operating networks have chosen to reduce the above design operating pressures
4”-12” ALH Systems Limited Design, 12”-48” BG Design

Flowstopping bags

A full range of flowstopping bags for low and medium pressure, gas-free working and open hole applications from 2” (50mm) to 60” (1,500mm). Special bags can also be manufactured to customer requirements.

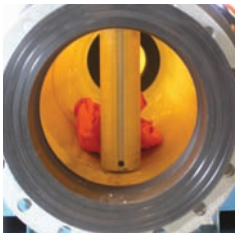
Maximum bag inflation and mains pressures supported

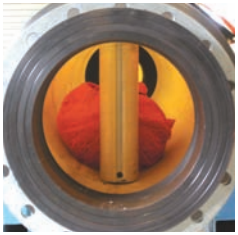
Pressure bar	GIS/E4 bags		Continental style	
Bag size	Inflation	Mains	Inflation	Mains
2” (50mm)	1.00	0.40	1.00	0.70
3” (75mm)	0.70	0.34	1.00	0.70
4” (100mm)	0.60	0.34	1.00	0.60
6” (150mm)	0.50	0.28	0.70	0.50
8” (200mm)	0.40	0.26	0.60	0.40
10”(250mm)	0.35	0.16	0.40	0.30
12” (300mm)	0.28	0.10	0.40	0.30
14” (350mm)			0.40	0.30
16” (400mm)			0.40	0.30
18” (450mm)			0.30	0.20
20” (500mm)			0.30	0.20
24” (600mm)			0.30	0.20

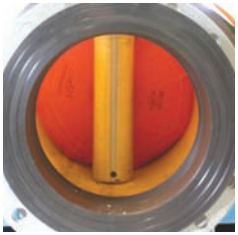
NEW gas-free secondary bag

The E20A semi-supported bag provides a gas-free secondary seal for Iris Stop operations and large diameter flowstopping. The bag has a bladder construction conforming to GIS/E20 specification.

It is made from triple-layer calendared dry natural rubber sheet, with a high tenacity unproofed nylon cover. The bag incorporates an extended neck and a backbone, which eliminates the risk of ‘twisted bladder’.



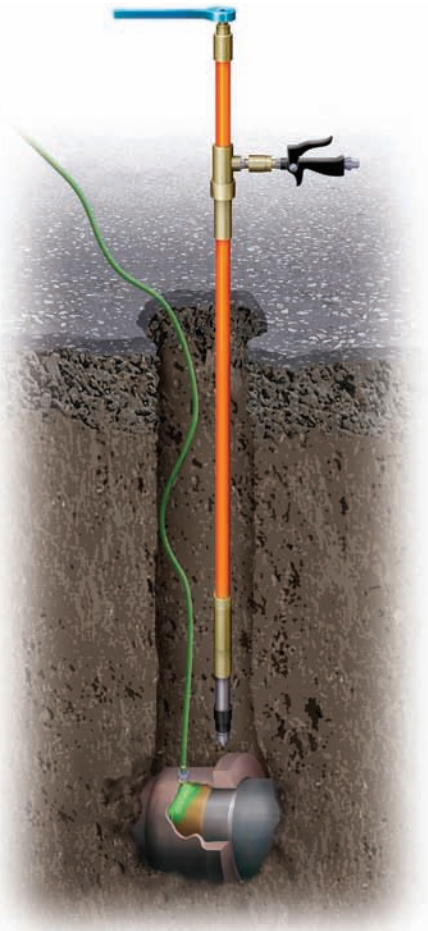




Range

- GIS/E4 Low pressure nylon bags
- GIS/E19 Iris Stop primary bag
- GIS/E20 Iris Stop secondary bag
- GIS/E20A Semi supported bag (for large diameter low pressure flowstopping and gas-free secondary bag for Iris Stop operations)
- Continental style low pressure bag
- Sniffer/sensor bags
- Double independently inflated bags

Keyhole long handle tooling



Long reach tooling enables operations to be conducted on underground gas pipes from surface level through a small ‘keyhole’ excavation. Keyhole excavation offers significant financial savings, reduced disruption to traffic and lower risk of damage to other buried plant.

The results are lower labour costs, smaller quantities of spoil and backfill material and lower reinstatement costs. Additionally, the operative is kept out of the excavation and away from the hazards associated with confined spaces.

In conjunction with network operators, ALH Systems has developed special long reach tools for keyhole operations and keyhole versions of conventional equipment, including leakage control, drilling and tapping, plug and tee insertion and camera entry systems.

Joint repair

Leaking joints between iron pipe sections can be treated without leaving the surface. This can have a big impact where a series of joints needs to be treated at frequent intervals along a main road.

Long reach tooling allows the back of a socket to be drilled and tapped to accept a standard brass injection nipple. The repair product is injected into the joint using long delivery tubes in the normal way or with the new mini pressure pot (see page 14).

Drilling and tapping

Systems for total gas-free drilling and tapping holes ¾”-6” in live mains operating at up to 4 bar (60 psi). The equipment is predominantly manufactured from aluminium for lightness. Cutters, drills and taps are also available.

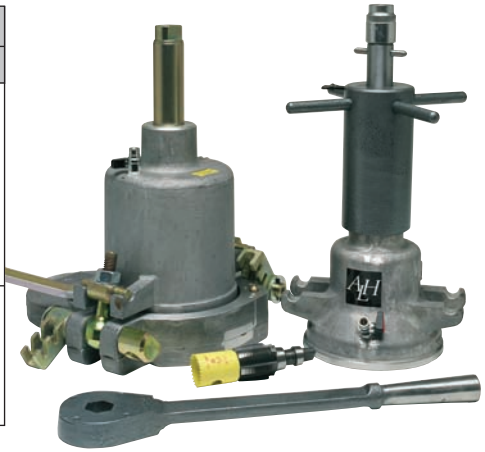
System 1 has been used for over 30 years world-wide. This machine can be hand operated or supplied with an air ratchet. Air powered drilling and tapping provides a fast and effective solution.

System 3 offers two options – a single speed air motor for smooth, high torque drilling or two-stage air motor for high speed drilling and low speed tapping. The drilling machine can also be hydraulically driven.

System 4, the new small hole working machine, has been designed for operation through an 18” core hole up to depths of 1.5 metres. The equipment allows for safe and easy entry into the gas main from the surface for keyhole operation (see also page 7).

System	Function	Hole/thread sizes
System 1	Drilling and tapping	¾”-2½” (BSP or NPT threads)
System 3	Drilling and tapping	3”-6” (BSP parallel threads)
	Drilling and tapping	3”-5” (NPT threads USA)
Option 1	Single speed air motor (680Nm torque)	2½”-6” (BSP or NPT threads)
Option 2	Two-speed, high speed drilling and lower speed tapping (3400Nm torque)	2½”-6” (BSP) 3”-5” (NPT)
System 4	For keyhole operations on pipe sizes 4”-12”	¾”-2” (BSP or NPT threads)

Hole size	Cutter size		
	BSP holes	NPT holes	
¾”	24mm	24mm	Holesaw
1”	30mm	30mm	
1¼”	38mm	38mm	
1½”	44mm	44mm	
2”	56mm	56mm	
2½”	73mm	68mm	
3”	84.58mm	82.55mm	Cup drill
4”	109.73mm	107.95mm	
5”	135.13mm	134.74mm	
6”	160.53mm	161.72mm	



Camera entry systems

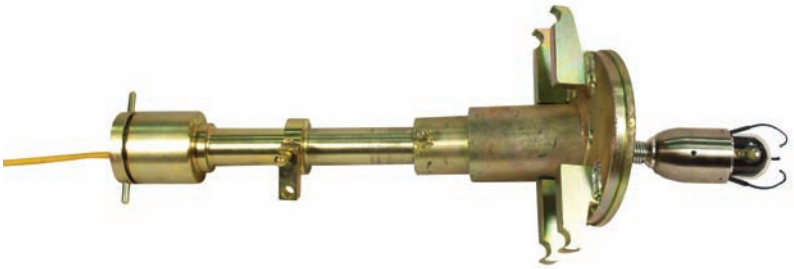
For gas-free launching of CCTV cameras for internal pipeline inspection, a range of fully approved entry heads is available for all pipe sizes. The launch equipment allows camera examination into live gas pipes with no exposure to the operator.

Full packages are available including drilling and plug insertion. Equipment allows for a 2½" hole to be drilled to accommodate larger camera entry and includes side and end entry systems.

Pipe clips are required for 4" and 6" pipe depending on the hole size drilled. Long reach tooling is available for keyhole operations (see page 7).

Water extraction

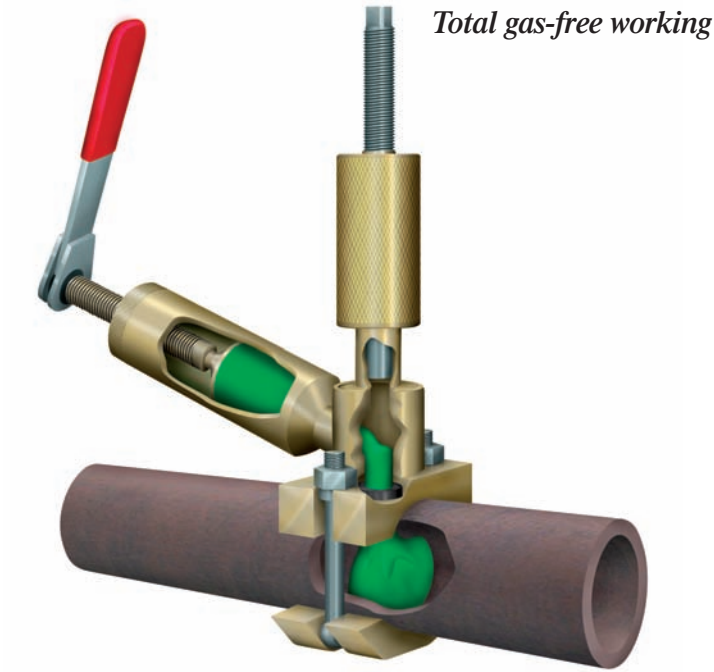
Special equipment is available for removal of water from gas mains, in conjunction with standard CCTV camera systems, including 'Y' entry heads, pumps and hoses.



Service termination

The service terminator is a simple and effective method of sealing horizontal or vertical service pipes ¾”-2”. A special single part non-hazardous, non-curing mastic is extruded into the service through a small hole drilled under gas-free conditions.

The temporary stopper allows the pipe to be cut with no risk to the operator, and then capped, removed or lined. The mastic can be removed with specialist tooling to allow live insertion.



Total gas-free working

Mastic required (low pressure working)

Service size (nominal diameter)	¾"	1"	1¼"	1½"	2"
Mastic weight (grams) (clean machine)	56	83	147	230	500

Plugs and branch connectors

Non-tap-plugs

A full range of non-tap-plugs from 2”-6” with the advantage of easy and guaranteed extraction due to the unique two flat design feature. Non-tap-plugs provide a simple and effective alternative to screwed plugs.

Composite lining plug/branch connector

A new and revolutionary solution for plugging/connecting to composite lined pipes (“Paltem” and “Phoenix” linings). Service connections can be achieved with no tracking.

Plug nipple assemblies

Full range of plug nipple assemblies from 3”-6” BSP allowing connections to existing mains from 12”-48”.

Insertion tooling

Full gas-free insertion equipment for all pipe and plug configurations.

MainSeal II

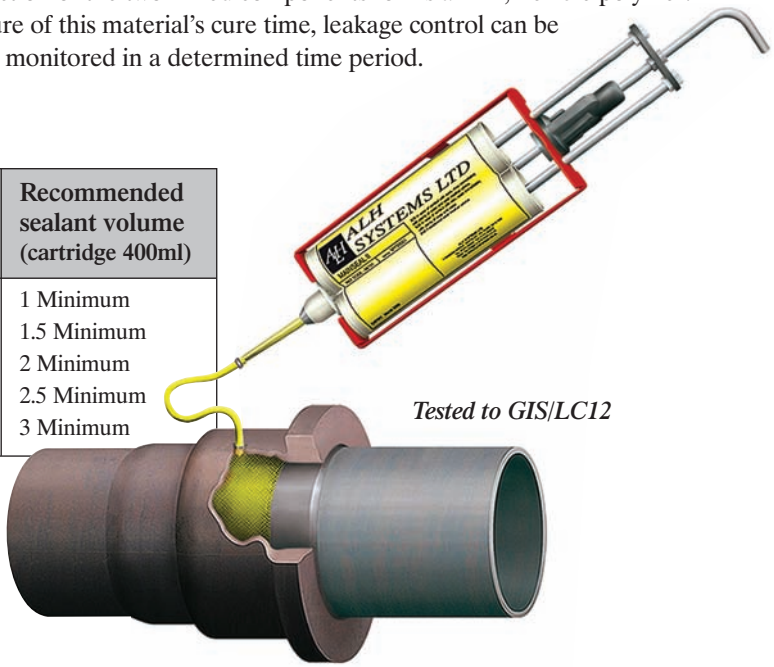
MainSeal II is an easy, quick and clean system for sealing leaking joints of any size on cast iron gas pipes. The system is suitable for repair of mechanical joints as well as lead yarn spigot and socket joints.

The two-component polymeric compound provides a non-classified, non-hazardous, external mains injection repair system. Incorporating the latest ecologically friendly polymer technology, MainSeal II is not regarded as dangerous to the environment and waste disposal is straightforward.

The product is supplied in a side-by-side cartridge fitted with a static mixer nozzle and tube and is dispensed using a specially-designed application gun. Joints can be treated by injection through the socket or directly through the lead joint face. The material comes in two viscosities – low for lead yarn joints and high for mechanical joints.

The low viscosity and surface tension of the initially mixed material give it excellent wicking properties. It works in either aerobic or anaerobic conditions, because the reaction of the two mixed components forms a firm, flexible polymer. Due to the nature of this material's cure time, leakage control can be guaranteed and monitored in a determined time period.

Pipe size	Recommended sealant volume (cartridge 400ml)
3"-6"	1 Minimum
8"-10"	1.5 Minimum
12"-14"	2 Minimum
16"-18"	2.5 Minimum
24" and above	3 Minimum



Tested to GIS/LC12

Mainspray

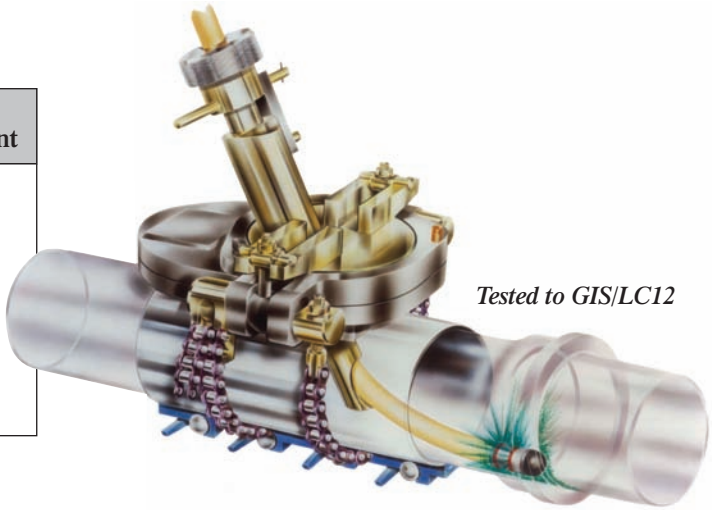
Mainspray is an effective, low-cost technique for repairing joints in iron gas distribution mains. The system utilises anaerobic sealant liquid, which is internally applied under live gas conditions. The specially-designed electronic joint location system, coupled with the internal spray head, allows accurate location of joints and pin-point delivery of sealant into the joint.

Compared with other systems for treating individual joints, Mainspray delivers considerable savings in excavation, reinstatement and time. With a reach of up to 60 metres, 120 metres of pipe can be treated from a single access excavation.

Mainspray is a two part system supplied in eight litre drums for sealing joints from 4”-48” mains. The standard package is suitable for mains 4"-18" in diameter and directional spraying equipment is available for mains of diameters 18" and above.

Sealant volumes

Pipe size	Litres per joint
3”/4”	1/4
6”	1/2
8”	3/4
10”	3/4
12”	1
18”	1 1/4
24”	1 1/2
30”+	2



Tested to GIS/LC12

Key features

- Simple to load pressure pot
- Digital liquid measurement
- Electronic joint location
- Slip ring technology
- Medium pressure glanding system
- Bronze brushed
- Distance control
- Gas-free working

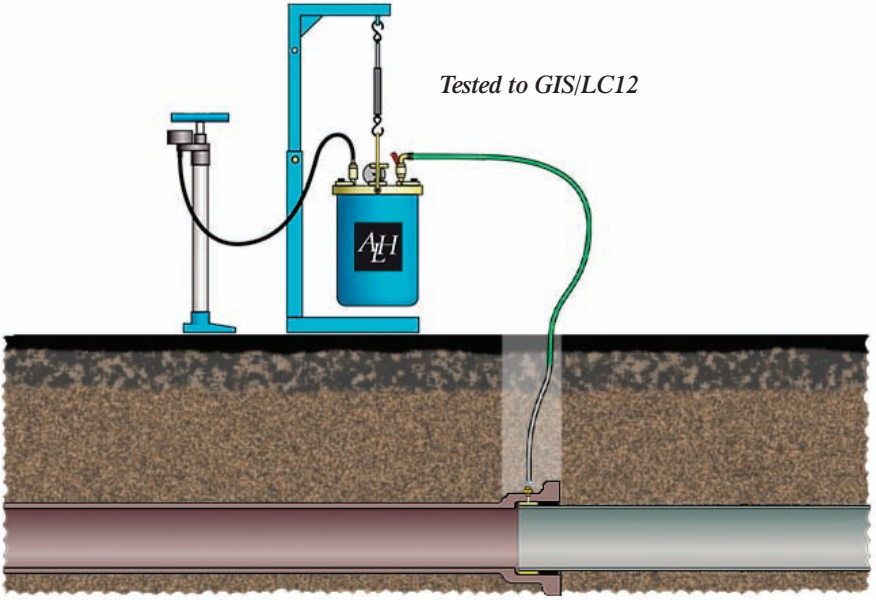
Benefits to the operator

- Low-cost leakage control and prevention
- Single point entry for multi-point repair
- Accurate joint location
- Excavations can be located to minimise traffic congestion
- Quick operation with reduced effort
- Accurate volume of liquid sprayed
- Fast and effective repair

Large diameter Mainspray injection

For repair of joints in large diameter metallic pipelines 14”-48”. With only the top of the main exposed, Mainspray liquid is directly injected through a single brass connection nipple. The system can be used with existing Mainspray liquid technology and the new mini pressure pot.

- Single injection point
- Reduced excavation size
- Reduced time spent in excavation
- Low cost equipment
- Simple operation
- No waste disposal problems
- No on cost



Long reach tooling available (see page 7)

Series Six

Series Six is a two-part polyurethane external repair system for mechanical joints on low and medium pressure metallic gas distribution mains. The technique can be used for all types of joints, including valves and tees, up to 48” in any situation.

The kits are fully effective in heavy traffic high vibration areas. Bespoke design services and on-site assistance are also available if required.

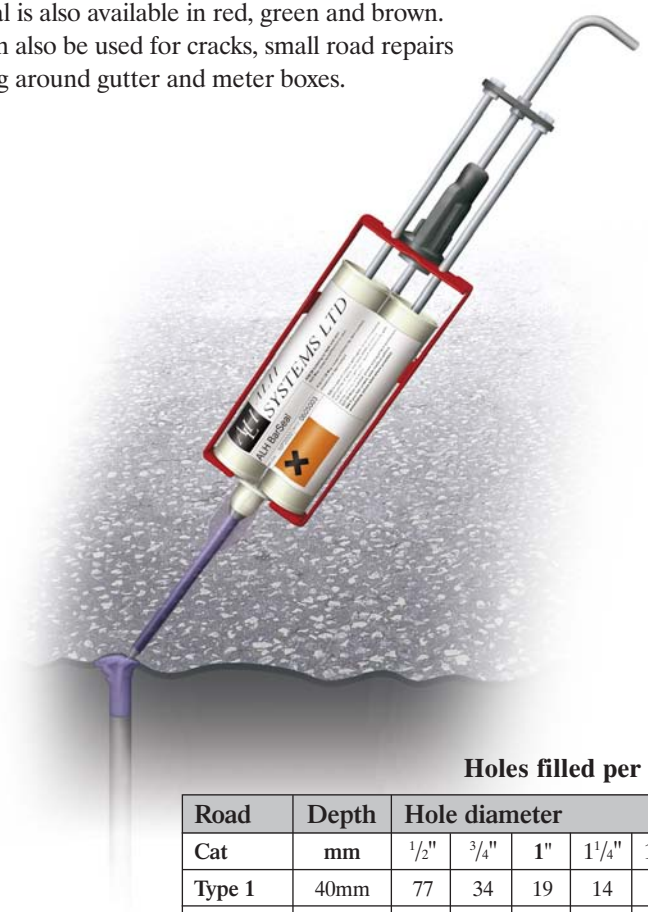
Tested to GIS/LC8/part 1 and DIN30658A

Kits available

Low pressure	**10 PSI**	**35 PSI** (with steel shell)
Lead yarn 2” - 48” Mechanical 2”- 48” (all types) Screw glands Specials	Lead yarn 2”- 48” Mechanical 2”- 48” (all types) Specials	Lead yarn 2”- 48” VJC Hook Bolt GCRK Stanton Wilson Specials

BarSeal

BarSeal is a rapid permanent repair and reinstatement system for gas sampling bar holes and core drill holes in road and pavement surfaces. The material is supplied in a 400ml cartridge for easy application. It is able to cure under water and at temperatures as low as –10°C. The two standard colours are clear and black, but the material is also available in red, green and brown.
BarSeal can also be used for cracks, small road repairs and jointing around gutter and meter boxes.



Holes filled per cartridge

Road	Depth	Hole diameter					
Cat	mm	½"	¾"	1"	1¼"	1½"	2"
Type 1	40mm	77	34	19	14	9	5
Type 2	40mm	77	34	19	14	9	5
Type 3	40mm	77	34	19	14	9	5
Type 4	40mm	77	34	19	14	9	5
Rigid	60mm	52	23	13	9	6	3

Partners for progress

ALH Systems has a long-standing commitment to innovation and ongoing support for gas distribution engineering, working in partnership with network operators and other specialist suppliers. The company undertakes dedicated research and development of systems, equipment and techniques to improve safety, increase effectiveness and reduce costs. Its Wiltshire headquarters includes a purpose-built laboratory and engineering workshop for design, manufacture and testing of new materials and specialist tooling for both metallic and PE pipelines.

Practical and safe

ALH products and systems are backed by comprehensive training support to provide operators with confidence and competence for safe and successful use. Training can be delivered anywhere in the UK, and is usually conducted on-site so that operatives gain firsthand experience. There is a strong emphasis on hands-on, practical learning and the health and safety aspects of each procedure. Courses typically range from half a day to two days and are tailored for small groups up to a maximum of five people.

Training topics

- Flowstopping (low and medium pressure)
- Leakage control (joint repair)
- Keyhole maintenance
- Gas-free operations
- Reinstatement materials

Metallic (guideline - inches)

Pipe (nom)	Grey cast iron		Ductile cast iron		Steel	
	O/D	Pipe wall	O/D	Pipe wall	O/D	Pipe wall
3	3.76	0.38				
4	4.80	0.39	4.82	0.24	4.50	0.21
6	6.98	0.43	7.04	0.25	6.62	0.21
8	9.14	0.47	9.22	0.25	8.62	0.25
10	11.26	0.52	11.34	0.26	10.75	0.25
12	13.14	0.57	13.22	0.28	12.75	0.25
14	15.22	0.61				
18	19.38	0.69	19.46	0.34	18.00	0.31
21	22.50	0.75	22.58	0.36	21.00	0.37
24	25.6	0.80	25.68	0.38	24.00	0.37

Polyethylene (guideline - mm)

Standard	SDR 9	SDR 11	SDR 17	SDR 17.6	SDR 21	SDR 26
O/D	I/D	I/D	I/D	I/D	I/D	I/D
90	68.60	72.60	78.50	78.90	80.80	82.50
110	84.00	88.90	96.00		98.70	101.00
125	95.30	100.90	109.30	109.90	112.30	114.80
140	106.90	113.20	122.40	123.10	125.80	128.50
160	122.30	129.20	139.90		143.70	146.80
180	137.60	145.40	157.40	158.20	161.80	165.40
200	152.80	161.60	174.90		179.70	183.70
225	171.90	181.80	196.70		202.20	206.80
250	191.30	202.20	218.80		224.90	229.70
280	214.10	226.50	245.00		251.70	257.40
315	240.90	254.80	275.60		283.40	289.40
355	271.50	287.20	310.50		319.40	326.30
400	306.00	323.60	350.10		359.70	367.70
450	344.20	364.00	393.80		404.70	413.70
500	382.70	404.50	437.50		449.70	459.70
560		453.20	490.10		503.80	514.90
630		509.70	551.30		566.90	579.20

Notes

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