Engineering Data Sheet

Installation, Operation & Maintenance Instructions for Newman Milliken Lubricated Parallel Plug Valves

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CE MARKING AND THE PRESSURE EQUIPMENT DIRECTIVE 97/23/EC

This has been implemented in United Kingdom law by the Pressure Equipment Regulations 1999 (SI 1999/2001).

The regulations apply to all valves with a maximum allowable pressure greater than 0.5 bar. Valves with a maximum allowable pressure not exceeding 0.5 bar are outside the scope of the Directive. Valves are categorised in accordance with the maximum working pressure, size and ascending level of hazard, which is dependent on the fluid being transported. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam. Categories are SEP (sound engineering practice) and for ascending levels of hazard, I, II, III or IV. All valves designated as SEP do not bear the CE mark nor require a Declaration of Conformity. Categories I, II, III or IV carry the CE mark and require a Declaration of Conformity (Note- all valves up to and including 25mm (1") having a maximum allowable pressure greater than 0.5 bar are designated SEP regardless of fluid group.)

CE MARKING AND THE ATEX Directive 94/9/EC

Concerning equipment and protection systems intended for use in potentially explosive atmospheres.

This has been implemented in United Kingdom law by the Equipment and Protective Systems Intended for Use in

Potentially Explosive Atmospheres Regulations 1996 (SI 1996/192) and amended by The Equipment and Protective Systems (amendment) Regulations 2001 (SI 2001/3766).

The regulations apply to all valves where each valve:

- has its own potential source of ignition.
- operates in a potentially explosive atmosphere created by:
    - the presence of air / dust mixtures external to the valve.
    - the presence of gases, vapours, mists released from the valve through leakage.

The regulations will not apply to a valve without a potential source of ignition, which operates in a dust free environment and the fluid being transported is cold, inert gas or non-flammable liquid.
The requisite level of protection for valves not exempt from the regulations is defined as Group II category 2 and shall bear the following marking:

 **II 2 GD X**

PRODUCT LIFE CYCLE

The life of the valve is dependent on its application, frequency of use and freedom from misuse. Compatibility with the system into which it is installed must be considered. The properties of the fluid being transported such as pressure, temperature and the nature of the fluid must be taken into account to minimise or avoid premature failure or non-operability. A well-designed system will take into consideration all the factors considered in the valve design, but additionally electrolytic interaction between dissimilar metals in the valve and the system must be examined. Before commissioning a system, it should be flushed to eliminate debris and chemically cleaned as appropriate to eliminate contamination, all of which will prolong the life of the valve.

LIMITS OF USE

The valves to which these installation, operation and maintenance instructions apply have been:

a) categorised in accordance with the Pressure Equipment Directive.

b) designated with the requisite level of protection in the ATEX Directive as Group II Category 2 non-electrical equipment.

These valves are permitted for use with Group 1 gases i.e. hazardous and may also be used on Group 1 liquids, Group 2 gases and Group 2 liquids

PN rated valves

Fluid	Group 1 Gas		
Fig No.	PN	DN	Category
170	16	1” 1¼”-2” 2½”-4”	SEP I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PN	DN	Category
200M, 200R 200L	16	½”-1” 1¼”-2” 2½”-3”	SEP I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PN	DN	Category
171	16	25 32-50 65-200 250-600	SEP I * II * III *
201M, 201T, 221T 201T	16	15-25 32-50 65-200	SEP I * II *

* Categories I and II require CE mark

Class Rated Valves

Fluid	Group 1 Gas		
Fig No.	PS	DN	Category
201M, 171M, 201T 171M only	6.9 (D drilled)	4”-6” 8”	SEP SEP
201M, 171M	13.8 (E drilled)	¾”-1” 1½”-2½” 3”-8”	SEP I * II *
201L only 201L, 201R		¾” 1” 1½”-2½”	SEP SEP I *
201T		1½”-2½” 3”-8”	I * II *
221L and 221T		2” 3”-4”	I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PS	DN	Category
170	13.8 ANSI 125	1” 1¼”-2” 2½”-4”	SEP I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PS	DN	Category
200M, 200R 200L	13.8 ANSI 125	½”-1” 1¼”-2½” 3”	SEP I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PS	DN	Category
171	13.8 ANSI 125	25 32-65 80-200 250-600	SEP I * II * III *
201M, 201R 301T 301L	13.8 ANSI 125	15-25 32-65 80-200	SEP I * II *

* Categories I and II require CE mark

Fluid	Group 1 Gas		
Fig No.	PS	DN	Category
400	34.5 ANSI 250	½”-1” 1¼”-2”	SEP II *
401	34.5 ANSI 250	15-25 32-100 125-150	SEP II * III *

* Categories II and III require CE mark

Operating pressures and temperatures

Screwed End Valve

PN	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
16	16 bar from –10°C to 120°C #	10.8 bar at 260 °C #

Class	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
250	34.5 bar from –10°C to 120°C #	17.5 bar at 260 °C #

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Not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids.

Flanged End Valves

PN	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
16	16 bar from –10°C to 120°C #	11.2 bar at 250 °C #
25	25 bar from –10°C to 120°C #	17.5 bar at 250 °C #

Class	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
Class 50	6.9 bar from –10°C to 40°C #	3.5 bar at 155 °C #
Class 100	13.8 bar from –10°C to 40°C #	6.9 bar at 170 °C #
ANSI 125		
½”-12”	13.8 bar from –10°C to 65°C #	8.6 bar at 230 °C #
14”-24”	10.3 bar from –10°C to 65°C #	6.9 bar at 180 °C #
ANSI 250		
½”-12”	34.5 bar from –10°C to 65°C #	17.2 bar at 230 °C #
14”-24”	20.7bar from –10°C to 65°C #	14.1 bar at 200 °C #

Not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids, high velocity gases that can cause shock waves.

The maximum surface temperature under normal use is given in the table. The auto-ignition temperature of a surrounding potentially explosive atmosphere must exceed the equipment surface temperature by at least 25% (BS EN 1127-1 clause 6.4.2).

The maximum temperature at which a valve may operate depends upon the sealing compound with which the valve is filled. However, should the sealing compound have an operating temperature different to that of the valve the lower temperature must apply.

Compound	90	44	17	18C	74
Temperature Range	–10°C to 190°C	–10°C to 140°C	–10°C to 150°C	–10°C to 230°C	–10°C to 250°C

PRESSURE/TEMPERATURE RATING

Valves must be installed in a piping system whose normal pressure and temperature do not exceed the above ratings.

If system testing will subject the valve to pressures in excess of the working pressure rating, this should be within the test pressure for the body with the valve open.

The maximum allowable pressure in valves as specified in the standards is for non-shock conditions. Water hammer and impact for example, should be avoided.

If the limits of use specified in these instructions are exceeded or if the valve is used on applications for which it was not designed, a potential hazard could result.

LAYOUT AND SITING

It should be considered at the design stage where valves will be located to give access for operation, maintenance or repair (i.e. removal of plug through bottom cover).

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Straight through pattern (2 way) Milliken plug valves can be installed with the flow in either direction while careful consideration should be given during installation for 3 way and 4 way ('L' and 'T' ported) valves with respect to flow direction.

Heavy valves may need independent support or anchorage.

In the interests of safety, valves installed on end-of-line service in the closed position with infrequent opening should be fitted with a locking device on the operating mechanism. Alternatively, it should be fitted with a blanking flange on the downstream flange of the valve.

INSTALLATION

Prior to installation, a check of the identification plate and or body marking must be made to ensure that the correct valve is being installed. Any electrical component e.g. actuators, limit switches must be explosion proof and comply with the Directive and Standards as listed in BS EN 1127-1 clause 6.4.5.

Valves are precision manufactured items and as such, should not be subjected to misuse such as careless handling, allowing dirt to enter the valve through the end ports, lack of cleaning both valve and system before operation and excessive force during bolting and handwheel operation.

All special packaging material must be removed.

Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body, which would impair its performance.

When large valves are provided with lifting lugs or eye nuts, these should be used to lift the valve.

Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.

Threaded Valves

Confirm that the pipe threading length is correct to avoid excessive penetration of the pipe into the valve, which would otherwise cause damage.

Thread sealing compounds appropriate to the application must be used but excessive use should be avoided, since this increases thread interference and may cause overstressing of the body ends.

Ensure the threads are properly engaged and proceed to tighten the valve onto the pipe. The wrench must only be located on the valve end into which the pipe is being threaded to avoid distortion of the valve.

Flanged Valves

Valve end protectors should only be permanently removed immediately before installation. The valve interior should be inspected through the end ports to determine whether it is clean and free from foreign matter.
The mating flange (both valve and pipework flanges) should be checked for correct gasket contact face, surface finish and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.

The gasket should be suitable for the operating conditions or maximum pressure/temperature ratings.

The gaskets should be checked to ensure freedom from defects or damage.

Care should be taken to provide correct alignment of the flanges being assembled. Suitable lubricant on bolt threads should be used. In assembly, bolts are tightened sequentially to make the initial contact of flanges and

gaskets flat and parallel followed by gradual and uniform tightening in an opposite bolting sequence to avoid bending one flange relative to the other, particularly on flanges with raised faces.

Parallel alignment of flanges is especially important in the case of the assembly of a valve into an existing system.

Flanged joints depend on compressive deformation of the gasket material between the flange surfaces.

The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized.

SEALING

In service, appropriate sealing compound should be used for each individual medium to effect good isolation.

Refer to the sealing compound application guide for suitability of service.

OPERATION

Milliken lubricated plug valves are normally wrench or gear operated.
(These valves may also be operated using Actuators.)

Note:- The valve should only be used in the open or closed position.
Regulating or throttling service should be avoided.

Wrench Operated

Valve closing is by clockwise motion of the wrench through 90°
Valve opening is by anti-clockwise motion of the wrench through 90°.

The drive square on the plug has a cast diamond shaped indicator to show plug position.

Gear Operated

A worm gear reduction operator (gearbox) is mounted on the valve body with the gear quadrant intimately connected with the valve stem.

Valve closing is by clockwise rotation of the handwheel.
Valve opening is by anti-clockwise rotation of the handwheel.

Care must be taken particularly with geared valves that the plug is eased off the body stop after operation.

Plug position is indicated by a moving pointer on the gearbox cover.

At the conclusion of installation and before operating, all dust deposits shall be removed from the equipment.

MAINTENANCE

The valve should be at zero pressure and ambient temperature prior to any maintenance.

Maintenance Engineers & Operators are reminded to use correct fitting tools and equipment, as follows:

Valves within the scope of the ATEX Directive with a protection level defined as Group II category 2 will operate in Zone 1 (gases / vapours) or Zone 21 (dusts) designated in BS EN 1127-1 Explosion prevention and protection. Tools are either ‘single spark’ e.g. screwdriver, spanner, impact screwdriver or ‘shower of sparks’ e.g. sawing or grinding. Only steel ‘single spark’ tools are permissible in Zones 1 and 21.
Tools causing showers of sparks are only permissible if:

- no hazardous explosive atmosphere is present.
- dust deposits have been removed and no dust cloud is present.

The use of tools on equipment in Zones 1 and 21 should be subject to a 'permit to work' system.

A full risk assessment and methodology statement must be compiled prior to any maintenance. This must include the removal of dust deposits by good housekeeping.

The risk assessment must take into account the possibility of the limits of use being exceeded whereby a potential hazard could result.

A maintenance programme should therefore include checks on the development of unforeseen conditions, which could lead to failure.

In systems where corrosion could be a potential hazard, wall thickness checks on the body and bonnet should be made. This requires either the removal of the valve from the pipeline or removal of the bonnet with the system at zero pressure. If the wall thickness has reduced by 25%, the valve must be replaced.

Milliken lubricated plug valves require routine maintenance and frequent operation to maintain the valve in a good operable condition.

Routine Maintenance

Valves are despatched by Hattersley charged with sealing compound. A compound identification tag states clearly that the valve has been assembled and tested with a universal compound. The user is advised to follow the chart for specific applications. When injecting additional sealing compound, care should be taken to ensure that it is of the correct type. Where the service permits, the valve should be partially or fully operated once to ensure free operation and to determine the effort required.

For infrequently operated valves maintenance is recommended at three monthly intervals and merely consists of two or three turns of the combination screw or, if gun injection, several strokes of the lever, and opening and closing the valve a minimum of three times to distribute the compound evenly around the plug. It is difficult to specify how often the valve should be recharged with sealing compound, since this is determined by the frequency of operation, type of service, pressure and temperature.

Injection of Compound

When the combination screw has reached its limit (screwed fully down) this indicates that the valve needs re-charging with sealing compound. When using sticks or the lightweight compound gun, remove the combination screw, insert a stick or partially fill the compound reservoir in the plug, replace the combination screw, and screw down. This operation may need repeating several times. When using the NMG 40 high-pressure gun, attach the nozzle to the injection nipple and give several steady strokes of the lever.

VALVES MUST BE EITHER FULLY OPEN OR FULLY CLOSED WHILST THEY ARE BEING CHARGED.

INDICATION OF FULL CHARGING

The first indication of the valve becoming fully charged is an increase in the effort required to rotate the combination screw, or with the high-pressure gun injection an increase in the effort required on the lever. The effort required to operate the valve should have increased from the initial operation prior to injection of sealing compound.

Method of Injection

Where the number of valves to be charged is small i.e. 12 – 15 valves, especially if they are in the smaller sizes, stick or lightweight gun injection can be satisfactorily used. For large quantities use of the NMG 40 high pressure gun is recommended.

Valve Leakage

Leakage through the valve indicates that the valve requires injection of sealing compound or that it needs opening and closing a minimum of three times to distribute the compound evenly.

Operating Torque

Should a valve become jammed or unusually stiff to operate, this can be generally cured by the injection of sealing compound. If this is ineffective, it will be necessary to dismantle the valve, clean the components and recharge with sealing compound.

SERVICING

Advice is available from the Hattersley Service Department in connection with all aspects of operation, lubrication and maintenance.
Hattersley offers an on-site service facility and annual maintenance contracts are available. Contact the Service Department for further details.

VALVE REFURBISHMENT

Depending upon the age of the valve and the service conditions, it may not be possible to refurbish the valve on site. (The valve would therefore require returning to Hattersley for a full inspection and refurbishment quotation).

Full refurbishment would require the following components:- PTFE thrust washer, ball check assembly and compound.

The following procedure should be followed:-

1. Isolate the system pressure and drain.
2. Operate the valve to the open position.
3. Remove bottom cover, hexagon capped in an anti-clockwise direction using a correct fitting spanner. (This may require shocking with suitable shock spanner). Bolted type, (slacken & remove the nuts in a diagonal sequence.)

Note:-
Care should be taken during bottom cover removal, as a spring is located within the bottom cover.

4. Remove plug using a copper rawhide mallet. Large valves may require hydraulic rams and chain equipment.
5. Clean inside the valve body, ensuring that the top plug face is free from dirt or damage.
6. Remove the combination screw and remove compound if present.
7. A ball check valve assembly is situated at the bottom of the combination screw thread, which requires removal in an anti-clockwise direction. (A broad flat bladed screwdriver is required).
8. Clean the plug including all grooves and compound cross holes (and ball check assembly if required).
9. Re-fit or replace the ball check assembly.
10. Clean the body face where the PTFE washer sits. Fit the new PTFE washer onto the plug sealing face and re-fit the plug into valve body. (Rotating the plug may assist this operation).
11. Ensure the cover and body joint faces are clean and smooth.

12. Fit plug spring and bottom cover. Hexagon capped (in a clockwise direction using a correct fitting spanner). Bolted type (nuts to be tightened in a diagonal sequence).
13. Fit the compound combination screw and charge the valve with compound as per the maintenance instructions 'Injection of Compound'.

Operate the valve, fill and pressurize the system checking for leaks at the bottom cover and further tighten if required

For the supply of genuine Hattersley spares, technical assistance or Hattersley ValveServe contact:

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