TECHNICAL BULLETIN TB8104

CERTIFIED KR AND MNFA VALUES

ASME Section VIII, Division 1 and API 520 provide guidance for the use of a rupture disc device in a pressure relieving system. See Fike technical bulletin TB8102 for guidance in selecting the applicable method for rupture disc sizing. Two of the basic methodologies for sizing rupture disc devices are the resistance to flow and the coefficient of discharge methods. The coefficient of discharge method, K_D, is used for simple systems. This method uses the minimum net flow area (MNFA) to calculate the capacity of a simple system to the 8&5 rule.

The resistance to flow method represents the velocity head loss due to the rupture disc device resistance value (K_R). This head loss is included in the overall system loss calculations to determine the size of the relief system. The resistance of the rupture disc is denoted by a dimensionless K_R value established by testing during the certification process to ASME PTC-25. Due to the variation in the opening characteristics of the rupture disc between compressible vapor and incompressible liquid, there are certified K_R values that are denoted by the applicable service media (K_{RG}, K_{RL} or K_{RGL}).

For sizing a rupture disc in combination with a pressure relief valve, ASME Certified Combination Capacity Factors (CCCF) for PRV sizing are listed in Fike technical bulletin TB8103.

Abbreviations:

- K_{RG}: Use K_{RG} when the media is a gas or vapor, or when the media is liquid but there is a significant vapor volume directly in contact with the disc at the time of rupture
- K_{RL}: Use K_{RL} when the media is liquid and the liquid is against the disc at the time of rupture
- K_{RGL}: Use K_{RGL} for any service conditions

- BT = single disc holder type for bolted flange joint type
- DD = double disc holder type for bolted flange joint type
- VT = viscous tee holder type for bolted flange joint type
- ST = screw type for threaded connection
- UT = union type for threaded connection
- SH = single hinge (1 petal)
- DH = double hinge (2 petals)
- CS = cross scored (4 petals)
- MP = multiple petals (4 or more)
- FS =flat seat option only

HOV-SC, AD series, and LO-V devices are not UD certified. Relief areas for these rupture discs are indicated on their respective data sheets.

Specialty rupture disc device UD certification values not listed are available on the NB-18. Consult Fike for confirmation of devices not listed.

The values shown in the following have been certified by the National Board of Pressure Vessel Inspectors and are published in NB-18. Rupture discs ordered from Fike with ASME UD Certification will be marked with the Kr and MNFA values on the rupture disc tag.

704 SW 10th Street, P.O. Box 610, Blue Springs, Missouri 64013-0610 U.S.A. Phone: (816) 229-3405 ● www.fike.com

		AXIUS, RD320, RD520 Low Pressure[1]	AXIUS, RD320, RD520 High Pressure[2]	AXIUS, RD320, RD520	ATLAS, RD300, RD500	SRX	SRL	SRL	AXIUS SC	SR-H
Holder		BT	BT	DD	BT	BT	BT	DD	Sanitary Ferrule	Sanitary Ferrule
Krg		-	0.45	0.68	0.65	0.99	0.43	-	-	-
Krl		-	1.25	1.1	1.5	-	-	-	-	-
Krgl		0.45	-	-	-	-	0.59	1.18	1.88	1.88
MNFA (in2)	NB-18 Redbook Certificate No.	M80558	M80615 M80604	M80749 M80750	M80716 M80727	M80042	M80031 M80277	M80738	M80626	M80097
	0.5 (DN15)	-	-	-	-	-	-	-	-	-
	0.75 (DN20)	0.533	-	-	-	-	-	-	-	-
	1 (DN25)	0.864	0.864	0.864	0.7	0.864	0.864	0.864	0.41	-
	1.5 (DN40)	2.04	2.04	2.04	1.8	1.54	1.67	1.67	1.109	1.34
	2 (DN50)	3.36	3.36	3.36	2.93	3.36	3.36	3.36	2.111	2.55
	3 (DN80)	7.39	7.39	7.39	6.35	7.39	7.39	7.39	5.007	6.1
	4 (DN100)	12.7	12.6	12.6	10.9	12.7	12.7	12.7	9.022	11
	6 (DN150)	23.5	21.6	21.6	22.1	25.3	25.2	25.2	-	-
	8 (DN200)	41.8	38.4	38.4	39.4	43.3	44.8	44.8	-	-
	10 (DN250)	64.9	59.5	59.5	61.3	69.6	-	-	-	-
	12 (DN300)	94.2	86.4	86.4	89.2	102	-	-	-	-
	14 (DN350)	-	-	-	117	138	-	-	-	-
	16 (DN400)	-	-	-	153	183	-	-	-	-
	18 (DN450)	-	-	-	195	234	-	-	-	-
	20 (DN500)	-	-	-	239	291	-	-	-	-
	24 (DN600)	-	-	-	346	425	-	-	-	-
	26 (DN650)	-	-	-	408	-	-	-	-	-
	28 (DN700)	-	-	-	474	-	-	-	-	-
	30 (DN750)	-	-	-	541	-	-	-	-	-
	32 (DN800)	-	-	-	617	-	-	-	-	-
	34 (DN850)	-	-	-	-	-	-	-	-	-
	36 (DN900)	-	-	-	784	-	-	-	-	-
	38 (DN950)	-	-	-	-	-	-	-	-	-
	40 (DN1000)	-	-	-	-	-	-	-	-	-
	42 (DN1050)	-	-	-	1066	-	-	-	-	-
	44 (DN1100)	-	-	-	-	-	-	-	-	-
	48 (DN1200)	-	-	-	-	-	-	-	-	-
	DIN DN33.7	-	-	-	-	-	-	-	0.801	-
	ISO DN38	-	-	-	-	-	-	-	1.109	1.34
	DIN DN40	-	-	-	-	-	-	-	1.33	1.6
	DIN DN42.4	-	-	-	-	-	-	-	1.368	-
	DIN DN50	-	-	-	-	-	-	-	2.111	2.72
	ISO DN51	-	-	-	-	-	-	-	2.111	2.55
	ISO DN76	-	-	-	-	-	-	-	5.007	6.1

Notes:

1. AXIUS, RD320, & RD520 Low Pressure K_{rgl} values are for the following ambient 72F (22C) burst pressures:
   <65 psig (sizes 1”-8”) / <4.48 barg (sizes DN25 – DN200)
   <50 psig (size 10”) / <3.44 barg (size DN250)
   <35 psig (size 12”) / <2.41 barg (size DN300)
   15 to 300 psig (3/4”) / 1.03 to 20.68 barg (size DN20)
2. AXIUS, RD320, & RD520 High Pressure K_r values are for burst pressures in excess of those listed in Note 1. Consult Fike if specific K_r values need to be confirmed at time of specification.
3. Conversion formula for MNFA to metric units: $in^2 * 6.4516 = cm^2$ ($in^2 * 645.16 = mm^2$)

Form No. TB8104-19, August, 2019. Specifications are subject changes without notice.

		SCRD-FSR	SCRD-FSR	POLY-SD² SH	POLY-SD² SH	POLY-SD² DH	POLY-SD² DH	POLY-SD² DH	POLY-SD² CS	POLY-SD² CS	POLY-SD SCRD-V FS CS	SCRD-V FS CS	SCRD FS CS	SCRD FS DH
Holder		BT	VT	BT	BT	BT	BT	BT	BT	BT	DD	BT	ST	ST
Krg		0.55	2.38	-	-	-	-	3.04	0.99	2.39 3.03[3]	-	-	-	-
Krl		2.4	8.71	-	-	-	-	5.3	1.1	5.71	-	-	-	-
Krgl		-	-	0.34	0.9	0.34	2.4	-	-	-	1.5	1.5	5.39	5.39
MNFA (in2)	NB-18 Redbook Certificate No.	M80075 M80514	M80154 M80187	M80008	M80424	M80019	M80288	M80299 M80301	M80020 M80334	M80356 M80345	M80592	M80200	M80536	M80547
	0.5 (DN15)	-	-	-	-	-	-	0.196	-	0.196	-	-	0.196 0.150[4]	0.196 0.150[4]
	0.75 (DN20)	-	-	-	0.442	-	0.442	-	0.442	-	-	-	-	-
	1 (DN25)	0.785 (gas) 0.590 (liquid)[1]	0.785 (gas) 0.590 (liquid)[1]	0.785	-	0.785	-	-	0.785	-	-	-	-	-
	1.5 (DN40)	1.77 (gas) 1.35 (liquid)[1]	1.77 (gas) 1.35 (liquid)[1]	1.77	-	1.77	-	-	1.77	-	-	-	-	-
	2 (DN50)	3.36	3.36	3.36	-	3.36	-	-	3.36	-	3.36	3.36	-	-
	3 (DN80)	7.39	7.39	7.39	-	7.39	-	-	7.39	-	7.35	7.35	-	-
	4 (DN100)	12.7	12.7	12.7	-	12.7	-	-	12.7	-	12.7	12.7	-	-
	6 (DN150)	28.9	-	28.9	-	28.9	-	-	28.9	-	22.3	22.3	-	-
	8 (DN200)	50	-	-	-	-	-	-	50	-	40.7	40.7	-	-
	10 (DN250)	78.9	-	-	-	-	-	-	78.9	-	67.2	67.2	-	-
	12 (DN300)	113	-	-	-	-	-	-	113	-	99.4	99.4	-	-
	14 (DN350)	138	-	-	-	-	-	-	138	-	138	138	-	-
	16 (DN400)	183	-	-	-	-	-	-	183	-	183	183	-	-
	18 (DN450)	234	-	-	-	-	-	-	234	-	234	234	-	-
	20 (DN500)	291	-	-	-	-	-	-	291	-	291	291	-	-
	24 (DN600)	425	-	-	-	-	-	-	425	-	425	425	-	-
	26 (DN650)	501	-	-	-	-	-	-	-	-	-	-	-	-
	28 (DN700)	583	-	-	-	-	-	-	-	-	-	-	-	-
	30 (DN750)	672	-	-	-	-	-	-	-	-	-	-	-	-
	32 (DN800)	767	-	-	-	-	-	-	-	-	-	-	-	-
	34 (DN850)	868	-	-	-	-	-	-	-	-	-	-	-	-
	36 (DN900)	976	-	-	-	-	-	-	-	-	-	-	-	-
	38 (DN950)	-	-	-	-	-	-	-	-	-	-	-	-	-
	40 (DN1000)	-	-	-	-	-	-	-	-	-	-	-	-	-
	42 (DN1050)	-	-	-	-	-	-	-	-	-	-	-	-	-
	44 (DN1100)	-	-	-	-	-	-	-	-	-	-	-	-	-
	48 (DN1200)	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. SCRD-FSR sizes 1” and 1.5” have reduced MNFA values in liquid service.
2. POLY-SD score patterns for sizes 0.5” to 6” will be selected at the discretion of Fike Corporation once rupture disc specifications are received. All POLY-SD sizes 8” and larger are only CS style. Consult Fike if specific K_r values need to be confirmed at time of specification.
3. ½” POLY-SD CS with liner Increases K_{rg} to 3.03.
4. ½” SCRD FS rupture discs used in the ½”-150 (15,000 psig rating) ST holder reduces MNFA to 0.150 in^2.
5. POLY-SD CS rupture discs in liquid service with liners are not UD certified.
6. Conversion formula for MNFA to metric units: $in^2 * 6.4516 = cm^2$ ($in^2 * 645.16 = mm^2$)

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		HO, HOV	HOV-FS (SH or MP)	HO, HOV	P, CP, CPC	PV, CP-C, CPV, CPV-C	P, CP, CPC	PV, CP-C, CPV, CPV-C	P FS	MRK, RKB	PLHO, PLHOV
Holder		BT	BT	UT	BT	BT	UT	UT	ST	BT	BT
Krg		-	-	-	-	-	-	-	-	1.56	5.75
Krl		-	-	-	-	-	-	-	-	-	-
Krgl		2.02	0.99	3.5	1.35	3.5	4.8	8.8	5.39	-	-
MNFA (in2)	NB-18 Redbook Certificate No.	M80064	M80570	M80479	M80132	M80053	M80457	M80468	M80525	M80109	M80198
	0.5 (DN15)	-	-	-	-	-	0.196	0.138	0.196 0.150[1]	-	-
	0.75 (DN20)	-	-	-	0.442	0.407	0.432	0.33	-	-	-
	1 (DN25)	0.694	-	0.684	0.785	0.694	0.719	0.562	-	0.785	0.694
	1.5 (DN40)	1.43	-	1.43	1.77	1.43	1.77	1.16	-	1.56	1.43
	2 (DN50)	3.34	-	2.95	3.34	3.34	2.95	2.39	-	3.36	3.34
	3 (DN80)	7.31	-	-	7.37	7.31	-	-	-	7.39	7.31
	4 (DN100)	12.7	-	-	12.7	12.7	-	-	-	12.7	12.7
	6 (DN150)	27.1	-	-	28.9	27.1	-	-	-	27.3	27.1
	8 (DN200)	47.2	-	-	50	47.2	-	-	-	47	47.2
	10 (DN250)	67.2	-	-	78.5	67.2	-	-	-	78.9	-
	12 (DN300)	99.4	-	-	113	99.4	-	-	-	108	-
	14 (DN350)	138	-	-	138	138	-	-	-	138	-
	16 (DN400)	183	-	-	183	183	-	-	-	183	-
	18 (DN450)	234	-	-	234	234	-	-	-	234	-
	20 (DN500)	291	-	-	291	291	-	-	-	291	-
	24 (DN600)	425	387	-	425	425	-	-	-	425	-
	26 (DN650)	-	459	-	-	-	-	-	-	-	-
	28 (DN700)	-	539	-	-	-	-	-	-	583	-
	30 (DN750)	-	624	-	-	-	-	-	-	672	-
	32 (DN800)	-	716	-	-	-	-	-	-	767	-
	34 (DN850)	-	814	-	-	-	-	-	-	868	-
	36 (DN900)	-	918	-	-	-	-	-	-	976	-
	38 (DN950)	-	1030	-	-	-	-	-	-	-	-
	40 (DN1000)	-	1150	-	-	-	-	-	-	-	-
	42 (DN1050)	-	1270	-	-	-	-	-	-	1340	-
	44 (DN1100)	-	1400	-	-	-	-	-	-	-	-
	48 (DN1200)	-	1680	-	-	-	-	-	-	-	-

Notes:

1. ½" P FS rupture discs used in the ½"-150 (15,000 psig rating) ST holder reduces MNFA to 0.150 in^2.
2. Conversion formula for MNFA to metric units: $in^2 * 6.4516 = cm^2$ ($in^2 * 645.16 = mm^2$)

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		GD	GDI, GDL	GDV BAR	GDV CROSS	GDV PLATE	GDV RING
Holder		N/A	N/A	N/A	N/A	N/A	N/A
Krg		-	-	-	-	-	-
Krl		-	-	-	-	-	-
Krgl		0.26	0.64	2.4	5.4	15.7	6.44
MNFA (in2)	NB-18 Redbook Certificate No.						
	0.5 (DN15)	0.3	0.3	-	-	-	-
	0.75 (DN20)	0.53	0.53	-	-	-	-
	1 (DN25)	0.78	0.78	0.6	0.47	0.32	0.44
	1.5 (DN40)	1.76	1.76	1.34	1.05	0.72	-
	2 (DN50)	3.14	3.14	2.39	1.86	1.3	-
	3 (DN80)	7.06	7.06	5.56	4.31	2.95	-
	4 (DN100)	12.6	12.6	10.56	8.81	5.47	-
	6 (DN150)	28.3	28.3	22.27	17.27	12.05	-
	8 (DN200)	50.0	50.0	40.26	31.82	21.14	-
	10 (DN250)	78.5	78.5	63.53	50.78	32.66	-
	12 (DN300)	113	113	89.09	69.09	47.24	-
	14 (DN350)	138	138	108.06	83.31	58.07	-
	16 (DN400)	183	183	144.52	112.6	84.49	-
	18 (DN450)	234	234	181.95	153.7	104.31	-
	20 (DN500)	291	291	233.28	184.5	122.49	-
	24 (DN600)	425	425	354.8	294.1	190.61	-

Notes:

1. Conversion formula for MNFA to metric units: $in^2 * 6.4516 = cm^2$ ($in^2 * 645.16 = mm^2$)

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