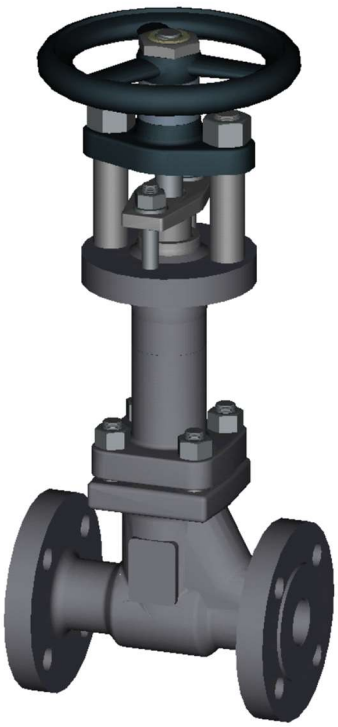
PHOENIX – Armaturenwerke GmbH

Manual for Gate Valve
BA 119-AS

Edition 2023-08-00



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Declaration of conformity acc. to Directive 2014/68/EU

The manufacturer	**PHOENIX Armaturenwerke GmbH D 34471 Volkmarsen**
declares that the valves	**Manufacturer and Brand PHOENIX:** **Gate valve types 830, 834,** **Brand STRACK:** **Gate Valve types S02, S03 and S04** **• with actuator and handwheel** **• with square for gear assembling**

1. are pressure bearing equipments within the meaning of the Pressure Equipment Directive 2014/68/EU and in conformity with the requirements of this directive,
2. can only be used and operated under observance of the attached operation manual N° A119 AS.

Related standards:

DIN EN 16668	**Requirements and testing for metallic valves as pressure accessories** **Direction for pressure bearing body components** *Body- and Bonnet Material acc. AD 2000 AD-A4 with Inspection Certificate 3.1 to DIN EN 10204*
DIN EN 19	**Marking of metallic valves**
API 600	**Steel Gate Valves**

Description of type and technical features:

PHOENIX-types datasheets <830, 834>
STRACK-types datasheets <S02, S03 and S04>
NOTE: This manufacturer declaration is valid for all variants of type mentioned in the PHOENIX catalogue

Applied procedure for the rating of the conformity:

to Annex II of the Pressure Equipment Directive 2014/68/EU Module „H“

Name od the notified body:	*Identification N° of the notified body:*
LRQA Deutschland GmbH	**0525**

Modifications on gate valves and/or components with consequences for the technical features of the valve, of the “defined use” acc. to section 1 of the operation instruction and which will modifiy the valve essentially cancel these declarations.

According to the guidelines for the application of the Council`s general direction 2014/34/EU of 26.02.2014 from for adapting legal regulations valid in the single member countries and dealing with appartuses and safety systems and their application in areas endangered by explosion, changeover valves do not have an integrated potential source of sparks as revealed by the danger of releasing sparks analysis. Due to this, gate valves are not subject to the guidline mentioned above.

Volkmarsen, 14.06.2023 _____

Gunter Wodara, CTO

0 Introduction

This instruction shall support the user for installation, operation, and maintenance of gate valve **types 830, 834, S02, S03 and S04**.

 **Attention**	**The non observance** of the following attention and warning notes **might cause dangers** with the consequence that the manufacturer's guarantee becomes void. For questions in this regard contact the manufacturer, adresses see section 8.

1 Defined use

After their installation in a piping system (either between flanges or by welding) the use of the gate valve **types 830, 834, S02, S03** and **S04** is exclusively defined as to stop or convey the flow of media within the admitted pressure and temperature limits by manual operation. The use of these gate valves for meda with solid matters, especially with wearing particles is not recommended.

The design document **<Pressure-Temperature-Tables TDB3/1 to 3/5>** (see section 8.1 <Information>) shows the admitted pressure-temperature-range for these gate valves.

 **Danger to life**	Valves whose admitted pressure-temperature range (=”Rating”) is not sufficient for the operating conditions shall not be used. For materials or pressures or temperatures not indicated in the a.m. **<Pressure-Temperature-Tables TDB 3/1 to 3/5>** a release note from the manufacturer is mandatory. **The disregard of this ordinance can provoke danger to life and cause damages in the piping system.**
 **Note**	*Gate valves are **not suitable for an operation in intermediate position.*** A gate valve shall only be used with its final positions totally open or totally closed.

When gate valves are used in dust loaded environment the use of a protecting cap for the open stem is recommended.

Gate valves will be supplied with the following types of connections:

- Flanges to ANSI B 16.5, EN 1759 and EN 1092
- Butt weld ends to ASME B 16.25 and 12627,
- Socket weld ends to ASME B 16.11 and 12760.

Other types of connections shall be agreed with manufacturer.

The strict observance of the section 2 <Safety notes> is taken for granted for the defined use of the gate valves.

2. Safety instruction

2.1 General safety instructions

Valves are subject to the same safety impositions which are valid for the piping system where the valves shall be installed. Therefore, the present instruction mentions only such kind of safety notes which must additionally be considered for valves.

2.2 Safety instructions for the user

It is not within the responsibility of the manufacturer and must be safeguarded by the user of the gate valve that

⇒ the valve is only used as required by the “defined use” as described in section 1,

Danger	**Protection against wrong use fo the gate valve:** It must be absolutely assured that the selected materials of the wetted parts of the gate valve are suitable for the handled media. The manufacturer is not responsible for damages of the gate valve caused by corrosive agents. **The disregard of this ordinance can provoke danger for the user and cause damages in the piping system.**

⇒ a gear operator which is fitted to the valve later on shall be adapted to this valve. In the closed position the final stop shall be realised in the seat of the valve,

⇒ the gate valve will be installed workmanlike in the piping system, especially such types of gate valves which are fitted into the piping system by welding. The wall thickness of the valve body shall be calculated in such a way that an additional load F_z within the usual order of magnitude ($F_z = \pi/4 \cdot DN^2 \cdot PS$) is taken into account for such a workmanlike moun-ted piping system.

(DN = max. inside flange diameter = max. pipe inside diameter),

(PS = max. admitted design pressure at ambien temperature),

⇒ the valve shall be fitted workmanlike with these systems,

⇒ inside this piping system the usual flow rates (e.g. 4 m/s for liquids) in continuous operation shall not be exceeded and exceptional operating conditions such as vibrations, water hammers, cavitation and higher percentages of solid matters in the media – especially wearing ones – had been cleared with the manufacturer,

⇒ gate valves used at operating temperatures >+50°C or <–10°C, are protected against contact as it is intended for the pertinent piping system,

⇒ only qualifed staff is used for the operation and maintenance of pressure bearing piping systems.

2.3 Special risks

Danger to life	The operating stem is sealed by a stuffing box. Before a loosening of the nuts on the gland follower the **piping system shall be completely depressurised** to avoid the leakage of the media throughout the stuffing box.
Danger to life	Before the disassembling of the valve out of the piping system and/or before the loosening of the bolts and nuts of the bonnet the **system shall be completely depressurised** to avoid an uncontrollable fugitive emission of the media. It must be assured that **the valve is completely open** to enable that the pressure can escape on both sides of the valve.
Danger	*Gate valves which are used as final shut-off valve:* For normal operation, especially with gaseous, hot and/or dangerous media **a blind flange or a cover plate shall be fitted on the free outlet** or adequately **secured against unauthorised operation acc. to the directives of EN 292 – Part 2.** Attention during the closing of such gate valves: **Mind the risk of pinching!**
Danger	*Gate valves which are not slowly operated in the starting up phase at service temperatures of >250°C:* Leakages might occure. See also section 6.1. <Starting-up phase>
Danger	Whenerver a gate valve which is used as final valve shall be opened under pressure load this must be performed with extraordinary care and in such a manner to assure that the outspurring media cannot provoke damages.

Danger	When a valve shall be disassembled from the piping system exists the risk that the me-dia can flow out off the piping or the valve. In case of liquids which are harmfull for the health or dangerous the piping system shall be completely drained before the val-ve can be removed from the system. Caution of **residues coming out off or remai-nin in dead holes of the valve or the piping system itself.**
Danger	For the refitting of the bolteld fixation of body components the bolts shall be tightened in accordance with the repair instruction <A 119 R> *(to procure see section 8*) using a dynamometric key.

2.4 Marking of the gate valve

Each gate valve is normally marked as follows:

For	***Marking***	***Note***
CE-Mark	**CE 0525**	Corresponding to PED 2014/68/EU article 3 valves with-out safety functions shall be marked with the CE-mark only for sizes DN 32 and more
Manufacturer	**PHOENIX (PAG)**	is the logo for <PHOENIX Armaturenwerke>
Brand	**STRACK (SAG)**	is the logo for <STRACK Armaturenwerke>
Manufacturer-N°	**e.g.:**98898/02	The first figures before the strike are the factory number, the last figures after thes trike = year of manfac-ture, e.g. /02 = 2002
Valve type	**Type** (and numerical value)	e.g. Type 830, see Datasheet PHOENIX
Body material	**e.g.:** 1.0619.01	N° of material standard to EN 12516, Part 1
Size	**DN or NPS** (and numerical value)	Numerical value in mm, e.g. DN 200 or NPS 8
Max. pressure	**PS or PN** (and numerical value)	Numerical value in [bar] at 20°C, e.g. PS 40
	ANSI and Class (numerical value)	e.g. ANSI 300

Table 1 Marking of the gate valve

Attention	*When the valve is not marked with „PN“ in accordance with the impositions A4-AD2000:* *The indication PS - max. admitted pressure for which the pressure equipment is de-signed – in conformity with the impositions to PED 2014/68/EU. The markings PN and PS are the max. admitted pressure for the valve at am-bient temperature.*

3 Transport and Storage

Gate valves shall be carefully treated, transported, and stored:

⇒ The valve shall be stored on pallets (or similar) with its protectecting packing and/or with its protecting caps on the inlet and outlet and shall also be transported in such a state (even on the transport to the installation point.

Attention	*To protect the valve against damages:* Ropes and belts shall only be fixed on the bonnet but never on the handwheel!

⇒ Before its installation the valve shall be normally stored in closed area shall be protected against detrimental influences such as dirt and humidity.

⇒ In particular, the handwheel and the end orifices of the gate valves for the connection with the piping system shall not be damaged neither by mechanical nor other influences.

⇒ Gate valves shall be stored in the conditions as they were supplied by manufacturer. The hand-wheel shall not be operated.

4 Installation into the piping system

4.1. General

For the installation of valves into a piping system the same instructions are valid as for the connection of pipes among themselves and similar piping components. When in a plant the piping and other equipment are isolated, this must also be applied to the built-in gate valves. In addition, the following instruc-tions are valid for gate valves. For the transport to the installation place please mind the informa-tions given in section 3 of this manual.

Danger to life	If gate valves are installed in insulated piping systems, or in the area of other isolated equipment, so they must also be isolate. In absence of insulation, gate valves can be damaged. In serious cases, the pressurized parts could be damaged.
Note	For API 600 Gate valves is the installation allowed as follows: ⇒ in horizontal pipes with vertical orientated stem ⇒ in horizontal pipes with horizontal orientated stem (It must be noted, that in this orientation contaminants of the fluid may accumulate on the wedge guides and have impact on the valves function.) ⇒ in vertical pipelines – riser pipes and down pipes
Note	Gate valves shall be installed – if possible - in a section of the piping system with undis-turbed flow, i.e. not immediately behind elbows, pumps and similar equipment.
Attention	The sealing surfaces on bodies with flanged ends are machined in such a manner that gaskets to EN 1514 or ANSI B16.21 shall be used between the connecting flanges. Counter flanges can have flat faces, e.g. type B to standard EN 1092 or stock finish to ANSI B 16.5. Other flange options to standard EN 1092 or stock finish to ANSI B 16.5. shall be agreed with the manufacturer PHOENIX:
Attention	*To avoid damages of gate valves with weld ends:* During the welding of the valves into the piping system the weld procedure shall be per-formed in such a way that the applied heat energy is limited, and deviations of the valve body are avoided. Therefore, larger sizes shall be welded in alternating pro-cedures once from one side and then from the other to avoid restraints in the valve's body. **During the weld procedure the gate valve shall be brought and kept in the open position until the weld conjunction is cooled down to <100°C.**
Danger to life	In case of a posterior installation of a gear operator the interface adaptation, the nomi-nal moment and the sense of the rotation must be adapted to the gate valve. **The gate valve shall be closed by turning the handwheel clockwise. Disregard of this imposition can provoke danger for the operator and damages in the piping system.**

As far as handwheels are concerned:

Danger	***Handwheels are no "stepboards nor ladders"!:*** Handwheel shall not be charged with heavy loads; this can damage or distruct both the handwheel and/or the gate valve.

4.2 Working steps

⇒ Transport the gate valve in its protecting packing to the installation site and unpack the valve just before its immediate fitting into the system to ensure that the valve is protected against each kind of contamination.
⇒ Inspect the valve on possible transport damages. Damaged valves shall not be installed.
⇒ Before the installation a functional test shall be performed. The valve must close and open correctly. Perceptible functional failures shall be repaired before the commissioning of the valve. See also section 7 <Trouble shooting>.
⇒ Make sure that only gate valves shall be installed whose pressure rating, type and dimensions of connections correspond to the operating conditions. In this regard also see related marking of the gate valve.

 **Danger to life**	Gate valves shall be installed whose admitted pressure-/temperature rating is not sufficient for the operating conditions shall not be installed. This admitted range results in the marking and/or in the design document **<Pressure-Temperature-Tables TDB3/1 to 3/5>** see also section 1 <Defined use>. **Disregard of this precautionary measure can provoke danger to life for the user and damages in the piping system.**

⇒ The connections of the piping system shall be in strict alignment with the end connections of the gate valve and have plane-parallel ends.
⇒ Before the installation the valve and the corresponding pipe shall be carefully cleaned from dirt and contaminations, especially hard foreign particles shall be removed.
⇒ The flow direction of gate valve is optional. For special designs with relief holes the direction of the arrow on the body shall be respected.
⇒ For installation position see section 4.1
Above the handwheel must be sufficient space to enable a disassembling of the bonnet. At least a height of approx. 1,3 x NPS or DN should be maintained. (For exact dimension please see PHOENIX datasheets <830, 834, S02, S03 and S04).
⇒ Introducing the valve (and the flange gasket) into an existing piping system e.g. in case of replacement, the distance between the pipe ends must be dimensioned in such a way that the sealing surfaces of the flanges and the gaskets, too, will not be damaged.
However, the gap shall not be larger than necessary to avoid additional loads onto the piping system during the installation.

For gate valves with flanges only:

⇒ The counter flanges of the piping system must be in true alignment and with parallel faces.
⇒ The torque for the tightening of the bolts shall be adapted to the used gasket and the operating conditions.

For gate valves with weld ends only:

⇒ The weld ends of the valve shall be in true alignment and shall have parallel faces and must be of identic type as the pipes – see type plate of the valve. Opposite weld ends must fit to each other as far as diameters and weld joints are concerned.
⇒ Make sure by workmanlike welding that neither worth mentioning tensions will be produced in this piping section or on the valve nor that the gate valve body might get distorted due to unilateral heat introduction during the weld procedure. Only temperatures of <300°C, measured on the body wall, are admitted.
⇒ The weldings must be performed workmanlike in such a way that the weld seam has all round about a uniform temperature. Gate valves > NPS 12 or DN 300 shall be welded in alternation on their opposite sides.
⇒ Weld cables shall not be fixed on the valve but exclusively on the pipings.

 **Attention**	**Disregard of these impositions can provoke distorsion of the valve body.** Even 1/10 mm of permanent distorsion in the seat area of the valve can signify that the valve becomes unserviceable.

5 Pressure test of the piping section.

For the pressure test of gate valves the same instructions are valid as imposed for the piping system. In addition, the following shall be considered:

- ⇒ Newly installed pipe system shall be carefully cleansed to flush off all foreign particles.
- ⇒ The test pressure “PT” of an **opened valve** the valve shall **not exceed the value 1,5x PS (at 20°C) by virtue of the marking of the valve and tables TDB3/1 to 3/5.**
  In case that the valve is only marked with PN then PT = 1,5 x PN [bar] is valid.
- ⇒ The test pressure “PT” of a **closed valve** shall **not exceed the value 1,1x PS (at 20°C) by virtue of the marking of the valve and tables TDB3/1 to 3/5.**
  In case that the valve is only marked with PN then PT = 1,1 x PN [bar] is valid.

6 Starting up, normal operation and maitenance.

6.1 Starting up

When **a gate valve is installed in closed position or as final shut-off device**, during the “starting up phase” of a piping section it must be assured at temperatures of >100°C – especially when gate valves of > NPS or DN 300 are involved - that a temperature gradient of approx. 50°C/h shall not be exceeded. Otherwise, the valve’s body gets distorted, and the valve will leak.

6.2 Normal operation and maintenance

Turning the handwheel clockwise provokes the closing of the gate valves and an anticlockwise operation opens the valve. Normal hand force is sufficient for the operation of the handwheel. Only for a tight closure or in the opening phase of the valve increased hand force might be necessary for a short transition time.

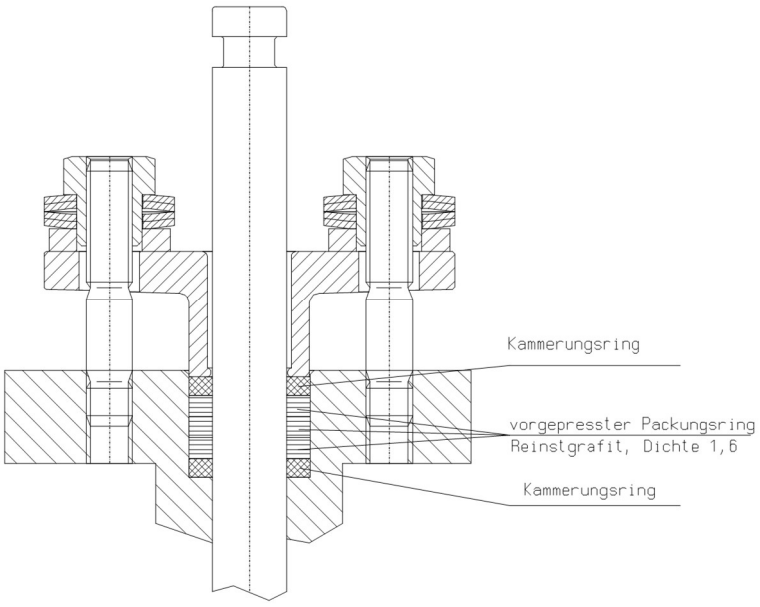
The use of extension rods, levers, and similar items to increase the operation moment is not admitted.

⚠ **Note**	*Gate valves are **not suitable for an operation in intermediate position**.* Gate valves shall only be used in their final position, i.e. either completely opened or closed. Opening and closing of gate valves shall be performed smoothly, i.e. without any interruption during the operation procedure.

Regular maintenance work is not required for gate valves without live-loaded packing (1), however, during the inspection of the pi-ping section no leakage shall appear neither on the flanged and/or screwed connections nor on the stuffing box. In case of leakages and repairs please see section 2 – <Safety instructions> and section 7 <Failures>

(1) Springs (A) on live-loaded packing glands per TA-Luft requirements should be frequently inspected. In case of a reduction of the initial load, the packing bolting (B) should be adjusted to establish the specified load (see operation manual sent with valve).

We recommend that gate valves which are permanently operated in open position should be three to four times a year be brought for a short period into the closed position.



7 Trouble shooting

During the remedy of failures section 2 <Safety instructions> shall be absolutely considered.

Danger	*When a gate valve is removed from systems conveying dangerous media and shall be carried away fromt he plant:* then the gate valve must be professionally decontaminated.

Kind of failures	Procedures for remedy	Note
Leakage on the flanges to the system or between body and bonnet	Tighten bolts and nuts. *When the valve is still leaking:* Remove the valve, considering always the notes in section 2.3 <Special dangers> and ask for spare gaskets for the bonnet and correlated instructions at PHOENIX:.	***Note 1:*** *Spare parts shall be ordered with all indications of the marking of the valve. Only the original PHOENIX spare parts shall be used for repairs and replacements.* ***Note 2:*** *When it is noted after the disassembling of the valve that the body and/or trim is not sufficiently resistant against at-tacks of the media opt for more suitable materials of design.*
Leakage of the stuffing box seal	Gate valves without bellows seal: Tighten the nuts of the gland follower alternating and clockwise in little steps of max. ¼ turn to a ¼ turn until the leakage stops. In the document <A119R> *please see section 8 how to get,* the max. admitted torque for the tightening is specified. *In case the leakage cannot be eliminated by this procedure:* Repair will be necessary. Ask PHOENIX for new packing and corresponding instructions. *In case the nuts of the gland follower shall be loosend or removed (anticlockwise turning):* **Danger of life** To protect the staff against possible risks the complete system shall be absolutely depressurised. Mind and consider section 2.3 <Special risks>. ***Gate valves with bellows seal:*** The bellows is damaged and shall be replaced as soon as possible, especially when used with corrosive/hazar-deous media: Repair necessary. Remove gate valve from the line, consider section 2.3 <Special risks>. Ask PHOENIX for required spares and corresponding instructions. *As long as replacement is not possible:* Retighten stuffing box as described above.	
Leakage in the closed position	Remove the valve (Mind and consider notes of section 2.3 <Special risks) and check the valve. *In case of damaged seats:* Repair necessary: Remove the valve, mind the notes of section 2.3 <Special risks>. Ask PHOENIX for corresponding instructions or send the valve back to PHOENIX for repair.	

Kind of failures	Procedures for remedy	Note
Functional failures	Check stem and stem nut. *When these functional components are ok but not sufficiently lubricated:* Clean stem from dirt and contaminations and lubricate with a grease compatible with the operating temperatures. For normal operating temperatures lithium saponyfied greases are sufficient. *When this procedure will not remedy the failure:* Repair necessary: Remove the valve and inspect, mind the notes of section 2.3 <Special risks>. Ask PHOENIX for corresponding spares and required instructions.	

In case of failures on the actuators see attached instructions.

8 Supplementary information

The mentioned <Data-sheetsr>, <Design documents> Repair instructions and other information – also in other languages - you can ask for under

Info@phoenix-valvegroup.com oder http://www.phoenix-valvegroup.com

or at the following address:

PHOENIX ArmaturenwerkeGmbH

Am Stadtbruch 6
34471 Volkmarsen

Tel.: 05693-988-0
Fax.: 05693-988-140

8.1 Pressure – Temperature-Rating, Excerpt TDB 3/1 to 3/5

The Pressure-Temperature-Ratings from API 600, ANSI B 16.34 are fulfilled.

For gate valves made from EN-Materials are the admitted Pressure-Temperature-Ratings as follows:

The requirements of DIN EN 12516 – 1 are principally fullfilled.

Low alloyed and not alloyed steels

PN	DN-range	Admitted oper. pressure (bar) at oper. temperatures (°C)						
		-60*	-10	120	200	300	400	450
10	15-500	7,5	10	10	8	6	6	5
16	15-500	12	16	16	**15**	**12**	**9**	6
25	15-500	18,75	25	25	**23**	**18**	**14**	12
40	15-300	30	40	40	**38**	**30**	**24**	20
63	15-150	47,25	63	63	**55**	**41**	**35**	32
100	15-150	75	100	100	**85**	**62**	**53**	51
160	15-150	120	160	160	130	96	**84**	81

* AD-W10, Load case II

Stainless steels

PN	DN-range	Admitted oper. pressure (bar) at oper. temperatures (°C)					
		-196*	-10	120	200	300	400
10	15-500	10	10	10	8	6	6
16	15-500	16	16	16	**15**	**12**	**11**
25	15-500	25	25	25	**23**	**18**	**16**
40	15-300	40	40	40	**36**	**30**	**25**
63	15-150	63	63	63	50	**44**	**40**
100	15-150	100	100	100	80	**70**	**64**
160	15-150	160	160	160	130	**112**	**103**

for SS 1.4571

Low temperature steels

PN	DN-range	Admitted oper. pressure (bar) at oper. temperatures (°C)					
		-60*	-50	-10	120	200	300
10	15-500	10	10	10	10	8	6
16	15-500	16	16	16	16	**15**	**12**
25	15-500	25	25	25	25	**23**	**18**
40	15-300	40	40	40	40	**36**	**30**
63	15-150	63	63	63	63	**55**	**41**
100	15-150	100	100	100	100	**85**	**62**
160	15-150	160	160	160	160	130	96

* 1.0566 / 1.0488

For steels not mentioned in these tables the user shall contact the manufacturer/supplier of the valve.

8.2 Torques

Torques [Nm] for stuffing bolts nuts only for valves with gland packing

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DN	Graphitee packing (Compounds included)					PTFE-packing (several designs)				
	PN 25 ANSI 150	PN 40	PN 63 ANSI 300	PN 100	PN 160 ANSI 900	PN 25 ANSI 150	PN 40	PN 63 ANSI 300	PN 100	PN 160 ANSI 900
10 / 15	4	5	5	6	8	4	5	5	6	8
20	4	5	5	6	8	4	5	5	6	8
25	4	5	5	6	8	4	5	5	6	8
32	4	8	8	9	12	4	8	8	9	12
40	4	8	8	9	12	4	8	8	9	12
50	4	8	8	9	12	4	8	8	9	12
65	4	8	8	9	12	4	8	8	9	12
80	5	12	12	13	15	5	12	12	13	15
100	8	19	19	20	25	8	19	19	20	25
125	8	19	19	22	25	8	19	19	22	25
150	12	30	30	32	34	12	36	36		
200	13	36				13	36			
250	15	36				15	36			
300	18	39				18	39			
350	18	39				18	39			
400	18	40				18	40			
500	20	40				20	40			

Torques [Nm] for stuffing bolts nuts only for valves with gland packing

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DN	Graphite packing (Compounds included)					PTFE-Packing (several designs)				
	PN 250 ANSI 1500	PN 320	PN400 ANSI 2500	PN 500	PN 630	PN 250 ANSI 1500	PN 320	PN400 ANSI 2500	PN 500	PN 630
10 / 15	32	32	32	32	35	25	25	25	25	27
20	32	32	32	32	35	25	25	25	25	27
25	32	32	32	32	35	25	25	25	25	27
32	140	140	140	140	145	135	135	135	135	137
40	140	140	140	140	145	135	135	135	135	137
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