



# Manual

## SOLKAV EPDM System

scope of delivery – technical data  
installation – reparation – stocking





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## 1. Scope of delivery

### EPDM Ice-field

- black
- white (two-component extrusion)
- Ø 7mm (till 35m field-length)
- Ø 9mm (till 60m field-length)
- box-breadth 2,5m
- diverter or loop
- header PE
- 3 pipe Tichelmannsystem
- Connection-flange for header
- 2 connection-coupler
- Checker plate for the header (walk able)

### Connection to the chiller

- Flexible pipe or fixed pipe
- 2 connection-coupler
- 2 end cap

### Reparation-set (20 sets / place)



## 2. Technical data

### 2.1. Dimensions

<b>EPDM</b>	DN 7mm, DN 9mm
<b>Header Ø</b>	<600m <sup>2</sup> : DA 110; DN 100 <1.200m <sup>2</sup> : DA 160; DN 150 <1.800m <sup>2</sup> : DA 225; DN 200 By middle feed: DA 160; DN 150
<b>EPDM reserve by roll out</b>	mind. 1m
<b>box – breadth, height roll out</b>	breadth 2,5m; height 0,6m install

### 2.2. Technical data

<b>Switching system</b>	diverter (loop, optional)
<b>Tichelmann pipe</b>	PE
<b>Tichelmann piece</b>	PE with loose-flange, To apply on each boxes
<b>Connection-system</b>	loose-flange PE mit steel reinforcement,
<b>between the boxes</b>	incl. screws and seals
<b>resistance/m<sup>2</sup> Classic (7mm)</b>	0,2 bar on 30m
<b>resistance/m<sup>2</sup> Classic Plus (9mm)</b>	0,1 bar on 30m
<b>note</b>	Pressure checked with 2,5 bar
<b>steel quality</b>	2/3,5 mm steel plate
<b>galvanising quality</b>	hot-dip galvanised
<b>Stackable of the boxes</b>	yes
<b>stack height</b>	0,95m
<b>tolerance (level difference)</b>	user-defined
<b>checker plate walk able</b>	thickness 2mm checkered

### 2.3. Connection to refrigeration-engineering

The connection possibility to the refrigeration-engineering is a flange-connection



## 2.4. Hydraulic design data

### Pressure lost in the ice-field/m on each length

Ice field length (m)	Äthylenglycol				Polypropylenglycol			
	20	30	40	60	20	30	40	60
Pressure lost bar/m 7mm	0,03	0,044	0,058	0,087	0,039	0,057	0,076	0,113
Pressure lost bar/m 9mm	0,018	0,026	0,035	0,052	0,023	0,034	0,046	0,068
Pressure lost bar 7mm	0,6	1,32	2,32	5,22	0,78	1,71	3,04	6,78
Pressure lost bar 9mm	0,36	0,78	1,4	3,12	0,46	1,02	1,84	4,08

e.g. ice-field (20x30) ø7mm = 0,044bar x30 = 1,32bar on 30m length

### Pressure lost in system incl. fittings and exhauster

Ice-field m <sup>2</sup>	DN header	Äthylenglycol		Polypropylenglycol	
		EPDM DN 7mm	EPDM DN 9mm	EPDM DN 7mm	EPDM DN 9mm
200 (10Bx20L)	100	1,64 bar	1,39 bar	1,86 bar	1,54 bar
450 (15Bx30L)	100	2,86 bar	2,32 bar	3,45 bar	2,74 bar
600 (20Bx30L)	150	2,50 bar	1,95 bar	2,97 bar	2,26 bar
800 (20Bx40L)	150	-	2,74 bar	-	3,29 bar
1200 (30Bx40L)	200	2,51 bar	1,97 bar	2,99 bar	2,29 bar
1800 (30Bx60L)	200	2,88 bar	2,33 bar	3,47 bar	2,77 bar

## 2.5. Refrigeration-engineering design data

### Heat-transmission resistance $\lambda$

#### EPDM Ø7mm – thickness 1,6mm

Heat-transmission resistance  $\lambda$ : 0,0073 m<sup>2</sup>K/W

temperature-complexity to overcoming of  $\lambda$ : -1,56°

#### EPDM Ø9mm – thickness 1,6mm

Heat-transmission resistance  $\lambda$ : 0,0073 m<sup>2</sup>K/W

temperature-complexity to overcoming of  $\lambda$ : -1,15°

### 3. Installation-manual

#### 3.1. Underground construction

If the underground is very permeable to water, it is recommendable to cover place with a plastic foil to anticipate the drain away of the water. Also by disassembling (melt of the ice) it is important, that the water cannot flow out uncontrollable.



#### 3.2. Ice-field layout

Than the boxes (2,5m) will be positioned on the breadth side of the place.

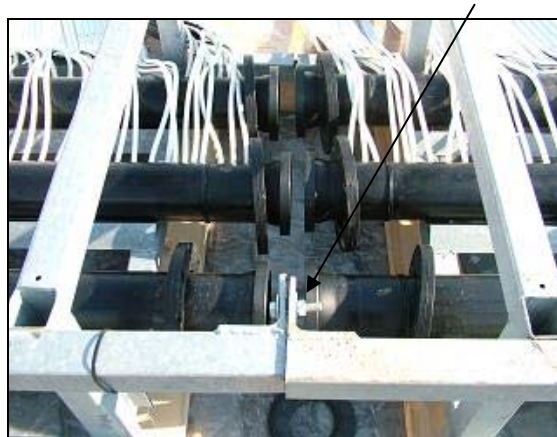




Afterwards the EPDM mats will be roll out on the length side of the place and will lay down properly.



If the boxes are on right position, they will be fixed together with screws.



### 3.3. Header - connection

After that the header will be connected with flanges (4 screws / flange). Before that, the seals have to be inserting between the flange-connection.



After the header connection, on one of the outside element, it will be installed the "Tichelmann"-piece and the end-caps as following the same principle as for the flange-connection.





### 3.4. Chiller-connection

The connection possibility to the refrigeration-engineering is a flange-connection on which will be flanged the pipes to the chiller.

#### Example

The connection between the header and the chiller will be made with a flexible pipe or with an inflexible pipe. The pipes are equipped with Storz-couplers.



- Connection on the header side:  
Here the flexible pipe will be connected with the header via Storz-coupler and flange.



- Connection on the chiller side:  
On the chiller side will be fixed a flange-connection with a Victaulic-coupler, on which will be fit a Storz-coupler.



Flange-connection with Storz-coupler



Flange-connection with Victaulic-coupler  
(on the chiller)



### 3.5. Glycol-fill – ventilation

The whole circle will be filled with a Glycol-water mixture (min. 30% Glycol; -18°C). With an external pump the mixture will be pumped from the Glycol-tank in the whole system to 1,5 bar pressure.

During the fill in, it will be hopefully to fix a tube on an output-valve and guide these back into the Glycol-tank. Due to these open system, the circle will be ventilated.

Ventilated must be:

- the pump
- the evaporator
- the pipe-system

After the ventilation, Glycol must be refill.

On following points have to be proved if the system is tight or not:

- EPDM mats
- Header-connection

If the system is not thick on one point, please check the screws or use the reparation-set (see under reparation)

It should be installed a manometer on the return side to control the pressure (return side >0,5 bar)

In non-operative the system should have 1,5 bar pressure.

### 3.6. Checker plate

The checker plate (2,5mm thick) will be covered on the header, so everybody can walk on them.





## 4. Commissioning – Chiller

By starting:

- starting the power supply to the chiller approx. **12 hours** before commissioning (compressor pre-Heating)
- switch **ON** the controller (Chiller starts and runs by shelf)

Recommended adjustment:

- Cold adjustment                    -10°C output temperature - forward
- Antifreeze security                -14°C
- System disconnection            -16°C
- Glycol mixture                     -18°C freeze security (min. 30% Glycol)
- $\Delta T$  (forward – return)        3°C
- Ice thickness                        5cm (min. 4cm/ max. 8 cm)
- Pressure in the system            return >0,5 bar  
    forward 1,5 – 2,5 bar

Producing ice:

- If return temperature > -5°C
- Infuse water
- Or fill in the bowl with water (control if the bowl is tight)

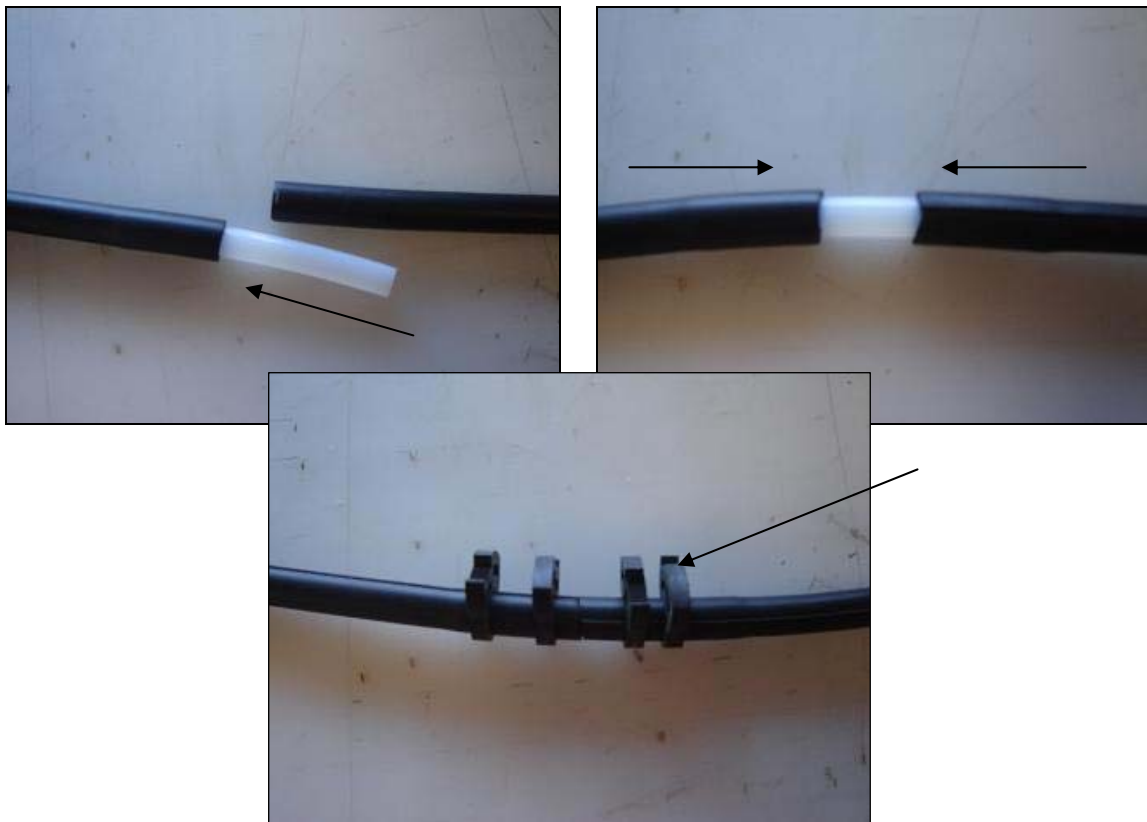


## 5. Reparation-manual

The including reparation-set consists of:

- reserve tube (teflon)
- connection-clips (4 Stk.)

If there is a leakage in the EPDM, this area will be cut out. Than the reserve tube (reparation-set) will be apply as connection-piece between the cut out piece. Afterwards it will be fixed with 4 connection-clips.





In case of leakage:

- switch off the pump and the chiller

Furthermore:

- fill in Glycol
- ventilation of the system
  - the pump
  - the evaporator
  - the pipe system

after that, fill in Glycol once more

Advice: The ice-thickness is keeping a few ours before it begin to melt.

## 6. Disassembling – stocking

- First the Glycol mixture must be pump out of the system
- After that the ice-field can be disassembled
- On the disassembled header must be installed end caps
- Also on the chiller must be installed end caps on in- and output

The EPDM mats will be roll up on the boxes and can be stack over each other.

The black EPDM can be stock open-air without damaging.

The white EPDM have to be stock underneath a roof, because it is not consistent to UV-rays.





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