by means of a thin bladed screw driver or suitable packing removal tool, taking care not to damage the valve stem. Fit new packing rings onto the stem and into the stuffing box.

8. Refit the gland and both nuts.
9. Re-fit handwheel and handwheel nut.
10. Tighten the gland nuts evenly in a clockwise direction until increased tension to operate the valve is obtained.Repeat the above procedure as required.

Replacing Stuffing Box Joint Ring

The valve should be isolated from the system and the valve drained before carrying out this operation.

Carry out stages 1, 3, 4 and 5 as for fitting additional packing

1. Operate valve to partially open position. (Handwheel anti-clockwise rotation).
2. Loosen and remove both stuffing box retaining nut situated at the base of gland bolts (anti-clockwise)
3. Refit handwheel and operate valve to closed position. When closed operate the valve a further 1/2 to 1 turn clockwise, this will break the stuffing box seal. (Note: stem damage could occur if the valve operation is continued after the seal is broken).
4. The stuffing box can then be pulled up the stem and removed.
5. After surfaces have been cleaned and the new gasket fitted ensure the stem collar is seated in the bonnet housing before reassembling which is carried out in reverse order to the dismantling procedure.

Replacing Bonnet Gasket

The valve should be isolated from the system and the valve drained before carrying out this operation.

1. Operate valve to mid-position.
2. Loosen and remove series of bonnet/body bolting (anti-clockwise).
3. Operate valve to closed position (clockwise rotation of handwheel). When closed, operate the valve a further 1/2 to 1 turn, which will break the bonnet joint.
4. Open valve to mid position (anti-clockwise rotation of handwheel).
5. The complete bonnet sub-assembly including the valve wedge can then be lifted off the valve body.
6. Upon reassembly, it is important that the guides on the wedge are located in the body guides.
7. Using a new bonnet gasket, refit the bonnet, bolting and tighten diagonally.
8. **NOTE: It is recommended that the bonnet sub-assembly be refitted complete when the valve body is in line.**

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

PO BOX 719, IPSWICH, IP1 9DU
HOME SALES: +44 (0) 1744 458670
EXPORT SALES: +44 (0)1744 458671
TECHNICAL HELPLINE: 0845 604 1790

FAX: +44 (0)1744 26912
EMAIL: uksales@hattersley.com
EMAIL: exportsales@hattersley.com

www.hattersley.com

FM311
ISO 9001

- Designed and manufactured under quality management systems in accordance with BS EN ISO 9001-2008

H-IWGV-0710
IOM_040M00549D799_rev6

501, 511, 540, 541 (DN50, 250, 300), 541D, 541E, 549, 549D, 549E Cast & Ductile Iron Wedge Gate Valves Non Rising Stem

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.)

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 categorised in accordance with the Pressure Equipment Directive.

These products are categorized for Group 1 Liquid but are not necessarily suitable for all fluids in this group. Refer to Hattersley Technical Application Engineers for advice. Codes of practice, specifications and regulations should be referred to for specific guidance for valve selection on hazardous service. These valves may also be used on Group 2 Liquids.

FLUID	GROUP 1 LIQUIDS		
FIG. NO	PRESSURE RATING	DN	CATEGORY
549	PN6	50-150 200-300	SEP I*
511	PN10	50-100 125-300	SEP I*
541	PN16	50 250-300	SEP II*
540	PN25	50-65 80-300	SEP II*
549D 541D	3.5 Class 50	2" - 10" 12"	SEP I*
549E 541E	13.8 Class 100	2" - 2 1/2" 3" - 5" 6" - 12"	SEP I* II*
501	13.8 Class 125	2" - 2 1/2" 3" - 5" 6" - 12"	SEP I* II*

*Category I & II valves requires CE mark

OPERATING PRESSURES AND TEMPERATURES

PN Rated Valves

PRESSURE RATING	NON-SHOCK PRESSURE AT TEMPERATURE RANGE	NON-SHOCK PRESSURE AT MAX TEMPERATURE
PN 6	6 bar from -10˚C to 120˚C	4.4 bar at 230˚C
PN 10	10 bar from -10˚C to 120˚C	7.4 bar at 230˚C
PN 16	16 bar from -10˚C to 120˚C	11.8 bar at 230˚C
PN 25	25 bar from -10˚C to 120˚C	21.0 bar at 230˚C

PN Rated Valves

CLASS RATED	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
Class 125*	13.8 bar from -10˚C to 66˚C	8.6 bar at 232˚C
Class 150	17.5 bar from -10˚C to 40˚C	12.8 bar at 190˚C

*Pressure temperature rating to MSS SP 70 Class 125

These products are 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.

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, adjustment, maintenance and repair.

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.

Heavy valves may need independent support or anchorage.

Gate valves may be installed in:
A. Horizontal pipework with stem vertical.
B. Vertical pipework with stem horizontal.

The valve should not be installed in horizontal pipework with the stem horizontal because shut off performance may be impaired.

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 body marking must be made to ensure that the correct valve is being installed. 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. Valves should not be lifted using the handwheel or stem. Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.

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

OPERATING

The valve is opened by anti-clockwise rotation of the handwheel to a positive stop. Further effort is not necessary. When fully open it is advantageous to rotate the handwheel clockwise 1/2 turn.

To close the valve, the handwheel is rotated clockwise to a positive stop.

Wheelkeys or other similar devices should not be used.

NOTE: When the valve is closed at extreme high temperature and then cooled, the wedge may become tight in the valve and prove difficult to open. Conversely, a valve closed at room temperature can be difficult to open if there is an increase in fluid temperature causing a linear expansion of the stem, which tightens the wedge further into the body seats.

The valve should only be used in the fully open or fully closed position. Regulating or throttling service should be avoided, as this may damage seat faces, and prevent isolation.

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.

A full risk assessment and methodology statement must be compiled prior to any maintenance.

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.

Gland Adjustment

The gland may need adjustment during installation and then periodically thereafter to maintain a stem gland seal. The following procedure is recommended:

The gland nut should be tightened in a clockwise direction until increased resistance to operate the valve is obtained, or if leakage is present until the leakage stops.

NOTE: It is recommended that within the 1st year the gland be inspected at 3 monthly intervals to check for gland leakage.

Under normal working conditions Hattersley Gate Valves should not need further attention but when required the following procedures are recommended.

Fitting Additional Packing Ring or Partially Repacking Valve Stem Seal

1. Turn off circulating pumps.
2. Close valve by clockwise rotation of handwheel.
3. Remove handwheel nut and handwheel.
4. Loosen the gland nuts anti-clockwise and remove.
5. Remove Gland.
6. Fit additional packing by means of wrapping packing round stem, cutting to length and pushing packing into stuffing box.
7. If partially repacking valves, remove old packing