

GG1DN Gasguard Nozzle – Recommended Maintenance & Repair Procedures.

18th May, 2011

GG1DN SERIES GASGUARD NOZZLE.

RECOMMENDED MAINTENANCE AND REPAIR & TESTING PROCEDURES.

OVERVIEW

The following statements on the maintenance and repair of the Gasguard GG1DN Series L.P.Gas Nozzle are designed to offer L.G. Equipment's (LGE) authorised international Distributors, O.E.M's & Service Centres recommended methods to bring back into serviceable condition Nozzles which require maintenance or repair.

LGE's recommendations are based on over twenty years of experience in the manufacture, assembly and testing, and repair of such Nozzles. **Whilst LGE's recommended procedures, as set out below, allow for proper repair and maintenance to be carried out on Nozzles, LGE cannot be held responsible for performance of repaired Nozzles.**

LGE has available a **GG3N SEAL KIT** for the GG1DN Nozzle Series. It contains seal components and wear items for proper service of the GG1DN Nozzle. Other components that are worn or damaged should be replaced on a needs basis. Refer to the assembly drawing for component detail and part numbers.

Age, wear and abuse of the product can render repair inappropriate, and it may be considered more economic to replace full Assemblies or even scrap the Nozzle where service inspection clearly indicates such action is required.

NOZZLE INSPECTION: It is recommended that the GasGuard GG1DN nozzle be inspected every **6-12 months** after initial installment and 3-6 months after every subsequent repair to uphold the safe operation of the GG1DN nozzle.

THE GASGUARD GG1DN SERIES NOZZLE.

The GG1DN Series Gasguard Nozzle is available in the following combinations:-

- GG1DNL – Nozzle with Latch Assembly fitted.
- GG1DNSL – Nozzle with Strainer and Latch Assembly fitted.

All Gasguard Nozzles are supplied with either a 15mm(1/2"), 20mm.(3/4")N.P.T. or 25mm. (1"B.S.P.G.) internal inlet thread for hose end connection.

The GG1DNL Nozzle Assembly consists of the following Sub-assemblies (Refer Dwg.X1323):-

- | | | |
|----|--|--------------------------|
| | (Inlet Swivel Assembly – 1/2" N.P.T. | Part No. LG2 x 15mm. or, |
| A. | (Inlet Swivel Assembly – 3/4" N.P.T. | Part No. LG2 x 20mm. or, |
| | (Inlet Swivel Assembly – 1" B.S.P.G. | Part No. LG2 x 25mm, |
| B. | Nozzle Body Assembly | Part No. 10-1314-715, |
| C. | Lever Assembly | Part No. GG5, |
| or | Lever/Latch Assembly. | Part No. GG5L |
| E. | Valve Assembly | Part No. LG4N, |
| F. | Connector Assembly | Part No. GG7N, |
| G. | Strainer (optional). | Part No. LG9. |

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TOOLS RECOMMENDED FOR SERVICE ON THE GASGUARD NOZZLE.

L.G.E. recommends the following tools be available to facilitate repair and maintenance of the Nozzle:-

- i) Adjustable pin spanner (Wrench) – Opening to 38mm (1.50”) across flats,
- ii) Internal circlip pliers,
- iii) Light ball-peen hammer,
- iv) 3.2mm (1/8”) dia. drift,
- v) Screw driver (medium size),
- vi) Bench vice,
- vii) 2.5 and 3.0mm across flats allen keys,
- viii) Spring clamps (medium size) - two only,
- ix) Sharp Nose Punch,
- x) Drill Bit – 5mm dia.
- xi) Nose Piece Assembly tool (available form L.G.E.)

ASSEMBLY GREASE RECOMMENDED FOR SERVICE ON THE GASGUARD NOZZLE.

L.G.E recommends and uses the following greases for general coating and/or lubrication of moving parts and threads in the assembly of the Gasguard Nozzle:-

- a. Aeroshell 22 (Grease) or equivalent for use on all threads,
- b. Dow Corning Molycote FS3451 fluorosilicone grease (Molycote) for use on all dynamic O-Ring, U-cup seals and lip seals,
- c. Nulon – L90 “Xtreme Pressure” Anti seize Lubricant.

L.G.E particularly recommends the use of the above greases where ambient temperatures can reach to –55 degrees Celcius. They provide satisfactory properties up to +80 degrees Celcius.

Aeroshell 22 Grease should be applied sparingly by a small brush. It should be used to lubricate all threads and close fitting parts prior to their assembly to mating components and/or assemblies.

Molycote grease may be used to assist easy fitment of seals: U cup, Back-up ring concave face and O-Ring type before their assembly into their related grooves/recesses, or shoulders. A thin film of Molycote is adequate.

Nulon L90 Grease is recommended to be used on rotating parts. Used sparingly with a small brush it should be applied to the slide sleeve, from the bearing at the top down to the ball groove, after seals and bearings have been assembled. It can then be mated to the swivel nut. More details are found on page 6 GG7N connector Assembly.

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DISASSEMBLY OF GG1DN MAJOR SUB-ASSEMBLIES (Refer Dwg. X1325)

1) Connector Assembly (E), Lever Assembly (C)

- Remove the Slide Sleeve Saddle (#10 of Dwg. X1351A), by sliding the Saddle over the rear of the Slide Sleeve using screw drivers or similar tools as levers.
- Remove the Lever Pivot Pin (#3 Dwg. X1300), then slide the Connector Assembly from the front of the Nozzle. This will expose the Valve Assembly (D).
- Remove the Lever Assembly from within the Nozzle Body lever guard.

2) Inlet Swivel Assembly (A)

- Remove the Locking Screw (#2) from the Nozzle Body Assembly (Dwg. X1304). Fit the Inlet Swivel flats of the Internal Swivel Body (#1 on Dwg. X0777) in a vice, and rotate the Nozzle Body anti-clockwise using a suitable spanner or adjustable wrench. The Inlet Swivel Assembly is removed and held for repair in Section A below.

3) Valve (D), Body (B), Strainer Assembly (F)

Fit the Valve Assembly (D) into a vice, using its flats to locate and hold the Assembly.

- (a) Rotate the Nozzle Body in a counter clockwise direction and separate Valve Assembly from the Body Assembly (B).
- (b) Remove the Strainer (F) (if fitted) by hand.

At this stage there will be six (6) Assemblies ready for individual inspection and service.

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DISASSEMBLY & MAINTENANCE OF SUB-ASSEMBLIES

A. LG2 INLET SWIVEL ASSEMBLY – Dwg. No. X0777.

Disassemble

- Holding the Inlet Swivel Assembly with the Ball Race Plug (#9) on the underside, give the Swivel a sharp tap on a hard surface to dislodge the Ball Plug. Having removed the Ball Plug, place the Internal Swivel Body (# 1) flats between a vice. Remove the Ball Bearings (13 off) (#3) by counter-rotation and if necessary apply solvent to remove grease. Pull apart the Internal Swivel Body (#1) and External Swivel Bodies (# 2a, b & c).
- Remove and discard all Seals and Back-up rings. Please note that the LG2 x 25mm. Assembly is supplied with a pipe O ring seal, which fits in the internal groove of the External Swivel Body (#2c), this seal should be inserted before screw connecting the GG1DN Nozzle to its dispenser hose connection. This O ring is not supplied in the GG3N kit.

Inspection

- Clean all parts in mild solvent and dry. Check the swivel section of both Swivel Bodies for clean, mark-free surfaces. Wear in the bearing groves and for unbroken plating.

Assembly

- Assemble one of the two (2) Main Seal O Rings (#6) to the centre internal shoulder of the Internal Swivel Body (#1). Assemble the concave surface of the Back-up Ring (#7) to the forward surface of this O ring. Fit the second O ring (#6) to the front O ring internal groove of the Internal Swivel Body.
- Assemble the O ring Dust Seal (#8) to the rear shoulder of the External Swivel Body (#2).
- Apply Aeroshell Grease to matting surfaces and with an easy twisting and forward thrusting motion, insert the External Swivel Body (#2) to the Internal Swivel Body (#1).
- Place this Assembly in a vice, with the Ball Race groove hole facing upward. Assemble the first of the 13 only Ball Bearings (#3) through this hole using a slight axial pressure between the two Swivel Bodies. Rotate the External Swivel Body to facilitate the first Ball Bearing entry and thereafter the remaining 12 Balls can be inserted during a slow rotation of the External Swivel Body.
- Fit the Ball Race Plug (#9) to the hole with its extraction hole facing outward. A little grease in the ball plug hole will prevent the Plug from falling out when handling this Inlet Swivel Assembly.
- The Inlet Swivel Assembly is complete and ready for re-assembly to the Nozzle Body Assembly.

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B) NOZZLE BODY ASSEMBLY – refer Dwg. No. X1314.

- This Assembly requires little or no maintenance, excepting close inspection to ensure all threads are in good condition for assembly of the Inlet Swivel Assembly and Valve Assembly. Cleaning and thread greasing is normally sufficient for this Assembly. Ensure that the Nozzle Body is not distorted and the Comfi-grip (#7) and Lever Latch Pin (#3) are correctly fitted. If being replaced, the pin should be ground flush with the pin supports on the body.
- In the unlikely event maintenance required on the Pawl Sub-assembly unscrew the Pawl Adjusting Nut (#6), remove the Pawl (#5) and Spring (#4). Check all three items for damage, and if replacement of any part is necessary, it is recommended that all three items are to be replaced with new parts.
- Use a little grease on the body internal thread; assemble the Spring, Pawl and Adjusting Nut, preferably with a slotted screwdriver. Check that the pawl leading radius point is 3.9-4.0mm from the machined face of the nozzle body Using a sharp nose punch and hammer, punch the nozzle body next to the Pawl Nut. This is to stop the Pawl Nut rotating during service.

C) GG5 LEVER ASSEMBLY or GG5L LEVER/LATCH ASSEMBLY – refer Dwg. No. X1300.

- This Assembly is normally in a satisfactory condition to be reused in a maintenance programme.
- Check the Slippers (#2) for excessive wear on their faces to the Nozzle Body. If there is wear, replace the Slippers – 2 off.
- If a Latch (#6) is fitted, check that its Latch Spring (#7) operates freely with the Latch. Ensure that the Latch has not been damaged or badly worn at the Latch Pivot Pin or contact point with Body Latch Pin. If damage or wear is evident then replace the complete Lever Assembly.

D) GG4N VALVE ASSEMBLY – refer Dwg. No. X1336.

Disassembly of Valve

- Unscrew Valve Body Assembly from Nozzle Body, holding Valve Body (#3) in a vice and applying close fitting wrench to the flats on the Nozzle Body. Discard the Valve/Body O’Ring (#9).
- Remove Circlip (#8) with pliers and remove spring Guide (#7), Ball Valve, Guide/Spring Assembly (#6).
- Place Valve Body in vice, using the flats of the Body and carefully apply close fitting wrench pressure to unscrew the U cup Spacer Housing (#1).
- Remove and discard U cup Seal (#2), Housing O Ring (#5) and DN Valve Seat (#4) from the Valve Body.

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Inspection

- Check the condition of the face of the Ball Valve, and if scored or damaged, replace the Ball Valve, Guide/Spring Assembly (#6). Check and clean all other components. Ensure the U-cup Seal groove in the “DN” Series Housing (#2) is clean and smooth.
- The “DN” Valve Seat (#4), U-cup Housing O ring (#5), U-cup Seal (#2) and Valve Body O ring (#9) are available from the **GG3N Seal Kit**. These should all be replaced at each service. Other items will only be replaced if worn or damaged.

Assembly

- Assemble U-cup Seal (#2), to “DN” U-cup Seal Housing (#1), ensure that the seal groove is clear of any swarf or dirt prior to fitment. Lightly grease the thread of the cleaned Valve Body (#3). Fit “DN” Valve Seat (#4) and Housing O ring (#5) into the Valve body.
- Fully screw this assembled U-cup Seal Housing using a wrench. The U-cup Housing should be firmly fitted into the Valve body. Over tightening will distort the Valve seat and create potential damage to seat.
- Stand the Valve body vertically and fit the stem of the Ball Valve, Guide/Spring Assembly (#6) into the Valve Spring Guide (#7) and place on what is now the underside of the Valve Seat (#4). Press the Valve Guide to expose the groove and fit the Circlip (#8). Ensure Circlip (#8) is correctly fitted and secure in the groove. Check spring action.
- Fit Valve / Body O ring (#9) into its groove behind the external thread of the Valve Body.
- The LG4N Valve Assembly is now ready to be assembled into the GG1DN Nozzle Body Assembly.

E) GG7N CONNECTOR ASSEMBLY – refer Dwg. No. X1351.

Disassembly

- Unscrew the ball plug (#8) of the connector assembly and remove the Ball Bearings (#7) – 31 only. A small amount of turps or similar dropped into the Ball Plug screw hole could assist the Ball Bearing removal.
- Withdraw the Swivel Nut (#5) and remove the internal (#4) and external (#3) lip seals from their grooves in the slide sleeve (#1) and discard the seals. Remove the GG6N Nose Piece.
- Refer to Dwg No. X1343B for Nose Piece Assembly. Remove Circlip (#6e) from the Tail Piece (#6d) of the GG6N Nose Piece Assembly. With a pulling and screwing action, disengage the Nose Piece from the Tail Piece. This will expose the red Lip Seal (#6c). This elastomer as well as the white Nose Piece O ring (#6b) should be discarded and replaced prior to re-assembly.

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Inspection

- Thoroughly clean the Nose and the Tail Piece and the Slide Sleeve, also clean the ACME Connector Nut and check if the thread is thick enough to last another 6 months (at least) in the working environment, if worn replacement is necessary.

Assembly

- For LG 6N Nose Piece; lightly grease the new Lip Seal (#6c) and slide into the cleaned internal groove. Molycote the white Nose Piece O ring (#6b) and assemble it into the Nose Piece Seal groove, ensuring that the Lip Seal is correctly orientated. Re-assemble the Tail Piece (#6d) to the Nose Piece with a pushing and screwing action, and check that there is easy to and fro sliding action between the two metal components.
- Refit the Circlip (#6e) into its groove in the Tail Piece (#6d). A special tool is recommended for this procedure. L.G.E. can recommend it's sourcing. Again check the free movement between the Nose and Tail Pieces when pulled and pushed together to their respective stops

Note: Special care should be taken to ensure the Lip Seal groove is clean. L.G.E. recommends that the groove is lightly greased using Dow Corning Molycote prior to fitment of the Lip Seal.

- Assemble the External Lip Seal (#3) into its groove in the Slide Sleeve. This is facilitated by using a smooth 3mm diameter rod, placing the Lip Seal partially into the groove of the Slide Sleeve. Hold the seal in place with thumb whilst rotating the rod around the outside diameter of the Slide Sleeve and the inside of the Lip Seal, this will allow you to ease the Lip Seal onto the Slide Sleeve and thence into the groove. Checking correct seal orientation.
- Ensure that the External Lip Seal (#3) is sitting squarely and untwisted in its groove and the Lips facing towards the front of the Nose Piece.
- Assemble the Internal Lip Seal (#4) into its internal groove on the Slide Sleeve, with the same precautions as per the External Lip Seal (#3) above. Lightly smear Nulon L90 lubricant onto the exposed lips on each of the seals. Apply with a small brush from the split bearing at the top end down to the ball groove. Applying too much Nulon L90 lubricant around the ball groove will inhibit insertion of ball bearings (#7).
- Insert the GG6N Nose Piece Assembly (#6) into the Swivel Nut (#5) and ensure that it is sitting squarely and centrally against the back of the ACME thread of the same. Gently rotate and push the Slide Sleeve with Lip Seals into the Swivel nut and align the Ball Race Groove of the Slide Sleeve to the tapped hole of the Swivel Nut.
- Hold the Swivel Nut tightly in a Vice with the Ball Race Plug hole facing up wards and insert the thirty-one (31) only cleaned Ball Bearings into the Ball Race at the same time slowly rotating the Slide Sleeve to assist entry.

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- Apply a small amount of Loctite 626 Thread Locker or similar to the Ball Plug (#8) and screw same into its position flush with the lug of the Swivel Nut.
- Rotate the Swivel Nut on the Slide Sleeve to ensure free movement of the same. Place on one side for the final Assembly to the repaired GG1DN Nozzle.
- If the Valve Spring Proved fit for use (ie. once compressed it returns to its original deformation), place it inside the Slide Sleeve ready for final assembly of the GG1DN Nozzle.

F) LG9 STRAINER ASSEMBLY – Dwg. No. R0872C.

- The Strainer (if fitted) should be inspected for contaminants and damage. If there is evidence of damage to the Nitrile flange it should be replaced. If the strainer mesh is filled with contaminants, use air pressure to dislodge contaminants. It may be necessary to soak the strainer in a solvent (such as Shell Narrow or Kerosene) to help soften and dislodge the contaminants. If the contaminants cannot be cleaned from the Strainer, it is then appropriate to replace this item.

ASSEMBLY OF THE GG1DN GASGUARD NOZZLE – refer to Dwg. No. X1323.

After maintenance of each Sub-assembly of the GGDN Nozzle, reassemble as a full Nozzle.

1) Assemble Inlet Swivel (A) & Body Assembly (B)

- Fit Nozzle Body/Swivel O Ring and Back Up Ring (#4 & #5 of Dwg X0777) into Nozzle Body. Place the Inlet Swivel Assembly (A) in a vice. Apply grease to the external diameters and external thread of the Internal Swivel Body (#1).
- Screw connect the Nozzle Body Assembly (B) to the Inlet Swivel Assembly firmly. Secure with the Locking Screw (#2 of Dwg X1304) to the Nozzle Body with an Allen Key.
- Check the Swivel Assembly rotates relative to the Nozzle Body. This rotational torque may be high initially, but it will loosen up with use.

2) Assemble Valve Assembly (D), Strainer (F) To Body

- Grease thread of Valve Assembly (D).
- Check O ring is fitted and if required, fit the LG 9 Strainer (F).
- Holding the Valve Body flats in a vise, screw the Nozzle Body onto the Valve Assembly. Check O ring is fully contained in its groove.

Note: At this stage of assembly, LGE recommend that a hydrostatic pressure test is carried out, to ensure assembly holds pressure without leaking. Refer to Nozzle Test Procedure – Over-Leaf for more details.

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3) Assemble Connector (E) and Lever (C)

- Make sure that you grease up the outside of the Valve Assembly before mating the two parts, this will ease the Valve/Body (D) into the Connector Assembly (E) and reduce wear over time.
- Fit the Lever Assembly (C) to the Nozzle Body; ensure that Lever is correctly aligned on Body and Body Lever Guard Web. Fit Lever Slippers (#2 - Dwg X1300) to Lever Assembly.
- Holding the Body and Lever, slide the Valve Assembly into the connector until the Lever Pivot Pin holes on the Lever and Connector Slide Sleeve, align. The Slide Sleeve must be fully pushed into Outer Sleeve for you to lock the pin through the Sleeve into the holes in the Lever and out the other side of the Sleeve again.
- Fit the Lever Pivot Pin (#3) – Dwg. X1300. Push this Lever Pivot Pin home fully.

Note: The Nozzle should be tested in an appropriate manner to confirm correct operation and performance prior to installation in the field, before fitting the Connector Saddle (#10 – Dwg. X1351A) and allowing use of the Nozzle. Refer to Nozzle Test Procedure – below for more details.

GG1DN NOZZLE TEST PROCEDURE

LGE recommends two (2) series of tests be carried out, i) **static** and ii) **dynamic** flow test.

It is recommended that the Nozzle be flow and pressure tested using LPGas (propane) as the testing medium (when performing Dynamic tests) at the normal flow pressures of 1300-1600 kPa (200-220 p.s.i.) experienced in the field. If LPGas (propane) is not available, a satisfactory substitute testing medium is bottle nitrogen set on its regulator at 1800 kPa or Compressed Air.

L.G.EQUIPMENT STRESSES THAT THE OPERATING PROCEDURES OVER-LEAF, BE PRECISELY PERFORMED BEFORE IT GOES ON-SITE AND THEN AGAIN ON THE SITE ITSELF.

STATIC TEST:

- 1) The **Static Test (with pressurised Air or Nitrogen)** should be performed firstly without connector (C) or Lever Assy (E), the Nozzle is connected to the supply hose, essentially fitted with an isolating valve immediately upstream of the hose end connection to the Nozzle. Apply pressure from the pressure unit at the above stated flow pressures, and slowly open the isolating valve.
- 2) With the Nozzle closed, check gas pressure security at all joints on the Nozzle especially at the Inlet Swivel connection to the Nozzle. Carry out this test by immersing the Nozzle Assembly in a container of detergent loaded water. Whilst checking pressure security, apply a bending moment to the Inlet Swivel of approx. 27Nm (20 foot pounds) whilst rotating the Swivel Assembly slowly.

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- 3) Once point 2) is completed apply Connector (C) and Lever Assy (E), without allowing gas into the Nozzle, connect the Nozzle Assembly via its ACME thread to an approved (vehicle) or Adaptor (ie. blanked connector), and check that the Nozzle locks firmly onto the Adaptor when the Lever is fully operated. If firm locking takes place, it can be assumed that the Valve of the Nozzle has opened and would allow LPGas to pass through same during normal pump operation.
- 4) Check Lever movement and where fitted that the Latch engages when the Lever is pulled back and allowed to rest open. Disengage the Latch by pulling back on the Lever and releasing to return Lever to the closed position.

DYNAMIC FLOW TEST:

- 1) For a **Dynamic Flow Test (with LPGas)**, connect the Nozzle to a vehicle connector fitted to the vapour return line on a dispenser or test rig, with a down-stream connector to a receiving tank.
- 2) Allow gas into the Nozzle and check for gas vapour while valve is closed (ideally spraying a liquid diluted with a detergent, to see any apparent leaks).
- 3) Activate Lever to allow gas flow. Check for leaks from the Connector sides (using same method as above). Release the lever and unscrew the Nozzle off $\frac{1}{2}$ to $\frac{3}{4}$ of a turn and test again, making sure the Dual Nose Piece operates properly. On releasing the Lever the second time check that there is a small amount of gas caused to escape to atmosphere.
- 4) At the conclusion of satisfactory static and dynamic tests, close the hose end isolating valve, operate the Lever to depressurise the Nozzle and remove the Nozzle from the supply hose. Fit the available Connector Saddle (#10 on Dwg. No. X1351) to the Slide Sleeve of the Connector Assembly.

IF ALL OF THE ABOVE ARE CARRIED OUT WITH CARE AND ATTENTION TO DETAIL, YOUR GASGUARD NOZZLE WILL PROVIDE YOU WITH SATISFACTORY SERVICE. HOWEVER, L.G.E. CANNOT BE HELD RESPONSIBLE FOR ANY INCIDENT, ACCIDENT OR OTHER SITUATIONS WHICH MIGHT OCCUR WHEN FOLLOWING THE ABOVE REPAIR AND MAINTENANCE PROCEDURES.

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