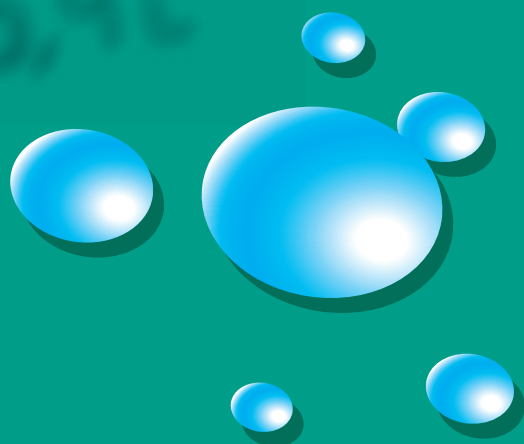


5,0°C
28,0°C
-63,5°C
-10,7°C
33,0°C
8,0°C



® PEKASOL 2000

Heat Transfer Fluid based on organic salt
for use in technical and
food manufacturing applications



pro KÜH SOLE GmbH

Dilution table ®PEKASOL 2000

Frost-proof up to °C	Density g/cm ³	Volume %	weight %
-10	1,105	32	40
-15	1,134	43	50
-20	1,163	54	60
-25	1,184	61	67
-30	1,203	67	73
-40	1,234	78	83
-50	1,250	85	88
-60	1,289	100	100

Physical Parameter ®PEKASOL 2000

Density (at 20°C):	see dilution table
Appearance:	light blue, clear liquid
Boiling point:	approx. 100°C
pH-Value (at 20°C):	8-10
Electric conductivity:	>100 mS/cm
Steam pressure (at 20°C:)	<0,1 mbar

Material compatibility of synthetics

The following synthetics are resistant to ®PEKASOL 2000

ABS	Acryl Nitrile Butadiene Styrene
PE	Polyethylene
PP	Polypropylene
PTFE	Polytetrafluoroethylene
PVC	Polyvenyl Chloride
IIR	Isobutylene-isoprene Rubber
EPDM	Ethylene Propylene Diene Monomer
CR	Chloroprene Rubber
SBR	Styrene Butadiene Rubber up to 100° C
NBR	Nitrile Butadiene Rubber
PA	Polyamide
FPM (®Viton)	Fluor Rubber
EP	epoxy resins

Product description

®PEKASOL 2000 is an aqueous solution of environmentally safe alkaline earth formate and acetate. ®PEKASOL 2000 is free of amine, nitrite and phosphate.

Environmentally safe additives protect the refrigerating system against corrosion and deposits. ®PEKASOL 2000 was developed as a low temperature refrigerating agent for technical and food-related systems and exhibits major advantages over glycol-based products thanks to its very low viscosity.

The combination of organic salts with the new additives allows cooling down to -60°C at low viscosity.

®PEKASOL 2000 is non-flammable and has no flash point or ignition temperature.

®PEKASOL 2000 should not be used exclusively as a heating medium.

®PEKASOL 2000 is delivered as a ready-to-use product and may not be diluted further. All thermodynamic and corrosion-related properties apply only to the ®PEKASOL 2000 concentration delivered.

®PEKASOL 2000 can only be mixed with ®PEKASOL 50 to a limited extent. It may not be mixed with other products since precipitation or reactions may occur.

Usage instructions

®PEKASOL 2000 should only be used in closed systems. The application temperature lies between -60°C and +60°C. Temperatures above +60°C should only be reached for thawing purposes or for brief periods.

All plant components must be cleaned and freed of rust before filling.

There should be a filter (approx. 50-80 µm) installed in every ®PEKASOL 2000 system to remove solids and suspended particles from the solution.

Material compatibility

The materials typically used in plant construction may be used.

Galvanized components should not be used. If ®PEKASOL 2000 leaks from the system, clean up thoroughly with water. Lab tests have shown that even galvanized products are only attacked weakly if they come into contact with ®PEKASOL 2000 and are immediately cleaned well.

Create soldered connections using hard solder (silver or copper solder).

Soft solders are not resistant! Always make certain that metallic materials of different types are not connected together directly since the high electrical conductivity could result in electro-chemical corrosion.

Hemp may be used in connection with typical sealing pastes.

As a general guideline, materials that are resistant to alkalis, carboxylic acid and salts may be used.

Suitable adhesives include LOCTITE 557 and 542.

Silicone and substances containing silicone are not resistant.

ABS can only be used if the manufacturer has approved the product for **®PEKASOL 2000**.

In the case of PVC, as with all plastics, the maximum and minimum usage temperatures must be observed.

Geberit Mapress has approved **®PEKASOL 2000** for use with press fittings. Please be sure to only use the approved materials.

When selecting seal materials, the seal manufacturer must generally be contacted to determine suitability.

Environmental issues and toxicology

®PEKASOL 2000 is non-toxic and easily biologically degradable.

®PEKASOL 2000 is not subject to mandatory labeling requirements.

Water hazard class: 1, low water hazard (acc. to the German Administrative Regulation on Substances Hazardous to Water).

The typical safety measures must be observed while handling **®PEKASOL 2000**.

Additional information and instructions can be found in the safety data sheet.

Shipping, Storage and Disposal

®PEKASOL 2000 is shipped in the adjacent packaging units.

All packaging units are reusable. Please return completely empty. Do not fill with other products!

®PEKASOL 2000 and all dilutions are storage-stable. Store dry. Avoid direct sunlight. **®PEKASOL 2000** dilutions do not unmix, even after a long storage period.

Follow the respective and valid regulation for disposal. Upon request the disposal will be organized by us.

Calculation Software

You may use the software on our website for the calculation of the thermodynamic parameters. This software can be also downloaded.

You may download all product brochures, data sheets, safety data sheets, general and product-related reports and documentations as well as prepared texts for invitation of tender from our website www.prokuehlsole.de.

Do not hesitate to contact us by telephone at **+49 2421/5 91 96-0**.

A detailed product brochure is available on our website and by phone.

Packaging units **®PEKASOL 2000**

Packaging	Volume
Canister	30 litres
Canister	60 litres
Drum	220 litres
IBC Container	1.000 litres
Tank truck	upon request

The weights of the respective packaging differ due to the different densities.

General Corrosion and Wear Data

Testing method according to ASTM D 1384	Weight Loss mg/sample
Materials	®PEKASOL 2000-15
Steel	-0,3
Copper	-1,0
Brass	-1,2
cast aluminum	-2,3
Stainless steel	-0,1
Grey cast iron	-0,4

This wear data are comparable with other densities.

Service

Free laboratory service

Please send us a sample of 500 ml about 6 weeks after filling of the system and then once a year. We will provide you an analysis certificate with advises and recommendations free of charge.

Filling pump rental

We provide our customers a pump package incl. hoses and connection armatures. A refundable security deposit is required.

Disposal of used brine

Upon request, we provide empty IBC free of charge (exclusive of freight charges). Upon filling with used brine, we pick up the IBC. Depending on kind and condition of the liquid, it will be recycled or disposed according to law. Only the arising expenses will be charged.

Personal consultation

We are pleased to arrange a personal meeting at your company or directly at the construction site to discuss the system-specific application of our products.

Measuring kit

We prepared a measuring kit with all necessary materials to test our heat carriers. This kit enables you and your staff to measure the required standard values directly at the facility.

Thermodynamic data of ®PEKASOL 2000 dilutions:

®PEKASOL 2000 - 10 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
°C	g/cm ²	W/m K	kJ/kg K	mPa*s	mm ² /s		loss	0,001/K	coefficient	m/s
0	1,111	0,53	3,41	2,6	2,3	16	1,28	0,23	0,60	1580
10	1,108	0,54	3,43	1,9	1,7	12	1,19	0,28	0,70	1604
20	1,105	0,55	3,45	1,5	1,3	9	1,11	0,33	0,80	1621
30	1,101	0,56	3,47	1,2	1,1	7	1,05	0,37	0,90	1634
40	1,097	0,57	3,49	1,0	0,9	6	1,00	0,42	1,00	1644
50	1,092	0,58	3,51	0,8	0,8	5	0,95	0,46	1,08	1649

®PEKASOL 2000 - 15 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-15	1,145	0,49	3,21	4,9	4,3	31	1,54	0,20	0,43	1588
-10	1,143	0,50	3,22	4,0	3,5	26	1,47	0,22	0,47	1603
0	1,141	0,51	3,25	2,9	2,5	18	1,34	0,27	0,56	1627
10	1,137	0,52	3,28	2,1	1,9	13	1,25	0,31	0,66	1646
20	1,134	0,53	3,30	1,7	1,5	10	1,17	0,34	0,75	1660
30	1,130	0,54	3,32	1,3	1,2	8	1,10	0,38	0,84	1670
40	1,125	0,55	3,34	1,1	1,0	7	1,05	0,42	0,93	1676
50	1,120	0,56	3,36	0,9	0,8	5	1,00	0,46	1,01	1679

®PEKASOL 2000 - 20 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-20	1,177	0,48	3,05	7,0	5,9	45	1,72	0,22	0,36	1633
-10	1,174	0,49	3,08	4,6	4,0	29	1,55	0,26	0,44	1653
0	1,171	0,50	3,11	3,3	2,8	21	1,42	0,29	0,52	1671
10	1,167	0,51	3,13	2,4	2,1	15	1,31	0,33	0,61	1686
20	1,163	0,52	3,16	1,9	1,6	12	1,23	0,36	0,69	1696
30	1,159	0,53	3,18	1,5	1,3	9	1,16	0,40	0,77	1703
40	1,154	0,54	3,20	1,3	1,1	7	1,10	0,43	0,86	1706
50	1,149	0,55	3,22	1,1	0,9	6	1,05	0,46	0,94	1707

®PEKASOL 2000 - 25 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-25	1,201	0,46	2,94	10,0	8,3	63	1,91	0,24	0,30	1655
-20	1,199	0,47	2,95	7,9	6,6	50	1,80	0,25	0,33	1667
-10	1,196	0,48	2,99	5,2	4,4	33	1,62	0,28	0,41	1685
0	1,193	0,49	3,02	3,7	3,1	23	1,48	0,31	0,49	1701
10	1,189	0,50	3,04	2,7	2,3	17	1,37	0,34	0,57	1714
20	1,184	0,50	3,07	2,1	1,8	13	1,28	0,37	0,65	1721
30	1,180	0,51	3,09	1,7	1,4	10	1,21	0,40	0,73	1726
40	1,175	0,52	3,11	1,4	1,2	8	1,15	0,43	0,81	1728
50	1,170	0,53	3,12	1,2	1,0	7	1,09	0,46	0,88	1727

®PEKASOL 2000 - 30 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-30	1,222	0,45	2,84	14,6	12,0	92	2,13	0,25	0,24	1682
-20	1,219	0,46	2,88	8,9	7,3	56	1,88	0,27	0,31	1700
-10	1,215	0,47	2,91	5,8	4,8	36	1,68	0,30	0,39	1716
0	1,211	0,48	2,94	4,1	3,4	25	1,54	0,33	0,46	1727
10	1,207	0,49	2,97	3,0	2,5	18	1,42	0,36	0,54	1737
20	1,203	0,50	2,99	2,3	1,9	14	1,33	0,38	0,62	1742
30	1,198	0,50	3,01	1,9	1,6	11	1,25	0,41	0,69	1745
40	1,193	0,51	3,03	1,5	1,3	9	1,19	0,44	0,76	1745
50	1,188	0,52	3,05	1,3	1,1	7	1,13	0,46	0,84	1743

®PEKASOL 2000 - 40 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-40	1,259	0,43	2,67	34,8	27,7	218	2,70	0,26	0,16	1725
-30	1,255	0,44	2,72	18,9	15,0	118	2,31	0,29	0,21	1738
-20	1,252	0,44	2,76	11,2	8,9	69	2,03	0,31	0,28	1751
-10	1,248	0,45	2,79	7,2	5,8	44	1,81	0,33	0,35	1761
0	1,243	0,46	2,82	4,9	4,0	30	1,64	0,35	0,42	1769
10	1,239	0,47	2,85	3,6	2,9	22	1,52	0,38	0,49	1774
20	1,234	0,48	2,87	2,8	2,2	17	1,41	0,40	0,56	1777
30	1,229	0,49	2,89	2,2	1,8	13	1,33	0,42	0,63	1776
40	1,224	0,50	2,91	1,8	1,5	11	1,26	0,44	0,70	1774
50	1,218	0,51	2,92	1,5	1,2	9	1,20	0,46	0,77	1769

®PEKASOL 2000 - 50 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-50	1,280	0,41	2,56	86	67	538	3,44	0,26	0,10	1746
-40	1,276	0,42	2,61	41	32	256	2,85	0,29	0,14	1757
-30	1,272	0,43	2,66	21,8	17,1	135	2,42	0,31	0,20	1767
-20	1,268	0,44	2,70	12,7	10,0	78	2,11	0,33	0,26	1775
-10	1,264	0,45	2,73	8,0	6,4	49	1,88	0,35	0,33	1784
0	1,260	0,45	2,76	5,5	4,4	33	1,70	0,37	0,39	1789
10	1,255	0,46	2,79	4,0	3,2	24	1,57	0,39	0,46	1792
20	1,250	0,47	2,81	3,0	2,4	18	1,46	0,41	0,53	1793
30	1,245	0,48	2,83	2,4	1,9	14	1,38	0,42	0,60	1792
40	1,239	0,49	2,84	2,0	1,6	11	1,30	0,44	0,66	1790
50	1,234	0,50	2,86	1,6	1,3	9	1,24	0,46	0,73	1784

®PEKASOL 2000 - 60 °C

Temperature °C	Density g/cm ²	Thermal- conductivity W/m K	Specific heat kJ/kg K	Dynam. viscosity mPa*s	Kinem. viscosity mm ² /s	Prandtl number	Relat. pressure loss	Coerfficient of cubic 0,001/K	Relat. Heat transfer gangszahl	Speed of sound m/s
-60	1,327	0,39	2,40	405	305	2498	5,20	0,30	0,05	1807
-50	1,323	0,40	2,45	152	115	942	4,06	0,32	0,08	1813
-40	1,319	0,40	2,49	66	50	408	3,29	0,33	0,11	1817
-30	1,314	0,41	2,53	32,5	24,7	200	2,74	0,35	0,16	1821
-20	1,310	0,42	2,57	17,9	13,6	109	2,36	0,36	0,22	1825
-10	1,305	0,43	2,60	10,8	8,3	66	2,07	0,38	0,28	1828
0	1,300	0,44	2,63	7,2	5,5	43	1,87	0,39	0,34	1829
10	1,295	0,44	2,65	5,1	3,9	30	1,71	0,41	0,41	1828
20	1,289	0,45	2,67	3,8	2,6	23	1,58	0,42	0,47	1826
30	1,284	0,46	2,69	3,0	2,3	17	1,48	0,44	0,53	1821
40	1,278	0,47	2,70	2,4	1,9	14	1,40	0,45	0,59	1815
50	1,272	0,48	2,72	2,0	1,5	11	1,33	0,46	0,66	1808

„The market
asks for the product

– we provide it.“

Development and
Manufacturing of Heat
Transfer Fluids and Coolants



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