ENGINEERING TOMORROW

Data Sheet

Hand operated regulating valve Type **SREG-SA** and **SREG-SB 15-40**

Assures favorable flow characteristics and accurate linear characteristics

SREG-SA and SREG-SB are angleway and straightway hand operated regulating valves, which act as normal shut-off valves in closed position.

The valves are available in two different versions – SREG-SA and SREG-SB designed for regulation purposes in liquid and expansion lines.

The valves are designed to meet the strict quality requirements on refrigerating installations specified by the international classification societies and are carefully designed to present favourable flow conditions and accurate linear characteristics.

Features

- Designed to ensure perfect regulation
- Easy to disassemble for inspection and possible repair
- Max. operating pressure: 40 bar (580 psig)
- Temperature range: -50 °C to +150 °C (-58 °F to +302 °F)
- Acts as a normal shut-off valve in closed position.
- Exact capacity and setting of the valve can be calculated for all refrigerants by means of Coolselector®2 (Danfoss calculation and selection software)

Media

Refrigerants

Applicable to HCFC, HFC and R717 (Ammonia). Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

New refrigerants

Danfoss products are continually evaluated for use with new refrigerants depending on market requirements.

When a refrigerant is approved for use by Danfoss, it is added to the relevant portfolio, and the R number of the refrigerant (e.g. R513A) will be added to the technical data of the code number. Therefore, products for specific refrigerants are best checked at store.danfoss.com/en/, or by contacting your local Danfoss representative.

Product specification

Design

The cone

The valves are available in two different versions – SREG-SA with an A cone and SREG-SB with a B cone. The A cone is designed for expansion lines, while the B cone is designed for regulating purposes e.g. liquid lines.

The valve cone is designed to ensure perfect regulation and provide an extensive regulating area. Irrespective of the refrigerant used, it is easy to obtain the correct capacity. A cone seal ring provides perfect sealing at a minimum closing momentum.

The valve cone can be turned on the spindle, thus there will be no friction between the cone and the seat when the valve is opened and closed.

Spindle

The spindle is made of polished stainless steel, which is ideal for O-ring sealing.

Packing gland - SREG-SA and SREG-SB

The “full temperature range” packing gland ensures perfect tightness in the whole range: -50 °C/+150 °C (-58 °F / +302 °F).

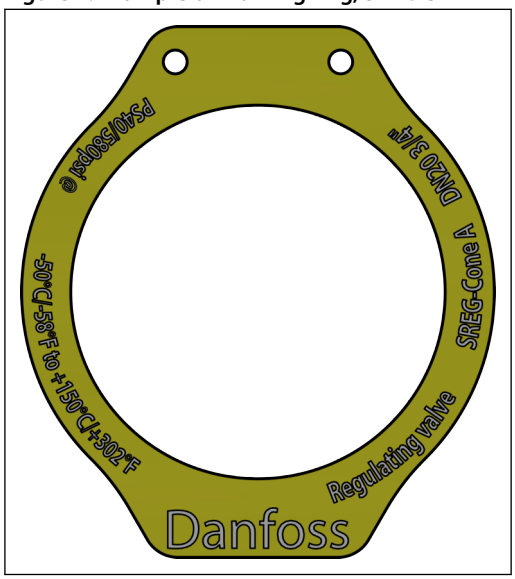
Installation

Install the valve with the spindle up or in horizontal position. The flow must be directed towards the cone.

The valve is designed to withstand high internal pressure. However, the piping system in general should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion.

For further information refer to product instruction for SREG-SA and SREG-SB.

Figure 1: Example of marking ring, SREG-SA



Pressure and temperature data

Table 1: Temperature and pressure

Description	Values
Temperature range	-50 °C /+150 °C (-58 °F /+302 °F)
Max working pressure	40 bar (580 psig)

Flow coefficients

Flow coefficients for fully opened valves from k_v = 1.5 to 21 m^3/h (C_v = 1.7 to 24.3 USgal/ min).

Connections

Available with the following connections:
- Butt-weld ANSI (B 36.10 Schedule 80)

Figure 2: ANSI

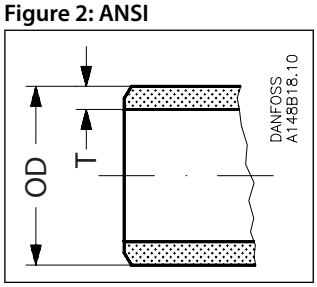


Table 2: Butt-weld ANSI (B 36.10 Schedule 80)

	Size mm	Size in.	OD mm	T mm	OD in.	T in.	Cone
SREG-SA / SB	15 20	½ ¾	21.3 26.9	3.7 4.0	0.839 1.059	0.146 0.158	A and B
SREG-SA / SB	25 32 40	1 1¼ 1½	33.7 42.4 48.3	4.6 4.9 5.1	1.327 1.669 1.902	0.181 0.193 0.201	A and B

Computation and selection

Introduction

In refrigeration plants, hand operated regulating valves are primarily used in liquid lines in order to regulate the flow of refrigerant. The valves can, however, also be used as expansion valves. From a calculation point of view the two fields of application are very different.

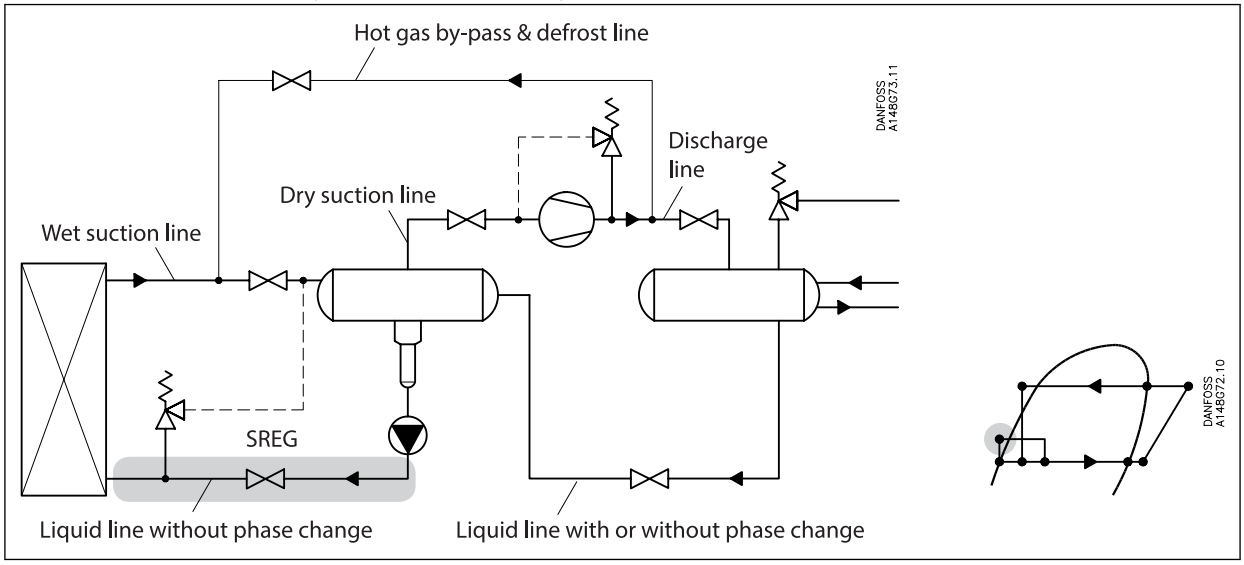
Normal flow is the term used to describe the general case where the flow through the valve is proportional to the square root of the pressure drop across it and inversely proportional to the density of the refrigerant (Bernouillis equation).

This relationship between mass flow, pressure drop and density satisfies the majority of all valve applications with refrigerants and brines.

Normal flow is characterised by turbulent flow through the valve without any phase change. The following capacity curves are based on the above mentioned assumption.

Application of the hand operated regulating valves outside the normal flow area will reduce the capacity of the valve considerably. In such cases it is recommended to use Coolselector®2 (Danfoss calculation and selection software).

Figure 3: Location of valve in system (marked with grey)



Sizing hand operated regulating valve for liquid flow

See below and use the flow coefficient tables (Figure 4, Figure 5, Figure 6, Figure 7 and Figure 8).

SI-units
Mass flow:

$$k_v = \frac{G}{\sqrt{\rho \times 1000 \times \Delta p}} = G \times C_A \, [m^3/h]$$

Volume flow:

$$k_v = \frac{V}{\sqrt{\frac{1000 \times \Delta p}{\rho}}} \, [m^3/h]$$

k_v	[m³/h]	Quantity [m³/h] of water flowing through a valve at a pressure loss of 1 bar (according to VDE/VDI Norm 2173).
P_1	[bar]	Pressure before the valve (upstream).
P_2	[bar]	Pressure after the valve (downstream).
Δp	[bar]	Actual pressure loss across the valve (P_1–P_2).
G	[kg/h]	Mass flow through the valve.
V	[m³/h]	Volume flow through the valve.
ρ	[kg/m³]	Density of the refrigerant before the valve.
C_A		Calculation factor (See Figure 9).

Imperial units
Mass flow:

$$C_v = \frac{0.95 \times G}{\sqrt{\rho \times \Delta p}} = 31.6 \times G \times C_A \, [USgal/min.]$$

Volume flow:

$$C_v = \frac{0.127 \times V}{\sqrt{\frac{\Delta p}{\rho}}} \, [USgal/min.]$$

C_v	[US gal/min]	Quantity [US gal/min] of water flowing through a valve at a pressure loss of 1 psi.
P_1	[psi]	Pressure before the valve (upstream).
P_2	[psi]	Pressure after the valve (downstream).
Δp	[psi]	Actual pressure loss across the valve (P_1–P_2).
G	[lb/min]	Mass flow through the valve.

V	[US gal/min]	Volume flow through the valve.
ρ	[lb/ft^3]	Density of the refrigerant before the valve.
C_A		Calculation factor (See Figure 9).

Figure 4: SREG -SA 15 and SREG-SB 15

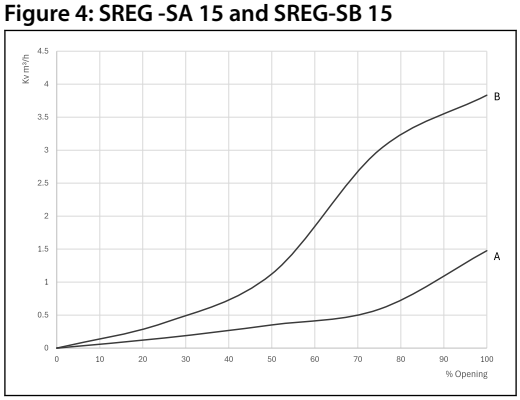


Figure 5: SREG -SA 20 and SREG-SB 20

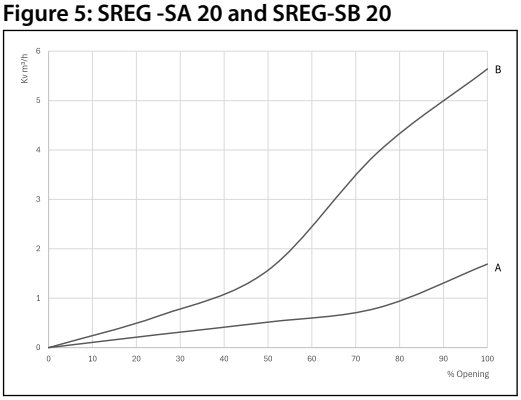


Figure 6: SREG -SA 25 and SREG-SB 25

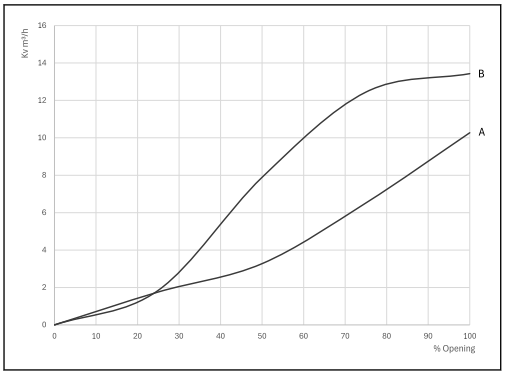


Figure 7: SREG -SA 32 and SREG-SB 32

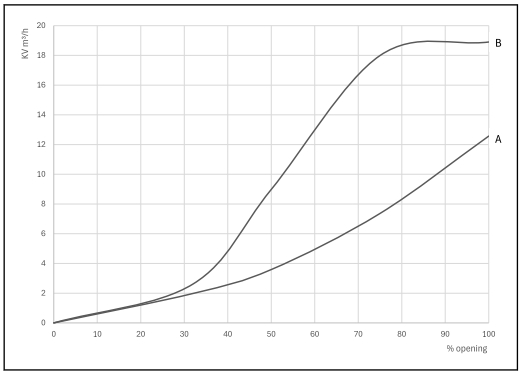


Figure 8: SREG -SA 40 and SREG-SB 40

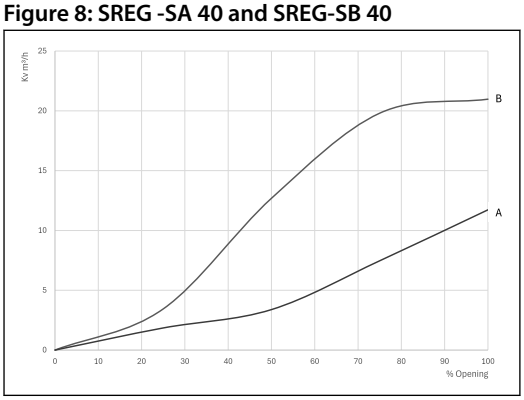
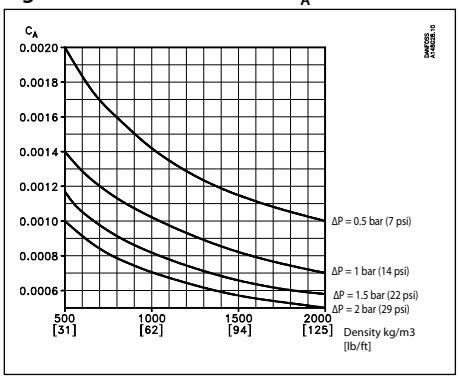


Figure 9: Calculation factor C_A



Computation and selection Example

Brine, density ρ: 1150 [kg/m^3]
Brine flow G: 2,700 [kg/h]
Pressure drop Δp: 0.5 [bar]

Use the curves of the K_v values (Figure 4, Figure 5, Figure 6, Figure 7, Figure 8) and calculate the required K_v by means of the formulas in the "Introduction" passage at the beginning of this chapter.

Calculate the K_v values by means of the calculation factor CA (Figure 10) and the curve of the K_v value(in this example: Figure 11) as per the following calculation example.

Required k_v-value
C_A = 0.00132 (from Figure 10)

$k_v = C_A \times G$
$k_v = 0.00132 \times 2{,}700$ [kg/h]
$= 3.56$ [m³/h]

Figure 10: Calculation factor C_A

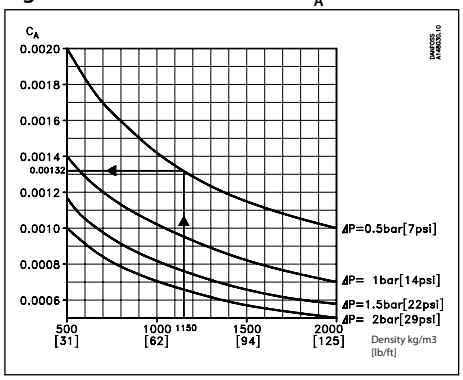
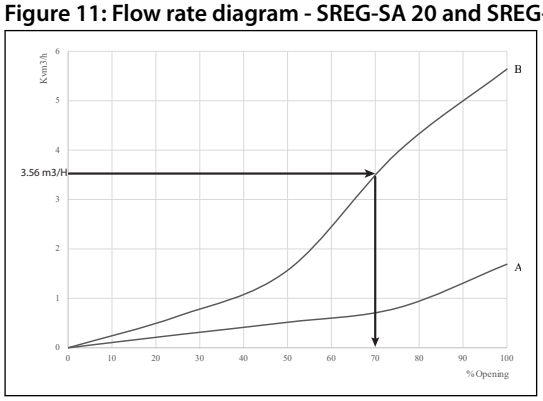


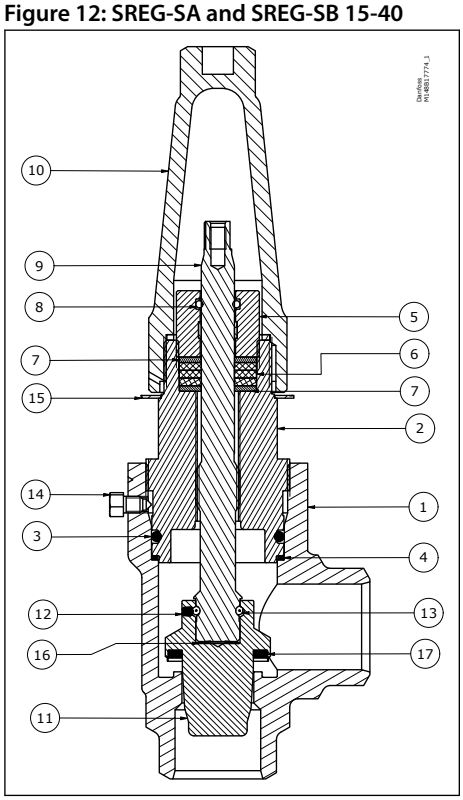
Figure 11: Flow rate diagram - SREG-SA 20 and SREG-SB 20



NOTE:
SREG-SB 20 with cone B can be used

Material specification

Figure 12: SREG-SA and SREG-SB 15-40



No	Part	Material	EN	GB / T	ASTM	JIS
1	Housing	Steel	P285QH 10222-4	#20 QT 699		
2	Bonnet	Iron	EN-GJS-400-15 1563	QT400-15 1348		
3	O ring	Chloroprene(Neo-prene)				
4	Gasket	Aluminium	EN AW-1050A 573		AL 6061-T6 B221	
5	Packing gland	Stainless Steel	X8CrNiS18-9 EN 10088-1		AISI 303 A276	SUS303 G4303
6	Teflon Ring	Tefflon				
7	Al Bushing	Aluminium	EN AW-1050A 573			
8	O ring	Chloroprene(Neo-prene)				

No	Part	Material	EN	GB / T	ASTM	JIS
9	Spindle	Stainless steel	X8CrNiS 18-9 10088		AISI 303 A276	SUS303 G4303
10	Seal cap	Aluminium	EN AC-431002-70 1706			
11	Cone	Steel	11SMn30 10087			
12	Grub screw	Steel				
13	Steel ball	Stainless steel				
14	Screw	Stainless steel	A2-70		Type 308	
15	ID Ring	Aluminium				
16	Disc spring	Steel				
17	Cone seal	Tefflon				

Dimensions and weights

Figure 13: SREG-SA/SB 15-40 in angleway version

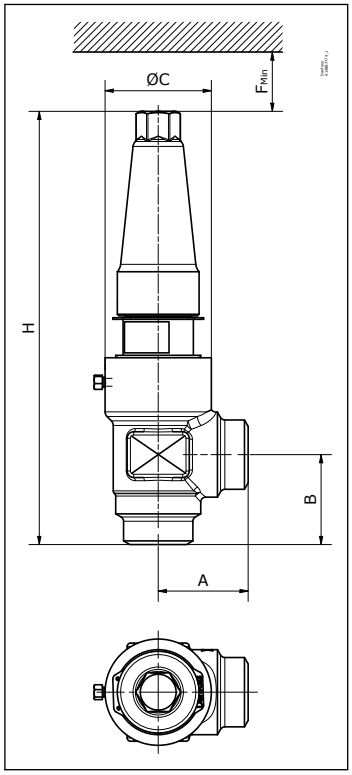


Table 3: SREG-SA/SB 15-40 in angleway version

Valve size	Unit	A	B	ϕC	F_{min}	H	Weight
SREG-SA/SB 15-20	mm	45	45	49	110	187	1.3 kg
SREG-SA/SB (¼-¾)	inch	1.77	1.77	1.92	4.33	7.36	2.8 lbs
SREG-SA/SB 25-40	mm	55	55	65	150	265	2.8 kg
SREG-SA/SB (1-1½)	inch	2.16	2.16	2.55	5.9	10.43	6.2 lbs

NOTE:
Specified weights are approximate values only.

Figure 14: SREG-SA/SB 15-40 in straightway version

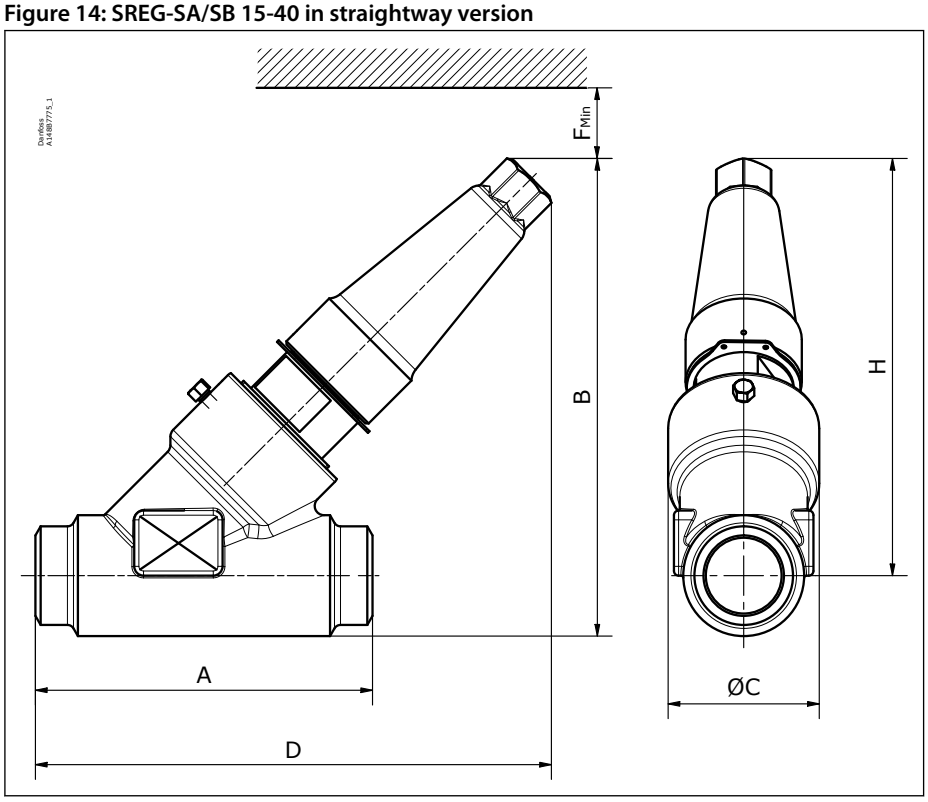


Table 4: SREG-SA/SB 15-40 straightway version

Valve size	Unit	A	B	ϕC	D	F_{min}	H	Weight
SREG-SA/SB 15-20	mm	120	142	49	158	110	123	1.6 kg
SREG-SA/SB (¼-¾)	inch	4.72	5.59	1.92	6.21	4.3	4.84	3.5 lbs
SREG-SA/SB 25-40	mm	145	205	65	222	150	179	3.6 kg
SREG-SA/SB (1-1½)	inch	5.7	8.07	2.55	8.74	5.9	7.04	7.9 lbs

NOTE:
Specified weights are approximate values only.

Ordering

How to order
The table below is used to indentify the valve required.

Please note that the type codes only serve to identify the valves, some of which may not form part of the standard product range. For further information please contact your local Danfoss Sales Company.

Example:
SREG-SA (Cone A) 15 ANSI angleway = 148B7768

IMPORTANT:
Where products need to be certified according to specific certification societies or where higher pressures are required, the relevant information should be included at the time of order.

Complete SREG-SA (Cone type A)

Table 5: Butt-weld ANSI(B 36.10 Schedule 80)-Angleway

Size		Type	Code no.
mm	in.		
15	½	SREG-SA 15 A ANG	148B7768
20	¾	SREG-SA 20 A ANG	148B7770
25	1	SREG-SA 25 A ANG	148B7772
32	1¼	SREG-SA 32 A ANG	148B7774
40	1 ½	SREG-SA 40 A ANG	148B7776

Table 6: Butt-weld ANSI(B 36.10 Schedule 80)-Straightway

Size		Type	Code no.
mm	in.		
15	½	SREG-SA 15 A STR	148B7769
20	¾	SREG-SA 20 A STR	148B7771
25	1	SREG-SA 25 A STR	148B7773
32	1¼	SREG-SA 32 A STR	148B7775
40	1½	SREG-SA 40 A STR	148B7777

Complete SREG-SB (Cone type B)

Table 7: Butt-weld ANSI(B 36.10 Schedule 80)-Angleway

Size		Type	Code no.
mm	in.		
15	½	SREG-SB 15 A ANG	148B7778
20	¾	SREG-SB 20 A ANG	148B7780
25	1	SREG-SB 25 A ANG	148B7782
32	1¼	SREG-SB 32 A ANG	148B7784
40	1 ½	SREG-SB 40 A ANG	148B7786

Table 8: Butt-weld ANSI(B 36.10 Schedule 80)-Straightway

Size		Type	Code no.
mm	in.		
15	½	SREG-SB 15 A STR	148B7779
20	¾	SREG-SB 20 A STR	148B7781
25	1	SREG-SB 25 A STR	148B7783
32	1¼	SREG-SB 32 A STR	148B7785
40	1 ½	SREG-SB 40 A STR	148B7787

A = Butt-weld ANSI
ANG = Angleway
STR = Straightway

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 9: Certificates and declarations

File name	Document type	Document topic	Approval authority
MD 033F0691	Manufacturers Declaration	RoHS	Danfoss

ENGINEERING TOMORROW

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