

**KUNKLE BAILEY 716 SAFETY RELIEF VALVE**

A safety relief valve that combines a top guided, unobstructed seat bore with full lift capability to provide maximum discharge



**FEATURES**

- Positive reseating achieved via freely pivoting EPDM discs for gas, hot water and other liquid duties up to 150°C.
- Optional Aflas soft seats increase the range to 200°C.
- Precision lapped stainless steel trim gives positive re-seating for steam duty at higher temperatures.
- Choice of threaded or flanged inlet connections.
- Fitted with test lever for inline safety checking.
- Alternative sealed dome for service conditions requiring a pressure tight seal on the discharge side (eg. liquid service).

**GENERAL APPLICATION**

The 716 is certified to BS6759 pt 1, 2, 3 and is suitable for the protection of vessels, pipelines and equipment using hot or cold water; air; process or corrosive liquids; cold and fine gases and for clean steam and gases in hygienic environments.

**TECHNICAL DATA**

Material:	Bronze, Stainless steel
Sizes:	½" to 2" (DN 15 to 50)
Connections	
Inlet:	Threaded or flanged
Outlet:	Threaded
Pressure range:	5 to 355 psig (0.35 to 24.5 barg)
Temperature range:	-20°F to 500°F (-29°C to 260°C)

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## SPECIFICATIONS

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#### Materials

- Body
- Bronze from -20°F to 428°F [-29°C to 220°C]
  - Stainless steel from -20°F to 500°F [-29°C to 260°C]
- Trim
- SS/EPDM from -20°F to 302°F [-29°C to 150°C]
  - SS/Aflas from -20°F to 392°F [-29°C to 200°C]
  - SS from -20°F to 500°F [-29°C to 260°C]

#### SIZE RANGE

Size, in (DN)	Orifice, mm <sup>2</sup>	Min pressure, barg	Max pressure, barg		
			Ct and SS all media	Bronze gas and liquid	Bronze steam and hot water
½ (15)	109	0.35	12.5	32	22
¾ (20)	314	0.33	12.5	24.5	22
1 (25)	415	0.35	12.5	20.5	20
1¼ (32)	660	0.35	12.5	18	18
1½ (40)	1075	0.35	12.5	18	18
2 (50)	1662	0.35	12.5	18	18

#### Maximum back pressure

Barg	5.5
Constant	80%
Built-up	10%
Variable	0%

(Total % must not exceed barg shown)

#### PERFORMANCE

	Kdr	Over pressure	Blow down
Steam	0.7	5%	15%*
Hot water ◊	0.7	5%	15%*
Air/Gas	0.7	10%	10%*
Liquid	0.46	10%	20%*❖

#### Connections

- Screwed in x screwed out
- Flanged in x screwed out

\* or 0.3 barg min

❖ or 0.6 barg min

◊ above 100°C

#### Cap options

- Open lever
- Pressure tight dome

#### Approvals

- BS6759 Pt 1, 2 and 3
- PED certified category IV

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## PARTS AND MATERIALS/DIMENSIONS

### MATERIALS

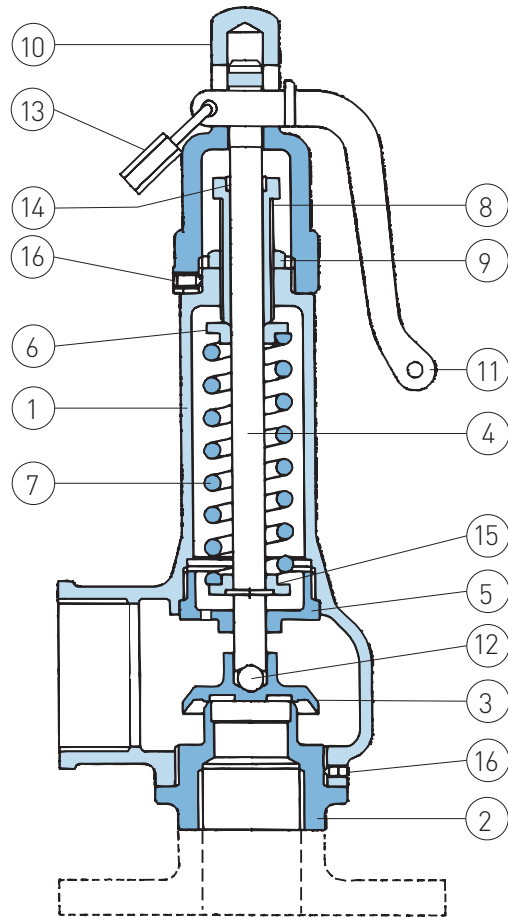
Item	Part	Material	Bronze
1	Body	St.St	Bronze
2	Seat	St.St	Bronze
3*	Disc	Various	Various
4	Spindle	St.St	Brass
5	Guide	Nickel alloy	Bronze
6	Top spring cap	St.St	Brass
7*	Spring	St.St	Chrome vanadium
8	Adjusting screw	St.St	Brass
9	Lock nut	St.St	Brass
10❖	Dome	St.St	Nylon
11	Lever	N/A	Brass
12*	Ball	Monel	St.St
13	Padlock	N/A	Brass
14	Bush	PTFE	PTFE
15	Bottom spring cap	St.St	Brass
16	Pinning screw	St.St	Brass

### NOTES

\* Recommended spares.

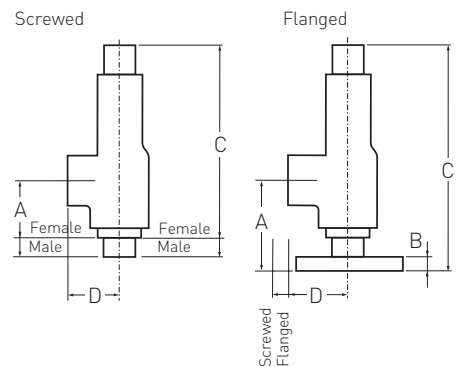
❖ Synthetic dome should not be adjacent to external heat sources.

Recommended inspection every 12 months.



### DIMENSIONS

Valve type	Valve size DN	Inlet	Outlet	A mm	B mm	C Dome mm	C Lever mm	D	Weight (kg)
*	15	1/2"	3/4"	58	-	173	192.5	40	1.0
	20	3/4"	1 1/4"	63	-	229	252	55	1.6
	25	1"	1 1/2"	70	-	257	280	60	2.1
	32	1 1/4"	2"	80	-	318.5	351	70	4.0
	40	1 1/2"	2 1/2"	91	-	366.5	405.5	81	7.0
	50	2"	3"	110	-	414.5	456.5	96	10.0
**	15	1/2"	3/4"	40	-	158	178	40	1.0
	20	3/4"	1 1/4"	44	-	209	232	55	1.6
	25	1"	1 1/2"	48	-	235	258	60	2.1
	32	1 1/4"	2"	58	-	295	328	70	4.0
	40	1 1/2"	2 1/2"	67	-	340	380	81	7.0
	50	2"	3"	80	-	382	424	96	10.0
***	20	3/4"	1 1/4"	75	10	242	265	55	2.5
	25	1"	1 1/2"	75	11	261	284	60	3.2
	32	1 1/4"	2"	95	12.7	332	365	70	5.7
	40	1 1/2"	2 1/2"	105	12.7	379	418	81	9.0
	50	2"	3"	120	12.7	422	464	96	12.5



### NOTES

\* Male x Female

\*\* Female x Female

\*\*\* Flanged x Flanged

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## AIR CAPACITY

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### AIR CAPACITY (l/s) at 0.3 barg or 10% overpressure\* and 15°C

Set pressure (barg)	(BS6759 Pt2)					
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.35	18.3	52.6	69.6	111	180	279
1.0	31.2	89.9	119	189	308	476
2.0	48.8	140	186	295	481	744
3.0	63.5	183	242	384	626	968
4.0	79.7	230	303	482	786	1215
5.0	95.9	276	365	580	945	1462
6.0	112	323	427	678	1105	1708
7.0	128	369	488	776	1265	1955
8.0	144	416	550	874	1424	2202
9.0	161	463	611	972	1584	2449
10.0	177	509	673	1070	1744	2696
12.0	209	603	796	1267	2063	3189
12.5	217	626	827	1316	2143	3313
14.0	242	696	920	1463	2382	3683
16.0	274	789	1043	1659	2701	4177
18.0	306	882	1166	1855	3021	4670
20.0	339	976	1289			
22.0	371	1069				
24.0	403	1162				
26.0	436					
28.0	468					
30.0	501					
32.0	533					

\* Minimum overpressure = 0.07 barg at set pressure less than 1.0 barg.

Maximum pressure per size based on 716 bronze valve. 716 CI and SS maximum pressure 12.5 barg.

### Other gases

If you wish to use the valve on other compatible gases, the sizing details above can be used.

However, the valve capacity will change depending on the specific gravity of the flowing gas.

Multiply the valve air capacity by  $1/\sqrt{SG}$  to give the gas capacity.

SG = specific gravity (relative to air = 1).

### Useful conversions

$Nm^3/h = l/sec \times 3.60$

$SCFM = l/sec \times 2.12$

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## STEAM CAPACITY/FSH CONVERSION

### SATURATED STEAM CAPACITY (kg/h)

Set pressure (barg)	(BS6759 Pt1 at 5% overpressure)*					
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.35	35.6	103	136	216	351	543
1.0	70.5	203	269	427	696	1075
2.0	125	359	475	755	1230	1902
3.0	167	480	635	1010	1645	2543
4.0	209	602	795	1265	2060	3185
5.0	251	723	955	1519	2475	3826
6.0	293	844	1115	1774	2889	4467
7.0	335	965	1276	2029	3304	5108
8.0	377	1086	1436	2283	3719	5750
9.0	419	1207	1596	2538	4134	6391
10.0	461	1329	1756	2793	4549	7032
12.0	545	1571	2076	3302	5378	8315
12.5	566	1632	2156	3429	5586	8636
14.0	629	1831	2397	3811	6208	9598
16.0	714	2056	2717	4321	7038	10880
18.0	798	2298	3037	4830	7867	12163
20.0	882	2540	3357			
22.0	966	2783				

\* Minimum overpressure = 0.07 barg at set pressure less than 1.0 barg.

Maximum pressure per size based on 716 bronze valve. 716 CI and SS maximum pressure 12.5 barg.

### FSH - SUPERHEAT STEAM CORRECTION

Set pressure (barg)	Saturated steam temp. °C	Total steam temperature in degrees centigrade					
		150	200	260	310	370	430
1	120	1.00	0.98	0.93	0.88	0.84	0.80
4	150	1.00	0.99	0.93	0.88	0.84	0.81
7	170	1.00	0.99	0.94	0.89	0.84	0.81
10	361	1.00	0.99	0.94	0.89	0.85	0.81
14	180	1.00	0.99	0.95	0.89	0.85	0.81
18	210	-	1.00	0.95	0.90	0.85	0.81
24	220	-	1.00	0.96	0.90	0.86	0.82
34	240	-	1.00	0.96	0.92	0.86	0.82
41	250	-	1.00	0.97	0.92	0.87	0.82

#### Other temperatures

This steam table is based on saturated steam, at the temperatures shown.

For steam systems operating at higher temperatures, the above capacities will need to be derated by using the super heat correction factor.

#### Useful conversions

lbs/h = kg/h x 2.2046

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## WATER CAPACITY

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### WATER CAPACITY (l/min) at 10% overpressure\* at 20°C

Set pressure (barg)	(BS6759 Pt3)					
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.35	27.6	79.4	105	167	272	420
1.0	44.6	129	170	270	440	680
2.0	63.1	182	240	382	622	962
3.0	77.3	223	294	468	762	1178
4.0	89.3	257	340	540	880	1361
5.0	99.8	287	380	604	984	1521
6.0	109	315	416	662	1078	1667
7.0	118	340	449	715	1164	1800
8.0	126	364	481	764	1245	1924
9.0	134	386	510	811	1320	2041
10.0	141	406	537	854	1392	2152
12.0	155	445	589	936	1525	2357
12.5	158	454	601	955	1556	2406
14.0	167	481	636	1011	1647	2546
16.0	179	514	680	1081	1760	2722
18.0	189	545	721	1146	1867	2887
20.0	200	575	760			
22.0	209	603				
24.0	219	639				
26.0	227					
28.0	236					
30.0	244					
32.0	252					

\* Minimum overpressure = 0.07 barg at set pressure less than 0.7 barg.

Maximum pressure per size based on 716 bronze valve. 716 CI and SS maximum pressure 12.5 barg.

### Other liquids

If you wish to use the valve on other compatible liquids, the sizing details above can be used.

The valve capacity will however change depending on the specific gravity of the flowing liquid.

Multiply the valve water capacity by  $1/\sqrt{SG}$  to give the liquid capacity.

SG = specific gravity (relative to water = 1).

### Useful conversions

lgpm = l/min x 0.22

m<sup>3</sup>/min = l/min x 0.001

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## HOT WATER CAPACITY

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### HOT WATER CAPACITY (kW) for a pressurized (un-vented) system

Set pressure (barg)	[BS6759 Pt1 at 5% overpressure]*					
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.35	54.5	157	208	330	538	832
1.0	61.9	178	236	374	611	944
2.0	78.2	225	298	473	771	1192
3.0	105	301	398	633	1031	1594
4.0	131	377	498	792	1291	1996
5.0	157	453	599	952	1551	2398
6.0	184	529	699	1112	1811	2799
7.0	210	605	799	1271	2071	3201
8.0	236	681	900	1431	2331	3603
9.0	263	757	1000	1590	2591	4005
10.0	289	833	1100	1750	2851	4407
12.0	342	984	1301	2069	3370	5211
12.5	355	1022	1351	2149	3500	5412
14.0	394	1136	1501	2388	3890	6015
16.0	447	1288	1703	2708	4410	6818
18.0	500	1440	1903	3027	4930	7622
20.0	553	1592	2104			
22.0	605	1744				

#### NOTE

\* Minimum overpressure = 0.07 barg at set pressure less than 1.0 barg.

Maximum pressure per size based on 716 bronze valve. 716 CI and SS maximum pressure 12.5 barg.

Pressurized (un-vented) hot water systems have the entire discharge capacity handled solely by the valve.

Open vented systems take into account the discharge capacities of the vent. Hence the equivalent discharge of the valve/system is considered to be double the chart capacities above.

# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## SPRING SELECTION

### DN 15 SPRING RANGE

Part no	Barg	Psig	Color code
C0074	0.35 - 1.0	5 - 15	Red
C2133	1.0 - 1.7	15 - 25	Blue
C2134	1.7 - 2.4	25 - 35	Orange
C2135	2.4 - 4.1	35 - 60	Orange/blue
C2136	4.1 - 6.9	60 - 100	Green/white
C2137	6.9 - 10.3	100 - 150	Green/blue
C2138	10.3 - 12.4	150 - 180	White/blue
C2181	12.4 - 15.5	180 - 225	-
C0623	15.5 - 18.6	225 - 270	White
C2169	18.6 - 22.1	270 - 320	-
C0645	22.1 - 26.5	320 - 384	Red/yellow
C2201	26.5 - 27.6	384 - 400	-
C0651	27.6 - 32.0	400 - 464	Red/green

### DN 32 SPRING RANGE

Part no	Barg	Psig	Color code
C0452	0.35 - 1.0	5 - 14	Red
C0457	1.0 - 1.7	14 - 25	Blue
C0461	1.7 - 3.1	25 - 45	Orange
C0467	3.1 - 4.1	45 - 60	Orange/blue
C0469	4.1 - 5.5	60 - 80	Purple
C0472	5.5 - 8.6	80 - 125	Green/white
C0475	8.6 - 10.3	125 - 150	Green/blue
C0476	10.3 - 12.8	150 - 185	White/blue
C0477	11.4 - 13.8	166 - 200	-
C0478	12.6 - 15.2	183 - 220	-
C0479	13.9 - 16.8	202 - 243	-
C0480	15.4 - 18.5	223 - 268	-

### DN 20 SPRING RANGE

Part no	Barg	Psig	Color code
C0686	0.35 - 1.0	5 - 14	Red
C0688	1.0 - 2.1	14 - 30	Blue
C0689	2.1 - 2.8	30 - 40	Orange
C2125	2.8 - 3.8	40 - 55	Orange/blue
C0690	3.8 - 5.5	55 - 80	Purple
C2126	5.5 - 7.6	80 - 110	Green/white
C0691	7.6 - 10.3	110 - 150	Green/blue
C2127	10.3 - 12.4	150 - 180	White/blue
C2178	12.4 - 15.5	180 - 225	-
C0693	15.5 - 18.6	225 - 270	White
C2170	18.6 - 20.3	270 - 295	-
C0694	20.3 - 24.5	295 - 355	Red/yellow

### DN 40 SPRING RANGE\*

Part no	Barg	Psig	Color code
C0508	0.35 - 1.0	5 - 14	Red
C0492	1.0 - 1.7	14 - 25	Blue
C0495	1.7 - 3.1	25 - 45	Orange
C0498	3.1 - 4.1	45 - 60	Orange/blue
C0499	4.1 - 5.5	60 - 80	Purple
C0501	5.5 - 8.6	80 - 125	Green/white
C0503	8.6 - 10.3	125 - 150	Green/blue
C0504	10.3 - 12.8	150 - 185	White/blue
C0505	11.4 - 13.8	166 - 200	-
C0506	12.6 - 15.2	183 - 220	-
C0507	15.4 - 18.5	223 - 268	-

### DN 25 SPRING RANGE

Part no	Barg	Psig	Color code
C2119	0.35 - 1.0	5 - 14	Red
C2120	1.0 - 1.7	14 - 25	Blue
C2121	1.7 - 3.1	25 - 45	Orange
C2114	3.1 - 4.1	45 - 60	Orange/blue
C2113	4.1 - 5.5	60 - 80	Purple
C2122	5.5 - 8.6	80 - 125	Green/white
C2123	8.6 - 10.7	125 - 155	Green/blue
C2124	10.7 - 12.8	155 - 185	White/blue
C2202	12.8 - 13.2	185 - 192	-
C2234	13.2 - 15.4	192 - 223	-
C2203	15.4 - 17.6	223 - 255	-
C2235	17.6 - 20.5	255 - 297	-

### DN 50 SPRING RANGE\*

Part no	Barg	Psig	Color code
C0919	0.35 - 1.0	5 - 14	Red
C0922	1.0 - 1.7	14 - 25	Blue
C0924	1.7 - 3.1	25 - 45	Orange
C1400	3.1 - 4.1	45 - 60	Orange/blue
C0928	4.1 - 5.5	60 - 80	Purple
C0930	5.5 - 8.6	80 - 125	Green/white
C0933	8.6 - 10.3	125 - 150	Green/blue
C0934	10.3 - 12.8	150 - 185	White/blue
C0935	11.4 - 13.8	166 - 200	-
C0936	12.8 - 15.4	185 - 223	-
C0937	14.5 - 17.4	210 - 253	-
C0939	15.4 - 18.5	223 - 268	-

### NOTES

1. Springs up to 12.5 barg (181 psig) listed above for all materials comply with the requirements of BS6759: Part 1.
  2. The cast iron 716 is only available up to 13 barg (188 psig) on any medium.
  3. The stainless steel 716 is only available up to 12.5 barg (181 psig) on any medium.
  4. Stainless steel springs are available for 716 to the same pressures as shown above.
- \* DN 40 and DN 50 716 valves with PTFE trim can not have their springs selected from the above two charts. Refer to factory.

The valves are fitted with a suitable spring. Every valve is tested thoroughly for efficient operation before leaving the factory. Ensure the set pressure is within the range of the existing spring. If not, select and fit the correct spring from the tables above. All our springs are low stressed and painted to minimize corrosion.



# KUNKLE BAILEY 716 SAFETY RELIEF VALVE

## SELECTION GUIDE

Example:	716	3	ES	L
<b>Model</b>				
<b>716</b>	716 safety relief valve			
<b>Size</b>				
<b>1</b>	DN 15			
<b>2</b>	DN 20			
<b>3</b>	DN 25			
<b>4</b>	DN 32			
<b>5</b>	DN 40			
<b>6</b>	DN 50			
<b>Materials trim/body</b>				
Screwed in and out connections (inlet available male or female)				
<b>AS</b>	SS/SS			
<b>BS</b>	Aflaz/SS			
<b>ES</b>	EPDM/bronze			
<b>VS</b>	Aflaz/bronze			
<b>SS</b>	SS/bronze			
Flanged in and screwed out connections				
<b>AF</b>	SS/SS			
<b>BF</b>	Aflaz/SS			
<b>EF</b>	EPDM/bronze			
<b>VF</b>	Aflaz/bronze			
<b>SF</b>	SS/bronze			
<b>Cap</b>				
<b>D</b>	Pressure tight dome			
<b>L</b>	Open lever			

