

Flowrox™ 泥浆刀闸阀  
SKW DN50 - 600 (对夹式)  
SKF DN80 - 600 (法兰式)

安装、维护和操作说明书



在安装、使用和维护本产品之前，请务必仔细阅读并理解本说明书中的内容。

## 免责声明

本手册（以下简称“手册”）所涉及的所有知识产权均归VALMET CORPORATION（以下简称“VALMET”）独家所有。相关知识的所有权不会从VALMET转移至与本手册有关的任何人员。本手册仅供VALMET的客户使用，交付后客户只能将产品用于协议规定的用途。未经VALMET书面许可，严禁使用、复制、拷贝、翻译、转换、改写本手册中的任何内容，也不得将相关内容储存在检索系统中，以任何方式交流或传播，或用于任何商业用途或其他目的，包括但不限于销售、转售、授权、出租或租赁。

本手册提供了执行某些操作的说明，这些说明内容旨在指导和协助接受过相关训练的专业人员执行其工作任务。在安装、使用、维护和维修设备或者对本手册涉及的货品和/或维修件执行任何操作之前，相关责任人必须熟悉本手册中规定的所有操作。也要严格遵守所有要求。在法律另有要求或允许的情况下，可以忽略本手册中的说明

虽然VALMET在编写本手册时竭尽所能保证本手册内容的准确性和完整性，但VALMET仍不作任何形式的陈述、承诺、或者明示或暗示保证。本手册将不定期更新和修订，敬请所有用户知悉。用户有责任查找和确定本手册是否有可用的更新内容或修订内容。VALMET及其董事、管理人员、雇员、转包商、子供应商、代表或代理不会因任何人员的任何损失、损害、伤害、死亡、责任、费用而承担合同、侵权或任何其他形式的责任或任何性质的费用，包括但不限于因创建、交付、持有和/或使用本手册而导致或与之相关的间接、附带、特殊、间接性、惩罚性或直接损害和/或损失。本段中的内容不视为排除或限制强制性法律所不能排除的责任。

FLOWROX（枫诺）是 VALMET公司或其子公司或附属公司在美国和/或其他国家或地区的注册商标或商标。本手册中出现的其他商标、标识、品牌和标志均为各自所有者的财产，另有说明除外。

版权 © 2014-2022 Valmet Corporation。保留所有权利。

# 目录

1	指令符合性声明	4
1.1	一般安全指示	5
2	概述	6
2.1	应用和用途	6
2.2	一般说明	6
2.3	技术数据	10
3	运输、存放和抬升	11
4	安装	12
4.1	概述	12
4.2	流动方向、支架和阀门位置	12
4.3	阀门安装	13
4.4	冲洗安装指引	14
5	阀门操作	15
5.1	调试和报废	15
5.2	冲洗	15
6	服务和维护	15
6.1	一般维护和检查	15
6.2	更换二级密封	17
6.3	更换环形套管	17
6.4	阀门拆卸	18
6.5	阀门组装	19
6.6	故障排除	21
	附录 A: SKW 和 SKF 阀门的 主要测量	22
	附录B: 如何订购	24

请务必先阅读本说明书！

本说明书提供有关阀门安全搬运和操作的信息。

如需其他帮助，请联系制造商或制造商代表。

请妥善保存本说明书！

地址和电话号码请见封底。

# 1 指令符合性声明

此声明由制造商全权负责签发：

VALMET FLOW CONTROL OY

Marssitie 1

53600 Lappeenranta

Finland

电话：+358 (0)10 417 5000

产品型号/类型：刀闸阀(SKF, SKW)

上述声明对象符合相关的欧盟协调标准：

机械指令2006/42/EC：附录IIB 部分成品机械

由于本产品可作为机械零部件或组件使用，我们在此声明，本产品仅可在相关机械符合机械指令的规定后投入使用。

请遵守本手册中的阀门安装、操作和维护说明。

授权编制此技术文件的人员为技术经理Jarmo Partanen。

Valmet Flow Control Oy代表

2022年5月13日Lappeenranta



Riku Salojärvi

运营主管

## 1.1 一般安全指示

本手册使用的Table 1中的符号用于突出显示需要特别注意的部件。

危害严重程度展示板：

	<p> 危险！</p> <p>“危险”用于表示风险程度较高的危害，若不能避免，将造成严重的人员伤亡。</p>
	<p> 警告！</p> <p>“警告”用于表示风险程度中等的危害，若不能避免，将可能导致严重的人员伤亡。</p>
	<p> 警示！</p> <p>“警示”用于表示风险程度较低的危害，若不能避免，将可能导致轻微或中等程度的人员伤害。</p>

表1. 警告和安全符号。

符号	说明
	人身安全风险： 忽视安全措施会造成严重受伤或死亡。
	压伤危害
	阅读操作和维护说明书： 使用本产品之前，请先阅读并理解操作和维护说明书中的内容。
	强制措施符号： 请按照说明书进行操作以防止机器出现故障。
	禁止措施符号。

请按照本手册中的安装、安全和维护说明进行操作，以防止发生事故，同时保证阀门的正常运行。阀门的安装和维护操作必须由经过相关培训的人员执行。致动器的电气安装必须由具有合格电工进行操作。

必须确保维护操作指示手册可在阀门操作位置随时查阅。在实施阀门的所有操作任务时，需遵照维护操作指示手册。

在进行阀门的任何检查或维护操作时，必须使用个人防护装备（防护眼镜、防护头盔、防护服和防护手套）。应始终遵守工厂安全规程。

若翻译有任何偏差，应以英语版为准。

## 2 概述

### 2.1 应用和用途

Flowrox 泥浆刀闸阀 (SKW) 和 (SKF) 适用于工业介质和泥浆应用。上述阀门采用双向式设计，安装在平板法兰之间，用于在规定的温度和压力限值范围内进行流开和流闭。

#### SKW 和 SKF 阀门的使用限制

阀门不得用于以任何方式进行节流，或使闸门停留在部分打开或关闭位置，否则会导致过早出现故障。

不得超出阀门温度和压力范围。适用于标准套管材料的温度范围参见 Table 2。查看阀门名牌上的温度等级。不得使用高于阀门额定值的管道压力。

表2. SKW 和 SKF 阀门的温度范围。

环形套管材料	NR	NBR	EPDM
最大阀门运行温度 °C (°F)	0 to 75 (32 至 167 °F)	0 to 100 (32 至 212 °F)	0 to 100 (32 至 212 °F)

#### 在易爆条件下使用阀门

此阀门类型不适合在易爆区域使用。

在易爆条件下使用时，阀门必须具有所需的防爆等级，且接地线必须接地。如需更多信息，联系 Valmet Flow Control。

### 2.2 一般说明

#### 工作原理

Flowrox SKW 和 SKF 阀门采用铸造或焊接阀体构造，且标准结构采用高度耐用的不锈钢闸板。闸板两侧的可移动式环形套管，具有双向防气泡密封特性。

在打开位置，两个环形套管可在阀门中心位置相互密封，从而形成便于介质通过的完整通孔。主要组件参见图 1 阀门主要部件。关闭阀门，迫使闸板在两个配对的环形套管之间逐级向下，直至其达到完全关闭的位置。当阀门完全关闭时，环形套管将推压闸板两侧，有效地实现密封，同时完整保持管道压力。环形套管在打开/关闭冲程时排放的任何介质，将收集到阀体腔室，并通过冲洗端口进行排放或冲洗。

二级密封安装在阀体上部。在完成每次阀门冲程时，将擦拭闸板，并用硅胶脂润滑。致动更为方便，同时最大程度减少磨损。在更换二级密封时，无需从管道移除阀门，但在空间狭小或不安全的条件下，该操作则不可避免。

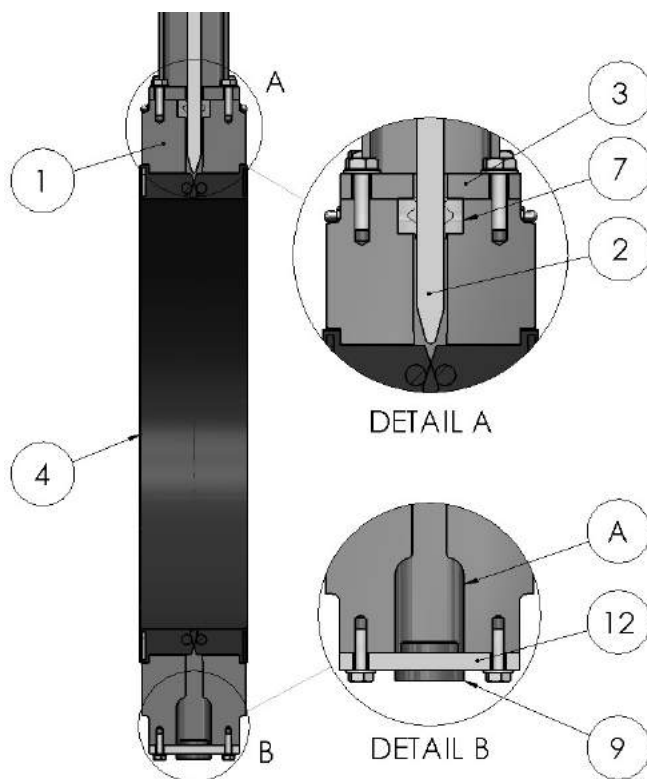
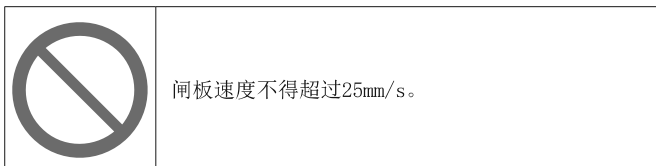


图1. 阀门主要部件

编号	说明	编号	说明
1	阀体	7	二级密封
2	闸板	9	保护塞 (或冲洗端口)
3	塔架	12	底部盖板
4	环形套管	A	阀体腔室

	<p>阀门不得用于以任何方式进行节流，或使闸门停留在部分打开或关闭位置，否则会导致过早出现故障。</p>
--	--

此阀门仅适用于开关操作。环形套管更换方便，具有多个模制弹性体选项，以匹配不同的条件。



### 机械结构

SKW 和 SKF 阀门可采用Figure 2. Alternative actuators中显示的致动器选项进行交付。手动致动器类型取决于阀门尺寸。

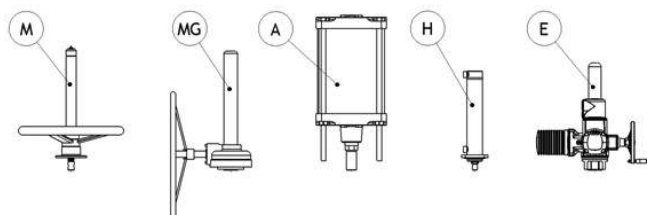


图2. 替代型致动器

类型	说明
M	手动致动器
MG	带齿轮箱的手动致动器
A	气动致动器
H	液压致动器
E	电动致动器

SKW 阀门部件列表参见Table 3，爆炸分解图参见Figure 3。若部件数量取决于阀门尺寸或致动器类型，则不显示。

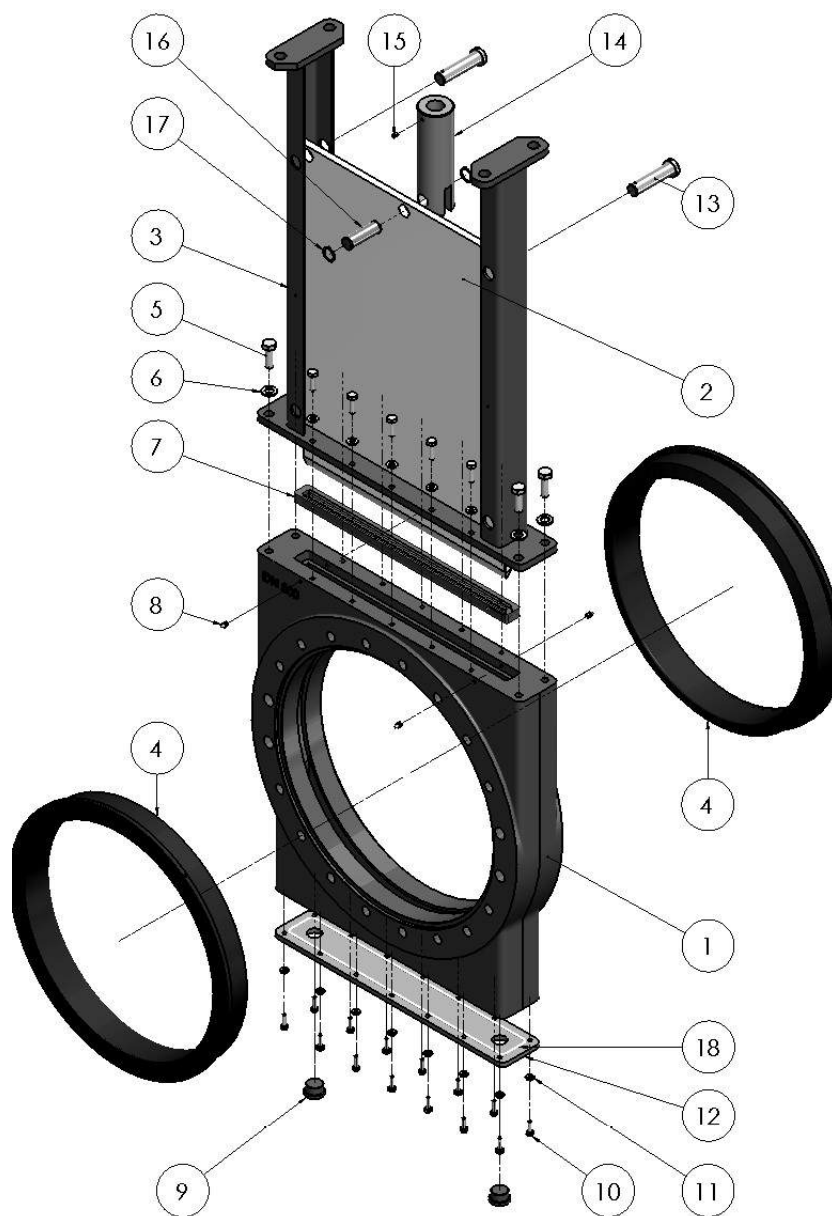


图3. SKW阀门的爆炸分解图

表3. SKW阀门部件列表

部件	数量	说明	部件	数量	说明
1	1	阀体	10		底盖螺栓
2	1	闸板	11		底盖垫圈
3	1	塔架	12	1	底部盖板
4	2	环形套管（建议采用的备件）	13	2	锁紧销
5		塔架安装螺栓	14	1	U形夹扣
6		塔架安装垫圈	15	1	U形锁紧螺钉
7	1	二级密封（建议采用的备件）	16	1	U形销
8	4	油脂嘴	17	2	固定环
9	2	保护塞	18		PTFE 密封条



SKF 阀门部件列表参见Table 4，爆炸分解图参见Figure 4。若部件数量取决于阀门尺寸或致动器类型，则不显示。

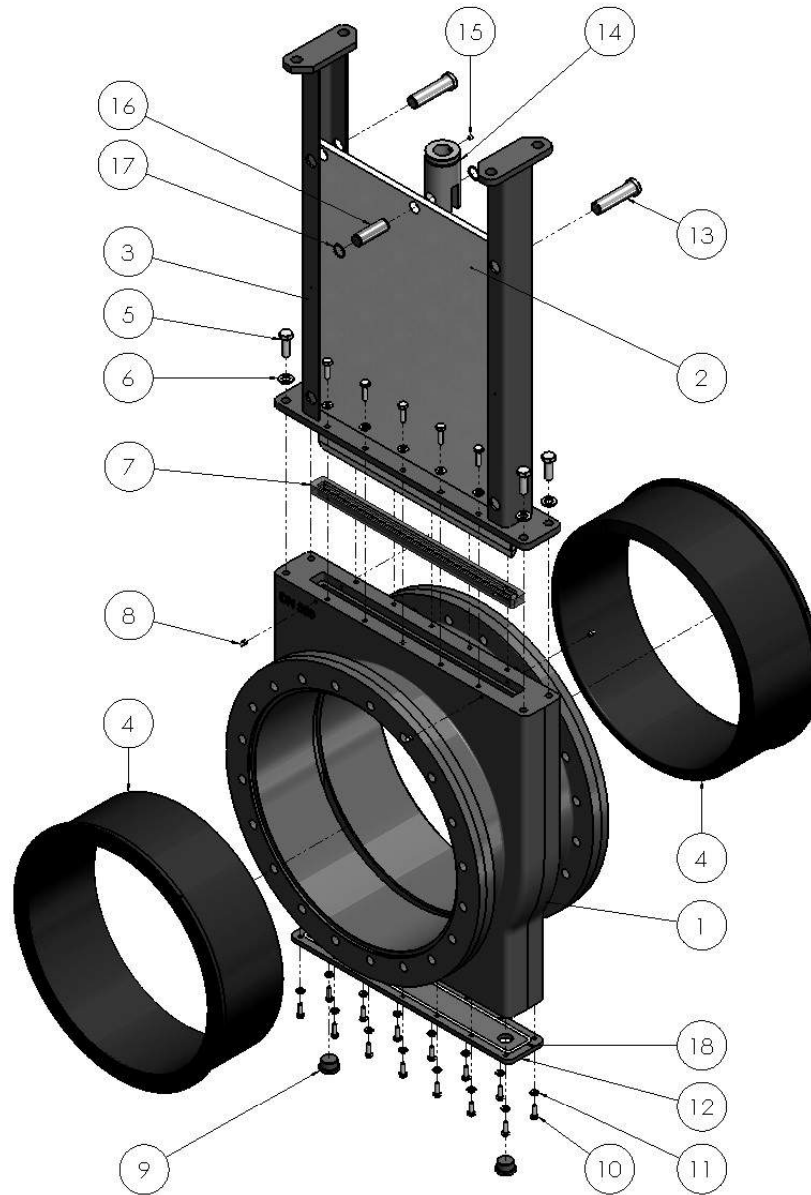


图4. SKF阀门的爆炸分解图

表4. SKF阀门部件列表

部件	数量	说明	部件	数量	说明
1	1	阀体	10		底盖螺栓
2	1	闸板	11		底盖垫圈
3	1	塔架	12	1	底部盖板
4	2	环形套管（建议采用的备件）	13	2	锁紧销
5		塔架安装螺栓	14	1	U形夹扣
6		塔架安装垫圈	15	1	U形锁紧螺钉
7	1	二级密封（建议采用的备件）	16	1	U形销
8	4	油脂嘴	17	2	固定环
9	2	保护塞	18		PTFE 密封条

## 2.3 技术数据

### 产品识别信息

Flowrox 阀门名牌参见Figure 5。

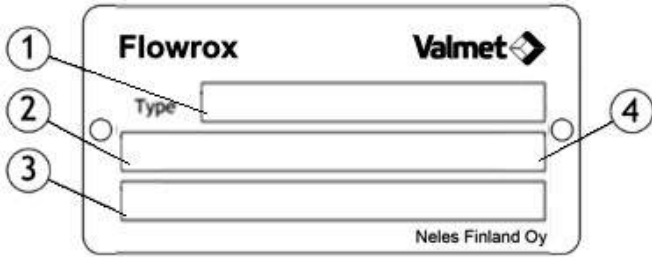


图5. 阀门铭牌示例。

1. 阀门类型
2. 序列号
3. 客户标签编号等
4. 标称直径，压力等级

### 执行机构

#### 标准致动器：

- 手轮/带齿轮箱的手轮
- 气动
- 液压
- 电动

手动致动器运行转速参见Table 5。通过顺时针转动关闭阀门。

气动执行机构的行程固定，不需要外部控制来定位闸板。气动操作的阀门的最小供给压力为6 bar。

空气必须清洁、干燥、润滑并适当过滤。建议空气质量满足ISO 8573-1:2010 [7:4:4]的最低要求。如果阀门所用的任何部件有更高要求，以较严格者为准。

使用正确尺寸的气动软管，以确保足够的气流。气动致动器噪音水平可能超过 85 dB，建议在阀门附近操作时，使用耳部防护装备。

液压致动器的最低供应压力为150 bar (2250 psi)。

电动执行机构出厂时已预设打开/关闭限位开关。执行机构制造商发货时通常包含单独的说明书。

确保三相电气连接无误。如果连接不当，限位或力矩开关将不会按照预期触发。这将导致执行机构移动超出限制，甚至损坏阀门。

有关执行机构要求和/或限制，请参见制造商的说明书。致动器已更换或需要调整阀门时，应遵照维护说明。

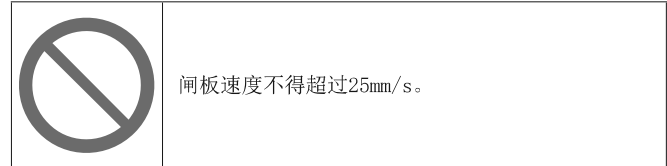


表5. 手动致动的阀门运行转速。

阀门标称尺寸	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 200 (8")	DN 250 (10")
冲程阀门的手轮转速	18	25	28	40	50	60
冲程阀门的锥齿轮转速	-	-	-	-	-	-

阀门标称尺寸	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
冲程阀门的手轮转速	-	-	-	-	-	-
冲程阀门的锥齿轮转速	120	137	313	350	380	340

### 3 运输、存放和抬升

检查并记录包装或阀门内的任何损坏。若出现损坏，联系运输公司。若新的或未使用过的阀门长时间处于闲置状态，应执行以下操作：

1. 存放前，彻底排空阀门内的任何液体。
2. 需要室内存放。在不利的环境条件下，应用防水油布将设备盖住，以使空气正常循环。
3. 对设备进行极端温度和湿度以及暴露在过多粉尘、潮气、振动或日光条件下的防护。
4. 存放闸门时，最好将闸板锁定在打开位置。
5. 确保气动和液压缸致动器在相应的供给端口安装了合适的塞子，以防止缸体受到污染。
6. 对阀门环形套管进行高温、光线和暴露于臭氧的相关防护。
7. 将法兰开口盖住。
8. 不得在橡胶环形套管上存放任何物体。
9. 遵照致动器存放说明。
10. 启动前，清洁闸板并润滑阀门。

在存放使用过的阀门时，用清水清洗阀门和阀体腔室，并遵照上述步骤。若存放期超过36个月，请联系Valmet Flow Control Oy，因为需要在使用前更换橡胶部件。

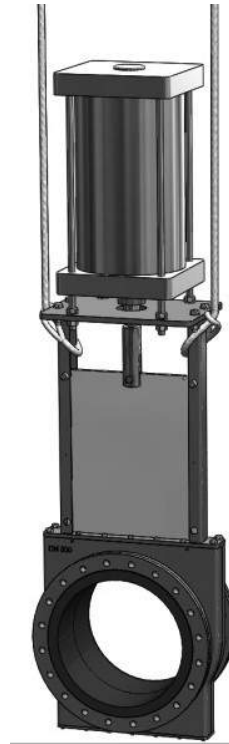
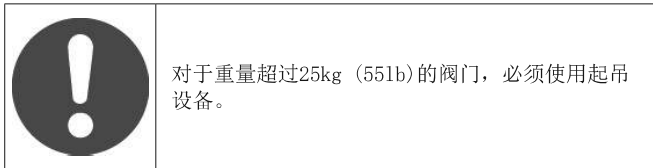


图6. 阀门起吊示例。

将阀门稳定地从塔架吊起（机械结构 第3部分）。较大的阀门可能预装有吊耳，应尽可能使用。如果预装的吊耳不可用，应使用软带以吊起阀门，如Figure 6所示。

请勿将起吊设备连接在阀孔、手轮、致动器、锁紧销或闸板护板上，以免造成损坏。

阀门尺寸和重量，参见 附录 A.

## 4 安装

	警告！
	<p>压伤和剪切危害。</p> <p>阀门循环时，勿将手或手指放入塔架或端口区域。将阀门正确安装到管道上，请勿使执行机构通电。安装和维护操作前，断开执行机构并断电。</p>
	<p>高压喷射危险。</p> <p>不得使用高于阀门额定值的压力。若采用更高的压力，可能会造成阀门严重损坏或对操作人员造成伤害。</p>

	警告！
	<p>有害物质危害。</p> <p>若过程介质需完全密封，具有腐蚀性或有害，应确保冲洗端口已通过管道连接到安全位置。</p>

	切勿在所有端口插上时使用阀门。积聚的固体可能会造成阀门堵塞。
--	--------------------------------

### 4.1 概述

通常，Flowrox 闸阀交付时已全部装配完毕，可供使用。仅允许接受过合适培训的人员安装阀门。如果阀门在交付时不带致动器或附件，则必须按照制造商指示说明进行安装。

Flowrox 闸阀采用带DIN 或 ANSI 螺栓钻孔的连接作为标准设计，可提供其他类型的钻孔，例如 BS, AS, JIS。

预留足够的空间用于安全安装和维护。阀门尺寸参见附录 A。注意，在打开和关闭循环时，少量介质将排放到阀体内，因此不得将闸阀安装在走道或关键部件的上方。若介质有害或具有腐蚀性，则必须安装冲洗和排放连接。

若阀门已存放在仓库内，应根据章节润滑 中的说明对阀门进行润滑。

### 4.2 流动方向、支架和阀门位置

	如未使用支架，仅可将DN250或更大规格的阀门安装在垂直位置。
	不得踩在安装在水平或弯角位置的阀门上面。

阀门不具有指定流动方向，在安装在管道时，两种方向均可。

应将合适的管道支架安装在阀门一侧，以支承管道重量。切勿将阀门用于支承管道。

阀门可安装在除低于水平方向的其他任何位置。若安装位置低于水平方向，冲洗将无法进行，并且将导致泄露和阀门功能失效。参见以下 Figure 7。

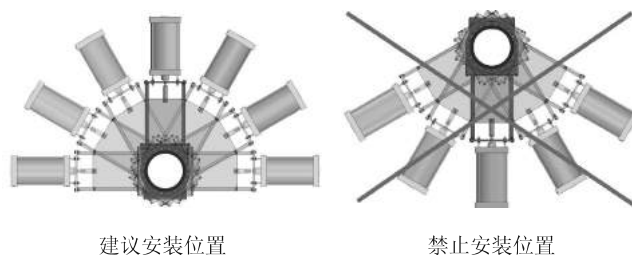


图7. SKW 和 SKF 阀门的替代安装方式。

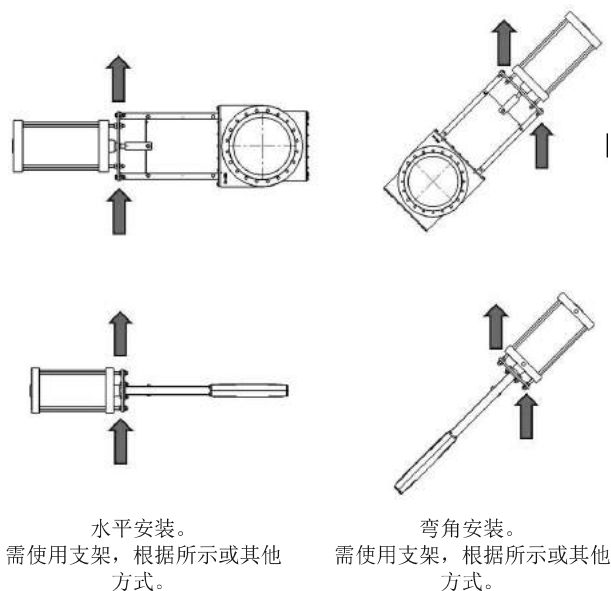


图8. 用于气动致动阀门的支架。

### 4.3 阀门安装

安装阀门前应至少确保以下几点：

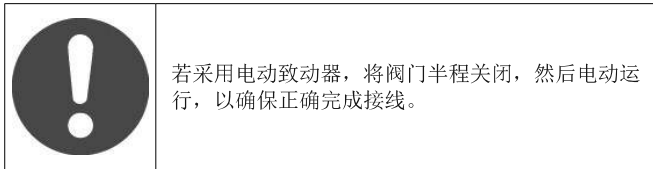
- 管道和过程隔离，且内部无压力。
- 管道已空、洁净且冷却。
- 管道法兰平行、同心且具有正确间距。
- 法兰连接螺栓具有正确的尺寸。参见Table 6。
- 阀门处于打开位置。

遵照以下安装步骤：

1. 自动致动器若已连接，将其从电源断开。
2. 将安全护板和所需附件装到阀门上。
3. 使用合适的提升设备将阀门提升到位。
4. 采用交叉顺序上紧法兰连接螺栓，如Figure 9所示。建议采用的紧固扭矩参见Table 6。
5. 除所述类型外，还可提供其他法兰钻孔。

应始终对 DN250 (10")和更大规格的气动致动阀门进行支承(用于气动致动阀门的支架。)

6. 将自动致动器连接到电源。
7. 连接冲洗连接（若可用）。
8. 检查所有连接是否已紧固，以及致动器是否已正确安装。
9. 在管道无压力状态下，运行打开/关闭循环数次。



10. 若阀门运行不顺畅或无附加力，参见故障排除。

表6. 阀门连接最大紧固扭矩和钢制法兰的螺栓标称直径

阀门尺寸 (DN)	建议采用的法兰螺栓紧固扭矩 (Nm (ft-lbs))	阀体内的锥孔深度 (mm)	DIN 螺栓标称直径	ANSI 150 螺栓标称直径
50 (2")	43 (32)	12	M16	5/8"-11 UNC
80 (3")	43 (32)	14	M16	5/8"-11 UNC
100 (4")	43 (32)	14	M16	5/8"-11 UNC
150 (6")	75 (55)	16	M20	3/4"-10 UNC
200 (8")	75 (55)	23	M20	3/4"-10 UNC
250 (10")	120 (90)	23	M20	7/8"-9 UNC
300 (12")	120 (90)	24	M20	7/8"-9 UNC
350 (14")	185 (135)	24	M20	1"-8 UNC
400 (16")	185 (135)	30	M24	1"-8 UNC
450 (18")	260 (190)	28	M24	1-1/8"-7 UNC
500 (20")	260 (190)	42	M24	1-1/8"-7 UNC
600 (24")	260 (190)	42	M27	1-1/4"-7 UNC

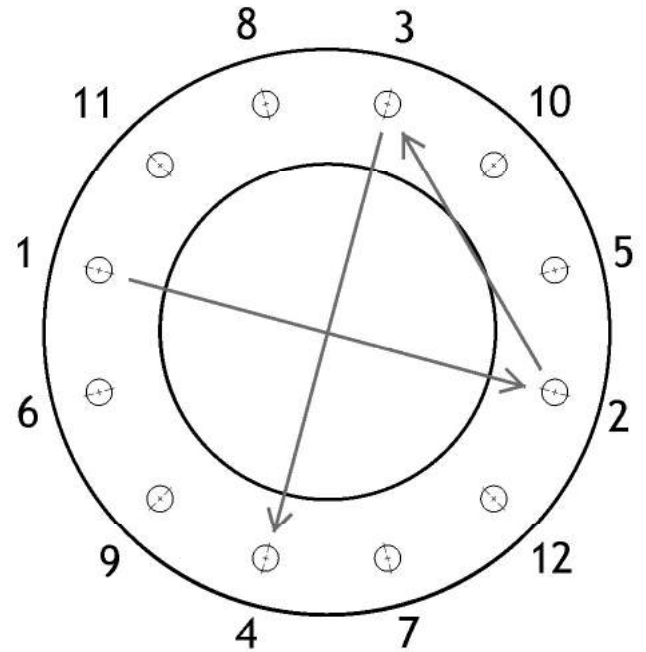





图9. 法兰螺栓紧固示例。

#### 4.4 冲洗安装指引

	 警示！
	有害物质危害。 若过程介质需完全密封，具有腐蚀性或有害，应确保冲洗端口已通过管道连接到安全位置。
	切勿在所有端口插上时使用阀门。积聚的固体可能会造成阀门堵塞。

若需进行法兰冲洗，客户需要提供管路。阀门发货时，冲洗孔内已安装塞子。如需过程特定说明，请联系 Valmet Flow Control Oy 办事处。

采用冲洗设计，可确保阀门不会由于阀体内介质固体积聚而出现堵塞。若介质对人、环境或附近的其他组件有害，还要使用冲洗管道或排放管道。在其他情况下，可打开冲洗连接，以防止阀体堵住。

若无立即可用的清水，再生水通常具有足够的洁净度，可满足冲洗的需要。

较大直径的阀门可能具有附加的冲洗连接，以确保完成正确的冲洗操作。冲洗连接位于阀门的侧面、底部或正面。孔尺寸参见附录 A。根据过程类型，使用一个或多个冲洗连接。

可将流量指示器安装到冲洗管道上，以便进行功能检查。

冲洗示例 1 中的阀门保护塞(9)已拆除，或底部盖板(12)已拆除。在阀门运行过程中，从闸板和环形套管之间排出的过程介质将自由流出阀门。若介质具有任何形式的有害特性，必须通过管道将冲洗端口连接导安装位置。



图10. 冲洗示例 1

- 9. 保护塞
- 12. 底部盖板

冲洗示例 2 (Figure 11)，水导入阀门一侧，并从另一侧排出。需要在冲洗管道的上游或给水侧安装一个截止阀(B)，以避免水不停流动。可将其安装在任何位置，通常位于阀门附近。

- 12. 底部盖板
- A. 冲洗水供给
- B. 截止阀
- C. 排放管道

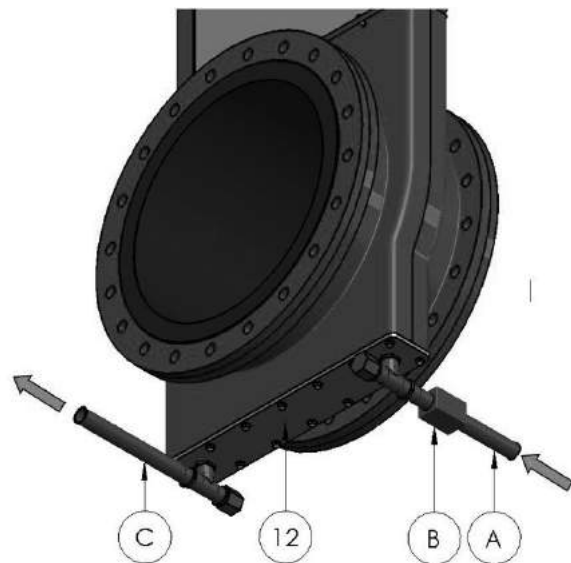


图11. 冲洗示例 2

## 5 阀门操作

### 5.1 调试和报废

在管道内运行阀门前，应确保已根据本手册中的说明以及适用安全规程完成阀门安装。

还必须确保以下几点：

- 铭牌上的参数适合过程和环境。
- 阀门用于销售时规定的用途。
- 已安装所需的闸板护板和其他附件。
- 已考虑到可能的易爆条件。

如果将阀门报废，根据当地规定和部件或设备制造商指示说明，对阀门部件和电动/气动/液压设备（致动器）进行废物处置。对危险的过程介质进行收集和废物处置，以避免人员 and 环境受到危害。遵照当地规定。

### 5.2 冲洗

若阀门冲洗装置已安装，则遵照以下操作说明。

根据应用和过程，至少每20次循环对Fowrox闸阀进行一次冲洗，以清除阀体内的固体。若过程中存在泥浆固体，每次运行阀门时，许对冲洗时序进行初始化。

必须在阀门即将运行前，打开给水阀。然后，保留冲洗水用于整个循环，以及在循环后保留至少10秒。为了改善冲洗效果，水应保留至洁净的冲洗水已通过排放管道排出。

## 6 服务和维护

### 6.1 一般维护和检查

	<b>警告！</b> 意外启动危险。 在维护前，断开致动器电源。特别是配备机械式弹簧的气动致动器，若缸体意外致动，可能会导致人员受伤和设备损坏。
	压伤危害。 不可用手和脚触碰移动的部件。在维护前，断开致动器电源。
	<b>警告！</b> 在进行任何操作前，排出阀门压力，将其清空，并冷却。阀门表面可能具有高温。将阀门和过程完全隔离，并遵照工程安全规定。
	对于重量超过25kg的阀门，必须使用起吊设备。
	不得踩在安装在水平或弯角位置的阀门上面。

仅允许由接受过合适培训的人员安装阀门。如需致动器服务说明，可参考和阀门随附提供的制造商文档。

定期检查阀门的状况。若阀门密封且致动无瑕疵，则仅需将润滑作为强制性维护任务。应进行阶段性检查，因为随着时间推移，根据状况和过程，阀门可能会出现磨损。

#### 制定维护日程

将阀门包含在您的工程维护方案中。维护任何和服务间隔时间，以指引的形式提供，参见维护日程。7。日程可能会根据应用而变化。

表7. 维护日程。

维护任务	频率和指导建议
实施泄漏检查	定期。参见故障排除。
对阀门进行润滑	每50次循环后。若阀门运行次数极少，则增加循环次数。参见章节6.1.3。
对致动器阀杆进行润滑	每6个月。阅读制造商说明。
运行一次打开/关闭循环	建议每月一次，以确保运行顺畅且可靠。
检查冲洗和排放	每2个月
清洁闸板	每2个月。减少环形套管和填料压盖磨损。
检查闸阀是否有腐蚀	每2个月。
检查阀门是否有腐蚀和磨损	每6个月。

备件

订单应至少包含以下信息，以保证备件正确且快速交付：

- 铭牌上的阀门类型编号（例如：SKW100M10-60S0-NR-G）
- 备件名称和数量（例如：环形套管，2件）

您可通过 Valmet Flow Control、经销商或代理商订购备件。如需联系方式信息，可访问网址 <http://www.contact.neles.com>

建议在您的工厂仓库内留存备件列表。8 所示的备件。部件编号参见 机械结构。

表8. 备件列表。

部件	部件编号	数量/阀门
环形套管	4	2
二级密封	7	1
用于液压或气动致动器的密封套件	-	1

润滑

仅使用基于硅胶的润滑剂，例如 DOW# 111、DOW 4、DOW 44、一般电气复合物 G661和 RHONE - POULENE RHODORSIL III。

Flowrox 闸阀在阀体两侧设有润滑嘴(Figure 12)。阀门在组装时已润滑，无需进行初次润滑，除非阀门已库存较长时间。在输送干燥材料时，润滑可能受限或禁止。

不可使用基于碳氢的润滑脂对此类阀门进行润滑，因为弹性环形套管可能会膨胀和松脱。

大约每50次循环，或在长时间低频次循环后，对阀门两侧进行润滑。润滑脂用量参见Table 10。请注意，即使润滑剂具有惰性，但仍会干扰敏感过程。可使用的润滑剂包括：DOW# 111, DOW 4, DOW 44, 一般电气复合物 G661 和 RHONE - POULENE RHODORSIL III。

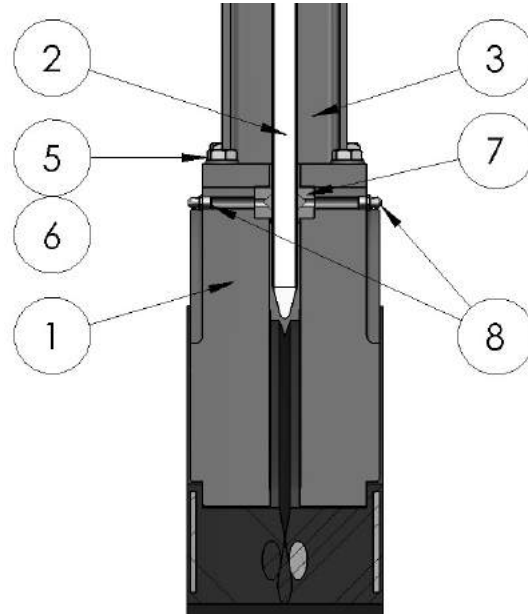


图12. 阀体上的润滑嘴。

1. 阀体
2. 闸板
3. 塔架
5. 塔架安装螺栓
6. 塔架安装垫圈
7. 二级密封
8. 油脂嘴

表9. 每个单元所需的润滑脂用量。

阀门标称尺寸	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 200 (8")	DN 250 (10")
每个阀门使用的润滑剂 (cm <sup>3</sup> )	35 (1.18 fl. oz.)	40 (1.35 fl. oz.)	60 (2.02 fl. oz.)	65 (2.19 fl. oz.)	105 (3.55 fl. oz.)	240 (8.11 fl. oz.)

阀门标称尺寸	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
每个阀门使用的润滑剂 (cm <sup>3</sup> )	480 (16.23 fl. oz.)	490 (16.56 fl. oz.)	550 (18.59 fl. oz.)	620 (20.96 fl. oz.)	1090 (36.85 fl. oz.)	1470 (49.70 fl. oz.)



6.2 更换二级密封

要在阀门安装到管道的同时更换二级密封，应遵照以下




说明。致动器、塔架和闸板已一起移除，以获得更多操作空间。若还需要进行其他服务，参见 更换环形套管或阀门拆卸。

部件编号参见 机械结构。

	 警告！
	压伤危害。 不可用手和脚触碰移动的部件。在维护前，断开致动器电源。



1. 排出管道压力，并排空。
2. 将阀门冲程到完全打开位置，并将锁紧销(13)放置到位。
3. 将自动（电动、气动或液压）致动器从电源断开，以避免受伤。
4. 移除用于将塔架(3)连接到阀体(1)的螺栓(5)。将致动器、塔架(3)和闸板(2)一起吊起。二级密封(7)可能会出现在闸板(2)上。
5. 移除二级密封(7)。
6. 清洁用于二级密封(7)的空间。
7. 将建议采用的硅胶润滑剂涂覆到新二级密封(7)的内部轮廓和外侧，并将其压入密封槽。若二级密封具有密封唇，将其放置在朝向阀门孔的位置。

	仅使用基于硅胶的润滑剂，例如 DOW# 111、DOW 4、DOW 44、一般电气复合物 G661和 RHONE - POULENE RHODORSIL III。
---	---


8. 将建议采用的硅胶润滑剂涂覆到闸板(2)倒角边缘。
9. 将致动器、塔架和闸板一起下降到阀体上，并用螺栓(5)紧固。
10. 对阀门润滑嘴(8)进行润滑，具体说明参见 润滑。
11. 将自动致动器重新连接到电源，并移除锁紧销(13)。
12. 在对管道增压前，运行测试冲程数次。

### 6.3 更换环形套管


在更换环形套管时，需从管道移除阀门。若还需要进行其他服务，参见 阀门拆卸。部件编号参见 机械结构。

	 警告！
	多重危险。
	管道内的增压介质可能会造成高压喷射、灼伤、腐蚀和刺激。 不得将增压阀从管道断开。

1. 排出管道压力，并排空。
2. 将阀门冲程到完全打开位置，并将锁紧销(13)放置到位。
3. 将自动（电动、气动或液压）致动器从电源断开，以避免受伤。
4. 若已安装冲洗装置，将冲洗管道从阀门断开。

	对于重量超过 25kg的阀门，应使用提升设备。
---	-------------------------

5. 移除法兰连接螺栓，并将阀门提起到合适的操作表面。
6. 将环形套管(4)提起，使其移出阀体，并检查是否有明显损坏，如划痕、开口或纹沟侵蚀。凹坑或明显的磨平点也视为损坏迹象。
7. 检查闸板(2)是否损坏，以及是否需要更换。
8. 清洁阀体(1)。

	仅使用基于硅胶的润滑剂，例如 DOW# 111、DOW 4、DOW 44、一般电气复合物 G661和 RHONE - POULENE RHODORSIL III。
---	---

9. 将建议采用的基于硅胶的润滑剂薄层涂覆到密封唇和新的环形套管外侧表面。将套管插入阀体，在孔内对环形套管进行对中。
10. 将阀门保持在打开位置，直至其已安装，若阀门存放在仓库内，参见 存放 说明。

## 6.4 阀门拆卸

要对阀门进行完整大修，应遵照以下说明。部件编号参见 机械结构。

### 移除致动器、闸板和塔架

1. 将阀门从管道移除，相关说明参见前面的章节 6.3。
2. 将锁紧销(13)安装在闸板(2)和塔架(3)之间的位置。
3. 移除塔架安装螺栓(5)并提起致动器、闸板(2)和塔架(3)。
4. 在将闸板(2)从致动器阀杆拆卸时，从U形夹扣(14)移除固定环(17)和U形销(16)。



图13. 移除U形销。

5. 清洁闸板(2)并检查是否有较深的疤痕和变形。若闸板出现损坏，应将其更换，以避免二级密封(7)和环形套管(4)累积损坏。
6. 使用标记笔在气缸轴上对U形夹扣(14)高度进行标记。阀门组装时需要该位置。
7. 移除U形锁紧销(15)和U形夹扣(14)。
8. 从致动器和塔架之间移除螺栓(或转接器板，若已配备)。将致动器从塔架提起。
9. 致动器密封更换或其他维护操作，参见致动器制造商指示说明。

### 拆卸阀体

1. 根据上述说明拆卸阀门，直至致动器、闸板(2)和塔架(3)已从阀体(1)移除。
2. 将环形套管(4)从阀体移除，并检查是否有明显损坏，如划痕、开口或纹沟侵蚀。凹坑或明显的磨平点也视为损坏迹象。若环形套管出现损坏，将其更换。
3. 移除二级密封(7)。
4. 移除底部盖板(12)。
5. 移除润滑嘴(8)。



图14. 已拆卸的阀体。

6. 从内测清洁阀体(1)，并确保开孔无瑕疵。
7. 若所有阀门已完成清洁和检查，继续至 阀门组装。

## 6.5 阀门组装


若此文档或其他提供的文档不包含特定紧固说明，应遵照Table 10中所示的一般紧固扭矩。部件编号说明参见机械结构。

表10. 一般紧固扭矩（螺栓等级 8.8, 润滑物 二硫化钼）。

尺寸	M6	M8	M10	M12	M16	M20	M24
紧固扭矩 Nm (ft-lbs)	7 (5)	17 (13)	33 (24)	57 (42)	140 (103)	282 (208)	499 (368)

### 阀体、二级密封和闸板组装

1. 将二级密封(7)装入密封槽，起重可能采用的密封唇朝向阀孔。将建议采用的硅胶润滑剂涂覆到新的二级密封的内部轮廓和外侧。
2. 安装润滑嘴(8)。

	<p>仅使用基于硅胶的润滑剂，例如 DOW# 111、DOW 4、DOW 44、一般电气复合物 G661和 RHONE - POULENE RHODORSIL III。</p>
--	--

3. 将一块木料插入开孔，如Figure 15所示。在安装U形销前，应避免闸板下降过度。
4. 仅将建议的硅胶润滑剂涂覆到闸板(2)倒角边沿和侧面，并将其滑移通过阀体顶部开口，直至其稳定停在木块上。
5. 继续至下一章节的塔架和致动器组装。

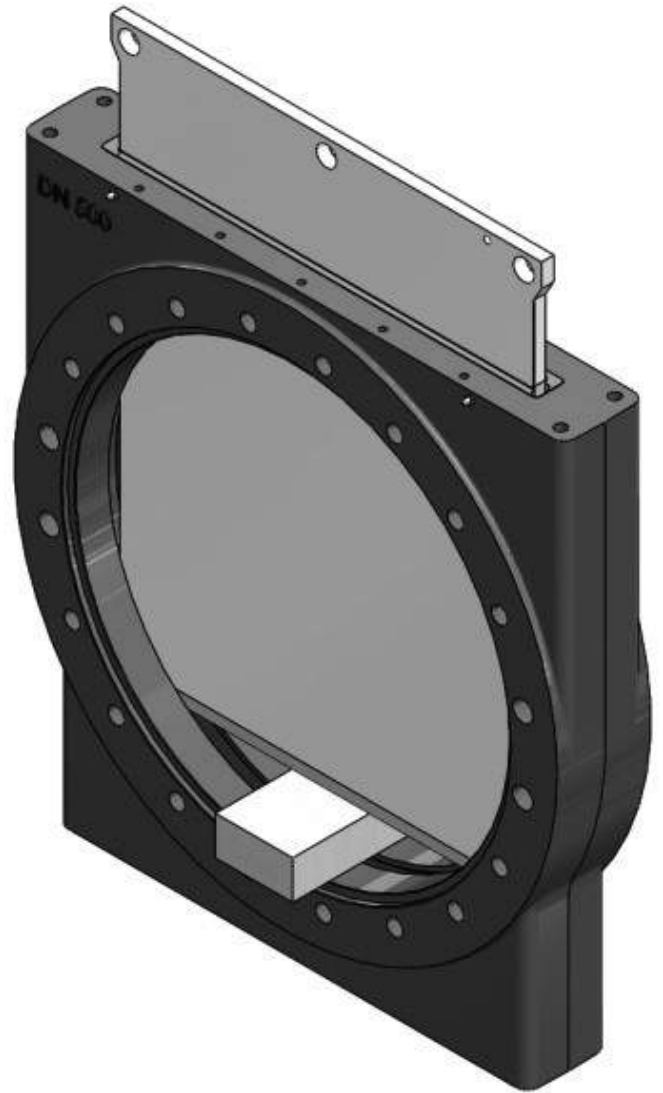


图15. 木料嵌入详细信息。

### 塔架和致动器装配

1. 完成阀体和闸板装配后，将塔架(3)提起并安装到阀体上。安装塔架安装螺栓，并用手紧固(5)。
2. 从中间位置紧固安装螺栓，如Figure 16所示。
3. 使用正确的螺栓和螺母，将致动器（以及可能的转接板）安装到塔架顶部(3)。
4. 若U形夹扣(14)已拆卸，则将其安装到致动器阀杆上。
5. 向下冲程致动器阀杆，以便将U形销(16)装入并穿过闸板(2)和U形夹扣(14)的对齐孔。用固定环(17)对U形销进行加固。
6. 安装底部盖板(12)并上紧底部盖板螺栓(10)。
7. 继续进行下一章节的测试冲程。

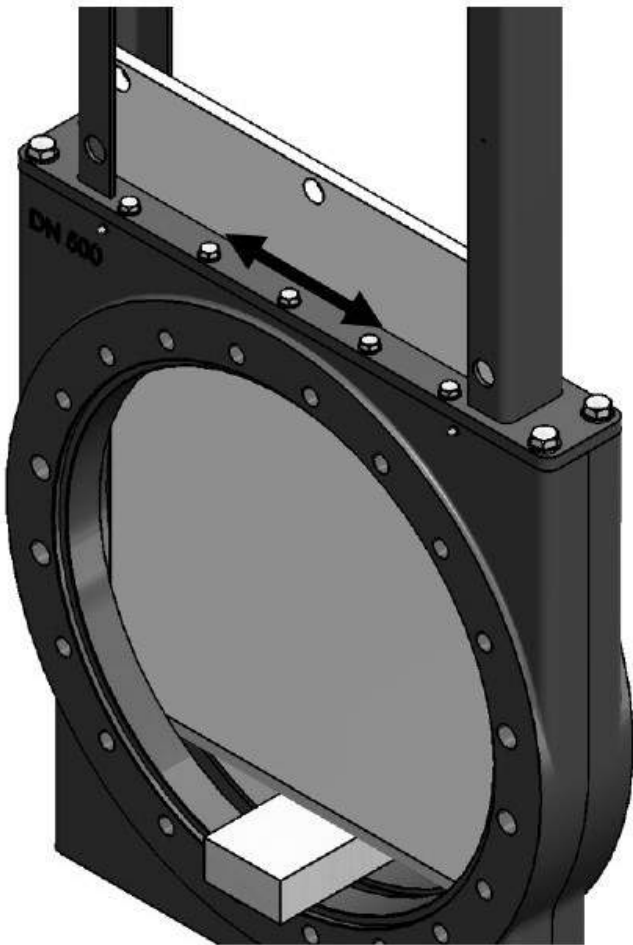




图16. 上紧塔架安装螺栓

### 测试并调整阀门冲程

仅允许接受过合适培训的人员对阀门进行通电。若拆卸阀门或组装气动或液压致动器，检查并调整阀门冲程。若使用手动致动器，则无需进行此操作。特定冲程调整说明，参见电动致动器文档。

	 <b>警告!</b>
	<p>压伤危害。</p> <p>不可用手和脚触碰移动的部件。在维护前，断开致动器电源。</p>

1. 根据上述说明组装阀门。
2. 将致动器连接电源，并将阀门冲程至完全打开位置。
3. 若闸板(2)现在可通过锁紧销(13)进行锁紧，则冲程已正确调整。否则，继续至下一步骤进行冲程调整。请参见Figure 17。
4. 测定闸板(2)所需调整量。
5. 将自动致动器从电源断开，以防止受伤。
6. 将固定环(17)从U形销(16)移除，并取下U形销。

7. 将闸板(2)向下推，以获得U形夹扣(14)转动所需的空間。
8. 松开U形锁紧螺钉(15)
9. 转动阀杆上的U形夹扣(14)，以根据测得的上述尺寸将其向上或向下调整。
10. 若锁紧销(13)现已到位，则重新安装U形夹扣。若销钉未安装到位，则重复调整操作。若阀门已正确调整，继续至下一章节。

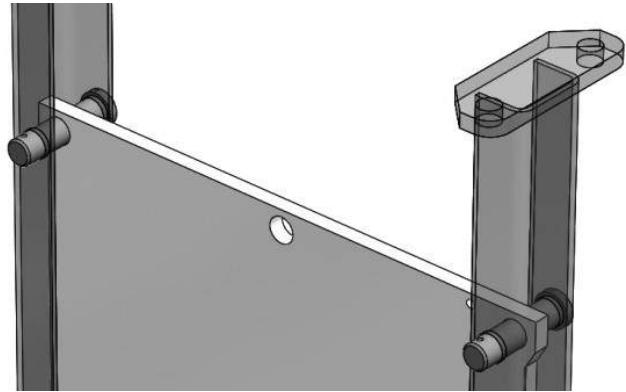


图17. 冲程已正确调整。

### 最后装配和测试

1. 在自动进行阀门冲程前，应确保已根据此手册说明完成调整操作。
2. 若阀门采用电动致动器，则在自动致动阀门前，手动半程关闭阀门（一半冲程）。此操作用于确保阀门在正确方向打开，接线连接已正确完成，以及防止阀门受到任何损坏。
3. 通过致动器将阀门冲程到完全打开和完全关闭位置，以确保顺畅运行，以及闸板位置正确。
4. 安装环形套管(4)。
5. 对阀门润滑嘴(8)进行润滑，具体说明参见 润滑。
6. 根据制造商说明安装所有拆除的安全护板和其他附件。
7. 运行打开/关闭循环数次，并使阀门保持打开状态。若阀门运行顺畅，可准备将其安装到管道上。遵照 安装 说明。

## 6.6 故障排除

表11. 故障排除。

问题	可能的原因	措施
底部盖板出现泄漏	冲洗管道连接或底部盖板松动	检查冲洗连接和底部盖板是否紧固
	环形套管和/或闸板损坏	检查环形套管和闸板，并按需更换
法兰连接出现泄漏	法兰连接松动	采用正确的扭矩紧固法兰连接
	法兰连接螺栓过长	测量螺栓并在需要时更换
	管道法兰和法兰对齐错误	检查法兰是否平行，以及是否和阀门同心
二级密封出现泄漏	塔架安装螺栓松动	将塔架安装螺栓紧固
	二级密封严重磨损	更换二级密封
阀门未打开/关闭或阀门不密封	致动器、限位开关或控制系统出现故障	检查并修复致动器运行
	固体造成堵塞	清洁闸板和阀体腔室检查或安装冲洗装置。
	闸板、环形套环或二级密封损坏	检查并更换损坏的部件
阀门打开/关闭不顺畅	润滑不足	对阀门进行润滑，并增加润滑计划次数。对致动器进行润滑。
打开/闭合力过大*	润滑不足	对阀门进行润滑，并增加润滑计划次数。对致动器进行润滑。
	法兰或塔架螺栓过紧	检查并松开螺栓
	闸板、环形套环或二级密封损坏	检查并更换受损的部件
环形套管使用寿命短	冲洗不足	检查冲洗流量和压力或安装冲洗装置
	润滑不足	增加计划的润滑次数
	环形套管材料不适合过程	使用Valmet Flow Control进行检查
	闸板损坏	检查闸板是否有刮擦和弯折，若有损坏，则更换。

\* 手动操作的阀门采用标称手动力进行致动。

附录 A: SKW 和 SKF 阀门的主要测量

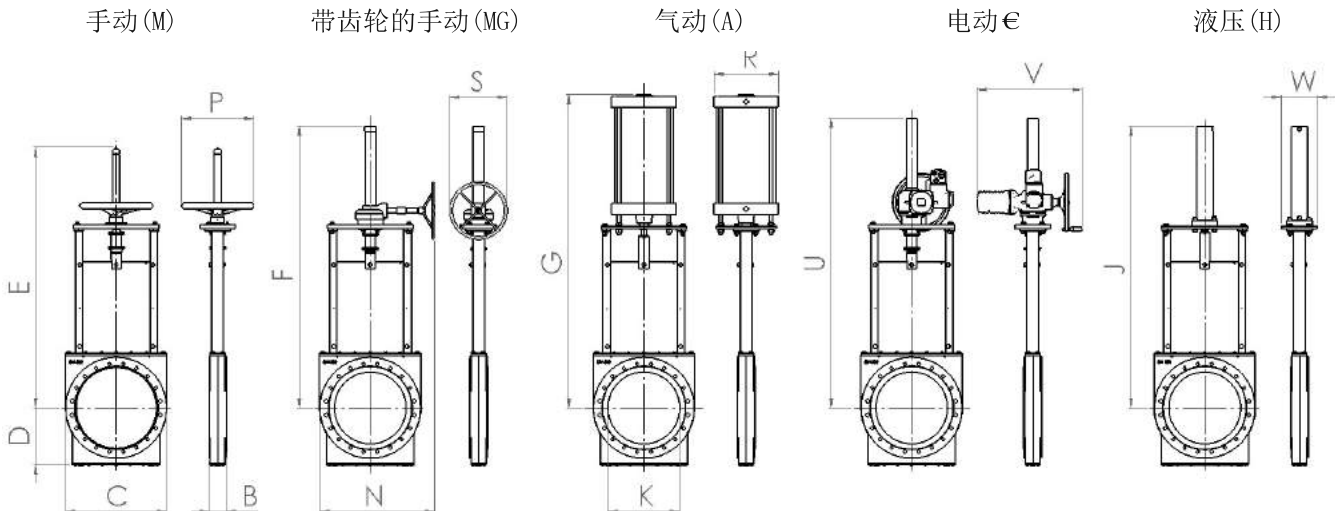


图18. SKW 阀门尺寸。

阀门尺寸 DN	尺寸, 单位: 英寸																重量, 单位: lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
50	54	58	165	102	566	-	586	-	-	-	-	350	110	-	-	-	20	-	17	-	-	G1/2"
80	57	61	200	112	628	-	683	-	739	80	-	350	110	-	513	-	24	-	22	48	-	G1/2"
100	57	61	230	132	648	-	725	-	751	100	-	350	120	200	513	-	30	-	28	51	-	G1/2"
150	64	68	285	157	921	-	972	-	879	150	-	350	176	200	513	150	42	-	49	64	-	G1/2"
200	76	80	346	188	1006	1148	1115	988	972	200	427	350	220	200	513	150	61	87	75	83	59	G1/2"
250	76	80	410	223	1133	1164	1316	1168	1150	250	459	350	284	200	537	180	82	-	113	104	-	G1/2"
300	83	87	483	262	-	1380	1512	1278	1363	300	535	-	340	400	537	200	-	134	190	150	-	G 1"
350	83	87	533	285	-	1455	1661	1521	1481	350	560	-	340	600	724	200	-	145	215	184	146	G 1"
400	95	99	600	322	-	1574	1799	1700	1600	400	698	-	340	400	724	200	-	186	260	222	187	G 1"
450	95	99	645	352	-	1875	2049	1831	1834	450	771	-	450	400	724	250	-	229	318	262	243	G 1"
500	121	125	705	403	-	1962	2180	1962	2015	500	801	-	450	500	731	250	-	316	400	370	320	G 1"
600	121	125	825	447	-	2250	2323	2291	2234	600	861	-	630	600	795	250	-	461	592	532	484	G 1"

阀门尺寸 英寸	尺寸, 单位: 英寸																重量, 单位: lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
3	2.13	2.28	6.50	4.02	22.28	-	23.07	-	-	-	-	13.78	4.33	-	-	-	44	-	37	-	-	G1/2"
4	2.24	2.40	7.87	4.41	24.72	-	26.89	-	29.09	3.15	-	13.78	4.33	-	20.20	-	53	-	48	106	-	G1/2"
6	2.24	2.40	9.06	5.20	25.51	-	28.54	-	29.57	3.94	-	13.78	4.72	7.87	20.20	-	66	-	62	112	-	G1/2"
8	2.52	2.68	11.22	6.18	36.26	-	38.27	-	34.61	5.91	-	13.78	6.93	7.87	20.20	5.91	92	-	108	141	-	G1/2"
10	2.99	3.15	13.62	7.40	39.61	45.20	43.90	38.90	38.27	7.87	16.81	13.78	8.66	7.87	20.20	5.91	134	191	165	183	130	G1/2"
12	2.99	3.15	16.14	8.78	44.61	45.83	51.81	45.98	45.28	9.84	18.07	13.78	11.18	7.87	21.14	7.09	180	-	249	229	-	G1/2"
14	3.27	3.43	19.02	10.31	-	54.33	59.53	50.31	53.66	11.81	21.06	-	13.39	15.75	21.14	7.87	-	295	418	330	-	G 1"
16	3.27	3.43	20.98	11.22	-	57.28	65.39	59.88	58.31	13.78	22.05	-	13.39	23.62	28.50	7.87	-	319	473	405	321	G 1"
18	3.74	3.90	23.62	12.68	-	61.97	70.83	66.93	62.99	15.75	27.48	-	13.39	15.75	28.50	7.87	-	409	572	488	411	G 1"
20	3.74	3.90	25.39	13.86	-	73.82	80.67	72.09	72.20	17.72	30.35	-	17.72	15.75	28.50	9.84	-	504	700	576	535	G 1"
24	4.76	4.92	27.76	15.87	-	77.24	85.83	77.24	79.33	19.69	31.54	-	17.72	19.69	28.78	9.84	-	695	880	814	704	G 1"

可根据要求提供更大尺寸。

B\* = 环形套管未压缩

M = 手轮

MG = 带齿轮的手动

A = 气动

E = 电动

H = 液压

T = 冲洗连接。

手动和电动阀采用波纹管盖板。

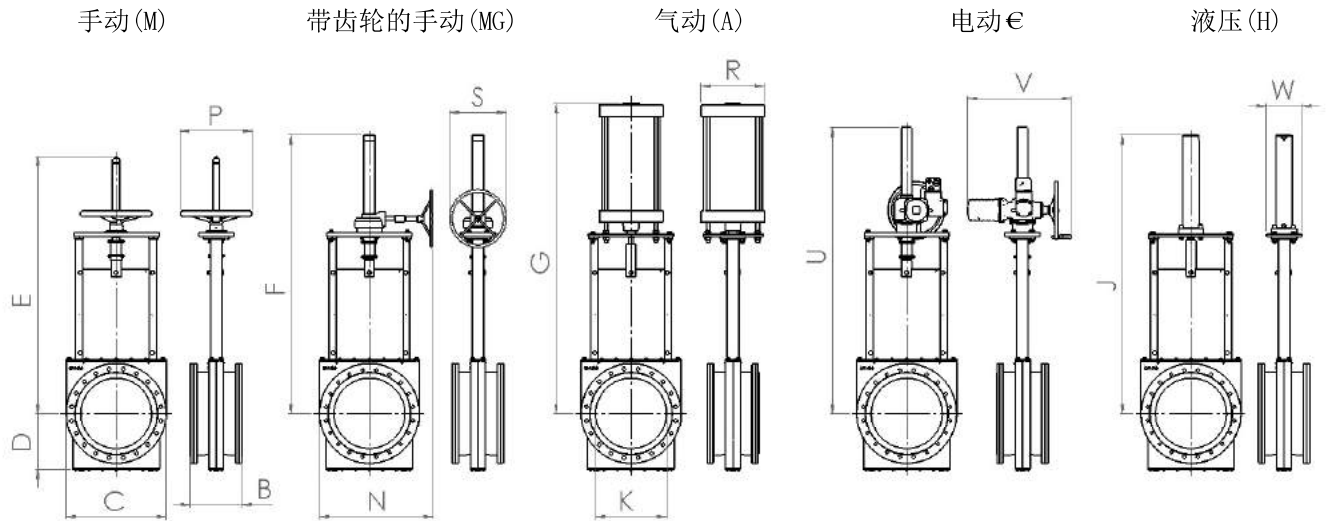


图19. SKF 阀门尺寸。

阀门尺寸 DN	尺寸, 单位: 英寸																重量, 单位: lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
80	175	179	200	112	628	-	683	-	739	80	-	350	110	-	513	-	32	-	31	57	-	G 1/2"
100	175	179	230	132	648	-	725	-	751	100	-	350	120	200	513	-	39	-	41	64	-	G 1"
150	178	182	285	157	921	-	972	-	879	150	-	350	176	200	513	150	41	-	66	80	-	G 1/2"
200	184	188	346	188	1006	1148	1115	988	972	200	427	350	220	200	513	150	85	-	100	108	-	G 1/2"
250	226	230	410	223	-	1164	1316	1168	1150	250	459	-	284	200	537	180	-	-	143	142	-	G 1/2"
300	257	261	483	262	1133	1380	1512	1278	1363	300	535	-	340	400	537	200	-	187	253	203	-	G 1"
350	257	261	533	285	-	1455	1661	1521	1481	350	560	-	340	600	724	200	-	215	282	252	216	G 1"
400	279	283	600	322	-	1574	1799	1700	1600	400	698	-	340	400	724	200	-	284	349	320	285	G 1"
450	311	315	645	352	-	1875	2049	1831	1834	450	771	-	450	400	724	250	-	335	420	368	344	G 1"
500	359	363	705	403	-	1962	2180	1962	2015	500	801	-	450	500	731	250	-	447	527	501	451	G 1"
600	372	376	825	447	-	2250	2323	2291	2234	600	861	-	-	600	795	250	-	629	-	700	652	G 1"

阀门尺寸 英寸	尺寸, 单位: 英寸																重量, 单位: lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
3	6.89	7.05	7.87	4.41	24.72	-	26.89	-	29.09	3.15	-	13.78	4.33	-	20.20	-	70	-	68	125	-	G 1/2"
4	6.89	7.05	9.06	5.20	25.51	-	28.54	-	29.57	3.94	-	13.78	4.72	7.87	20.20	-	86	-	90	141	-	G 1/2"
6	7.01	7.17	11.22	6.18	36.26	-	38.27	-	34.61	5.91	-	13.78	6.93	7.87	20.20	5.91	90	-	145	176	-	G 1/2"
8	7.24	7.40	13.62	7.40	39.61	45.20	43.90	38.90	38.27	7.87	16.81	13.78	8.66	7.87	20.20	5.91	187	-	220	238	-	G 1/2"
10	8.90	9.06	16.14	8.78	44.61	45.83	51.81	45.98	45.28	9.84	18.07	-	11.18	7.87	21.14	7.09	-	-	315	312	-	G 1/2"
12	10.12	10.28	19.02	10.31	-	54.33	59.53	50.31	53.66	11.81	21.06	-	13.39	15.75	21.14	7.87	-	411	557	447	-	G 1"
14	10.12	10.28	20.98	11.22	-	57.28	65.39	59.88	58.31	13.78	22.05	-	13.39	23.62	28.50	7.87	-	473	620	554	475	G 1"
16	10.98	11.14	23.62	12.68	-	61.97	70.83	66.93	62.99	15.75	27.48	-	13.39	15.75	28.50	7.87	-	625	768	704	627	G 1"
18	12.24	12.40	25.39	13.86	-	73.82	80.67	72.09	72.20	17.72	30.35	-	17.72	15.75	28.50	9.84	-	737	924	810	757	G 1"
20	14.13	14.29	27.76	15.87	-	77.24	85.83	77.24	79.33	19.69	31.54	-	17.72	19.69	28.78	9.84	-	983	1159	1102	992	G 1"
24	14.65	14.80	32.48	17.60	-	88.58	91.46	90.20	87.95	23.62	33.90	-	-	23.62	31.30	9.84	-	1384	-	1540	1434	G 1"

可根据要求提供更大尺寸  
 B\* = 环形套管未压缩  
 M = 手轮  
 MG = 带齿轮的手动

A = 气动  
 E = 电动  
 H = 液压  
 T = 冲洗连接  
 手动和电动阀采用波纹管盖板。

附录B: 如何订购

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
SKW	150	A	10	-	2	0	S1	-	NR	-	R1Z1

1.	产品类型
SKW	Flowrox 高耐用型对夹式刀闸阀。
SKF	Flowrox 高耐用型法兰式刀闸阀。
2.	产品尺寸 DN
	50-1500 a)

a) 无法提供所有尺寸。联系 Valmet Flow Control。

3.	致动器													
AU1C						EB				H		MG		
气动						电动				液压		手动		
气缸		手动超控		失效选项		类型		电压范围		类型		类型		
A	气动气缸	-	无	-	无	E	电动开-关 AUMA 标准	-	400V/50Hz	H	液压	M	手动手轮	
A1S	气动采用 不锈钢枪体 杆体, 横 拉杆 和涂漆 气缸	B	手动超 控	U2C	采用气动 弹簧 (压力 开关) 失效	EP	电动开-关 采用反馈 单元 EWG 01. 1, AUMA	B	380V/50Hz			MG	手动, 带 锥形 齿轮	
A2S	气动 “不锈钢” 无 涂漆			U20	采用气动 弹簧 (压力 开关) 失效 打开	ES	电动开-关 AUMA-Matic	C	440V/50Hz			MCW	链轮	
				VC	采用机械 弹簧 失效 关闭 a)	EL	电动 开/关	D	525V/50Hz					
				VO	采用机械 弹簧 失效 打开 a)			E	460V/60Hz					
								N	其他					

4.	压力等级 PN
4	4 bar / 60 psi
6	6 bar / 90 psi
10	10 bar / 150 psi



6.	法兰孔
2	DIN PN 10
3	DIN PN 16
4	DIN PN 25
5	DIN PN 40
6	ASME B16.5 Class 150
7	ASME B16.5 Class 300
8	BS TABLE D
9A	AS TABLE D
9B	AS TABLE E
9C	JIS 10
9D	JIS 16
9	其他

7.	阀体材料
0	铸铁 / 焊接钢
2	AISI 316
4	其他

8.	闸板材料
S1	AISI 316
S2	Duplex 2205
S3	Duplex 2101
S4	7-4PH®
S5	ALLOY C-276
S6	DUPLEX 2507
S7	AISI 316L
S8	AISI 904L

9.	闸板涂层
-	无

10.	环形套管材料
NR	天然橡胶
NBR	丁腈橡胶
EPDM	乙烯丙烯

12.	辅件			
	说明	额外信息	适用的执行机构	
B	空气供应增压器	增压器由Flowrox确定, 用于增加供气压力, 确保气动气缸有足够压力。	气动	*
F	过滤调压 + 压力表	过滤器调节器 + GaugeFlowrox 选择的型号。	气动	*
F1	过滤调压 + 压力表 (不锈钢AISI 316)	过滤器调节器 + GaugeFlowrox 选择的型号FESTO PCRPG1/4 & G1/2	气动	*
F5	过滤调压或过滤调压 + 压力表	过滤调压或过滤调压 + 压力表 (非标准)	气动	*
G	闸板护板		任意	*
H	液压手泵 (仅适用于液压)	手动液压手泵, 仅适用于液压致动器H。	液压	*
J1	小接线盒 (Flowrox标准)	小接线盒, 用于限位开关或电磁阀, IP66, 塑料, 2个M12x1.5和1个M20x1.5, 预接线。	任意	*
J2	大接线盒 (Flowrox标准)	大接线盒, 用于限位开关和电磁阀, IP66, 塑料, 4个M12x1.5和1个M20x1.5, 预接线。	任意	*
J4	接线盒 (非标准)	Flowrox标准规格范围以外的接线盒, 由投标书和阀门序列号特定说明。	任意	
P1	不锈钢连接件 + 耐腐蚀管道	高温和耐腐蚀	气动	
P2	AISI 316 连接件和管道	不锈钢连接件和管道	气动	
R	电感限位开关支架	可安装18 mm电感限位开关。	任意	*
R1	AC/DC (18mm圆柱形开关) (Flowrox标准)	AC/DC, 双线式, (24...240VAC / 24...240VDC), Flowrox特定型号	任意	*
R2	DC, PNP (18mm圆柱形开关) (Flowrox标准)	DC, 三线式, PNP (12...24V), Flowrox特定型号	任意	*
R3	DC, NPN (18mm圆柱形开关) (Flowrox标准)	DC, 三线式, NPN (12...24V), Flowrox特定型号	任意	*
R5	限位开关 (非标准)	Flowrox标准规格范围以外的限位开关, 由投标书和阀门序列号特定说明。	任意	
S	磁感限位开关 (Flowrox标准)	磁感限位开关, 连接至铝制气动气缸执行机构。气缸配置磁性活塞。	气动	*
S5	磁感限位开关 (非标准)	磁感限位开关, 连接至铝制气动气缸执行机构。气缸配置磁性活塞。	气动	
T	机械限位开关 (Flowrox标准)	机械限位开关, Flowrox特定型号	任意	*
T5	机械限位开关 (非标准)	机械限位开关 (非标准), 请咨询Flowrox	任意	*
Z1	电磁阀, 24VDC, 单稳态 (Flowrox标准)	电磁阀 24 VDC - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 单稳态 (单线圈)。	气动	*
Z1B	电磁阀, 24VDC, 双稳态 (Flowrox标准)	电磁阀 24 VDC - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 双稳态 (双线圈)。	气动	*
Z2	电磁阀, 230V, 50/60Hz, 单稳态 (Flowrox标准)	电磁阀 230V - 50/60Hz - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 单稳态 (单线圈)。	气动	*
Z2B	电磁阀, 230V, 50/60Hz, 双稳态 (Flowrox标准)	电磁阀 230V - 50/60Hz - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 双稳态 (双线圈)。	气动	*
Z3	电磁阀, 110V, 50/60Hz, 单稳态 (Flowrox标准)	电磁阀 110V-50/60Hz - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 单稳态 (单线圈)。	气动	*
Z3B	电磁阀, 110V-50/60Hz, 双稳态 (Flowrox标准)	电磁阀 110V-50/60Hz - 采用镀镍黄铜管件和塑料管体。Flowrox选择的型号, 双稳态 (双线圈)。	气动	*
Z5	电磁阀, 24VDC, 单稳态 (非标准)	Flowrox标准规格范围以外的24 VDC单稳态 (单线圈) 电磁阀, 由投标书和阀门序列号特定说明。	气动	
Z5B	电磁阀, 24VDC, 双稳态 (非标准)	Flowrox标准范围以外的24 VDC双稳态 (双线圈) 电磁阀, 由投标书和阀门序列号特定说明。	气动	
Z6	电磁阀, 230V, 50/60Hz, 单稳态 (非标准)	Flowrox标准范围以外的230V 50/60Hz单稳态 (单线圈) 电磁阀, 由投标书和阀门序列号特定说明。	气动	

12.	辅件			
	说明	额外信息	适用的执行机构	
Z6B	电磁阀，230V，50/60Hz，双稳态（非标准）	Flowrox标准范围以外的230V 50/60Hz双稳态（双线圈）电磁阀，由投标书和阀门序列号特定说明。	气动	
Z7	电磁阀，110V，50/60Hz，单稳态（非标准）	Flowrox标准范围以外的110V 50/60Hz单稳态（单线圈）电磁阀，由投标书和阀门序列号特定说明。	气动	
Z7B	电磁阀，110V，50/60Hz，双稳态（非标准）	Flowrox标准范围以外的110V 50/60Hz双稳态（双线圈）电磁阀，由投标书和阀门序列号特定说明。	气动	
X	需要特定说明	未列出的其他辅助装置。	任意	

Valmet Flow Control Oy  
Marssitie 1, 53600 Lappeenranta, Finland.  
电话: +358 10 417 5000  
[www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol)

如有变更，恕不另行通知。  
Neles、Neles Easyflow、Jamesbury、Stonel、Valvcon、Flowrox及其他  
商标是Valmet Oyj或其子公司在美国和/其他国家的注册商标或商标。  
更多信息，请访问 [www.needes.com/trademarks](http://www.needes.com/trademarks)



# Flowrox™ Slurry Knife Gate valves SKW DN50–600 (Wafer) SKF DN80–600 (Flanged)

Installation, maintenance and  
operating instructions



These instructions must be read carefully and understood prior to the installation, use, and servicing of this product.

## DISCLAIMER

ALL DRAWINGS, SPECIFICATIONS, DATA, SOFTWARE, FIRMWARE, MANUALS, INSTRUCTIONS, DOCUMENTATION OR OTHER WORKS OF AUTHORSHIP FURNISHED BY VALMET ARE COPYRIGHTED PROPERTY OF VALMET OR ITS SUPPLIERS, AND ARE TO BE USED BY CUSTOMER, PURCHASER, SUBCONTRACTOR, SUPPLIER OR OTHER AUTHORIZED PERSONS (“USERS”) ONLY FOR THE PURPOSE OF INSTALLING, OPERATING, MAINTAINING AND REPAIRING THE GOODS AND SERVICES SUPPLIED BY VALMET (“PRODUCTS”). SUCH WORKS AND DATA MAY NOT BE OTHERWISE USED OR REPRODUCED OR DISCLOSED. VALMET OR ITS SUPPLIERS RETAIN ALL RIGHT, TITLE AND INTEREST IN AND TO ITS AND THEIR INVENTIONS, DISCOVERIES, CONCEPTS, IDEAS OR OTHER INTELLECTUAL PROPERTY EMBODIED IN OR RELATED TO ITS PRODUCTS.

ANY AND ALL TRADE SECRETS, SPECIFICATIONS, DRAWINGS, DESIGNS, SOFTWARE, SAMPLES, OTHER TECHNICAL, FINANCIAL, PRODUCT, MARKETING, SALES, PRODUCTION, SUBCONTRACTING, PRICING AND OTHER CONFIDENTIAL AND/OR PROPRIETARY INFORMATION OF A PARTY PERTAINING TO THE PRODUCTS OR OTHERWISE TO THIS CONTRACT, OR TO A PARTY, ITS PRODUCTS, BUSINESSES, OPERATIONS, OR PLANS, SHALL NOT BE DISCLOSED TO ANY UNAUTHORIZED THIRD PARTY BY THE OTHER PARTY. THE RECEIVING PARTY SHALL ENSURE THAT ITS DIRECTORS, OFFICERS, EMPLOYEES AND AGENTS COMPLY WITH THE OBLIGATIONS HEREIN. UNLESS OTHERWISE AGREED TO IN WRITING BY THE PARTIES, THE PARTIES' CONFIDENTIALITY, NON-DISCLOSURE AND NON-USE OBLIGATIONS HEREIN SHALL REMAIN IN FORCE TO THE MAXIMUM TERM PERMITTED BY APPLICABLE LAW.

THIS MANUAL PROVIDES INSTRUCTIONS TO CARRY OUT CERTAIN ACTIVITIES AND IS DESIGNED AND MEANT TO GUIDE AND ASSIST PROFESSIONAL AND PROPERLY TRAINED EXPERTS IN PERFORMING THEIR FUNCTIONS. EVERYONE MUST BECOME FAMILIAR WITH ALL INSTRUCTIONS IN THIS MANUAL BEFORE ANY INSTALLATION, USE, MAINTENANCE, REPAIR OR ANY OTHER ACTIONS OF THE RESPECTIVE GOODS AND/OR SERVICES WHICH THIS MANUAL APPLIES TO. ALL INSTRUCTIONS MUST BE FOLLOWED CAREFULLY. HOWEVER, OBSERVANCE OF ANY PART OF THE INSTRUCTIONS PRESENTED IN THIS MANUAL MAY BE OMITTED IN EVENT WHEN IT IS REQUIRED OR ALLOWED BY LAW. VALMET HAS TAKEN EVERY CARE IN THE PREPARATION OF THE CONTENT OF THIS MANUAL, BUT DOES NOT MAKE ANY REPRESENTATIONS, WARRANTIES OR GUARANTEES OR, EXPRESS OR IMPLIED, AS TO THE ACCURACY OR COMPLETENESS OF THIS MANUAL.

ALL USERS MUST UNDERSTAND AND BE AWARE THAT UPDATES AND AMENDMENTS WILL BE MADE FROM TIME TO TIME TO THIS MANUAL. ALL USERS ARE OBLIGATED TO FIND OUT AND DETERMINE WHETHER THERE HAVE BEEN ANY APPLICABLE UPDATES OR AMENDMENTS TO THIS MANUAL. NEITHER VALMET NOR ANY OF ITS DIRECTORS, OFFICERS, EMPLOYEES, SUBCONTRACTORS, SUB-SUPPLIERS, REPRESENTATIVES OR AGENTS SHALL BE LIABLE IN CONTRACT, TORT OR IN ANY OTHER MANNER WHATSOEVER TO ANY PERSON FOR ANY LOSS, DAMAGE, INJURY, DEATH, LIABILITY, COST OR EXPENSE OF ANY NATURE, INCLUDING WITHOUT LIMITATION INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE OR DIRECT DAMAGES AND/OR LOSSES ARISING OUT OF OR IN CONNECTION WITH THE CREATION, DELIVERY, POSSESSION AND/OR USE OF THIS MANUAL. HOWEVER, NOTHING IN THIS PARAGRAPH IS DEEMED TO EXCLUDE OR RESTRICT ANY LIABILITY WHICH CANNOT BY MANDATORY LAW BE EXCLUDED.

FLOWROX™ IS EITHER REGISTERED TRADEMARK OR TRADEMARK OF VALMET OR ITS SUBSIDIARIES OR AFFILIATES IN THE UNITED STATES AND/OR IN OTHER COUNTRIES. ALL OTHER TRADEMARKS, LOGOS, BRANDS AND MARKS DISPLAYED IN THIS MANUAL ARE PROPERTY OF THE RESPECTIVE OWNERS UNLESS STATED OTHERWISE.

Copyright © 2014-2023 Valmet Corporation. All rights reserved

# Table of Contents

<b>1</b>	<b>EU Declaration of Conformity</b>	<b>4</b>		
1.1	General safety instructions	5		
<b>2</b>	<b>Introduction</b>	<b>6</b>		
2.1	Applications and purpose of use	6		
2.2	Restrictions on use for SKW and SKF valves	6		
2.3	Using the valve in explosive conditions	6		
2.4	General description	6		
2.5	Principle of operation	6		
2.6	Mechanical structure	7		
2.7	Technical Specifications	10		
2.8	Product identification	10		
<b>3</b>	<b>Transportation, Storage and lifting</b>	<b>11</b>		
<b>4</b>	<b>Installation</b>	<b>12</b>		
4.1	General	12		
4.2	Flow direction, support, and valve position	12		
4.3	Valve installation	13		
4.4	Flushing installation guidelines	14		
<b>5</b>	<b>Operation</b>	<b>15</b>		
5.1	Commissioning and decommissioning	15		
5.2	Flushing	15		
<b>6</b>	<b>Maintenance</b>	<b>15</b>		
6.1	General maintenance and checks	15		
6.4	Changing the secondary seal	17		
6.5	Changing the ring sleeves	17		
6.6	Valve dismantling	18		
6.7	Valve assembly	19		
6.8	Troubleshooting	21		
	<b>Appendix A: Dimensions</b>		<b>22</b>	
	<b>Appendix B: Type code</b>		<b>24</b>	

## **READ THESE INSTRUCTIONS FIRST!**

These instructions provide information about safe handling and operation of the product.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

## **SAVE THESE INSTRUCTIONS!**

Addresses and phone numbers are printed on the back cover.

# 1 EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

VALMET FLOW CONTROL OY

Marssitie 1

53600 Lappeenranta

Finland

Tel. +358 (0)10 417 5000

Product model/type: **Knife Gate Valve (SKE, SKW)**

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

Machinery Directive 2006/42/EC: Annex IIB partly completed machinery

As the product may be used as parts or components in machinery, we declare that this product must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Follow the valve installation, operating and maintenance instructions in this manual.

Person authorised to compile the technical file is Technology Manager Jarmo Partanen.

On behalf of Valmet Flow Control Oy

In Lappeenranta, 13th May 2022



Riku Salojärvi







Head of Operations








## 1.1 General safety instructions

The symbols in Table 1 are used in this manual to highlight the parts requiring particular attention.

Hazard severity panels:

	 <b>DANGER!</b>
	DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	 <b>WARNING!</b>
	WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	 <b>CAUTION!</b>
	CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**Table 1. Warning and safety signs.**

Symbol	Description
	Risk to personal safety: Neglecting the safety measures can cause serious injury or death.
	Crushing hazard
	Read the operation and maintenance instructions: Read and understand the operation and maintenance instructions before using the product.
	Mandatory action symbol: Obey these instructions to prevent machine malfunctions.
	Forbidden action symbol.

Prevent accidents and ensure the valve's appropriate operation

by complying with the installation, safety, and maintenance instructions in this manual. Installation and maintenance of the valve must be carried out by persons with appropriate training. Electrical installation work of the actuator must be performed by a qualified electrician.

Access to the IOM-manual must be guaranteed at all times at the place of operation of the valve. It is required to observe the IOM-manual in all work tasks for the valve.

Use personal protective equipment when performing any checks or maintenance operation for the valve (goggles, helmet, clothing and gloves). Always follow the factory safety regulations.

In case of any discrepancies between translations, the English version shall prevail.

## 2 Introduction

### 2.1 Applications and purpose of use

Flowrox Slurry Knife Gate valves (SKW) and (SKF) are intended for industry medium and slurry applications. They are bi-directional and are installed between flat flanges to shut-off or open flow within instructed temperature and pressure limits.

### 2.2 Restrictions on use for SKW and SKF valves

The valve must not be used to throttle the flow in any way, nor should the gate be left in partially opened or closed position as this will lead to premature failure.

The valve temperature and pressure range must not be exceeded. The temperature ranges are given in Table 2 for standard sleeve materials. Check the pressure class from the valve type plate. Do not use higher pipeline pressure than rated for the valve.

**Table 2. Temperature ranges for SKW and SKF valves.**

Ring sleeve material	NR	NBR	EPDM
Max valve operating temperature °C (°F)	0 to 75 (32 to 167 °F)	0 to 100 (32 to 212 °F)	0 to 100 (32 to 212 °F)

### 2.3 Using the valve in explosive conditions

This valve type is not designed for Ex-areas.

For use in explosive conditions the valve must have the required Ex-classification and the grounding cables must be connected to earth. For more information, contact Valmet Flow Control.

### 2.4 General description

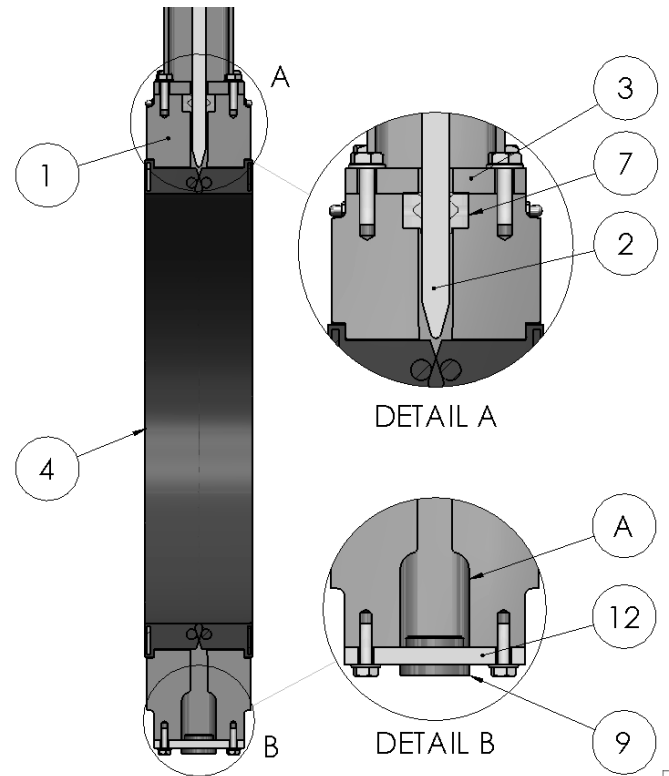
### 2.5 Principle of operation

Flowrox SKW and SKF valves are built with a cast or welded body and feature a heavy-duty stainless steel gate as a standard structure. Removable ring sleeves on both sides of the gate provide a bi-directional bubble tight seal.

In the open position the two ring sleeves seal against each other in the centre of the valve, providing a full bore through which the medium can travel. Main components are shown in Figure 1. Valve main components.. Closing the valve forces the gate progressively down between the two mating ring


sleeves, until it reaches the fully closed position. When the valve is fully closed, the ring sleeves push against both sides of the gate, effectively sealing and completely containing the line pressure. Any medium discharged between the ring sleeves during open/close strokes is collected to the valve body cavity and drained or flushed through the flushing ports.

The secondary seal is located in the upper part of the body. On every valve stroke, it wipes the gate and lubricates it with silicone grease. Easier actuation and minimum wear are achieved. There is no need to remove the valve from the line when replacing the secondary seal, but in tight or unsafe conditions it is unavoidable.



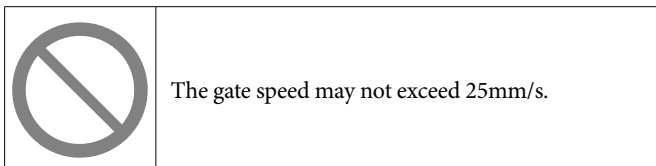
**Figure 1. Valve main components.**

No.	Description	No.	Description
1	Valve body	7	Secondary seal
2	Gate	9	Protective plug (on flushing port)
3	Tower	12	Bottom cover plate
4	Ring sleeve	A	Valve body cavity



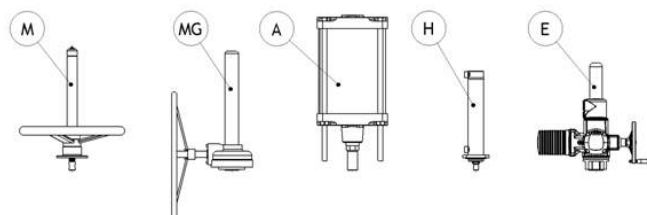
The valve must not be used to throttle in any way, nor should the gate be left in partially opened or closed position as this will lead to premature failure.

This valve is intended for on-off operation only. Ring sleeves are easily replaced, and are available in a number of molded elastomer options to suit different conditions.



## 2.6 Mechanical structure

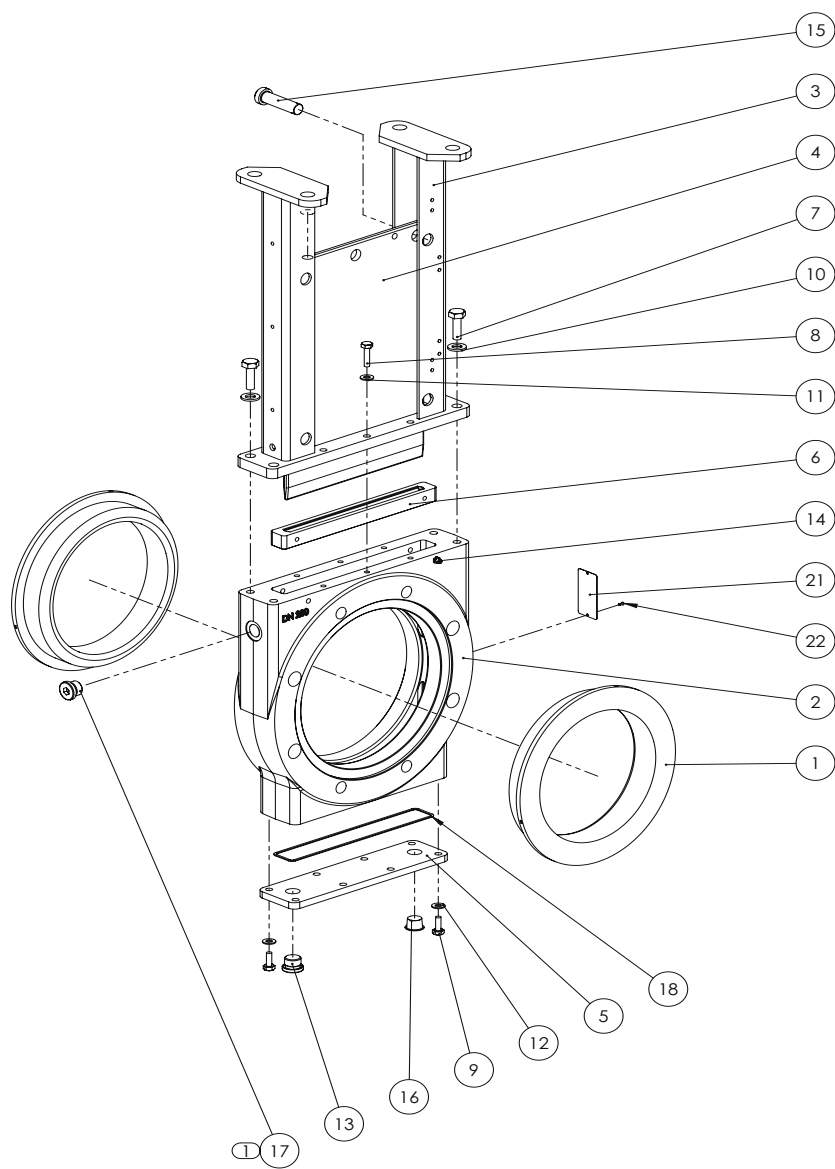
SKW and SKF valves can be delivered with the actuator options shown in Figure 2. Alternative actuators. Manual actuator type depends on the valve size.



**Figure 2. Alternative actuators**

Type	Description
M	Manual actuator
MG	Manual actuator with gearbox
A	Pneumatic actuator
H	Hydraulic actuator
E	Electric actuator

SKW valve part list is shown in Table 3 and the exploded view in Figure 3. Part quantities are not displayed if they are valve size or actuator type dependent.

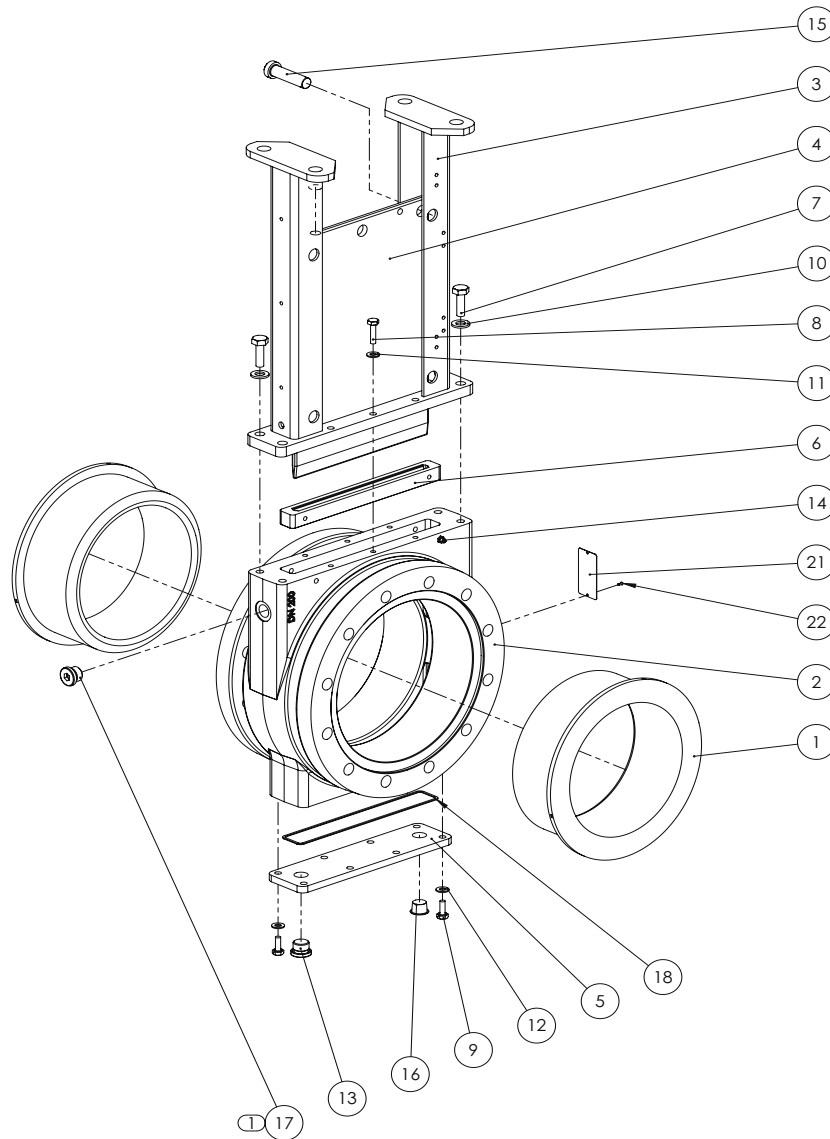


Ⓛ NOT AVAILABLE ON ALL OPTIONS / SIZES  
**Figure 3. Exploded view of SKW valve**

**Table 3. SKW valve part list**

Part	Description	Part	Description
1	Ring sleeve	12	Washer
2	Body SKW	13	Plug
3	Tower	14	Grease nipple
4	Gate	15	Locking pin
5	Bottom plate	16	Plug
6	Secondary seal	17	Plug
7	Hex screw	18	Sealing strip
8	Hex screw	19	Ferrule (not shown)
9	Hex screw	20	Steel wire rope (not shown)
10	Washer	21	Tag plate
11	Washer	22	Hammerdrive screw

SKF valve part list is shown in Table 4 and the exploded view in Figure 4. Part quantities are not displayed if they are valve size or actuator type dependent.



① NOT AVAILABLE ON ALL OPTIONS / SIZES  
**Figure 4. Exploded view of SKF valve**

**Table 4. SKF valve part list.**

Part	Description	Part	Description
1	Ring sleeve	12	Washer
2	Body	13	Plug
3	Tower	14	Grease nipple
4	Gate	15	Locking pin
5	Bottom plate	16	Plug
6	Secondary seal	17	Plug
7	Hex screw	18	Sealing strip
8	Hex screw	19	Ferrule (not shown)
9	Hex screw	20	Steel wire rope (not shown)
10	Washer	21	Tag plate
11	Washer	22	Hammerdrive screw

## 2.7 Technical Specifications

Pressure range: 0-10 bar (0 -150 psi)

Max pressure differential: according to pressure rating.

Temperature range: See section 2.2.

Flow direction: Bidirectional

## 2.8 Product identification

Flowrox valve name plates or identification plates are shown on Figure 5.

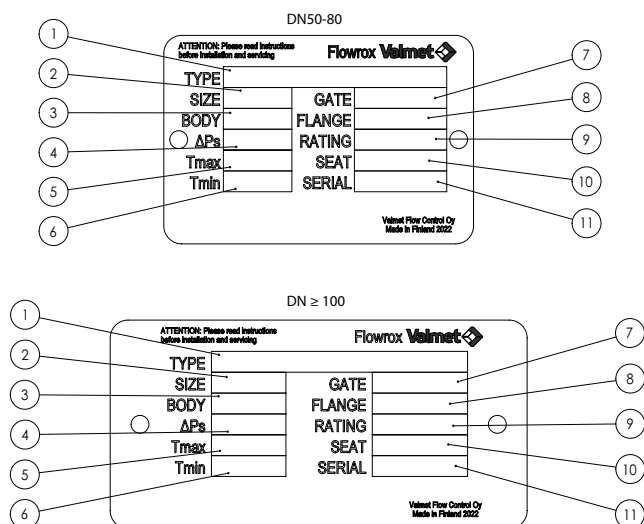


Figure 5. Valve type plate example.

1. Type designation
2. Size
3. Body material
4. Maximum shut-off pressure differential
5. Max. temperature
6. Min. temperature
7. Gate material
8. Flange drilling
9. Pressure rating
10. Seat material
11. Serial number

## 2.9 Actuators

Standard actuators:

- Handwheel / handwheel with gearbox
- Pneumatic
- Hydraulic
- Electric

Manual actuator operation revolutions are shown in Table 5. Valves are closed by turning clockwise. Do not use additional levers or long wrenches for valve operation.

Pneumatic actuators are with a fixed stroke and do not require external controls to position the gate. The nominal supply pressure for pneumatically operated valves is 6 bar (90 psi).

The air must be clean, dry, lubricated and properly filtered. An air quality of minimum requirement to ISO 8573-1:2010 [7:4:4] is recommended. If any component used on the valve has a stricter requirement (pressure, air quality), the stringent shall prevail.

Use correct sized pneumatic hoses to ensure sufficient air flow. Pneumatic actuator noise level may exceed 85 dB and it is recommended to use ear protectors when working near the valve.

Hydraulic actuators have a nominal supply pressure of 150 bar (2250 psi).

Electric actuators have open/close limit switches preset at the factory. A separate instruction from the actuator manufacturer is always included in the shipment.

Make sure that the 3-phase electrical connection is done correctly. If the connection is done wrong, the limit or torque switches will not trigger as designed. This will allow the actuator to move beyond limits and cause damage to the valve.

Consult the manufacturer's instructions on actuator requirements or/and limitations. If actuator is changed or valve needs adjustment, follow the *Maintenance* instructions.

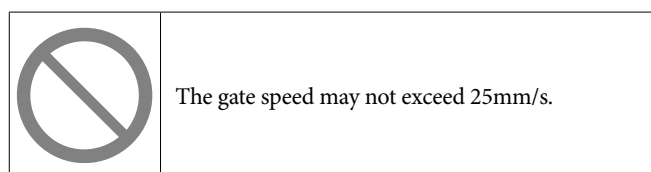


Table 5. Manually actuated valve operating revolutions.

Valve nominal size	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 200 (8")	DN 250 (10")
Handwheel revs. to stroke valve	18	25	28	40	50	60
Bevel gear revs. to stroke valve	-	-	-	-	-	-

Valve nominal size	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Handwheel revs. to stroke valve	-	-	-	-	-	-


Bevel gear revs. to stroke valve	120	137	313	350	380	340
----------------------------------	-----	-----	-----	-----	-----	-----

### 3 Transportation, Storage and lifting

Check and document any damage in packages or valves. Contact the transportation company in case of damage. When new or unused valves are sitting idle for long periods, execute the following procedures:

1. Prior to storage, thoroughly drain valves of any liquid.
2. Indoor storage is required. For unfavorable environment, cover the equipment with protective tarpaulin that will allow proper air circulation.
3. Protect the equipment from temperature and humidity extremes and exposure to excessive dust, moisture, vibration and sunlight.
4. It is preferred to store valves with the gate locked in open position.
5. Ensure pneumatic and hydraulic cylinder actuators have appropriate plugs installed in the respective supply ports to prevent contamination of the cylinders.
6. Protect valve ring sleeves from heat, light and exposure to ozone.
7. Cover the flange openings.
8. Do not store any objects on the rubber ring sleeves.
9. Follow actuator instructions for storage.
10. Before start-up, clean the gate and lubricate the valve.

When storing used valves, wash the valve and also the body cavities with fresh water and follow the steps above. For storage periods greater than 36 months, please contact Valmet Flow Control Oy as the rubber parts need to be changed before use.

	<p>Lifting equipment must be used for valves weighing over 25kg (55 lbs).</p>
---	---





**Figure 6. Valve lifting example.**



Lift the valves securely from the tower (part 3 in *Mechanical structure*). Bigger valves may have pre-installed lifting eyes which should be used when available. When pre-installed lifting eyes are not available, use soft straps to lift valve as shown in Figure 6.


Do not attach lifting equipment to the valve bore, handwheel, actuator, locking pin holes or gate guards, as they can be damaged.

For valve dimensions and weight, refer to *Appendix A*.

## 4 Installation

 <b>WARNING!</b>	
	Crushing and cutting hazard. Do not put your hands or fingers into the tower or port areas when the valve cycles. Do not energize the actuator before the valve is properly attached to the pipeline. Disconnect and de-energize the actuator before installation and maintenance work.
	High pressure injection hazard. Do not use higher pressure than rated for the valve. Higher pressures can cause serious damage to the valve or harm to operating personnel.

 <b>CAUTION!</b>	
	Harmful substance hazard. If the process medium has to be fully contained, is corrosive or harmful, make sure the flushing ports are piped to a safe location.

	Never use the valve with all flushing ports plugged. Accumulated solids can cause the valve to jam.
---	---

### 4.1 General



Flowrox gate valves are normally delivered fully assembled and ready for use. Only personnel with appropriate training are allowed to install the valves. If the valve is delivered without an actuator or accessories, they must be installed in accordance with the manufacturer's instructions.

Flowrox gate valves have connections with DIN or ANSI bolt drillings as standard design, but other drillings are also available, such as BS, AS, JIS.

Reserve enough space for safe installation and maintenance. See *Appendix A* for valve dimensions. Notice that during opening and closing cycles, a small amount of medium is discharged in the valve body cavity; therefore do not install gate valves above walkways or critical components. Flushing and drainage connection must be installed if medium is harmful or corrosive.

If the valve has been stored in the warehouse, lubricate the valve as instructed in the *Lubrication* chapter.

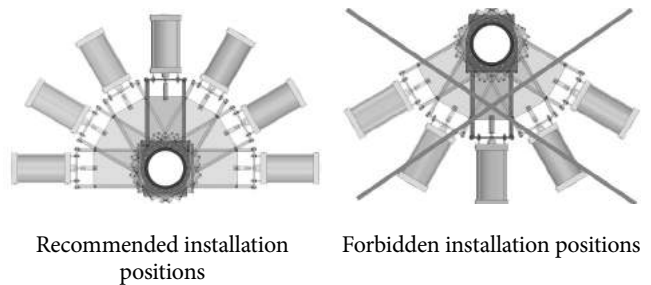
### 4.2 Flow direction, support, and valve position

	Do not install DN250 or larger valves in other than vertical position without support.
	Do not step on a valve installed in horizontal or angled position.

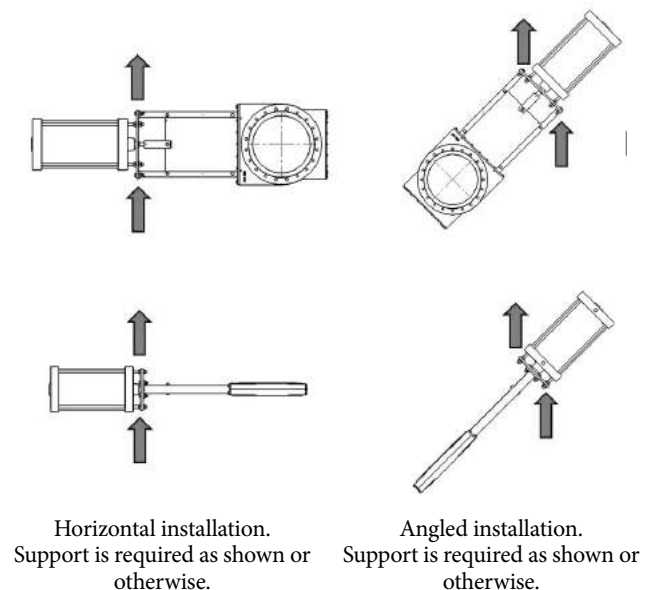
The valve does not have an intended flow direction; therefore it can be installed either way in the pipeline.

Proper pipe support must be placed on either side of the valve to support the weight of the pipe. The valve must never be used to support the pipes.

The valve can be installed in any position other than below horizontal. Flushing will not work in installations below horizontal level and it will lead to leaking and nonfunctional valve. See the following Figure 7.



**Figure 7. Installation alternatives for SKW and SKF valves.**



**Figure 8. Support for automatically actuated valves.**



### 4.3 Valve installation

At least the following must be ensured before valve installation:


- The pipeline is isolated from the process and there is no pressure in it.
- The pipeline is empty, clean, and cooled down.
- The pipeline flanges are parallel, concentric and with correct distance.
- The flange connection bolts size is correct. See Table 6.
- The valve is in OPEN position.

Follow these Installation steps:

1. Disconnect automatic actuator from power supply if connected.
2. Install the safety guards and required accessories to the valve
3. Lift the valve on place with appropriate lifting equipment.
4. Tighten the flange connection bolts evenly in a crosswise sequence shown in Figure 9. Recommended tightening torque is shown in Table 6.
5. Other than mentioned flange drillings are also available.

Always support DN250 (10") and larger automatically actuated valves (Support for automatically actuated valves.).

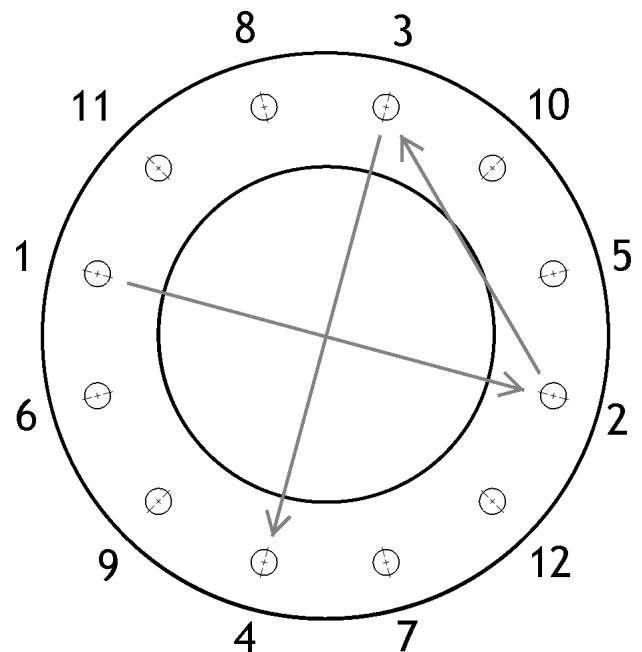
6. Connect automatic actuator to power supply.
7. Connect flushing connection (if applicable).
8. Check that all connections have been fastened and the actuator is installed correctly.
9. Run a few open/close cycles without pressure in the pipeline.

	<p>For an electric actuator, close the valve manually halfway then operate electrically to ensure that the wiring is done properly.</p>
---	---

10. Refer to *Troubleshooting* if the valve does not operate smoothly or without extra force.



**Table 6. Valve connection maximum tightening torque and bolt nominal diameter for steel flanges.**

Valve size (DN)	Recommended tightening torque for flange bolt Nm (ft-lbs)	Tapped hole depth in body (mm)	DIN Bolt nominal diameter	ANSI150 Bolt nominal diameter
50 (2")	43 (32)	12	M16	5/8"-11 UNC
80 (3")	43 (32)	14	M16	5/8"-11 UNC
100 (4")	43 (32)	14	M16	5/8"-11 UNC
150 (6")	75 (55)	16	M20	3/4"-10 UNC
200 (8")	75 (55)	23	M20	3/4"-10 UNC
250 (10")	120 (90)	23	M20	7/8"-9 UNC
300 (12")	120 (90)	24	M20	7/8"-9 UNC
350 (14")	185 (135)	24	M20	1"-8 UNC
400 (16")	185 (135)	30	M24	1"-8 UNC
450 (18")	260 (190)	28	M24	1-1/8"-7 UNC
500 (20")	260 (190)	42	M24	1-1/8"-7 UNC
600 (24")	260 (190)	42	M27	1-1/4"-7 UNC



**Figure 9. Flange bolt tightening example.**

#### 4.4 Flushing installation guidelines

	<p style="text-align: center;"><b>⚠ CAUTION!</b></p> <p>Harmful substance hazard.</p> <p>If the process medium has to be fully contained, is corrosive or harmful, make sure the flushing ports are piped to a safe location.</p>
	<p>Never use the valve with all flushing ports plugged. Accumulated solids can cause the valve to jam.</p>

When valve flushing is required, customers need to provide the plumbing. The valves are shipped with plugs installed in the flushing holes. Contact Valmet Flow Control Oy office for process specific instructions.

The concept of flushing is to ensure the valve does not jam due to accumulation of medium solids in the valve body. Flushing line or drain line is also required if the medium is harmful to people, environment or other components nearby. In other cases, the flushing connections can be opened to prevent valve body from clogging up.

Reclaim service water is usually clean enough to accomplish the water flush, if clean water is not readily available.

Larger diameter valves can have additional flushing connection to ensure proper flushing. Flushing connections are on the sides, bottom or on the face of the valve. Hole sizes are shown in *Appendix A*. One or more flushing connections are used, depending on the process.

A flow indicator can be installed to the flushing line for easier function check-out.

**In flushing example 1** the valve protective plugs (9) are removed or bottom cover plate (12) is removed. The process medium slipping between the gate and ring sleeves during valve operation flows freely out of the valve. If the medium is harmful in any way, the flushing port must be piped to a safe location.

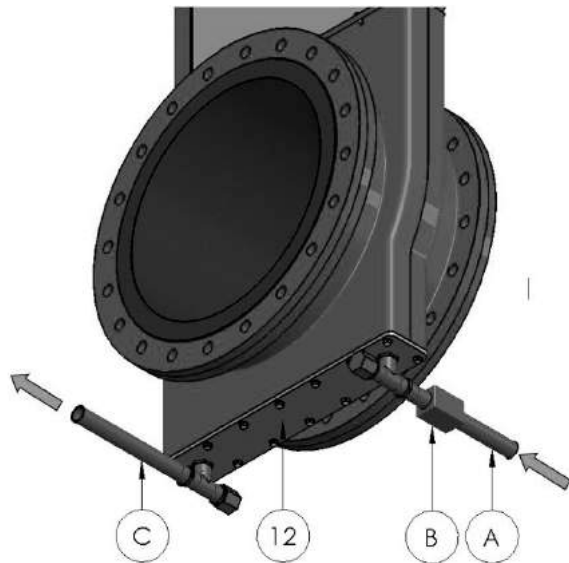


**Figure 10. Flushing example 1.**

- 9. Protective plug
- 12. Bottom cover plate

**In flushing example 2** (Figure 11), the water is supplied to one side and drained from the other side of the valve. It is necessary to have a shut-off valve (B) on the upstream or supply side of the flush water line to prevent water running constantly. This can be located anywhere, but is usually near to the valve.

- 12. Bottom cover plate
- A. Flush water supply
- B. Shut-off valve
- C. Drain line



**Figure 11. Flushing example 2.**

## 5 Operation

### 5.1 Commissioning and decommissioning

Before the valve is operated within the pipeline, ensure that it has been installed in accordance with this manual and applicable safety regulations.

The following must also be ensured:

- Parameters on the type plate are suitable for the process and environment
- The valve is used for the purpose specified at the time of sales
- Required gate guards and other accessories are installed
- Possible explosive conditions have been taken into account

When a valve is decommissioned, dispose the valve parts and electric/pneumatic/hydraulic devices (actuators) according to the local regulations and the instructions given by the part or device manufacturer. Collect and dispose dangerous process media, so that people and environment are not endangered. Follow the local regulations.

### 5.2 Recycling and disposal

Most valve parts can be recycled. Separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal for a fee.

### 5.3 Flushing

Follow these operation instructions, when valve flushing is installed.








Flush Fowrox gate valves at least after every 20 cycles to keep the body clear of solids, depending on application and process. If slurry solids are present in the process, the flushing sequence needs to be initiated each time the valve is operated.

It is important to open the water supply valve a moment before the valve is operated. The flushing water is then left on for the entire cycle and for a minimum of 10 seconds after the cycle. To improve flushing, the water should be left on until clean flushing water is exhausting through the drain line.

The flushing water pressure must not exceed the maximum allowable operating pressure of the valve.

## 6 Maintenance

### 6.1 General maintenance and checks

	 <b>WARNING!</b>
	<p>Unexpected start-up hazard.</p> <p>De-energize actuators before maintenance. Especially pneumatic actuators equipped with a mechanical spring can cause injury to people and equipment if cylinder actuates unintentionally.</p>
	<p>Crushing hazard.</p> <p>Keep your hands and feet clear of moving parts. De-energize actuators before maintenance.</p>
	 <b>CAUTION!</b>
	<p>Depressurize, empty and cool down the valve before any maintenance work. Valve surface can be hot. Isolate the valve completely from the process and follow the factory safety regulations.</p>
	<p>Lifting equipment must be used for valves weighing over 25 kg (55 lbs).</p>
	<p>Do not step on a valve installed in horizontal or angled position.</p>

Only personnel with appropriate training are allowed to service the valves. For actuator service instructions consult the manufacturer's documentation supplied with the valve.

Check the condition of the valve regularly. When the valve is tight and it actuates flawlessly, lubricating is the only mandatory maintenance task. Periodic inspections should be done as valves may wear over time depending on conditions and process.

### 6.2 Scheduled maintenance

Include the valves in your factory maintenance program. Maintenance tasks and service intervals are offered as a guideline in Maintenance schedule.7. Schedules will vary with applications.

**Table 7. Maintenance schedule.**

Maintenance task	Frequency & advice
Do a leakage inspection	Regularly. Refer to Troubleshooting.
Lubricate valve	After every 50 cycles. More often if valve is operated rarely. Refer to chapter 6.1.3.
Lubricate the actuator stem	Every six months. Read the manufacturer's instructions.
Run an open/close cycle	Suggested once a month for smooth and reliable operation.
Examine the flushing and drainage	Every two months
Clean the gate	Every two months. Reduces the ring sleeve and gland packing wear.
Examine the gate for erosion	Every two months.
Examine the valve for erosion and wear	Every six months.

### 6.3 Spare parts

To ensure correct and quick delivery of spare parts, the order must contain at least the following information:

- Serial number
- Valve type code
- Spare part name and quantity (example: Ring sleeve, 2 pieces)


You can order the spare parts from Valmet Flow Control, distributors or agents. Contact information is available at [www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol).

It is recommended to keep the spare parts of Spare part list.8 available at your factory warehouse. Part numbers refer to *Mechanical structure*.

**Table 8. Spare part list.**

Part	Part number	Quantity/valve
Ring sleeve (set)	4	1
Secondary seal	7	1
Sealing kit for hydraulic or pneumatic actuator	-	1

### Lubrication

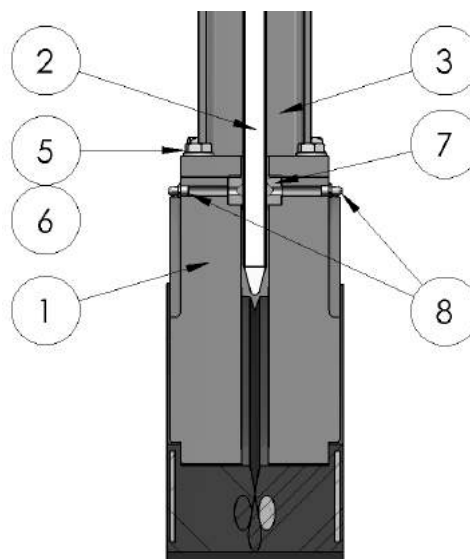
	Use only silicone based lubricants such as DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661, AND RHONE - POULENE RHODORSIL III.
--	--

Flowrox gate valves have grease nipples on both sides of the valve body (Figure 12). Valves are lubricated when assembled

- therefore first lubrication should not be required unless the valves have been in stock for a longer time. For dry material handling, lubrication might be limited or forbidden.

Hydrocarbon based greases cannot be used to lubricate these valves as the elastomer ring sleeves will swell and disintegrate.

Lubricate both sides of the valve approximately every 50 cycles, or after long periods of infrequent cycling. Grease volume requirement is shown in Table 10. Please notice that even when the lubricant is inert it may disturb a sensitive process. Acceptable lubricants include: DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661 AND RHONE - POULENE RHODORSIL III.



**Figure 12. Grease nipples on valve body.**

1. Valve body
2. Gate
3. Tower
4. Tower mounting bolt
5. Tower mounting washer
6. Secondary seal
7. Grease nipple
8. Grease nipple

**Table 9. Volume of grease required per unit.**

Valve nominal size	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 200 (8")	DN 250 (10")
Lubricant per valve (cm <sup>3</sup> )	35 (1.18 fl. oz.)	40 (1.35 fl. oz.)	60 (2.02 fl. oz.)	65 (2.19 fl. oz.)	105 (3.55 fl. oz.)	240 (8.11 fl. oz.)



  

Valve nominal size	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
Lubricant per valve (cm <sup>3</sup> )	480 (16.23 fl. oz.)	490 (16.56 fl. oz.)	550 (18.59 fl. oz.)	620 (20.96 fl. oz.)	1090 (36.85 fl. oz.)	1470 (49.70 fl. oz.)


## 6.4 Changing the secondary seal

Follow these instructions if you are to change the secondary seal while the valve is installed to a pipeline. The actuator, tower, and gate are removed as one package to get more work space. Refer to *Changing the ring sleeves* or *Valve dismantling* if further service is required as well.

Part numbers refer to *Mechanical structure*.

	 <b>WARNING!</b>
	Crushing hazard. Keep your hands and feet clear of moving parts. De-energize actuators before maintenance.



1. Depressurize and drain the pipeline.
2. Stroke the valve to fully OPEN position and put the locking pins (13) on place.
3. Disconnect automatic (electric, pneumatic or hydraulic) actuator from power supply to prevent injuries.
4. Remove the bolts (5) that attach the tower (3) to the body (1). Lift the actuator, tower (3) and gate (2) off as one package. The secondary seal (7) might come up with the gate (2).
5. Remove the secondary seal (7).
6. Clean the space for the secondary seal (7).
7. Apply recommended silicon lubricant to any inner contours and outside of the new secondary seal (7) and push it in the sealing slot. If the secondary seal has a sealing lip, place it towards valve bore.

	Use only silicone based lubricants such as DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661, AND RHONE - POULENE RHODORSIL III.
---	--


8. Apply recommended silicon lubricant on the chamfered edge of the gate (2).
9. Lower the actuator, tower and gate package on the body and fasten with bolts (5).
10. Lubricate valve grease nipples (8) as instructed in *Lubrication*.
11. Reconnect automatic actuator to power supply and remove locking pins (13).
12. Run a few test strokes before the pipeline is pressurized.

## 6.5 Changing the ring sleeves


To change the ring sleeves, the valve needs to be removed from the pipeline. Refer to *Valve dismantling* if further service is required as well. Part numbers refer to *Mechanical structure*.

	 <b>WARNING!</b>
	Multiple hazards.
	Pressurized medium in the pipeline can cause high pressure injection, scalding, corrosion and irritation.  Do not disconnect a pressurized valve from a pipeline.

1. Depressurize and drain the pipeline.
2. Stroke the valve to fully OPEN position and put the locking pins (13) on place.
3. Disconnect automatic (electric, pneumatic or hydraulic) actuator from power supply to prevent injuries.
4. Disconnect flushing pipelines from the valve if flushing is installed.

	Use lifting equipment on valves weighing over 25 kg (55 lbs).
---	---

5. Remove the flange connection bolts and lift the valve to a suitable working surface.
6. Lift the ring sleeves (4) out from the valve body and inspect for visible damage such as cuts, slits or erosion grooves. Depressions and evident flat spots are also to be taken as signs of damage.
7. Check if the gate (2) is damaged and needs to be replaced.
8. Clean the valve body (1).

	Use only silicone based lubricants such as DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661, AND RHONE - POULENE RHODORSIL III.
--	--

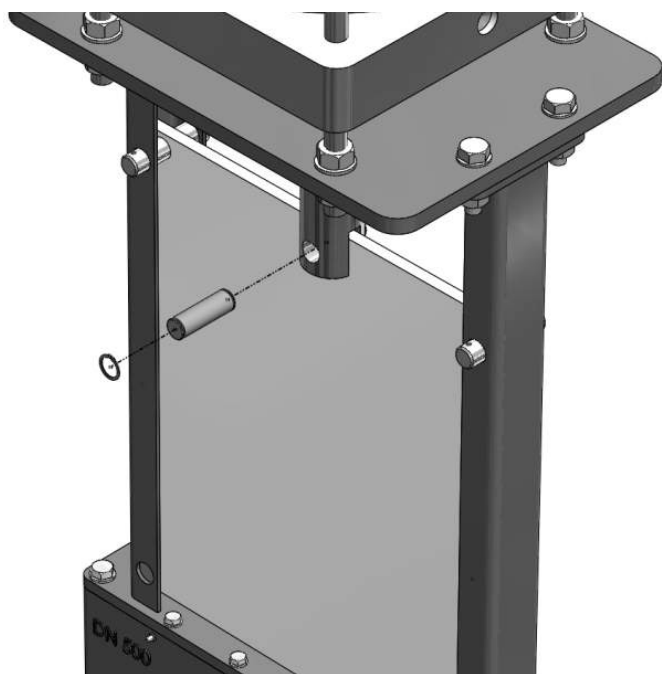
9. Apply a thin layer of recommended silicone based lubricant to the sealing lip and to the outer face of the new ring sleeves. Insert the sleeves into the valve body - centering the ring sleeve within the bore.
10. Leave the valve to OPEN position until it is installed and follow the *storage* instructions if the valve is placed in stock.

## 6.6 Valve dismantling

Follow these instructions if you are to do full overhaul on the valve. Part numbers refer to *Mechanical structure*.

### Removing the actuator, gate, and tower

1. Remove the valve from the pipeline as instructed in the earlier chapter 6.5.
2. Install locking pins (13) between the gate (2) and tower (3).
3. Remove the tower mounting bolts (5) bolts and lift the actuator, gate (2) and tower (3) off.
4. To detach the gate (2) from the actuator stem, remove retaining ring (17) and the clevis pin (16) from the clevis (14).



**Figure 13. Removing the clevis pin.**

5. Clean the gate (2) and inspect it for deep scars and transformations. Replace the gate if it's damaged to prevent accumulation of damage to the secondary seal (7) and ring sleeves (4).
6. Use a marker to mark the height of the clevis (14) on the cylinder shaft. The position is needed in valve assembly.
7. Remove the clevis locking screw (15) and the clevis (14).
8. Remove the bolts from between the actuator and tower (or adapter plate if equipped). Lift the actuator off the tower.
9. Refer to actuator manufactures' instructions for actuator sealing replacement or other maintenance work.

### Dismantling the valve body

1. Disassemble the valve with the instruction above to the point where the actuator, gate (2) and tower (3) have been removed from the valve body (1).
2. Remove the ring sleeves (4) from the valve body and inspect for visible damage such as cuts, slits or erosion grooves. Depressions and evident flat spots are also to be taken as signs of damage. Change ring sleeves if damaged.
3. Remove the secondary seal (7).
4. Remove bottom cover plate (12).
5. Remove grease nipples (8).



**Figure 14. Dismantled valve body.**

6. Clean the body (1) from the inside and ensure that the bores are flawless.
7. When all valve parts have been cleaned and inspected, continue to *Valve assembly*.

## 6.7 Valve assembly


Follow the general tightening torques in Table 10, when specific tightening instructions are not given in this document or in other supplied documentation. Part numbers in assembly instructions refer to *Mechanical structure*.

**Table 10. General tightening torques (bolt class 8.8, lubrication MoS<sub>2</sub>).**

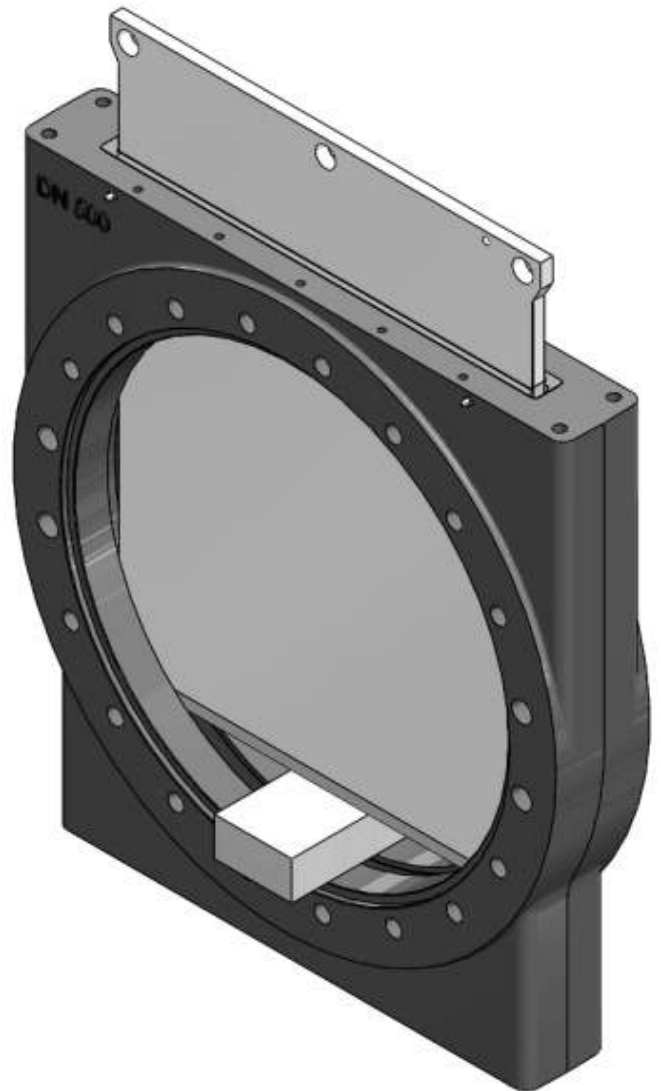
Size	M6	M8	M10	M12	M16	M20	M24
Tightening torques Nm (ft-lbs)	7 (5)	17 (13)	33 (24)	57 (42)	140 (103)	282 (208)	499 (368)

Valve body, secondary seal, and gate assembly

1. Install the secondary seal (7) in the sealing slot with the possible sealing lip facing towards valve bore. Apply recommended silicon lubricant to any inner contours and outside of the new secondary seal.
2. Install grease nipples (8).

	Use only silicone based lubricants such as DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661, AND RHONE - POULENE RHODORSIL III.
--	--

3. Insert a piece of timber in the bore as shown in Figure 15. It is to prevent excessive gate drop before clevis pin is installed.
4. Apply recommended silicon lubricant on the chamfered edge and sides of the gate (2) and slide it through the opening at the top of the valve body until it stands safely on the piece of timber.
5. Continue to the tower and actuator assembly in the next chapter.



**Figure 15. Detail of timber insert.**

### Tower and actuator assembly

1. After the valve body and gate have been assembled, lift and fit the tower (3) on the valve body. Install the tower mounting bolts hand tight (5).
2. Tighten the mounting bolts by starting from the middle as shown in the Figure 16.
3. Fit the actuator (and possible adapter plate) on the top of the tower (3) using the correct bolts and nuts.
4. Assemble the clevis (14) to the actuator stem if it was dismantled.
5. Stroke the actuator stem down or lift the gate to fit the clevis pin (16) through the aligning holes of the gate (2) and clevis (14). Secure the clevis pin with the retaining rings (17).
6. Install the bottom cover plate (12) and tighten the bottom cover bolts (10).
7. Continue to test the stroke in the next chapter.

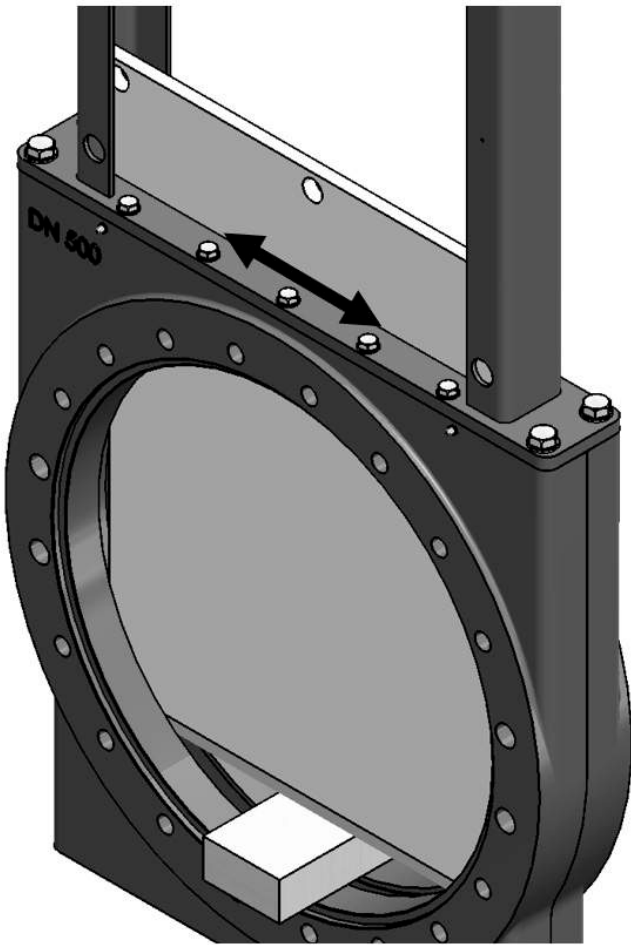


Figure 16. Tightening the tower mounting bolts.

### Testing and adjusting the valve stroke

Only personnel with appropriate training are allowed to energize the valves. Check and adjust the valve stroke if you dismantle the valve or assemble a pneumatic or hydraulic actuator. This is not needed with manual actuators. Refer to the electric actuator documentation for specific stroke adjustment instructions.

	<b>WARNING!</b>
	<p>Crushing hazard.</p> <p>Keep your hands and feet clear of moving parts. De-energize actuators before maintenance.</p>

1. Assemble the valve according to the instructions above.
2. Connect the actuator to power source and stroke the valve to fully OPEN position.
3. Stroke is adjusted correctly if gate (2) can now be locked with the locking pins (13). Otherwise continue to the next step for stroke adjustment. See Figure 17.
4. Measure how much the gate (2) must be adjusted.

5. Disconnect automatic actuator from power supply to prevent injuries.
6. Remove retaining ring (17) from the clevis pin (16) and remove the clevis pin.
7. Push the gate (2) down to get space for the clevis (14) to turn.
8. Loosen the clevis locking screw (15)
9. Rotate the clevis (14) on the stem to adjust it up or down according the dimension measured above.
10. Re-install the clevis and test if the locking pins (13) fit in now. Repeat adjustment if pin does not fit in place. Continue to the next chapter if valve is adjusted correctly.

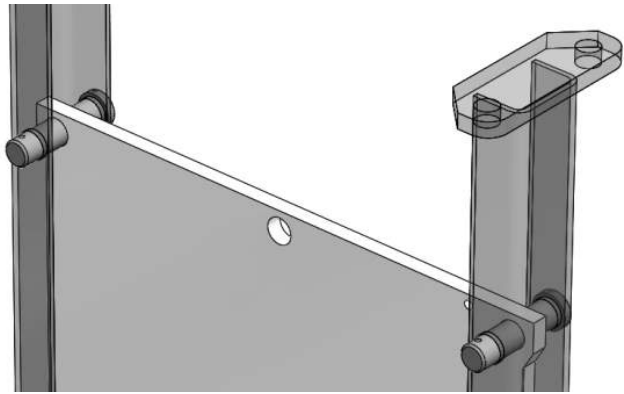


Figure 17. Stroke correctly adjusted.

### Final assembly and testing

1. Before stroking to the valve automatically, ensure that the adjustments are done as instructed in this manual.
2. If the valve is with an electric actuator, manually close the valve to halfway (half the stroke) before actuating the valve automatically. This is done to ensure that the valve is opening in the right direction, wiring connections are done properly and prevent any damage to the valve.
3. Stroke the valve with the actuator to fully OPEN and fully CLOSED position to ensure smooth operation and the correct positioning of the gate.
4. Install the ring sleeves (4).
5. Lubricate valve grease nipples (8) as instructed in *Lubrication*.
6. Install all removed safety guards and other accessories according to the manufacturer's instructions.
7. Run a few open/close cycles and leave the valve open. If the valve operates smoothly, it is ready to be installed on the pipeline. Follow the *Installation* instructions.



## 6.8 Troubleshooting

**Table 11. Troubleshooting.**

Problem	Possible reason	Action
Leakage from bottom cover plate	Loose flushing pipeline connections or bottom cover plate	Check the flushing connection and bottom cover plate tightness
	Damaged ring sleeve and/or gate	Check ring sleeves and gate and change as needed
Leakage from flange connection	Flange connection is loose	Tighten the flange connection bolts to correct torque
	Flange connection bolts are too long	Measure the bolts and change as needed
	Pipeline flanges and valve are misaligned	Check that the flanges are parallel and concentric to valve
Leakage from the secondary seal	Tower mounting bolts loose	Tighten tower mounting bolts
	Secondary seal worn out	Replace secondary seal
Valve does not open/close or valve is not tight	Fault in actuator, limit switch or control system	Check and fix actuator operation
	Clogged up with solids	Clean gate and body cavity. Check or install flushing.
	Damaged gate, ring sleeve or secondary seal	Check and change damaged parts
Valve does not open/close smoothly	Insufficient lubrication	Lubricate valve and increase scheduled lubrication. Lubricate the actuator.
Opening/closing force too high*	Insufficient lubrication	Lubricate valve and increase scheduled lubrication. Lubricate the actuator.
	Flange or tower mounting bolts too tight	Check and loosen bolts
	Damaged gate, ring sleeve or secondary seal	Check and change damaged parts
Ring sleeve lifetime is short	Insufficient flushing	Check flushing flow and pressure or install flushing
	Insufficient lubrication	Increase scheduled lubrication
	Unsuitable ring sleeve material for process	Check with Valmet Flow Control
	Damaged gate	Check gate for scrapes and bending and change if damaged

## Appendix A: Dimensions

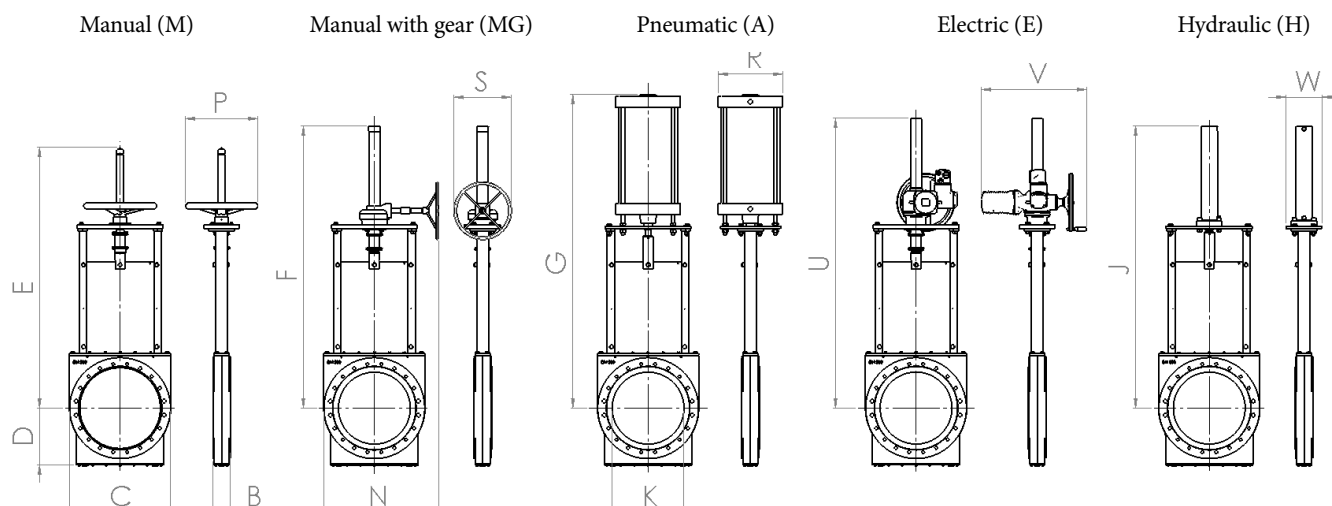


Figure 18. SKW valve dimensions.

Valve size DN	Dimensions in mm																Weight in kg					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
50	54	58	165	102	566	-	586	-	-	-	350	110	-	-	-	20	-	17	-	-	G1/2"	
80	57	61	200	112	628	-	683	-	739	80	-	350	110	-	513	-	24	-	22	48	-	G1/2"
100	57	61	230	132	648	-	725	-	751	100	-	350	120	200	513	-	30	-	28	51	-	G1/2"
150	64	68	285	157	921	-	972	-	879	150	-	350	176	200	513	150	42	-	49	64	-	G1/2"
200	76	80	346	188	1006	1148	1115	988	972	200	427	350	220	200	513	150	61	87	75	83	59	G1/2"
250	76	80	410	223	1133	1164	1316	1168	1150	250	459	350	284	200	537	180	82	-	113	104	-	G1/2"
300	83	87	483	262	-	1380	1512	1278	1363	300	535	-	340	400	537	200	-	134	190	150	-	G 1"
350	83	87	533	285	-	1455	1661	1521	1481	350	560	-	340	600	724	200	-	145	215	184	146	G 1"
400	95	99	600	322	-	1574	1799	1700	1600	400	698	-	340	400	724	200	-	186	260	222	187	G 1"
450	95	99	645	352	-	1875	2049	1831	1834	450	771	-	450	400	724	250	-	229	318	262	243	G 1"
500	121	125	705	403	-	1962	2180	1962	2015	500	801	-	450	500	731	250	-	316	400	370	320	G 1"
600	121	125	825	447	-	2250	2323	2291	2234	600	861	-	630	600	795	250	-	461	592	532	484	G 1"

Valve size inch	Dimensions in inch																Weight in lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
3	2.13	2.28	6.50	4.02	22.28	-	23.07	-	-	-	-	13.78	4.33	-	-	-	44	-	37	-	-	G1/2"
4	2.24	2.40	7.87	4.41	24.72	-	26.89	-	29.09	3.15	-	13.78	4.33	-	20.20	-	53	-	48	106	-	G1/2"
6	2.24	2.40	9.06	5.20	25.51	-	28.54	-	29.57	3.94	-	13.78	4.72	7.87	20.20	-	66	-	62	112	-	G1/2"
8	2.52	2.68	11.22	6.18	36.26	-	38.27	-	34.61	5.91	-	13.78	6.93	7.87	20.20	5.91	92	-	108	141	-	G1/2"
10	2.99	3.15	13.62	7.40	39.61	45.20	43.90	38.90	38.27	7.87	16.81	13.78	8.66	7.87	20.20	5.91	134	191	165	183	130	G1/2"
12	2.99	3.15	16.14	8.78	44.61	45.83	51.81	45.98	45.28	9.84	18.07	13.78	11.18	7.87	21.14	7.09	180	-	249	229	-	G1/2"
14	3.27	3.43	19.02	10.31	-	54.33	59.53	50.31	53.66	11.81	21.06	-	13.39	15.75	21.14	7.87	-	295	418	330	-	G 1"
16	3.27	3.43	20.98	11.22	-	57.28	65.39	59.88	58.31	13.78	22.05	-	13.39	23.62	28.50	7.87	-	319	473	405	321	G 1"
18	3.74	3.90	23.62	12.68	-	61.97	70.83	66.93	62.99	15.75	27.48	-	13.39	15.75	28.50	7.87	-	409	572	488	411	G 1"
20	3.74	3.90	25.39	13.86	-	73.82	80.67	72.09	72.20	17.72	30.35	-	17.72	15.75	28.50	9.84	-	504	700	576	535	G 1"
24	4.76	4.92	27.76	15.87	-	77.24	85.83	77.24	79.33	19.69	31.54	-	17.72	19.69	28.78	9.84	-	695	880	814	704	G 1"

Bigger sizes on request.

B\* = ring sleeve uncompressed

M = handwheel

MG = manual with gearbox

A = pneumatic

E = electric

H = hydraulic

T = flushing connection.

Manual and electric valve stems are covered by bellows.

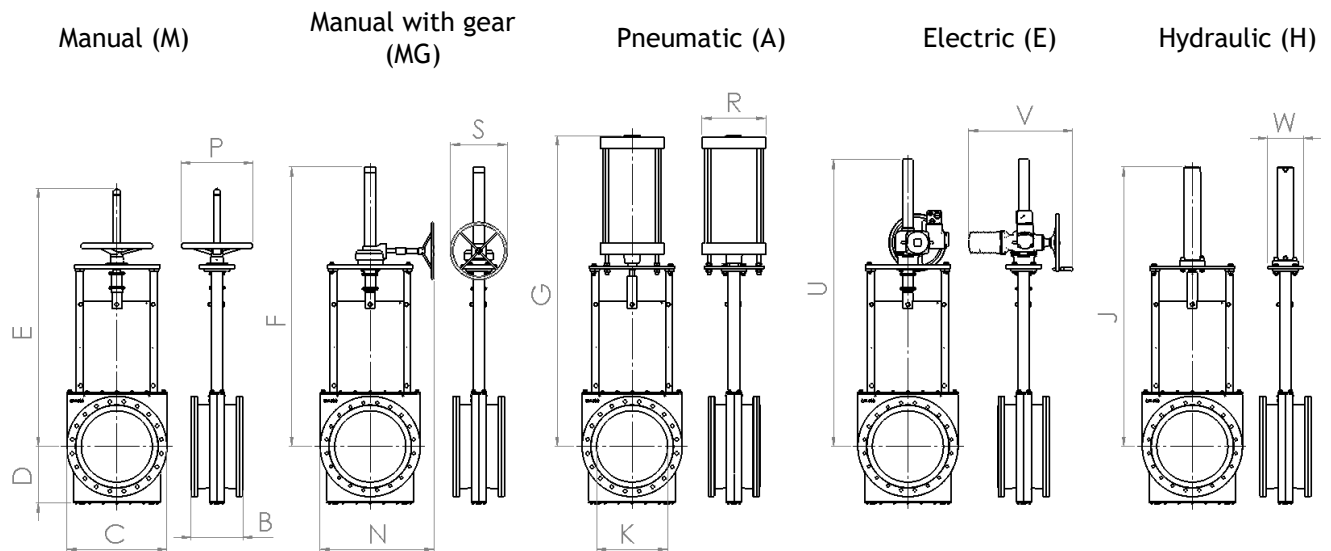


Figure 19. SKF valve dimensions.

Valve size DN	Dimensions in mm																Weight in kg					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
80	175	179	200	112	628	-	683	-	739	80	-	350	110	-	513	-	32	-	31	57	-	G 1/2"
100	175	179	230	132	648	-	725	-	751	100	-	350	120	200	513	-	39	-	41	64	-	G 1/2"
150	178	182	285	157	921	-	972	-	879	150	-	350	176	200	513	150	41	-	66	80	-	G 1/2"
200	184	188	346	188	1006	1148	1115	988	972	200	427	350	220	200	513	150	85	-	100	108	-	G 1/2"
250	226	230	410	223	-	1164	1316	1168	1150	250	459	-	284	200	537	180	-	-	143	142	-	G 1/2"
300	257	261	483	262	1133	1380	1512	1278	1363	300	535	-	340	400	537	200	-	187	253	203	-	G 1"
350	257	261	533	285	-	1455	1661	1521	1481	350	560	-	340	600	724	200	-	215	282	252	216	G 1"
400	279	283	600	322	-	1574	1799	1700	1600	400	698	-	340	400	724	200	-	284	349	320	285	G 1"
450	311	315	645	352	-	1875	2049	1831	1834	450	771	-	450	400	724	250	-	335	420	368	344	G 1"
500	359	363	705	403	-	1962	2180	1962	2015	500	801	-	450	500	731	250	-	447	527	501	451	G 1"
600	372	376	825	447	-	2250	2323	2291	2234	600	861	-	-	600	795	250	-	629	-	700	652	G 1"

Valve size inch	Dimensions in inch																Weight in lbs					T
	B	B*	C	D	E	F	G	J	U	K	N	P	R	S	V	W	M	MG	A	E	H	
					M	MG	A	H	E	MG	M	A	MG	E	H							
3	6.89	7.05	7.87	4.41	24.72	-	26.89	-	29.09	3.15	-	13.78	4.33	-	20.20	-	70	-	68	125	-	G 1/2"
4	6.89	7.05	9.06	5.20	25.51	-	28.54	-	29.57	3.94	-	13.78	4.72	7.87	20.20	-	86	-	90	141	-	G 1/2"
6	7.01	7.17	11.22	6.18	36.26	-	38.27	-	34.61	5.91	-	13.78	6.93	7.87	20.20	5.91	90	-	145	176	-	G 1/2"
8	7.24	7.40	13.62	7.40	39.61	45.20	43.90	38.90	38.27	7.87	16.81	13.78	8.66	7.87	20.20	5.91	187	-	220	238	-	G 1/2"
10	8.90	9.06	16.14	8.78	44.61	45.83	51.81	45.98	45.28	9.84	18.07	-	11.18	7.87	21.14	7.09	-	-	315	312	-	G 1/2"
12	10.12	10.28	19.02	10.31	-	54.33	59.53	50.31	53.66	11.81	21.06	-	13.39	15.75	21.14	7.87	-	411	557	447	-	G 1"
14	10.12	10.28	20.98	11.22	-	57.28	65.39	59.88	58.31	13.78	22.05	-	13.39	23.62	28.50	7.87	-	473	620	554	475	G 1"
16	10.98	11.14	23.62	12.68	-	61.97	70.83	66.93	62.99	15.75	27.48	-	13.39	15.75	28.50	7.87	-	625	768	704	627	G 1"
18	12.24	12.40	25.39	13.86	-	73.82	80.67	72.09	72.20	17.72	30.35	-	17.72	15.75	28.50	9.84	-	737	924	810	757	G 1"
20	14.13	14.29	27.76	15.87	-	77.24	85.83	77.24	79.33	19.69	31.54	-	17.72	19.69	28.78	9.84	-	983	1159	1102	992	G 1"
24	14.65	14.80	32.48	17.60	-	88.58	91.46	90.20	87.95	23.62	33.90	-	-	23.62	31.30	9.84	-	1384	-	1540	1434	G 1"

Bigger sizes on request

B\* = ring sleeve uncompressed

M = handwheel

MG = manual with gearbox

A = pneumatic

E = electric

H = hydraulic

T = flushing connection

Manual and electric valve stems are covered by bellows.

## Appendix B: Type code

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
SKW	0100	B010	J	00	S1	N	C	B	A	A

1. Sign	Product type
SKF	Slurry Knife Gate Valve Flanged (LUGGED)
SKW	Slurry Knife Gate Valve Wafer (SEMI-LUGGED)
SKH	Slurry Knife Gate Valve High Pressure (LUGGED)

2. Sign	Body size	
0050	DN 50	2"
0080	DN80	3"
0100	DN100	4"
0125	DN125	5"
0150	DN150	6"
0200	DN200	8"
0250	DN250	10"
0300	DN300	12"
0350	DN350	14"
0400	DN400	16"
0450	DN450	18"
0500	DN500	20"
0600	DN600	24"
0650	DN650	26"
0700	DN700	28"
0750	DN750	30"
0800	DN800	32"
0900	DN900	36"
1000	DN1000	40"
1100	DN1100	44"
1200	DN1200	48"
1350	DN1350	54"
1400	DN1400	56"
1500	DN1500	60"

3. Sign	Working pressure
B004	4 bar
B006	6 bar
B007	7 BAR (Only AS Table D and BS Table D)
B010	10 bar
B014	14 BAR (Only AS Table E and BS Table E)
B020	20 bar

For further information on the new type code on valve and actuators, see the product Technical bulletin.

4. Sign	Flange drilling
J	PN 10 EN 1092
K	PN 16 EN 1092
L	PN 25 EN 1092
M	PN 40 EN 1092
C	ANSI 150 (ASME B16.5)
D	ANSI 300 (ASME B16.5)
B	BS TABLE D
A	AS TABLE D
E	AS TABLE E
R	JIS 10K
S	JIS 16K
Y	Other

5. Sign	Body material
00	Grey Cast iron EN 1561-GJL-250
01	Ductile Iron EN 1563-GJS-450
02	AISI 316 (EN 1.4408 /A351 CF8M)
08	Ductile Iron EN 1563-GJS-500
0Y	Other

6. Sign	Gate material
S1	AISI 316
S2	Duplex 2205
S3	Duplex 2101
S4	17-4PH*
S5	ALLOY C-276
S6	DUPLEX 2507
S7	AISI 316L
S8	AISI 904L

7. Sign	Gate coating
N	None

8. Sign	Ring sleeve / seat
C	NR Natural rubber
B	EPDM Ethylene Propylene
D	NBR Nitrile

9. Sign	Gate coating
B	EPDM Ethylene propylene
T	PTFE gland packing (SKF700-1500 and SKH series)

10. Sign	Ring sleeve material
A	FEZN (Standard)
C	All Stainless steel, A4-80

11. Sign	Ring sleeve material
A	Standard EN 1092-1/A Flat Face
B	EN 1092-1/B1 Raised Face (Only SKH series)
R	ASME B16.5 RF, Raised Face (Only SKH series)

**Valmet Flow Control Oy**

Marssitie 1, 53600 Lappeenranta, Finland.

Tel. +358 10 417 5000

[www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol)

Subject to change without prior notice.

Neles, Neles Easyflow, Jamesbury, Stonel, Valvcon and Flowrox, and certain other trademarks, are either registered trademarks or trademarks of Valmet Oyj or its subsidiaries in the United States and/or in other countries.

For more information [www.neles.com/trademarks](http://www.neles.com/trademarks)

