

COMPONENTS: (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	EVALUATOR: J. Eyseltová and J. Makovička Charles University Prague, Czechoslovakia May 1985
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## CRITICAL EVALUATION: (cont'd)

Table II. Values for the parameters in equation [1].

Parameter	value	dihydrate		monohydrate		anhydrous	
		$\sigma^a$		$\sigma^a$		$\sigma^a$	
A	$-3.52 \times 10^4$	100		$1.596 \times 10^6$	5000	$-6.29 \times 10^5$	3000
B	-253		1	9940	40	-3700	10
C	0.472	0.002		-15.47	0.07	5.45	0.02
$x_o$	0.12454			0.19467		0.21720	
$T_o$	298.2			323.2		338.2	

<sup>a</sup> These are the standard deviations for the respective parameter.

Table III. Solubility data calculated by equation [1].

T/K	mol fraction	mol/kg	mass%
$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$			
273.2	0.079491	4.80	36.54
278.2	0.086735	5.28	38.77
283.2	0.094636	5.81	41.07
288.2	0.10340	6.41	43.47
293.2	0.11327	7.10	46.00
298.2	0.12454	7.90	48.68
303.2	0.13759	8.86	51.54
308.2	0.15287	10.02	54.61
313.2	0.17095	11.46	57.89
313.7 <sup>a</sup>	0.17299	11.62	58.24
$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$			
313.7	0.17299	11.62	58.24
315.2	0.17505	11.79	58.59
317.2	0.17893	12.11	59.23
319.2	0.18376	12.51	60.02
321.2	0.18915	12.96	60.87
323.2	0.19467	13.43	61.71
325.2	0.19981	13.87	62.48
327.2	0.20412	14.25	63.10
329.2 <sup>b</sup>	0.20707	14.51	63.52
331.2	0.20815	14.60	63.67
$\text{NaH}_2\text{PO}_4$			
333.2	0.19865	13.77	62.30
338.2	0.21720	14.72	63.85
343.2	0.22437	16.07	65.86
348.2	0.23358	16.93	67.02
353.2	0.24767	18.29	68.70
358.2	0.27010	20.56	71.16

<sup>a</sup> The dihydrate to monohydrate transition temperature.

<sup>b</sup> The monohydrate to anhydrous salt transition temperature.

The above transition temperature values were determined graphically by the evaluators.

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>EVALUATOR:</b> J. Eyseltová and J. Makovička Charles University Prague, Czechoslovakia May 1985
<b>CRITICAL EVALUATION: (cont'd)</b>	
<p>gives a summary of the values for the parameters of equation [1]. In Table III are given some solubility values obtained by the use of equation [1] and the parameters given in Table II. In Table III, the values for <math>\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}</math> are recommended values. For the dihydrate and the anhydrous salt the values given are tentative values because only the data of Imadsu (2) survived the iteration procedure.</p>	
<b>References</b>	
<ol style="list-style-type: none"> <li>1. Apfel, O. Dissertation, Technical University, Darmstadt <u>1911</u>.</li> <li>2. Imadsu, A. <i>Mem. Col. Sci. Emp. (Kyoto)</i> <u>1911-12</u>, 3, 257.</li> <li>3. Beremzhanov, B.A.; Savich, R.F. <i>Kunanbaev, G.S. Khim. Tekhnol.</i>, (<i>Alma Ata</i>) <u>1977</u>, 22, 15.</li> <li>4. Ferroni, G.; Galea, J.; Antonetti, G. <i>Bull. Soc. Chim. Fr.</i> <u>1974</u>, 12 (Pt. 1), 273.</li> <li>5. Shpunt, S.J. <i>Zh. Prikl. Khim.</i> <u>1940</u>, 13, 19.</li> <li>6. Kol'ba, V.I. <i>Zhikharev, M.I.; Sukhanov, L.P.; Zh. Neorg. Khim.</i> <u>1981</u>, 26, 828.</li> <li>7. Khallieva, Sh. D. <i>Izv. Akad. Nauk Turkmen SSR, Ser. Fiz-Tekhn., Khim. Geol. Nauk</i> <u>1977</u>, 3, 125.</li> <li>8. Girich, T.E.; Gulyamov, Yu. M. <i>Vopr. Khim. Khim. Tekhnol.</i> <u>1979</u>, 57, 54.</li> <li>9. Lilich, L.S.: Alekseeva, E.A. <i>Zh. Neorg. Khim.</i> <u>1969</u>, 14, 1655.</li> <li>10. Shpunt, S.J.; <i>Zh. Prikl. Khim.</i> <u>1940</u>, 13, 9.</li> <li>11. Brunisholz, G.; Bodmer, M. <i>Helv. Chim. Acta</i> <u>1963</u>, 46, 289, 2575.</li> <li>12. Babenko, A.M.; Vorob'eva, T.A. <i>Zh. Prikl. Khim.</i> <u>1976</u>, 49, 1502.</li> <li>13. Cohen-Adad, R. <i>Pure Appl. Chem.</i> <u>1985</u>, 57, 255.</li> <li>14. Platford, R.F. <i>J. Chem. Eng. Data</i> <u>1974</u>, 19, 166.</li> <li>15. Scatchard, G.; Breckenridge, R.C. <i>J. Phys. Chem.</i> <u>1954</u>, 58, 596.</li> <li>16. Tenu, R.; Couniou, J.J.; Cohen-Adad, R. <i>8th International CODATA Conference, Jachanka, Poland</i> <u>1982</u>.</li> </ol>	

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Apfel, O. Dissertation, Technical University, Darmstadt, 1911.
<b>VARIABLES:</b> Composition and temperature.	<b>PREPARED BY:</b> J. Eyseltová

**EXPERIMENTAL VALUES:**Composition of saturated solutions in the  $\text{NaH}_2\text{PO}_4\text{-H}_2\text{O}$  system.

$t/\text{°C}$	$\text{PO}_4^{3-}$	$\text{Na}^+$	$\text{NaH}_2\text{PO}_4$	<sup>b</sup>	solid phase
	c <sup>a</sup>	c <sup>a</sup>	mass%		
0	3.01		36.13	4.71	
0		2.84	34.08	4.31	
25	4.08		48.97	8.00	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$
35.5	4.47		53.65	9.64	"
40	4.70		56.41	10.78	"
44 <sup>c</sup>	4.83		57.97	11.49	"
44	5.06		60.73	12.89	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$
50	5.15		61.81	13.48	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$
50		5.26	63.13	14.27	
55	5.32		63.85	14.72	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$
58	5.46		65.53	15.84	
61	5.48		65.77	16.01	$\text{NaH}_2\text{PO}_4$
65	5.49		65.89	16.10	"
70	5.52		66.25	16.36	"
75	5.60		67.21	17.08	"
83	5.76		69.13	18.66	"

<sup>a</sup> These concentrations are expressed as mol/1000 g soln.<sup>b</sup>

These values were calculated by the compiler.

<sup>c</sup>

This was a metastable equilibrium.

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b> All the experiments were performed in a water thermostat. Equilibrium was ascertained by repeated analysis of the liquid phase, which was separated from the solid phase by filtration through a mat of platinum wires. Phosphate was determined gravimetrically as $\text{Mg}_2\text{P}_2\text{O}_7$ . Sodium was determined as $\text{Na}_2\text{SO}_4$ after phosphoric acid had been removed as lead phosphate.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Water; $\text{H}_2\text{O}$ , [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Imadsu, A. <i>Mem. Col. Sci. Emp. (Kyoto)</i> <u>1911-12</u> , 3, 257-63.			
<b>VARIABLES:</b> Composition and temperature.		<b>PREPARED BY:</b> J. Eyseltová			
<b>EXPERIMENTAL VALUES:</b> Solubility in the $\text{NaH}_2\text{PO}_4-\text{H}_2\text{O}$ system.					
g/100 g $\text{H}_2\text{O}$					
<i>t</i> /°C	mean	mass% <sup>a</sup>	mol/kg <sup>a</sup>		
0.10	57.84 57.87	57.86 36.66	4.82 4.82		
1.00	59.10 59.06	59.08 37.15	4.92 4.92		
3.00	61.45 61.49	61.47 38.06	5.12 5.12		
5.00	63.80 63.84	63.82 38.95	5.32 5.32		
10.00	69.85 69.89	69.87 41.14	5.82 5.82		
15.00	76.74 76.70	76.72 43.42	6.39 6.39		
20.00	85.23 85.18	85.21 46.01	7.10 7.08		
25.00	94.62 94.63	94.63 48.62	7.88 7.88		
26.00	96.70 96.75	96.73 49.16	8.06 8.06		
27.00	99.20 99.19	99.20 49.80	8.26 8.26		
28.00	101.75 101.67	101.71 50.43	8.48 8.47		
(continued next page)					
<b>AUXILIARY INFORMATION</b>					
<b>METHOD/APPARATUS/PROCEDURE:</b> Equilibrium was approached from both undersaturation and supersaturation. Care was taken during sampling to insure the absence of solid particles. Samples of solution were weighed, evaporated to dryness and heated strongly to convert the solid into metaphosphate. The concentration of the solution was calculated from the weight of metaphosphate formed.	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{NaH}_2\text{PO}_4$ was prepared by adding $\text{H}_3\text{PO}_4$ to ordinary sodium phosphate until the solution gave no precipitate with $\text{BaCl}_2$ . The solution was then evaporated until crystals formed. These crystals were recrystallized. Subsequent analysis showed that the crystals were free from ordinary impurities.				
	<b>ESTIMATED ERROR:</b> The temperature was kept constant to within 0.03 K (below 40°C), 0.05 K (between 40 and 60°C), 0.1 K (between 60 and 80°C), and 0.15 K (above 80°C). Duplicate analyses agreed				
	<b>REFERENCES:</b> Within ±0.1%.				

## COMPONENTS:

(1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Water;  $\text{H}_2\text{O}$ , [7732-18-5]

## ORIGINAL MEASUREMENTS:

Imadsu, A.  
*Mem. Col. Sci. Emp. (Kyoto)* 1911-12, 3,  
 257-63.

## EXPERIMENTAL VALUES cont'd:

Solubility in the  $\text{NaH}_2\text{PO}_4-\text{H}_2\text{O}$  system.

$t/\text{°C}$	g/100 g $\text{H}_2\text{O}$		
	mean	mass% <sup>a</sup>	mol/kg <sup>a</sup>
30.00	106.40	51.55	8.86
	106.50	51.57	8.87
31.00	108.99	52.15	9.08
	108.87	52.12	9.07
33.00	114.38	53.35	9.53
	114.23	53.32	9.52
34.00	117.08	53.93	9.76
	117.20	53.96	9.76
35.00	120.42	54.63	10.03
	120.45	54.64	10.04
37.00	126.82	55.91	10.57
	126.70	55.89	10.56
40.00	138.22	58.02	11.52
	138.10	58.00	11.51
40.20	139.12	58.18	11.59
	139.00	58.16	11.58
40.55	140.95	58.50	11.74
	140.70	58.45	11.72
41.00	142.50	58.76	11.87
	142.60	58.78	11.88
42.00	143.80	58.98	11.98
	143.85	58.99	11.99
45.00	148.19	59.71	12.35
	148.20	59.71	12.35
50.00	158.55	61.32	13.21
	158.67	61.34	13.22
52.00	163.91	62.11	13.66
	163.76	62.09	13.64
55.00	170.93	63.09	14.24
	170.77	63.07	14.23
56.00	173.15	63.39	14.43
	173.30	63.41	14.44
57.00	175.87	63.75	14.65
	175.74	63.73	14.64
58.00	177.33	63.94	14.78
	177.14	63.92	14.76
60.0	179.31	64.20	14.94
	179.34	64.20	14.94
62.0	181.20	64.44	15.10
	181.50	64.48	15.12
65.0	185.06	64.92	15.42
	184.92	64.90	15.41
69.0	190.17	65.54	15.84
	190.31	65.55	15.86
80.0	207.08	67.44	17.25
	207.50	67.48	17.29
90.0	225.17	69.25	18.76
	225.45	69.27	18.78
99.1	246.20	71.11	20.51
	246.92	71.17	20.57

<sup>a</sup>These values were calculated by the compiler.

Examination of the equilibrium solid phases showed the presence of the anhydrous salt, the monohydrate, dihydrate and tetrahydrate. The transition points of anhydrous salt and monohydrate and of monohydrate and dihydrate were estimated to be 57.4°C and 40.8°C, respectively.

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b> (1) Sodium metaphosphate; $\text{NaPO}_3$ ; [10361-03-2] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Morey, G.W. <i>J. Am. Chem. Soc.</i> <u>1953</u> , 75, 5794-7.		
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eysseltová		
<b>EXPERIMENTAL VALUES:</b>				
Solubility of $\text{NaPO}_3$ in water.				
concentration				
wt. fraction	mass% <sup>a</sup>	mol/kg <sup>a</sup>	<i>t</i> /°C.	primary phase
0.70	70	22.88	147	$\text{NaH}_2\text{PO}_4$
0.739	73.9	27.77	159	"
0.765	76.5	31.92	210	$\text{Na}_2\text{H}_2\text{P}_2\text{O}_7$
0.78	78	34.77	235	"
0.794	79.4	37.80	256	"
0.849	84.9	55.14	305	"
0.92	92	112.8	348	"
0.93	93	130.3	402	$\text{NaPO}_3$ II
0.96	96	235.4	517	$\text{NaPO}_3$ I
<sup>a</sup> These values were calculated by the compiler.				
<b>AUXILIARY INFORMATION</b>				
<b>METHOD/APPARATUS/PROCEDURE:</b> The solubilities below 400°C were made in sealed glass tubes rotating in an oven which was provided with an automatic temperature control (1). Runs above 400°C were also made in sealed glass tubes but in an ordinary furnace without continuous rotation. The tubes were inverted several times to make sure that equilibrium was obtained. Temperatures were determined with a Pt-Pt90Rh10 thermocouple, the bare junction of which was within a few mm of the middle of the tube. The glass tubes were Corning 702 glass.	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{NaPO}_3 \cdot \text{H}_2\text{O}$ was obtained from Ontario Research Foundation, but the purity is not specified.			
	<b>ESTIMATED ERROR:</b> No information is given but the compiler estimates the accuracy of the temperature measurement to be within $\pm 1^\circ\text{C}$ .			
	<b>REFERENCES:</b> 1. Kracek, F.C.; Morey, G.W.; Merwin, H.E. <i>Am. J. Sci.</i> <u>1938</u> , 35A, 143.			

COMPONENTS:	EVALUATOR:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	J. Eysseletová Charles University Prague, Czechoslovakia
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	May 1985

## CRITICAL EVALUATION:

The values reported for the solubilities in multicomponent systems containing sodium dihydrogenphosphate will be presented, and, where possible, evaluated in this chapter.

## Ternary systems with two saturating components

Seven such systems have been studied, but in several of these reports, there are insufficient data to permit a critical evaluation to be made. There was no evidence for the formation of solid solutions and/or solid ternary compounds in any of these systems. Critical evaluations will be made for the following four systems.

1. The  $\text{NaH}_2\text{PO}_4$ - $\text{NaBO}_2$ - $\text{H}_2\text{O}$  system. This system has been studied at 298 and 308 K (1). The appearance of  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$  [61028-24-8] as one of the solid phases in this system indicates that the system cannot be treated as a ternary one, but should be considered as a part of the  $\text{Na}_2\text{O}$ - $\text{B}_2\text{O}_3$ - $\text{P}_2\text{O}_5$ - $\text{H}_2\text{O}$  system.

2. The  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system. Solubility data for this system have been obtained at 273, 283, 293 and 303 K (2), and at 323 K (3). The solubility data for the isotherms at 273, 283 and 293 K can be described by equation [1], derived by Kirgintsev (4). In this equation,  $m_1$  is the molality of the salt,  $m_0$  is the molality of the same salt in a

$$\log(m_1/m_0) = (-1/\alpha)\log y_1 \quad [1]$$

saturated aqueous solution under the same conditions,  $y_1$  is the solute mole fraction of the component, and  $\alpha$  is an adjustable parameter. In an ideal solution  $\alpha = da_w/dm$  where  $a_w$  is the activity of the water and  $m$  is the molality of the component. The values of  $(-1/\alpha)$  for this system are given in Table I.

Table I. Parameters of equation [1] for the  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system.

T/K	$\text{NaH}_2\text{PO}_4$	$\text{NaNO}_3$		
	$-1/\alpha$	$\sigma^\alpha$	$-1/\alpha$	$\sigma^\alpha$
273	0.68	0.02	1.03	0.06
283	0.70	0.02	0.98	0.03
293	0.68	0.03	0.88	0.06

$\sigma$  the standard deviation of the  $(-1/\alpha)$  value

The data at 303 K (2) and at 323 K (3) do not give a constant value for  $\alpha$ . This is possibly due to some interaction between the two salts at these higher temperatures, whereas in the derivation of equation [1] it was assumed that there is no such interaction. Figure 1 is a summary of the solubility data obtained experimentally and by the use of equation [1].

3. The  $\text{NaH}_2\text{PO}_4$ - $\text{NaCl}$ - $\text{H}_2\text{O}$  system. Solubility data for this system were reported for 273, 298 and 348 K (5), at 298 and 323 K (6), and at 313 K (7). Of all these data only the 298 K isotherms (5, 6) can be compared directly, Figure 2. The solubility of  $\text{NaH}_2\text{PO}_4$  can be expressed by equation [2]. Neither the solubility of  $\text{NaH}_2\text{PO}_4$  at other temperatures nor the solubility of NaCl can be expressed by equation [1]. Attempts to use

$$\log m_1 = \log 7.7 - (1.1 \pm 0.1) \log y_1 \quad [2]$$

equation [1] gave values for  $\alpha$  that either varied or had standard deviations of about 50%. 4. The  $\text{NaH}_2\text{PO}_4$ - $\text{KH}_2\text{PO}_4$ - $\text{H}_2\text{O}$  system. Babenko and Vorob'eva (8) present solubility data from which it is possible to construct a polytherm and make comparison with data obtained by others for solutions simultaneously saturated with two solids (5, 7). This is done on Figure 3. The agreement is fairly good. However, equation [1] could not be used for this system because it was impossible to obtain a constant value for  $\alpha$ . This is likely due to the fact that equation [1] was derived on the basis of simplifying assumptions and this system is too complex for such assumptions to be valid. A more precise model is needed but this may require additional parameters. At present there are too few data available to calculate values for additional parameters.

Three other ternary systems have been studied but only a limited amount of experimental data is available. Therefore, no evaluation of these data can be made.

(continued next page)

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## EVALUATOR:

J. Eyseltová  
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 Prague, Czechoslovakia

May 1985

## CRITICAL EVALUATION:

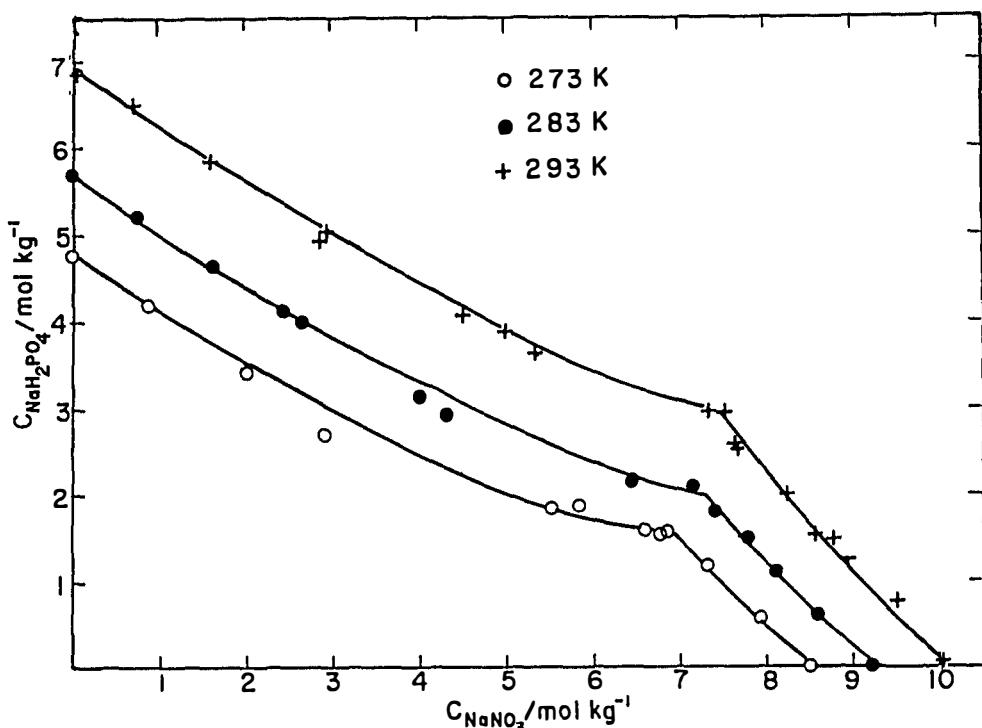


Figure 1. Solubility in the  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system. The solid lines represent equation [1].

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## EVALUATOR:

J. Eyseltová  
 Charles University  
 Prague, Czechoslovakia

May 1985

## CRITICAL EVALUATION:

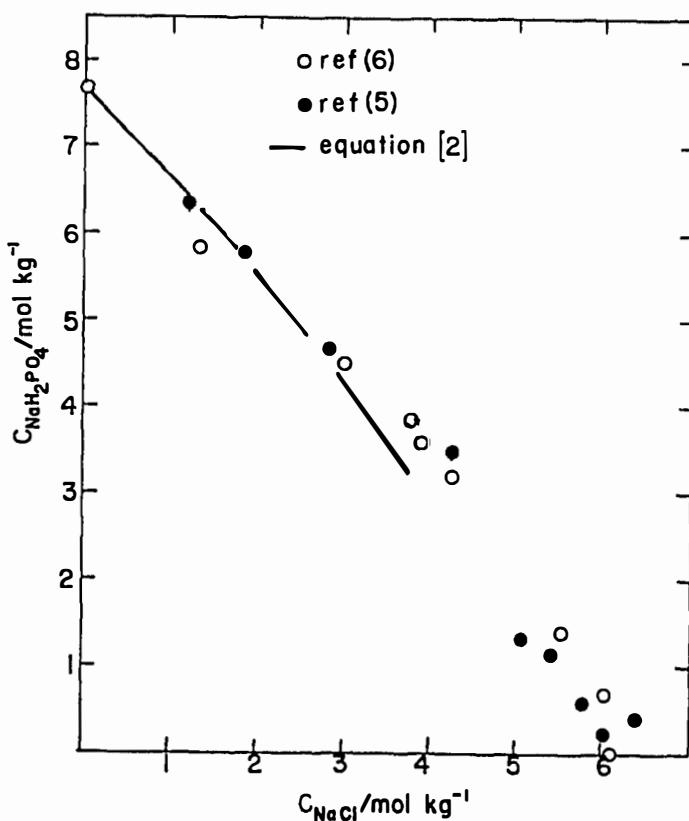


Figure 2. Solubility in the  $\text{NaH}_2\text{PO}_4\text{-NaCl}\text{-H}_2\text{O}$  system at 298 K.

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## EVALUATOR:

J. Eysseltová  
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 Prague, Czechoslovakia

May 1985

## CRITICAL EVALUATION:

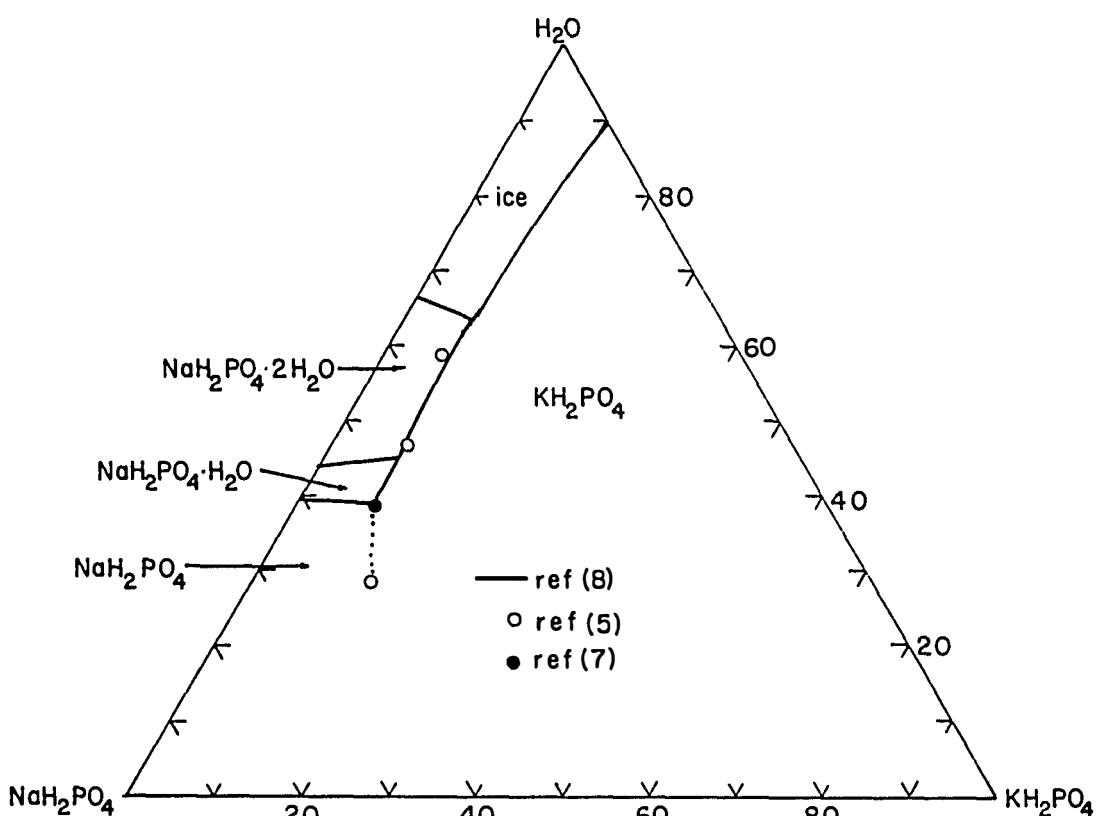


Figure 3. Solubility in the  $\text{NaH}_2\text{PO}_4$ - $\text{KH}_2\text{PO}_4$ - $\text{H}_2\text{O}$  system.

COMPONENTS:	EVALUATOR:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	J. Eyssettová Charles University Prague, Czechoslovakia
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	May 1985

## CRITICAL EVALUATION: (cont'd)

These other systems are:  $\text{NaH}_2\text{PO}_4-\text{Na}_2\text{SO}_4-\text{H}_2\text{O}$  studied at 298 K (9);  $\text{NaH}_2\text{PO}_4-\text{NaClO}_4-\text{H}_2\text{O}$  studied at 298 K (10); and  $\text{NaH}_2\text{PO}_4-\text{NH}_4\text{H}_2\text{PO}_4-\text{H}_2\text{O}$ , studied at 263 to 303 K (11).

## Systems having an organic component

Solubility data for the  $\text{NaH}_2\text{PO}_4$ -acetone- $\text{H}_2\text{O}$  system and for two sections through the  $\text{NaH}_2\text{PO}_4-\text{NaClO}_4$ -acetone- $\text{H}_2\text{O}$  system at 298 K have been reported (12). Layer formation was observed in all the studies. Not enough data are available to make a critical evaluation of the work. However, the value reported for the solubility of  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$  in water at 298 K is in error by about +20%.

## Quaternary systems

Solubility data have been reported for four quaternary systems: (a) a section through the  $\text{NaH}_2\text{PO}_4-\text{NH}_4\text{H}_2\text{PO}_4-(\text{NH}_4)_2\text{HPO}_4-\text{H}_2\text{O}$  system at 262 to 343 K (13); (b) three isotherms of the  $\text{Na}^+, \text{K}^+||\text{H}_2\text{PO}_4^-$ ,  $\text{NO}_3^-$ - $\text{H}_2\text{O}$  system (14); (c) the  $\text{Na}^+, \text{NH}_4^+||\text{H}_2\text{PO}_4^-$ ,  $\text{Cl}^-$ - $\text{H}_2\text{O}$  system at 298 K (15); and (d) the  $\text{Na}^+, \text{K}^+||\text{H}_2\text{PO}_4^-$ ,  $\text{Cl}^-$ - $\text{H}_2\text{O}$  system at 298 K (15), at 313 K (7), and at 273, 298, 323 and 373 K (16).

The 298 K solubility isotherm for the  $\text{Na}^+, \text{K}^+||\text{H}_2\text{PO}_4^-$ ,  $\text{Cl}^-$ - $\text{H}_2\text{O}$  system is given on Figure 4. The values given for the boundary ternary systems are those reported for the eutonic solutions in the  $\text{NaH}_2\text{PO}_4-\text{NaCl}-\text{H}_2\text{O}$  system (5, 6), the  $\text{NaH}_2\text{PO}_4-\text{KH}_2\text{PO}_4-\text{H}_2\text{O}$  system (5), the  $\text{KH}_2\text{PO}_4-\text{KCl}-\text{H}_2\text{O}$  system (17-19), and the  $\text{KCl}-\text{NaCl}-\text{H}_2\text{O}$  system (20). There appears to be a systematic error in the data of Brunisholz and Bodmer (16). The phosphate content is too large. Therefore, the data of Solov'ev, et al. (15) are preferred.

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## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## EVALUATOR:

J. Eyseltová  
 Charles University  
 Prague, Czechoslovakia

May 1985

## CRITICAL EVALUATION:

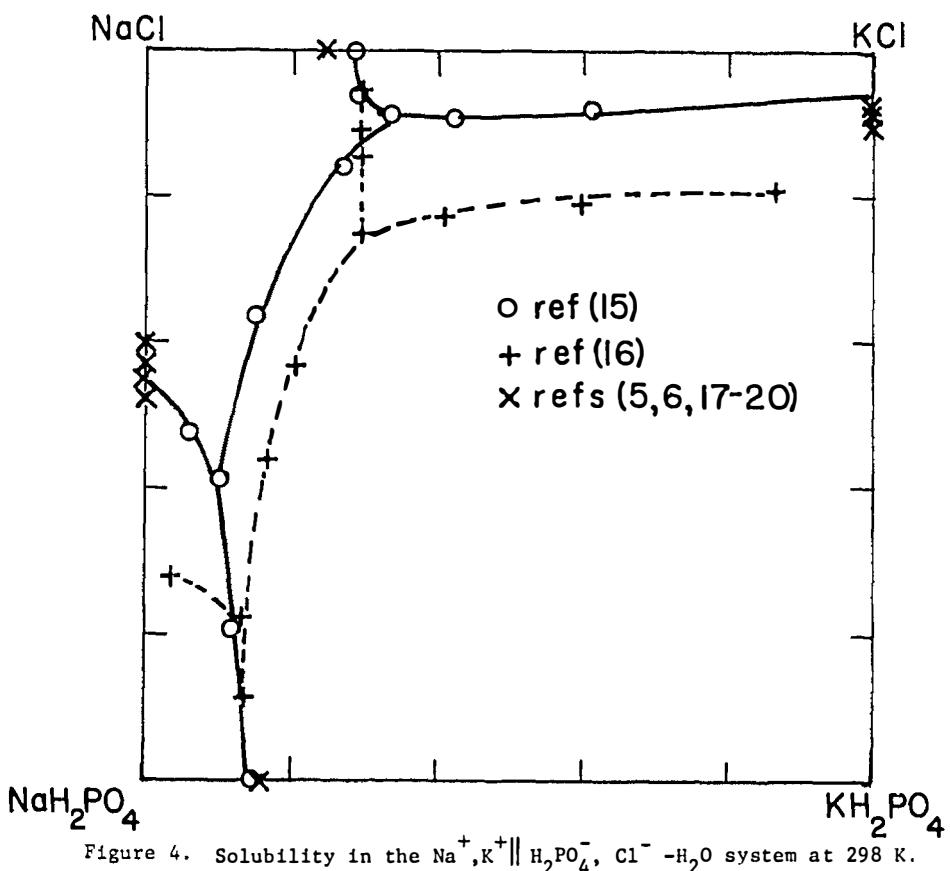


Figure 4. Solubility in the  $\text{Na}^+, \text{K}^+ \parallel \text{H}_2\text{PO}_4^-$ ,  $\text{Cl}^- - \text{H}_2\text{O}$  system at 298 K.

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Disodium sulfate; $\text{Na}_2\text{SO}_4$ ; [7757-82-6] (3) Water; $\text{H}_2\text{O}$ , [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Apfel, O. Dissertation, Technical University, Darmstadt <u>1911</u> .
<b>VARIABLES:</b> Composition at 25°C.	<b>PREPARED BY:</b> J. Eyseltová

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the  $\text{NaH}_2\text{PO}_4$ - $\text{Na}_2\text{SO}_4$ - $\text{H}_2\text{O}$  system at 25°C.

$\text{PO}_4^{3-}$ mol/1000 g soln	$\text{SO}_4^{2-}$ mol/1000 g soln	$\text{NaH}_2\text{PO}_4^a$ mass%	$\text{Na}_2\text{SO}_4^a$ mol/kg	$\text{H}_2\text{O}^a$ mass%		
4.08	----	48.97	8.00	----	----	51.03
3.92	0.11	47.05	7.63	1.56	0.21	51.39
3.82	0.26	45.85	7.57	3.69	0.52	50.46
3.58	0.45	42.97	7.07	6.39	0.89	50.64
3.27	0.71	39.25	6.45	10.08	1.40	50.67
3.29	0.72	39.49	6.54	10.23	1.43	50.28

<sup>a</sup>The mass% and mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b> Equilibrium was reached isothermally. Equilibrium was ascertained by repeated analysis of the liquid phase. The solid and liquid phases were separated from each other by filtration through a mat of platinum wires. Phosphate content was determined gravimetrically as $\text{Mg}_2\text{P}_2\text{O}_7$ . The sulfate content was determined gravimetrically as $\text{BaSO}_4$ . Sodium content was determined as $\text{Na}_2\text{SO}_4$ after removing the phosphate and sulfate as $\text{Pb}_3(\text{PO}_4)_2$ and $\text{PbSO}_4$ .	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>		<b>ORIGINAL MEASUREMENTS:</b>									
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]		Shpunt, S.J. <i>Zh. Prikl. Khim.</i> <u>1940</u> , 13, 9-18.									
(2) Ammonium dihydrogenphosphate; $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]											
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]											
<b>VARIABLES:</b>		<b>PREPARED BY:</b>									
Temperature and composition.		J. Eysseltová									
<b>EXPERIMENTAL VALUES:</b>											
Part 1. Crystallization temperatures on sections of the $\text{NaH}_2\text{PO}_4-\text{NH}_4\text{H}_2\text{PO}_4-\text{H}_2\text{O}$ system.											
$\text{NaH}_2\text{PO}_4$		$\text{NH}_4\text{H}_2\text{PO}_4$									
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	<i>t</i> /°C	solid <sub>b</sub> phase						
Section I											
7.7	0.70	----	----	-2.1	A						
7.4	0.70	4.8	0.48	-3.3	"						
7.0	0.70	9.1	0.94	-4.5	"						
6.8	0.71	13.0	1.41	-5.5	"						
6.5	0.70	16.7	1.89	-0.6	B						
6.2	0.70	20.0	2.36	8.5	"						
6.0	0.70	23.1	2.83	17.1	"						
5.8	0.71	25.9	3.30	25.0	"						
5.6	0.71	28.6	3.78	30.8	"						
Section II											
15.4	1.52	----	----	-4.5	A						
15.0	1.52	2.9	0.31	-5.0	"						
14.6	1.53	5.7	0.62	-5.6	"						
14.2	1.53	8.3	0.93	-6.1	"						
13.9	1.54	10.7	1.23	-6.7	"						
13.2	1.54	15.2	1.84	1.4	B						
12.8	1.52	17.3	2.15	8.9	"						
12.5	1.53	19.3	2.46	13.6	"						
12.2	1.53	21.3	2.78	19.8	"						
12.0	1.53	23.1	3.09	24.5	"						
11.7	1.54	24.8	3.39	30.1	" (continued next page)						
<b>AUXILIARY INFORMATION</b>											
<b>METHOD/APPARATUS/PROCEDURE:</b>		<b>SOURCE AND PURITY OF MATERIALS:</b>									
A standard visual polythermic method and the isothermal method were used but no details are given. The $\text{P}_2\text{O}_5$ content was determined by a standard method described in the "NIUIF materials" but no reference is given. The ammonia content was determined by the Kjeldahl method. The sodium ion content was probably determined by difference-compiler.		No information is given.									
		<b>ESTIMATED ERROR:</b>									
		The temperature was controlled to within $\pm 0.2$ K.									
		<b>REFERENCES:</b>									

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Shpunt, S.J. <i>Zh. Prikl. Khim.</i> <u>1940</u> , 13, 9-18.
(2) Ammonium dihydrogenphosphate; $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]	
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd.

Part 1. Crystallization temperatures on sections  
of the  $\text{NaH}_2\text{PO}_4-\text{NH}_4\text{H}_2\text{PO}_4-\text{H}_2\text{O}$  system.

$\text{NaH}_2\text{PO}_4$		$\text{NH}_4\text{H}_2\text{PO}_4$		<i>t</i> /°C	'solid' phase <sup>b</sup>
mass%      mol/kg <sup>a</sup>					
23.1	2.50	----	----	-6.6	A
22.7	2.51	2.0	0.23	-7.1	"
22.2	2.50	3.8	0.45	-7.6	"
21.8	2.50	5.7	0.68	-8.0	"
21.4	2.50	7.4	0.90	-8.5	"
21.0	2.50	9.1	1.13	-9.0	"
20.3	2.50	12.2	1.57	-2.2	B
19.9	2.50	13.8	1.81	3.5	"
19.6	2.50	15.2	2.03	7.9	"
19.2	2.52	17.3	2.37	13.1	"
18.7	2.51	19.3	2.70	19.0	"
18.1	2.50	21.3	3.06	26.1	"
17.7	2.49	23.1	3.39	30.1	"
Section III					
34.6	4.41	----	----	-2.7	C
33.9	4.41	2.0	0.27	-2.6	"
33.2	4.39	3.8	0.52	-2.5	"
32.6	4.40	5.7	0.80	-2.6	"
32.0	4.40	7.4	1.06	-2.5	"
31.5	4.42	9.1	1.33	-2.9	"
30.9	4.41	10.7	1.59	1.9	B
30.4	4.41	12.2	1.85	9.0	"
29.9	4.42	13.8	2.13	13.9	"
29.4	4.42	15.2	2.38	18.5	"
28.4	4.41	18.0	2.92	27.6	"
Section IV					
38.5	5.22	----	----	7.1	C
37.8	5.23	2.0	0.29	6.8	"
37.1	5.23	3.8	0.56	6.9	"
36.4	5.24	5.7	0.86	7.2	"
35.8	5.25	7.4	1.13	7.1	"
35.2	5.26	9.1	1.42	7.1	"
34.5	5.24	10.7	1.70	7.1	B + C
33.9	5.24	12.2	1.97	12.1	B
33.3	5.24	13.8	2.27	17.9	"
32.8	5.26	15.2	2.54	22.8	"
32.2	5.25	16.7	2.84	27.3	"
Section V					
42.3	6.11	----	----	14.5	C
41.4	6.09	2.0	0.31	14.4	"
39.9	6.11	5.7	0.91	14.7	"
38.4	6.09	9.1	1.51	14.6	"
37.1	6.10	12.2	2.09	14.5	"
36.4	6.09	13.8	2.41	20.9	B
35.9	6.12	15.2	2.70	26.6	"
35.2	6.10	16.7	3.02	31.1	"
Section VI					
42.3	6.11	----	----	14.5	C
41.4	6.09	2.0	0.31	14.4	"
39.9	6.11	5.7	0.91	14.7	"
38.4	6.09	9.1	1.51	14.6	"
37.1	6.10	12.2	2.09	14.5	"
36.4	6.09	13.8	2.41	20.9	B
35.9	6.12	15.2	2.70	26.6	"
35.2	6.10	16.7	3.02	31.1	"

(continued next page)

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Ammonium dihydrogenphosphate;  $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]  
 (3) Water,  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Shpunt, S.J.  
*Zh. Prikl. Khim.*, 1940, 13, 9-18

## EXPERIMENTAL VALUES cont'd.

Part 1. Crystallization temperatures on sections  
of the  $\text{NaH}_2\text{PO}_4-\text{NH}_4\text{H}_2\text{PO}_4-\text{H}_2\text{O}$  system.

$\text{NaH}_2\text{PO}_4$		$\text{NH}_4\text{H}_2\text{PO}_4$		$t/^\circ\text{C}$	solid <sup>b</sup> phase
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>		
Section VII					
24.9	2.91	3.8	0.46	-8.4	A
26.6	3.18	3.7	0.46	-8.8	"
28.2	3.44	3.6	0.46	-9.7	"
31.1	3.96	3.5	0.46	-8.2	C
32.5	4.22	3.4	0.46	-5.3	"
34.1	4.54	3.3	0.46	-1.2	"
36.5	5.04	3.2	0.46	3.4	"
38.5	5.49	3.1	0.46	7.8	"
41.9	6.32	2.9	0.46	15.6	"
44.8	7.12	2.8	0.46	20.8	"
46.1	7.50	2.7	0.46	24.3	"
Section VIII					
19.9	2.30	8.0	0.96	-7.9	A
22.0	2.61	7.8	0.96	-8.7	"
23.8	2.89	7.6	0.96	-9.3	"
25.6	3.18	7.4	0.96	-9.9	"
27.3	3.47	7.2	0.96	-10.7	A + C
28.8	3.74	7.1	0.96	-8.0	C
31.7	4.29	6.8	0.96	-3.3	"
34.1	4.79	6.6	0.97	1.5	"
36.5	5.33	6.4	0.97	6.5	"
38.5	5.80	6.2	0.97	10.7	"
40.2	6.22	6.0	0.97	14.7	"
41.9	6.68	5.8	0.96	18.3	"
44.8	7.52	5.6	0.98	23.5	"
47.3	8.31	5.3	0.97	28.2	"

## Part 2. Solutions coexisting with two solid phases.

$\text{NaH}_2\text{PO}_4$		$\text{NH}_4\text{H}_2\text{PO}_4$		$\text{H}_2\text{O}$		solid <sup>b</sup> phase
$t/^\circ\text{C}$	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	
-4.3	----	----	16.7	1.74	83.3	A + B
-9.9	32.4	3.99	----	----	67.6	A + C
-6.0	6.6	0.70	14.7	1.62	78.7	A + B
-7.1	13.6	1.53	12.4	1.46	74.0	"
-9.1	21.0	2.53	9.8	1.23	69.2	"
-2.8	31.3	4.39	9.3	1.36	59.4	B + C
7.1	34.4	5.22	10.7	1.69	54.9	"
14.7	37.3	6.09	11.7	1.99	51.0	"
-10.2	30.0	3.75	3.4	0.44	66.6	A + C
-10.7	27.4	3.49	7.2	0.96	65.4	"

(continued next page)

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Ammonium dihydrogenphosphate;  $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]  
 (3) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Shpunt, S.J.  
*Zh. Prikl. Khim.* 1940, 13, 9-18.

## EXPERIMENTAL VALUES cont'd.

## Part 3. Solubility isotherms.

$\text{NH}_4\text{H}_2\text{PO}_4$			$\text{NaH}_2\text{PO}_4$			$\text{H}_2\text{O}$		
mass%	c <sup>c</sup>	mol/kg <sup>a</sup>	mass%	c <sup>c</sup>	mol/kg <sup>a</sup>	mass%	c <sup>c</sup>	solid phase <sup>b</sup>
temp. = -9.9°C								
---	---	---	32.4	100.0	3.99	67.6	1391	A + C
3.6	11.7	0.46	28.6	88.3	3.51	67.8	1400	A
7.5	24.0	0.96	24.6	76.0	3.02	67.9	1398	"
9.2	29.6	1.18	22.8	70.4	2.79	68.0	1402	A + B
8.5	23.8	1.17	28.4	76.2	3.75	63.1	1129	B + C
3.4	10.4	0.45	30.4	89.6	3.83	66.2	1302	C
temp. = -7°C								
---	---	---	24.2	100.0	2.66	75.8	2092	A
4.0	16.5	0.46	21.0	83.5	2.33	75.0	1988	"
8.4	33.5	0.98	17.4	66.5	1.95	74.2	1893	"
12.3	48.1	1.45	13.8	51.9	1.56	73.9	1851	A + B
10.6	34.6	1.34	20.8	65.4	2.53	68.6	1436	B
8.8	23.7	1.24	29.4	76.3	3.96	61.8	1068	B + C
7.0	19.8	0.96	29.7	80.2	3.91	63.3	1140	C
3.4	10.0	0.45	31.5	90.0	4.03	65.1	1239	"
---	---	---	33.6	100.0	4.22	66.4	1261	"
temp. = -4.3°C								
---	---	---	15.1	100.0	1.48	84.9	3745	A
8.8	56.8	0.91	7.0	43.2	0.69	84.2	3484	"
16.8	100.0	1.76	----	----	----	83.2	3184	A + B
15.3	70.9	1.70	6.6	29.1	0.70	78.1	2309	B
13.3	50.8	1.58	13.5	49.2	1.54	73.2	1782	"
11.4	36.4	1.46	20.6	63.6	2.52	68.0	1396	"
9.1	23.8	1.30	30.3	76.2	4.16	60.6	1015	B + C
6.9	18.9	0.96	31.0	81.1	4.16	62.1	1084	C
3.3	9.5	0.45	32.8	90.5	4.28	63.9	1175 <sup>d</sup>	"
---	---	---	34.6	100.0	4.41	65.4	----	"
temp. = 0°C								
18.4	100.0	1.96	----	----	----	81.6	2833	B
16.9	73.4	1.92	6.4	26.6	0.70	76.7	2127	"
16.06	65.0	1.86	9.02	35.0	1.00	74.92	1941	"
14.7	54.0	1.77	13.1	46.0	1.51	72.2	1697	"
13.11	42.6	1.66	18.46	57.4	2.25	68.43	1420	"
12.9	40.1	1.67	20.0	59.9	2.48	67.1	1333	"
10.53	28.5	1.48	27.47	71.5	3.69	62.0	1077	"
10.0	25.1	1.48	31.1	74.9	4.40	58.9	944	"
9.64	24.1	1.43	31.69	75.9	4.50	58.67	937	B + C
9.8	24.3	1.46	31.7	75.7	4.51	58.5	931	"
6.7	17.4	0.97	33.2	82.8	4.60	60.1	999	C
5.8	15.3	0.83	33.5	84.7	4.60	60.7	1024	"
3.2	8.8	0.45	34.8	91.2	4.68	62.0	1083	"
2.62	7.3	0.36	34.84	92.7	4.64	62.54	1109	"
---	---	---	36.4	100.0	4.77	63.6	1150	"

(continued next page)

## Sodium Dihydrogenphosphate

COMPONENTS:				ORIGINAL MEASUREMENTS:				
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				Shpunt, S.J. Zh. Prikl. Khim. 1940, 13, 9-18.				
(2) Ammonium dihydrogenphosphate; $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]								
(3) Water, $\text{H}_2\text{O}$ ; [7732-18-5]								

EXPERIMENTAL VALUES cont'd.

## Part 3. Solubility isotherms.

$\text{NH}_4\text{H}_2\text{PO}_4$			$\text{NaH}_2\text{PO}_4$			$\text{H}_2\text{O}$		
mass%	c <sup>c</sup>	mol/kg <sup>a</sup>	mass%	c <sup>c</sup>	mol/kg <sup>a</sup>	mass%	c <sup>c</sup>	solid <sup>b</sup> phase
temp. = +10°C								
21.8	100.0	2.42	----	----	----	78.2	2288	B
20.5	77.6	2.43	6.2	22.4	0.70	73.3	1766	"
18.0	59.7	2.26	12.7	40.3	1.53	69.3	1470	"
16.1	46.4	2.16	19.4	53.6	2.51	64.5	1196	"
12.7	30.5	1.93	30.2	69.5	4.41	57.1	875	"
11.5	26.0	1.84	34.1	74.0	5.22	54.4	788	"
11.1	24.6	1.81	35.5	75.4	5.54	53.4	757	B + C
6.2	14.6	0.96	38.0	85.4	5.67	55.8	838	C
3.0	7.3	0.45	39.5	92.7	5.72	57.5	900	"
----	----	----	40.5	100.0	5.67	59.5	961	"
temp. = +20°C								
25.9	100.0	3.04	----	----	----	74.1	1824	B
24.2	81.4	3.00	5.7	18.6	0.68	70.1	1508	"
21.4	64.9	2.80	12.1	35.1	1.52	66.5	1293	"
19.5	51.8	2.75	18.9	48.2	2.56	61.6	1048	"
15.8	36.1	2.50	29.2	63.9	4.42	55.0	806	"
14.5	31.5	2.40	32.9	68.5	5.21	52.6	730	"
13.4	27.6	2.33	36.7	72.4	6.13	49.9	658	"
12.4	24.9	2.22	39.1	75.1	6.72	48.5	621	B + C
5.7	12.2	0.96	42.9	87.8	6.95	51.4	701	C
2.8	6.2	0.45	44.2	93.8	6.95	53.0	750	"
----	----	----	45.3	100.0	6.90	54.7	789	"
temp. = +30°C								
30.2	100.0	3.76	----	----	----	69.8	1477	B
28.0	84.0	3.66	5.5	16.0	0.70	66.5	1278	"
26.10	73.6	3.54	9.77	26.4	1.27	64.13	1156	"
25.2	69.5	3.46	11.5	30.5	1.51	63.3	1116	"
23.0	56.9	3.40	18.2	43.1	2.58	58.8	930	"
20.0	45.6	3.16	24.97	54.4	3.78	55.03	802	"
18.6	40.7	3.04	28.2	59.3	4.42	53.2	745	"
17.3	36.1	2.96	31.9	63.9	5.23	50.8	678	"
16.2	32.3	2.91	35.4	67.7	6.09	48.4	617	"
15.78	31.6	2.82	35.62	68.4	6.11	48.60	622	"
13.30	24.9	2.58	41.89	75.1	7.79	44.81	536	B + C
13.20	24.9	2.54	41.60	75.1	7.67	45.20	544	"
9.55	18.5	1.78	43.75	81.5	7.80	46.70	580	C
6.26	12.3	1.15	46.50	87.7	8.20	47.24	594	"
5.2	10.2	0.96	47.8	89.8	8.47	47.0	588	"
3.42	6.8	0.62	48.55	93.2	8.42	48.03	615	"
2.5	5.0	0.45	49.0	95.0	8.42	48.5	627	"
----	----	----	51.2	100.0	8.74	48.8	628	"

<sup>a</sup>The mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.<sup>b</sup>The solid phases are: A = ice; B =  $\text{NH}_4\text{H}_2\text{PO}_4$ ; C =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ .<sup>c</sup>The concentration units are: mol/100 mol of solute.<sup>d</sup>The compiler calculates this missing value to be 1259.

COMPONENTS:	ORIGINAL MEASUREMENTS:								
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	Shpunt, S.J. <i>Zh. Prakt. Khim.</i> <u>1940</u> , 13, 19-28.								
VARIABLES:	PREPARED BY:								
Temperature and composition.	J. Eysseltová								
EXPERIMENTAL VALUES:									
Part 1. Composition of the relevant sections.									
I. 46.9% $\text{NaNO}_3$ + 4.8% $\text{NaH}_2\text{PO}_4$ + 48.2% $\text{H}_2\text{O}$ , water added. II. 43.8% $\text{NaNO}_3$ + 8.5% $\text{NaH}_2\text{PO}_4$ + 47.7% $\text{H}_2\text{O}$ , water added. III. 42.0% $\text{NaNO}_3$ + 11.0% $\text{NaH}_2\text{PO}_4$ + 47.0% $\text{H}_2\text{O}$ , water added. IV. 39.0% $\text{NaNO}_3$ + 13.2% $\text{NaH}_2\text{PO}_4$ + 47.8% $\text{H}_2\text{O}$ , water added. V. 38.0% $\text{NaNO}_3$ + 18.0% $\text{NaH}_2\text{PO}_4$ + 44.0% $\text{H}_2\text{O}$ , water added. VI. 28.7% $\text{NaNO}_3$ + 27.4% $\text{NaH}_2\text{PO}_4$ + 43.9% $\text{H}_2\text{O}$ , water added. VII. 26.4% $\text{NaNO}_3$ + 29.0% $\text{NaH}_2\text{PO}_4$ + 41.6% $\text{H}_2\text{O}$ , water added. VIII. 16.0% $\text{NaNO}_3$ + 38.0% $\text{NaH}_2\text{PO}_4$ + 46.0% $\text{H}_2\text{O}$ , water added. IX. 12.0% $\text{NaNO}_3$ + 88.0% $\text{H}_2\text{O}$ , $\text{NaH}_2\text{PO}_4$ added. X. 6.0% $\text{NaNO}_3$ + 94.0% $\text{H}_2\text{O}$ , $\text{NaH}_2\text{PO}_4$ added.									
Part 2. Crystallization temperatures.									
	Section I								
	$\text{NaH}_2\text{PO}_4$	$\text{NaNO}_3$		$\text{NaH}_2\text{PO}_4$		$\text{NaNO}_3$			
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	$t/^\circ\text{C}$	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	$t/^\circ\text{C}$
4.7	0.78	46.2	11.07	36.5	4.0	0.58	38.8	7.98	2.2
4.5	0.73	44.1	10.09	26.1	3.8	0.53	37.3	7.45	-4.5
4.3	0.67	42.2	9.28	17.8	3.7	0.51	35.9	6.99	-10.2
4.2	0.63	40.4	8.58	10.4	3.6	0.49	34.7	6.62	-15.4
3.4	0.45	33.4	6.22	-18.4	1.6	0.16	15.4	2.18	-6.8
3.2	0.41	31.2	5.60	-16.1	1.4	0.14	13.3	1.83	-5.8
3.0	0.37	29.3	5.09	-14.8	1.1	0.10	10.4	1.38	-4.4
2.3	0.26	22.6	3.54	-10.4	0.9	0.08	8.6	1.12	-3.7
2.0	0.21	18.3	2.70	-8.2					
(continued next page)									
AUXILIARY INFORMATION									
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:								
No information is given.	No information is given.								
	ESTIMATED ERROR:								
	No information is given.								
	REFERENCES:								

## Sodium Dihydrogenphosphate

COMPONENTS:				ORIGINAL MEASUREMENTS:											
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				Shpunt, S.J. <i>Zh. Prikl. Khim.</i> <u>1940</u> , 13, 19-28.											
(2) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4]															
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]															
EXPERIMENTAL VALUES cont'd:															
Part 2. Crystallization temperatures.															
Section II															
$\text{NaH}_2\text{PO}_4$		$\text{NaNO}_3$		$\text{NaH}_2\text{PO}_4$		$\text{NaNO}_3$									
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	$t/^\circ\text{C}$	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	$t/^\circ\text{C}$						
8.2	1.39	42.7	10.23	35.3	5.8	0.75	29.9	5.47	-17.4						
7.5	1.17	39.1	8.61	17.8	5.4	0.68	28.1	4.97	-16.0						
7.2	1.08	37.5	7.98	9.8	4.1	0.46	21.5	3.40	-10.9						
6.9	1.01	36.0	7.42	1.4	3.3	0.35	17.4	2.58	-8.4						
6.8	0.98	35.2	7.14	-2.3	2.8	0.28	14.6	2.08	-6.9						
6.6	0.93	34.4	6.86	-6.0	2.4	0.24	12.6	1.74	-6.0						
6.5	0.90	33.6	6.61	-9.7	1.9	0.18	9.9	1.32	-4.5						
6.3	0.86	32.9	6.37	-13.6	1.6	0.15	8.0	1.04	-3.8						
6.2	0.84	32.0	6.09	-15.8	1.3	0.12	6.9	0.89	-3.0						
6.0	0.79	30.9	5.76	-18.2											
Section III															
10.6	1.81	40.6	9.79	34.3	8.0	1.08	30.4	5.80	-16.4						
10.2	1.67	38.8	8.95	24.7	5.8	0.67	22.3	3.65	-12.2						
9.8	1.54	37.2	8.26	16.3	4.7	0.51	17.8	2.70	-9.1						
9.4	1.43	35.7	7.65	9.2	3.9	0.40	14.8	2.14	-7.4						
9.0	1.32	34.3	7.12	0.8	3.3	0.33	12.7	1.78	-6.3						
8.7	1.24	33.1	6.69	-6.0	2.9	0.28	11.1	1.52	-5.4						
8.4	1.17	31.9	6.29	-11.2	2.3	0.22	8.9	1.18	-4.3						
8.2	1.13	31.4	6.12	-13.2	1.9	0.17	7.4	0.96	-3.5						
8.1	1.11	31.0	5.99	-15.2											
Section IV															
12.7	2.12	37.5	8.86	27.7	9.0	1.16	26.6	4.86	-18.0						
12.1	1.94	35.8	8.08	19.0	8.5	1.06	25.0	4.42	-16.4						
11.6	1.79	34.3	7.46	11.1	8.0	0.97	23.6	4.06	-14.0						
11.1	1.65	32.9	6.91	3.5	6.2	0.68	18.3	2.85	-10.1						
10.7	1.56	32.2	6.63	0.4	5.0	0.52	14.9	2.19	-8.1						
10.2	1.42	30.2	5.96	-5.3	4.3	0.43	12.6	1.78	-6.5						
10.0	1.38	29.6	5.77	-7.2	3.3	0.32	9.6	1.30	-4.9						
9.7	1.31	28.5	5.42	-13.0											
Section V															
16.5	2.83	34.9	8.45	30.7	12.3	1.66	25.9	4.93	-9.8						
16.1	2.69	34.0	8.02	26.5	11.6	1.51	24.4	4.48	-14.3						
15.9	2.62	33.5	7.79	22.7	11.3	1.45	23.7	4.29	-16.8						
15.8	2.58	33.2	7.66	20.7	11.0	1.39	23.1	4.12	-16.0						
15.5	2.49	32.7	7.43	18.0	10.4	1.28	21.9	3.80	-14.5						
15.3	2.43	32.3	7.25	15.5	9.9	1.19	20.9	3.55	-13.5						
14.8	2.29	31.3	6.83	13.2	9.4	1.11	19.9	3.31	-12.6						
14.5	2.20	30.5	6.52	10.6	8.6	0.98	18.2	2.92	-11.2						
14.0	2.07	29.6	6.17	8.0	7.1	0.76	15.0	2.26	-8.9						
13.9	2.04	29.2	6.04	6.3	6.0	0.62	12.8	1.85	-7.3						
13.5	1.94	28.4	5.75	3.7	5.3	0.53	11.8	1.67	-6.3						
13.1	1.84	27.5	5.45	-1.1	4.2	0.40	8.9	1.20	-4.9						
12.7	1.75	26.7	5.18	-4.8	3.5	0.33	7.3	0.96	-3.8						
Section VI															
34.9	7.88	28.2	8.99	38.5	30.7	5.75	24.8	6.56	24.1						
34.3	7.52	27.7	8.58	34.4	29.6	5.30	23.9	6.05	20.5						
33.8	7.24	27.3	8.26	31.6	27.6	4.61	22.5	5.30	15.9						
33.2	6.92	26.8	7.88	29.5	25.8	4.02	20.8	4.58	6.8						
31.9	6.27	25.7	7.13	26.2											

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## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Sodium nitrate;  $\text{NaNO}_3$ ; [7631-99-4]  
 (3) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS

Shpunt, S.J.  
*Zh. Prilkl. Khim.* 1940, 13, 19-28.

## EXPERIMENTAL VALUES cont'd:

## Part 2. Crystallization temperatures.

## Section VII

$\text{NaH}_2\text{PO}_4$		$\text{NaNO}_3$		$t/^\circ\text{C}$	$\text{NaH}_2\text{PO}_4$		$\text{NaNO}_3$		$t/^\circ\text{C}$
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>		mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	
26.7	4.57	24.6	5.94	28.8	15.8	1.89	14.6	2.47	-12.9
25.7	4.23	23.7	5.51	24.7	15.1	1.77	13.9	2.30	-11.9
23.8	3.66	22.0	4.78	18.7	12.2	1.33	11.3	1.74	-9.1
22.2	3.22	20.4	4.18	11.9	10.3	1.07	9.5	1.39	-7.4
20.8	2.89	19.2	3.76	6.2	8.9	0.89	8.2	1.16	-6.1
20.0	2.71	18.5	3.54	2.5	7.8	0.76	7.2	1.00	-5.5
19.3	2.56	17.8	3.33	-1.2	7.0	0.67	6.5	0.88	-4.9
18.4	2.37	17.0	3.10	0.0	5.8	0.54	5.3	0.70	-3.9
17.5	2.20	16.1	2.85	-11.1	4.9	0.45	4.5	0.58	-3.2
16.6	2.03	15.3	2.64	-13.7					

## Section VIII

38.0	6.88	16.0	4.09	33.6	21.3	2.55	9.0	1.52	-11.7
37.0	6.50	15.6	3.87	31.7	20.3	2.37	8.4	1.39	-10.8
35.4	5.93	14.9	3.53	28.2	18.4	2.08	7.8	1.24	-9.4
33.9	5.45	14.3	3.25	24.7	15.1	1.60	6.3	0.94	-7.2
31.4	4.72	13.2	2.80	17.6	12.8	1.30	5.4	0.78	-5.9
29.1	4.14	12.3	2.47	11.2	11.0	1.08	4.6	0.64	-4.9
27.8	3.83	11.7	2.28	7.8	8.7	0.83	3.7	0.50	-3.9
26.0	3.44	11.0	2.05	0.8	7.2	0.67	3.0	0.39	-3.2
24.5	3.13	10.3	1.86	-4.2	5.3	0.48	2.2	0.28	-2.4
23.8	3.00	10.0	1.78	-7.0	4.2	0.37	1.8	0.22	-1.8
22.5	2.76	9.5	1.64	-12.7					

## Section IX

0	0.0	12.0	1.60	-4.8	34.1	4.90	7.9	1.60	13.3
7.0	0.71	11.2	1.61	-6.6	36.4	5.42	7.6	1.60	16.6
12.7	1.40	11.5	1.78	-8.4	38.4	5.91	7.5	1.63	20.5
17.7	2.04	9.9	1.61	-10.2	39.4	6.16	7.3	1.61	22.2
22.0	2.67	9.4	1.61	-11.6	40.2	6.36	7.1	1.58	23.7
25.6	3.26	8.9	1.60	-6.4	41.1	6.60	7.0	1.59	25.3
27.3	3.55	8.7	1.60	-2.8	41.9	6.82	6.9	1.59	26.3
28.8	3.83	8.6	1.62	-0.1	43.4	7.26	6.8	1.61	28.7
31.7	4.39	8.2	1.60	7.1	45.1	7.78	6.6	1.61	29.8

## Section X

---	---	6.0	0.75	-2.2	36.4	5.07	3.8	0.75	9.2
7.0	0.67	5.6	0.75	-4.1	38.4	5.52	3.7	0.75	13.4
12.7	1.29	5.2	0.74	-5.7	39.4	5.76	3.6	0.74	14.9
17.7	1.90	4.9	0.74	-7.2	40.2	5.96	3.6	0.75	16.6
22.0	2.50	4.7	0.75	-8.7	41.1	6.18	3.5	0.74	18.1
25.6	3.05	4.5	0.76	-10.2	41.9	6.38	3.4	0.73	19.5
27.3	3.33	4.4	0.76	-10.9	43.4	6.80	3.4	0.73	22.6
28.8	3.59	4.3	0.76	-8.5	44.8	7.18	3.2	0.72	24.8
30.3	3.85	4.2	0.75	-4.7	45.5	7.39	3.2	0.73	26.2
31.7	4.11	4.1	0.75	-1.8	46.1	7.58	3.2	0.74	27.4
34.1	4.59	4.0	0.76	4.3					

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## Sodium Dihydrogenphosphate

COMPONENTS:				ORIGINAL MEASUREMENTS:			
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				Shpunt, S.J. <i>Zh. Prikl. Khim.</i> 1940, 13, 19-28.			
(2) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4]							
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]							

## EXPERIMENTAL VALUES cont'd:

## Part 3. Solutions coexisting with two equilibrium solid phases.

$\text{NaH}_2\text{PO}_4$	$\text{NaNO}_3$	$\text{H}_2\text{O}$				$t/^\circ\text{C}$	solid phase <sup>c</sup>
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	$t/^\circ\text{C}$		
----	----	38.4	7.33	61.6	-17.5	A + B	
3.6	0.48	34.1	6.44	62.3	-18.4	A + B	
6.2	0.84	32.0	6.09	61.8	-18.9	A + B	
8.4	1.17	31.8	6.26	59.8	-12.8	B + C	
7.8	1.03	29.4	5.51	62.8	-18.8	A + C	
11.2	1.67	32.8	6.89	56.0	2.3	B + C	
9.2	1.20	27.2	5.03	63.6	-18.5	A + C	
15.5	2.48	32.4	7.32	52.1	15.1	B + C	
11.6	1.51	24.4	4.48	64.0	-17.2	A + C	
26.0	4.63	27.2	6.84	46.8	29.8	B + C	
17.7	2.23	16.2	2.89	66.1	-14.6	A + C	
23.0	2.84	9.6	1.68	67.4	-12.8	A + C	
23.4	2.89	9.2	1.60	67.4	-12.5	A + C	
27.8	3.41	4.3	0.74	67.9	-10.9	A + C	

Part 4. Solubility isotherms in the  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system.

$\text{NaH}_2\text{PO}_4$	$\text{NaNO}_3$	$\text{H}_2\text{O}$				$t/^\circ\text{C}$	solid phase <sup>c</sup>
mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass%	M <sup>b</sup>
temp. = -17.5°C.							
----	----	---	38.4	7.33	100.0	61.6	758 A + B
3.6	0.48	7.0	34.4	6.53	93.0	62.0	793 B
6.3	0.85	12.1	32.2	6.16	87.9	61.5	793 "
7.6	1.03	14.8	31.0	5.94	85.2	61.4	797 B + C
8.0	1.08	16.0	30.0	5.69	84.0	62.0	820 C
9.4	1.24	19.5	27.5	5.13	80.5	63.1	872 "
10.7	1.39	23.1	25.2	4.62	76.9	64.1	924 A + C
8.9	1.14	19.3	26.3	4.77	80.7	64.8	940 A
7.4	0.96	19.6	28.3	5.18	84.4	64.3	906 "
5.9	0.77	12.2	30.0	5.51	87.8	64.1	886 "
3.4	0.44	6.8	32.8	6.05	93.2	63.8	856 "
temp. = -14°C.							
----	----	---	39.1	7.55	100.0	60.9	736 B
3.7	0.50	7.0	35.3	6.81	93.0	61.0	759 "
6.4	0.88	12.1	33.0	6.41	87.9	60.6	762 "
8.2	1.13	15.6	31.4	6.12	84.4	60.4	766 B + C
8.3	1.14	15.9	31.2	6.07	84.1	60.5	771 C
9.6	1.28	19.4	28.2	5.33	80.6	62.2	840 "
12.0	1.59	25.3	25.0	4.67	74.7	63.0	888 "
17.8	2.25	43.9	16.2	2.89	56.1	66.0	1082 "
19.4	2.43	49.6	14.0	2.47	50.4	66.6	1133 A + C
17.1	2.11	43.9	15.5	2.70	56.1	67.4	1152 A
10.0	1.21	25.1	21.2	3.62	74.9	68.8	1149 "
7.6	0.90	19.4	22.5	3.79	80.6	69.9	1182 "
6.4	0.77	15.7	24.4	4.15	84.3	69.2	1132 "
5.1	0.61	12.3	25.8	4.39	87.7	69.1	1109 "
2.9	0.35	6.8	28.2	4.82	93.2	68.9	1076 "
----	----	---	31.4	5.38	100.0	68.6	1028 "

(continued next page)

COMPONENTS:				ORIGINAL MEASURMENTS:				
(1) Sodium dihydrogenphosphate; NaH <sub>2</sub> PO <sub>4</sub> ; [7558-80-7]				Shpunt, S.J. Zh. Prikl. Khim. 1940, 13, 19-28				
(2) Sodium nitrate; NaNO <sub>3</sub> ; [7631-99-4]								
(3) Water; H <sub>2</sub> O; [7732-18-5]								

## EXPERIMENTAL VALUES cont'd:

Part 4. Solubility isotherms in the NaH<sub>2</sub>PO<sub>4</sub>-NaNO<sub>3</sub>-H<sub>2</sub>O system.

NaH <sub>2</sub> PO <sub>4</sub>		NaNO <sub>3</sub>		H <sub>2</sub> O		mass%	M <sup>b</sup>	solid phase <sup>c</sup>
mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass%	mol/kg <sup>a</sup>	M <sup>b</sup>			
temp. = -9.9°C.								
----	----	---	39.8	7.78	100.0	60.2	714	B
1.30	0.18	2.3	38.99	7.68	97.7	59.71	707	"
3.8	0.53	6.9	36.2	7.10	93.1	60.0	728	"
6.01	0.85	10.8	34.95	6.96	89.2	59.04	712	"
6.6	0.92	12.1	33.7	6.64	87.9	59.7	736	"
8.5	1.20	15.7	32.3	6.42	84.3	59.2	730	"
9.02	1.28	16.5	32.37	6.50	83.5	58.61	714	B + C
8.8	1.24	16.3	32.0	6.36	83.7	59.2	781	C
10.0	1.37	19.5	29.3	5.68	80.5	60.7	789	"
10.43	1.46	19.8	29.85	5.88	80.2	59.72	757	"
12.3	1.66	25.8	25.8	4.90	74.8	61.9	848	"
15.75	2.08	34.4	21.3	3.98	65.6	62.95	916	"
18.1	2.31	43.9	16.6	2.99	56.1	65.3	1039	"
20.74	2.62	52.4	13.38	2.39	47.6	65.88	1108	"
23.6	2.95	63.1	9.8	1.73	36.9	66.6	1187	"
24.1	3.00	65.3	9.1	1.60	34.7	66.8	1205	"
28.4	3.52	82.3	4.3	0.75	17.7	67.3	1300	"
32.4	3.99	100.0	----	----	----	67.6	1391	A
25.0	2.95	79.7	4.5	0.75	20.3	70.5	1497	"
19.2	2.20	63.0	8.0	1.29	37.0	72.8	1592	"
17.3	1.98	55.2	10.0	1.62	44.8	72.7	1545	"
13.3	1.48	43.8	12.1	1.91	56.2	74.6	1639	"
7.9	0.87	25.1	16.6	2.59	74.9	75.5	1607	"
6.0	0.66	19.5	17.7	2.73	80.5	76.3	1639	"
5.0	0.55	15.8	19.0	2.94	84.2	76.0	1592	"
3.9	0.43	12.1	20.2	3.13	87.9	75.9	1562	"
2.3	0.25	6.9	21.8	3.38	93.1	75.9	1531	"
----	----	----	23.3	3.57	100.0	76.7	1552	"
temp. = 0°C.								
----	----	----	41.9	8.48	100.0	58.1	654	B
4.02	0.58	6.9	38.67	7.94	93.1	57.31	653	"
4.0	0.58	6.9	38.43	7.85	93.1	57.6	660	"
7.0	0.67	12.2	35.8	7.33	87.8	57.2	666	"
7.98	1.17	13.8	35.24	7.30	86.2	56.78	656	"
9.0	1.32	15.7	34.2	7.08	84.3	56.8	661	"
10.64	1.57	18.7	32.96	6.88	81.3	56.40	657	B + C
10.5	1.54	18.6	32.7	6.77	81.4	56.8	667	"
10.9	1.59	19.6	32.0	6.59	80.4	57.1	679	C
13.17	1.89	24.5	28.81	5.84	75.5	58.02	718	"
13.2	1.86	25.2	27.8	5.54	74.8	59.0	750	"
19.50	2.68	40.9	19.97	3.88	59.1	60.53	847	"
20.0	2.70	43.8	18.2	3.46	56.2	61.8	902	"
25.9	3.41	63.0	10.8	2.01	37.0	63.3	1027	"
26.67	3.54	64.3	10.52	1.97	35.7	62.81	1008	"
31.83	4.18	82.8	4.70	0.87	17.2	63.47	1106	"
32.6	4.28	85.3	4.0	0.74	14.7	63.4	1106	"
36.4	4.77	100.0	----	----	----	63.6	1150	"

(continued next page)

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Sodium nitrate;  $\text{NaNO}_3$ ; [7631-99-4]  
 (3) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Shpunt. S.J.  
*Zh. Prikl. Khim.* 1940, 13, 19-28.

## EXPERIMENTAL VALUES cont'd:

Part 4. Solubility isotherms in the  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system.

$\text{NaH}_2\text{PO}_4$			$\text{NaNO}_3$			$\text{H}_2\text{O}$			solid phase <sup>c</sup>
mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass%	M <sup>b</sup>		
temp. = 10°C.									
----	----	---	43.9	9.21	100.0	56.1	604	B	
4.2	0.63	6.9	40.5	8.62	93.1	55.3	603	"	
7.4	1.12	12.2	37.7	8.09	87.8	54.9	604	"	
9.5	1.46	15.8	36.1	7.81	84.2	54.4	600	"	
11.6	1.78	19.5	34.1	7.39	80.5	54.3	605	"	
13.6	2.11	22.7	32.7	7.16	77.3	53.7	599	B + C	
14.4	2.17	25.2	30.3	6.45	74.8	55.3	645	C	
20.4	2.92	40.4	21.3	4.30	59.6	58.3	769	"	
21.9	3.14	43.8	19.9	4.02	56.2	58.2	778	"	
29.0	4.10	63.0	12.1	2.42	37.0	58.9	856	"	
33.0	4.66	74.5	8.0	1.60	25.5	59.0	890	"	
36.8	5.16	87.2	3.8	0.75	12.8	59.4	939	"	
40.5	5.67	100.0	----	----	----	59.5	961	"	
temp. = 20°C.									
----	----	---	46.0	10.02	100.0	54.0	555	B	
4.5	0.71	6.8	42.7	9.51	93.2	52.8	545	"	
7.8	1.24	12.2	39.8	8.94	87.8	52.4	546	"	
8.86	1.41	13.9	38.89	8.76	86.1	52.25	547	"	
9.9	1.58	15.6	38.0	8.58	84.4	52.1	546	"	
12.4	2.01	19.6	36.1	8.25	80.4	51.5	545	"	
15.57	2.54	24.9	33.35	7.68	75.1	51.08	544	"	
15.8	2.58	25.2	33.1	7.62	74.8	51.1	545	"	
17.79	2.96	28.3	32.05	7.52	71.7	50.16	540	B + C	
18.1	2.99	29.0	31.5	7.35	71.0	50.4	542	"	
23.0	3.62	40.5	24.0	5.33	59.5	53.0	621	C	
24.7	3.90	43.7	22.5	5.01	56.3	52.08	624	"	
26.10	4.07	48.4	20.44	4.50	51.6	52.46	625	"	
32.6	5.05	62.9	13.6	2.97	37.1	53.8	692	"	
32.27	4.94	63.2	13.33	2.88	36.8	54.40	709	"	
38.1	5.84	78.3	7.5	1.62	21.7	54.4	745	"	
42.2	6.46	89.9	3.4	0.74	10.1	54.4	772	"	
45.3	6.90	100.0	----	----	----	54.7	789	"	
temp. = 30°C.									
----	----	---	48.0	10.86	100.0	52.0	490	B	
4.7	0.78	6.8	44.8	10.44	93.2	50.5	498	"	
6.25	1.05	9.1	43.98	10.40	90.9	49.77	485	"	
8.1	1.35	12.1	41.9	9.86	87.9	50.0	496	"	
9.10	1.53	13.5	41.31	9.80	86.5	49.59	490	"	
10.4	1.74	15.6	39.8	9.40	84.4	49.8	494	"	
13.0	2.21	19.5	38.0	9.12	80.5	49.0	490	"	
13.31	2.27	19.9	37.77	9.08	80.1	48.92	490	"	
16.7	2.87	25.4	34.8	8.44	74.6	48.5	491	"	
20.3	3.56	30.7	32.25	8.00	69.3	47.45	482	"	
24.99	4.44	38.6	28.10	7.05	61.4	46.91	485	"	
26.72	4.80	41.2	26.89	6.82	58.8	46.39	479	B + C	
26.0	4.63	40.4	27.2	6.84	59.6	46.8	485	"	
27.6	4.87	43.7	25.2	6.28	56.3	47.2	498	C	
28.85	5.13	45.7	24.3	6.11	54.3	46.82	493	"	
36.5	6.32	62.7	15.4	3.77	37.3	48.10	551	"	
37.45	6.56	64.0	14.95	3.70	36.0	47.60	542	"	
40.76	7.10	71.7	11.41	2.81	28.3	47.83	561	"	
45.0	7.75	82.9	6.6	1.60	17.1	48.4	594	"	
46.20	8.10	84.0	6.25	1.55	16.0	47.55	576	"	
48.87	8.47	92.0	3.04	0.74	8.0	48.09	603	"	
49.1	8.54	92.0	3.0	0.74	8.0	47.9	599	"	
51.2	8.74	100.0	----	----	----	48.3	628	"	

<sup>a</sup>The mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.

<sup>b</sup>The concentration units are: mol/100 mol of solute.

<sup>c</sup>The solid phases are: A = ice; B =  $\text{NaNO}_3$ ; C =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ .

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Brunisholz, G.; Bodmer, M. <i>Helv. Chim. Acta</i> <u>1963</u> , <u>46</u> , <u>7</u> , 288, 2566-74.
<b>VARIABLES:</b> Composition and temperature.	<b>PREPARED BY:</b> J. Eysseltová

## **EXPERIMENTAL VALUES:**

## Solubility isotherms in the $\text{NaH}_2\text{PO}_4$ - $\text{NaCl}$ - $\text{H}_2\text{O}$ system

$\text{Na}^+$	$\text{Cl}^-$	$\text{NaH}_2\text{PO}_4$		$\text{NaCl}$		$\text{H}_2\text{O}$		solid phase
ion%	ion%	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	n <sup>b</sup>	mass% <sup>a</sup>	
temp. = 0°C.								
91.06	86.56	2.64	0.30	24.88	5.87	818.6	72.47	A
76.31	64.51	8.32	0.99	22.11	5.44	658.7	69.55	A + B
63.31	44.92	13.50	1.59	16.09	3.91	637.9	70.39	B
50.76	26.47	19.97	2.39	10.50	2.58	568.9	69.52	"
43.09	14.98	25.54	3.13	6.57	1.65	502.0	67.87	"
temp. = 25°C.								
93.26	89.86	1.97	0.22	25.53	6.02	828.1	72.48	A
89.73	84.52	3.30	0.39	26.34	6.40	732.8	70.35	"
84.62	76.97	4.92	0.57	24.02	5.78	739.1	71.05	"
74.50	61.37	9.40	1.13	21.81	5.42	628.1	68.77	"
65.45	48.15	14.42	1.82	19.57	5.07	527.2	66.00	"
52.67	28.95	24.99	3.46	14.87	4.23	379.8	60.12	A + B
44.71	16.87	32.45	4.66	9.62	2.84	329.7	57.91	B
39.75	9.65	38.46	5.77	6.00	1.84	289.9	55.53	"
37.45	5.89	41.64	6.36	3.80	1.19	274.0	54.55	"

(continued next page)

#### AUXILIARY INFORMATION

<p><b>METHOD/APPARATUS/PROCEDURE:</b></p> <p>At 0 and 25°C the usual techniques were used (1). At 75°C a self-constructed apparatus was used for equilibration and sampling. The dihydrogenphosphate content was determined acidimetrically (after first changing it to H<sub>3</sub>PO<sub>4</sub> by ion exchange) using chlorophenol red as indicator. The chloride ion content was determined by titrating potentiometrically with silver nitrate. The sodium ion and water contents were determined by difference.</p>	<p><b>SOURCE AND PURITY OF MATERIALS:</b></p> <p>No information is given.</p>
<p><b>ESTIMATED ERROR:</b></p> <p>No information is given.</p>	
<p><b>REFERENCES:</b></p> <p>1. Flatt, R. <i>Chimia</i> <u>1962</u>, 6, 62.</p>	

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Sodium chloride; NaCl; [7647-14-5]  
 (3) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Brunisholz, G.; Bodmer, M.  
*Helv. Chim. Acta* 1963, 46, 7, 288, 2566-74.

## EXPERIMENTAL VALUES cont'd:

Solubility isotherms in the  $\text{NaH}_2\text{PO}_4$ -NaCl- $\text{H}_2\text{O}$  system.

$\text{Na}^+$	$\text{Cl}^-$	$\text{NaH}_2\text{PO}_4$	NaCl	$\text{H}_2\text{O}$		solid phase		
ion%	ion%	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	n <sup>b</sup>	mass% <sup>a</sup>	c
temp. = 75°C.								
73.29	59.89	10.40	1.29	22.70	5.80	572.9	66.88	A
43.69	15.21	39.75	6.64	10.41	3.57	236.2	49.82	"
36.06	3.79	60.24	13.83	3.46	1.63	128.8	36.28	A + C

<sup>a</sup>These values were calculated by the compiler.

<sup>b</sup>The concentration units are: mol/100 mol solute.

<sup>c</sup>The solid phases are: A = NaCl; B =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{NaH}_2\text{PO}_4$ .

<b>COMPONENTS:</b>							
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				<b>ORIGINAL MEASUREMENTS:</b>			
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]				Brunisholz, G.; Bodmer, M. <i>Helv. Chim. Acta</i> <u>1963</u> , <i>46</i> , 288, 2566-74.			
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]							
<b>VARIABLES:</b>							
Composition and temperature.				<b>PREPARED BY:</b>			
				J. Eysseltová			

**EXPERIMENTAL VALUES:**Solubility isotherms in the  $\text{KH}_2\text{PO}_4$ - $\text{NaH}_2\text{PO}_4$ - $\text{H}_2\text{O}$  system.

$\text{K}^+$ ion%	$\text{Na}^+$ ion%	$\text{H}_2\text{O}$ n <sup>b</sup>	$\text{KH}_2\text{PO}_4$ <sup>a</sup> mass%	$\text{KH}_2\text{PO}_4$ <sup>a</sup> mol/kg	$\text{NaH}_2\text{PO}_4$ <sup>a</sup> mass%	$\text{NaH}_2\text{PO}_4$ <sup>a</sup> mol/kg	$\text{H}_2\text{O}$ mass%	solid phase <sup>c</sup>
temp. = 0°C								
27.03	6.30	1495	11.73	1.00	2.41	0.23	85.85	A
21.62	11.71	1217	11.20	0.98	5.35	0.53	83.42	"
16.47	16.86	941.5	10.56	0.97	9.53	0.99	79.89	"
13.00	20.33	756.9	9.92	0.95	13.68	1.49	76.39	"
5.11	28.22	326.1	6.98	0.87	34.03	4.80	58.97	A + B
2.80	30.53	355.5	3.64	0.43	35.08	4.77	61.26	B
0	33.33	390.7	0.00	0.00	36.25	4.73	63.74	"

(continued next page)

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b>  The usual techniques (1) were used at 0 and 25°C. At 75°C a self-constructed apparatus was used for equilibration and for sampling. $\text{H}_2\text{PO}_4^-$ was changed to $\text{H}_3\text{PO}_4$ by ion exchange and then titrated acidimetrically using chloroph-nol red as indicator. $\text{K}^+$ was determined gravimetrically as $\text{KCIO}_4$ or as the tetrphenylborate. $\text{Na}^+$ and $\text{H}_2\text{O}$ were determined by difference.	<b>SOURCE AND PURITY OF MATERIALS:</b>  No information is given.
	<b>ESTIMATED ERROR:</b>  No information is given.
	<b>REFERENCES:</b>  1. Flatt, R. <i>Chémia</i> <u>1962</u> , <i>6</i> , 62.

## Sodium Dihydrogenphosphate

COMPONENTS				ORIGINAL MEASUREMENTS:									
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				Brunisholz, G. Bodmer, M. <i>Helv. Chim. Acta</i> <u>1963</u> , 46, 288, 2566-74.									
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]													
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]													
EXPERIMENTAL VALUES cont'd:													
Solubility isotherms in the $\text{KH}_2\text{PO}_4$ - $\text{NaH}_2\text{PO}_4$ - $\text{H}_2\text{O}$ system.													
K <sup>+</sup> ion%	Na <sup>+</sup> ion%	H <sub>2</sub> O n <sup>b</sup>		$\text{KH}_2\text{PO}_4$ <sup>a</sup> mass%	$\text{KH}_2\text{PO}_4$ <sup>a</sup> mol/kg	$\text{NaH}_2\text{PO}_4$ <sup>a</sup> mass%	$\text{NaH}_2\text{PO}_4$ <sup>a</sup> mol/kg	H <sub>2</sub> O mass% solid phase <sup>c</sup>					
temp. = 25°C													
30.44	2.89	927.3	19.55	1.82	1.63	0.17	78.80	A					
26.20	7.13	808.6	18.79	1.80	4.50	0.48	76.69	"					
22.96	10.37	718.3	18.06	1.77	7.19	0.80	74.74	"					
18.58	14.75	602.5	16.69	1.71	11.68	1.36	71.61	"					
13.29	20.04	457.0	14.53	1.61	19.33	2.43	66.12	"					
10.90	22.43	347.0	14.23	1.74	25.83	3.59	59.93	"					
5.03	28.30	198.4	8.94	1.40	44.38	7.92	46.66	A + B					
4.71	28.62	200.4	8.34	1.30	44.70	7.93	46.94	B					
2.56	30.77	211.9	4.43	0.67	47.01	8.06	48.55	"					
1.44	31.89	226.2	2.42	0.35	47.28	7.83	50.29	"					
1.11	32.22	227.5	1.86	0.27	47.66	7.86	50.47	"					
0	33.33	236.2	0.00	0.00	48.47	7.83	51.52	"					
temp. = 75°C													
26.76	6.57	332.5	34.96	4.47	7.57	1.09	57.46	A					
18.23	15.10	236.3	29.02	4.28	21.20	3.55	49.76	"					
10.53	22.80	149.6	20.88	3.91	39.87	8.46	39.23	"					
6.22	27.11	94.1	14.61	3.67	56.15	16.00	29.23	A + C					
2.93	30.40	105.6	6.70	1.54	61.33	15.99	31.95	C					
0	33.33	111.7	0.00	0.00	66.57	16.57	33.44	"					

<sup>a</sup>These values were calculated by the compiler.

<sup>b</sup>The concentration units are: mol H<sub>2</sub>O/100 g equiv. of the solute.

<sup>c</sup>The solid phases are: A =  $\text{KH}_2\text{PO}_4$ ; B =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{NaH}_2\text{PO}_4$ .

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Sodium perchlorate; $\text{NaClO}_4$ ; [7601-89-0] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Lilich, L.S.; Alekseeva, E.A.; <i>Zh. Neorg. Khim.</i> , <u>1969</u> , 14, 1655-8.			
<b>VARIABLES:</b> Composition at 25°C.		<b>PREPARED BY:</b> J. Eyseltová			
<b>EXPERIMENTAL VALUES:</b>					
Solubility in the $\text{NaH}_2\text{PO}_4$ - $\text{NaClO}_4$ - $\text{H}_2\text{O}$ system at 25°C.					
$\text{NaH}_2\text{PO}_4$	$\text{NaClO}_4$	$\text{H}_2\text{O}$			
mass%	mol/kg	mass%	mol/kg	mass%	solid <sup>a</sup> phase
48.69	7.91	----	----	51.31	A
46.59	7.53	1.86	0.29	51.55	"
40.84	6.50	6.80	1.06	52.36	"
37.71	5.95	9.50	1.47	52.79	"
34.24	5.38	12.81	1.97	52.95	"
27.99	4.37	18.67	2.86	53.34	"
24.69	3.85	21.51	3.26	53.50	"
22.89	3.55	23.43	3.56	53.68	"
13.89	2.18	33.15	5.11	52.96	"
11.53	1.84	36.41	5.71	52.06	"
8.37	1.37	40.82	6.56	50.81	"
5.23	0.90	46.36	7.82	48.41	"
3.55	0.64	50.11	8.83	46.34	"
1.47	0.31	59.44	12.42	39.09	"
0.66	0.17	67.09	16.99	32.25	B
0.74	0.19	65.97	16.94	32.29	"
0.39	0.10	67.35	17.05	32.26	"

<sup>a</sup>The solid phases are: A =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; B =  $\text{NaClO}_4 \cdot \text{H}_2\text{O}$ .

#### AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b> No information is given.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]						<b>ORIGINAL MEASUREMENTS:</b> Babenko, A.M.; Vorob'eva, T.A. <i>Zh. Prikl. Khim. (Leningrad)</i> 1975, 48, 11, 2437-41.
<b>VARIABLES:</b> Temperature and composition.						<b>PREPARED BY:</b> J. Eysseltová
<b>EXPERIMENTAL VALUES:</b>						
Part 1. Solubility isotherms in the $\text{KH}_2\text{PO}_4$ - $\text{NaH}_2\text{PO}_4$ - $\text{H}_2\text{O}$ system.						
$\text{NaH}_2\text{PO}_4$ mass%	$\text{NaH}_2\text{PO}_4$ mol/kg <sup>a</sup>	$\text{KH}_2\text{PO}_4$ mass%	$\text{KH}_2\text{PO}_4$ mol/kg <sup>a</sup>	$\text{H}_2\text{O}$ mass%		solid phase <sup>b</sup>
temp. = -10°C						
34.2	4.51	2.632	0.31	63.168	A	
31.0	4.03	4.83	0.55	64.170	"	
28.6	3.67	6.426	0.73	64.974	"	
34.7	4.61	2.612	0.31	62.688	B	
33.0	4.41	4.69	0.55	62.31	"	
29.3	3.79	6.363	0.72	64.337	"	
temp. = -5°C						
19.2	1.98	0	0	80.8	A	
17.2	1.80	3.312	0.31	79.488	"	
14.0	1.46	6.02	0.55	79.980	"	
11.4	1.18	7.974	0.73	80.626	"	
18.16	2.08	9.2	0.93	72.64	C	
27.42	3.57	8.6	0.99	63.98	"	
35.4	4.56	0	0	64.6	B	
36.2	4.92	2.522	0.31	61.248	"	
34.6	4.74	4.578	0.55	60.822	"	
30.8	4.08	6.228	0.73	62.976	"	
(continued next page)						
<b>AUXILIARY INFORMATION</b>						
<b>METHOD/APPARATUS/PROCEDURE:</b>				<b>SOURCE AND PURITY OF MATERIALS:</b>		
A modified polythermic method was used (1).				Chemically pure or reagent grade dihydrogenphosphates were used. They were recrystallized twice and dried at 105°C. The purity is stated to be near to 100%.		
				<b>ESTIMATED ERROR:</b>		
				Nothing is stated.		
				<b>REFERENCES:</b>		
				1. Kaganskii, I.M. Zavod. Lab. 1967, 1, 119.		

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]		Babenko, A.M.; Vorob'eva, T.A.			
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]		<i>Zh. Prikl. Khim. (Leningrad)</i> <u>1975</u> , 48, 11, 2437-41.			
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]					

## EXPERIMENTAL VALUES cont'd:

Part 1. Solubility isotherms in the  $\text{KH}_2\text{PO}_4$ - $\text{NaH}_2\text{PO}_4$ - $\text{H}_2\text{O}$  system.

$\text{NaH}_2\text{PO}_4$		$\text{KH}_2\text{PO}_4$		$\text{H}_2\text{O}$	solid phase <sup>b</sup>
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	
temp. = 0°C					
0	0	12.3	1.03	87.7	C
8.92	0.92	10.8	0.99	80.280	"
17.98	2.06	10.1	1.03	71.92	"
27.18	3.57	9.4	1.09	63.42	"
37.6	5.02	0	0	62.4	B
37.8	5.27	2.488	0.31	59.712	"
36.0	5.04	4.48	0.55	52.52	"
32.1	4.33	6.111	0.73	61.79	"
temp. = 10°C					
0	0	15.2	1.32	84.8	C
8.72	0.93	12.8	1.20	78.48	"
17.6	2.08	12.0	1.25	70.4	"
26.7	3.57	11.0	1.30	62.3	"
32.868	4.69	8.7	1.09	58.432	"
42.2	6.08	0	0	57.8	B
34.056	4.69	5.4	0.66	60.544	"
41.0	6.03	2.36	0.31	56.64	"
39.4	5.82	4.242	0.55	56.358	"
35.2	4.97	5.832	0.73	58.97	"
temp. = 20°C					
0	0	18.0	1.61	82.0	C
8.5	0.92	15.0	1.44	76.5	"
17.24	2.08	13.8	1.47	68.96	"
26.25	3.57	12.5	1.50	61.25	"
32.4	4.69	10.1	1.29	57.6	"
46.6	7.27	0	0	53.4	B
44.0	6.82	2.24	0.31	53.760	"
42.4	6.59	4.032	0.55	53.568	"
38.2	5.66	5.562	0.73	56.238	"

## Part 2. Crystallization temperatures and composition of solutions existing in equilibrium with two or three solid phases.

$\text{NaH}_2\text{PO}_4$		$\text{KH}_2\text{PO}_4$		$\text{H}_2\text{O}$	solid phase <sup>b</sup>
t/°C	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	
-2.5	0	0	11.6	0.96	88.4 A + C
-4.2	9.0	0.92	10.0	0.91	81.0 A + C
-6.5	18.2	2.08	9.0	0.91	72.8 A + C
-9.6	27.6	3.57	8.0	0.91	64.4 A + B + C
-8.8	33.5	4.20	0	0	66.5 A + B
-10.1	34.6	4.59	2.616	0.31	62.784 A + B
-10.5	32.8	4.37	4.704	0.55	62.496 A + B
-10.1	29.2	3.78	6.372	0.73	64.428 A + B
7.6	32.940	4.69	8.5	1.07	58.560 B + C
14.6	36.8	5.55	8.0	1.06	55.2 B + C
24.8	41.4	6.82	8.0	1.16	50.6 B + C
33.0	45.5	8.33	9.0	1.45	45.5 B + C + D
40.2	56.0	10.60	0	0	44.0 B + D
47.0	52.0	9.40	1.92	0.31	46.08 B + D
50.0	52.0	9.70	3.36	0.55	44.64 B + D
52.8	49.0	8.80	4.59	0.73	46.41 B + D
19.2	48.5	8.98	6.5	1.06	45.0 B + D

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## Sodium Dihydrogenphosphate

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Babenko, A.M., Vorob'eva, T.A.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]	Zh. Prikl. Khim. (Leningrad) 1975, 48, 11, 2437-41.
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd:

Part 2. Crystallization temperatures and composition of solutions existing in equilibrium with two or three solid phases.

$t/\text{°C}$	$\text{NaH}_2\text{PO}_4$		$\text{KH}_2\text{PO}_4$		$\text{H}_2\text{O}$		solid <sup>b</sup> phase
	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%		
45.1	52.780	11.51	9.0	1.73	38.220	C + D + E	
62.4	55.8	13.59	10.0	2.15	34.2	D + E	
57.2	60.8	12.92	0	0	39.2	D + E	
65.0	60.0	13.02	1.6	0.31	38.4	D + E	
64.0	58.0	12.37	2.94	0.55	39.06	D + E	
66.5	56.0	11.96	3.96	0.52	40.04	D + E	
49.0	53.45	11.16	7.05	0.97	39.5	D + E	

<sup>a</sup>The mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.

<sup>b</sup>The solid phases are: A = ice; B =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{KH}_2\text{PO}_4$ ; D =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ ; E =  $\text{NaH}_2\text{PO}_4$ .

<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Beremzhanov, B.A.; Savich, R.F.; Kunanbaev, G.S.
(2) Sodium borate; $\text{NaBO}_2$ ; [7775-19-1]	<i>Khim. Khim. Tekhnol. (Alma Alta)</i> <u>1977</u> , 22, 15-20.
(3) Water; $\text{H}_2\text{O}$ , [7732-18-5]	

<b>VARIABLES:</b>	<b>PREPARED BY:</b>									
Composition at 25 and 35°C.	J. Eysseltova									
<b>EXPERIMENTAL VALUES:</b>										
Solubility isotherms in the $\text{NaH}_2\text{PO}_4$ - $\text{NaBO}_2$ - $\text{H}_2\text{O}$ system.										
$\text{B}_2\text{O}_3$	$\text{P}_2\text{O}_5$	refr. index	pH	$\text{NaH}_2\text{PO}_4^a$ mass%	$\text{NaH}_2\text{PO}_4^a$ mol/kg	$\text{NaBO}_2^a$ mass%	$\text{NaBO}_2^a$ mol/kg	solid <sup>b</sup> phase		
mass%	mol%	mass%	mol%	temp. = 25°C						
8.91	0.0125	----	----	1.394	10.80	0.00	0.00	16.84	2.87	A
4.52	0.0226	2.04	0.0002	1.365	10.38	3.45	0.32	8.54	1.46	"
4.01	0.0107	1.25	0.0016	1.365	10.49	2.11	0.20	7.56	1.29	"
1.47	0.0039	3.92	0.0052	1.354	9.69	6.63	0.62	2.78	0.47	"
5.43	0.0147	1.15	0.0015	1.380	10.73	1.94	0.18	10.26	1.75	"
2.52	0.0062	5.23	0.0070	1.362	9.31	8.84	0.83	4.76	0.81	"
2.74	0.0075	5.50	0.0074	1.364	9.20	9.30	0.87	5.18	0.88	"
1.50	0.0041	5.98	0.0081	1.369	8.18	10.11	0.94	2.84	0.48	"
7.00	0.0191	0.99	0.0013	1.372	10.92	1.67	0.16	13.23	2.25	"
3.25	0.0090	5.97	0.0090	1.370	9.05	10.10	0.94	6.14	1.05	A + B
----	-----	26.40	0.0435	1.407	3.03	44.64	4.17	0.00	0.00	C
1.28	0.0038	14.23	0.0212	1.405	4.25	24.06	2.25	2.32	0.40	"
1.02	0.0031	16.06	0.0239	1.400	3.99	27.16	2.54	1.93	0.33	"
0.50	0.0015	18.00	0.0272	1.401	4.01	30.44	2.84	0.94	0.16	"
1.42	0.0041	13.17	0.0198	1.411	4.52	22.27	2.08	2.68	0.46	"
3.69	0.0109	12.10	0.0177	1.418	6.87	20.46	1.91	6.97	1.19	B + C
1.51	0.0041	5.58	0.0075	1.367	8.48	9.44	0.88	2.85	0.49	B
2.40	0.0069	10.81	0.0154	1.400	6.67	18.23	1.71	4.54	0.77	"
1.36	0.0038	8.96	0.0124	1.375	7.50	15.15	1.42	2.57	0.43	"
1.01	0.0028	8.60	0.0118	1.373	7.48	14.54	1.36	1.91	0.33	"

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<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>
The isothermal method was used. The phases were separated from each other by filtration through a Schott filter. In the analyses, the $\text{BO}_2^-$ content was determined by titration with a 0.1 N solution of a base containing mannite, $\text{Na}^+$ was determined by flame photometry, and $\text{PO}_4^{3-}$ was determined gravimetrically by precipitation as $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$ . The precipitating solution contained limonic acid.	The materials were of a chemically pure grade.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

## Sodium Dihydrogenphosphate

COMPONENTS:				ORIGINAL MEASUREMENTS:															
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]				Beremzhanov, B.A.; Savich, R.F.; Kunanbaev, G.S.															
(2) Sodium borate; $\text{NaBO}_2$ ; [7775-19-1]				Khim. Khim. Tekhnol. (Alma Alta) 1977, 22, 15-20.															
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]																			
EXPERIMENTAL VALUES cont'd:																			
Solubility isotherms in the $\text{NaH}_2\text{PO}_4$ - $\text{NaBO}_2$ - $\text{H}_2\text{O}$ system.																			
$\text{B}_2\text{O}_3$		$\text{P}_2\text{O}_5$		refr. index	pH	$\text{NaH}_2\text{PO}_4^a$		$\text{NaBO}_2^a$		$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$	solid <sup>b</sup>								
mass%	mol%	mass%	mol%			mass%	mol/kg	mass%	mol/kg	mass%	phase								
temp. = 35°C																			
13.16	0.0375	----	----	1.400	10.36	0.00	0.00	24.87	4.24	A									
2.42	0.0065	3.85	0.0051	1.368	10.13	6.51	0.61	4.57	0.78	"									
2.51	0.0068	4.00	0.0053	1.371	10.65	6.76	0.63	4.74	0.81	"									
1.26	0.0033	1.18	0.0001	1.370	10.36	2.00	0.19	2.38	0.40	"									
5.02	0.0134	0.75	0.0010	1.391	11.17	1.27	0.12	9.45	1.62	"									
1.49	0.0039	2.59	0.0034	1.365	10.02	4.38	0.41	2.82	0.48	"									
2.54	0.0071	7.20	0.0099	1.365	8.19	12.18	1.14	4.80	0.82	B									
1.90	0.0054	6.17	0.0083	1.362	9.60	10.43	0.97	3.59	0.61	"									
1.83	0.0049	2.51	0.0032	1.367	10.66	4.24	0.40	3.46	0.59	A									
5.03	0.0146	8.96	0.0128	1.391	7.51	11.77	1.10	9.51	1.62	B									
-----	-----	32.40	0.0603	1.412	3.02	54.79	5.12	0.00	0.00	C									
0.84	0.0025	15.25	0.0596	1.377	3.24	25.79	2.41	1.59	0.27	"									
1.20	0.0035	14.16	0.0206	1.380	3.40	23.94	2.24	2.27	0.39	"									
1.71	0.0049	11.82	0.0169	1.380	3.63	19.99	1.87	3.23	0.55	"									
2.51	0.0073	11.76	0.0169	1.383	3.70	19.87	1.89	4.74	0.81	"									
7.48	0.0234	10.10	0.0149	1.413	7.00	17.08	1.60	14.14	2.41	B + C									
1.43	0.0043	12.71	0.0183	1.381	3.61	21.49	2.01	2.70	0.46	C									
4.20	0.0121	9.20	0.0131	1.385	7.44	15.56	1.45	7.94	1.35	B									
2.05	0.0057	7.03	0.0096	1.365	9.10	11.89	1.11	3.87	0.66	"									
3.50	0.0099	7.98	0.0111	1.371	7.92	13.49	1.26	6.62	1.13	"									

<sup>a</sup>These values were calculated by the compiler from the authors' data.

<sup>b</sup>The solid phases are: A =  $\text{NaBO}_2 \cdot 4\text{H}_2\text{O}$ ; B =  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ; C =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ .

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Khaliieva, Sh.D.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]	Izv. Akad. Nauk Turkm. SSR, Ser. Fiz.-Tekh., Khim. Geol. Nauk 1977, 3, 125-6.
(3) Water: $\text{H}_2\text{O}$ ; [7732-18-5]	

VARIABLES:	PREPARED BY:
Composition at 40°C.	J. Eysseltova

EXPERIMENTAL VALUES: Solubility in the $\text{KH}_2\text{PO}_4$ - $\text{NaH}_2\text{PO}_4$ - $\text{H}_2\text{O}$ system at 40°C.						
$\text{KH}_2\text{PO}_4$		$\text{NaH}_2\text{PO}_4$		$\text{H}_2\text{O}$	solid phase <sup>b</sup>	
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%		
27.12	2.73	----	----	72.88	A	
25.05	2.55	2.76	0.32	72.19	"	
23.60	2.50	7.10	0.83	69.30	"	
20.36	2.32	15.19	1.96	64.45	"	
18.33	2.20	20.53	2.79	61.14	"	
17.01	2.18	25.74	3.75	57.25	"	
15.69	2.19	31.60	5.00	52.71	"	
9.79	1.78	49.90	10.31	40.31	A + B	
5.19	0.92	53.32	10.71	41.49	B	
----	----	56.31	10.74	43.69	"	

<sup>a</sup>The mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.  
<sup>b</sup>The solid phases are: A =  $\text{KH}_2\text{PO}_4$ ; B =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ .

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The isothermal method was used. The experiments were performed in glass vessels with stirrers. Equilibrium was checked by repeated analysis of the saturated solution. Standard analytical methods were used for the determination of sodium, potassium, and dihydrogenphosphate ions.	Reagent grade materials were used.
	ESTIMATED ERROR:
	The temperature was constant to within $\pm 0.5$ K. No other information is given.
	REFERENCES:

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Khallieva, Sh.D. Izv. Akad. Nauk Turkm. SSR, Ser. Fiz.-Tekh., Khim. Geol. Nauk 1977, 3, 125-6.
(2) Sodium chloride; NaCl; [7647-14-5]	
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

<b>VARIABLES:</b> Composition at 40°C.	<b>PREPARED BY:</b> J. Eyseltová																																																																
<b>EXPERIMENTAL VALUES:</b> <b>Solubility in the <math>\text{NaH}_2\text{PO}_4</math>-NaCl-<math>\text{H}_2\text{O}</math> system at 40°C.</b>																																																																	
<table> <thead> <tr> <th><math>\text{NaH}_2\text{PO}_4</math></th> <th></th> <th>NaCl</th> <th><math>\text{H}_2\text{O}</math></th> <th></th> </tr> <tr> <th>mass%</th> <th>mol/kg<sup>a</sup></th> <th>mass%</th> <th>mol/kg<sup>a</sup></th> <th>mass%</th> </tr> </thead> <tbody> <tr> <td>56.31</td> <td>10.74</td> <td>----</td> <td>----</td> <td>43.69</td> <td>A</td> </tr> <tr> <td>47.09</td> <td>8.38</td> <td>6.08</td> <td>2.22</td> <td>46.83</td> <td>"</td> </tr> <tr> <td>45.25</td> <td>8.09</td> <td>8.14</td> <td>2.99</td> <td>46.61</td> <td>"</td> </tr> <tr> <td>37.15</td> <td>6.25</td> <td>13.31</td> <td>4.60</td> <td>49.54</td> <td>A + B</td> </tr> <tr> <td>30.57</td> <td>4.56</td> <td>13.60</td> <td>4.17</td> <td>55.83</td> <td>B</td> </tr> <tr> <td>16.67</td> <td>2.16</td> <td>19.05</td> <td>5.07</td> <td>66.28</td> <td>"</td> </tr> <tr> <td>10.22</td> <td>1.26</td> <td>21.94</td> <td>5.53</td> <td>67.84</td> <td>"</td> </tr> <tr> <td>3.80</td> <td>0.44</td> <td>24.90</td> <td>5.98</td> <td>71.30</td> <td>"</td> </tr> <tr> <td>----</td> <td>----</td> <td>26.54</td> <td>6.18</td> <td>73.46</td> <td>"</td> </tr> </tbody> </table>		$\text{NaH}_2\text{PO}_4$		NaCl	$\text{H}_2\text{O}$		mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	56.31	10.74	----	----	43.69	A	47.09	8.38	6.08	2.22	46.83	"	45.25	8.09	8.14	2.99	46.61	"	37.15	6.25	13.31	4.60	49.54	A + B	30.57	4.56	13.60	4.17	55.83	B	16.67	2.16	19.05	5.07	66.28	"	10.22	1.26	21.94	5.53	67.84	"	3.80	0.44	24.90	5.98	71.30	"	----	----	26.54	6.18	73.46	"
$\text{NaH}_2\text{PO}_4$		NaCl	$\text{H}_2\text{O}$																																																														
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<sup>a</sup>The mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.

<sup>b</sup>The solid phases are: A =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ ; B = NaCl.

## AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b> The isothermal method was used. Equilibrium was ascertained by repeated analysis of the saturated solution. Standard analytical methods were used for the determination of sodium, chloride, and dihydrogenphosphate ions, but no details are given. The water content was probably determined by difference (compiler).	<b>SOURCE AND PURITY OF MATERIALS:</b> The sodium dihydrogenphosphate and the sodium chloride were of reagent grade quality.
	<b>ESTIMATED ERROR:</b> The temperature was controlled to within $\pm 0.5\text{K}$ . No other information is given.
	<b>REFERENCES:</b>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	Girich, T.E.; Gulyamov, Yu.M.; Ganz, S.N.; Miroshina, O.S. Vopr. Khim. Khim. Tekhnol. <u>1979</u> , 57, 58-61.
VARIABLES:	PREPARED BY:
Composition at 298 and 323 K.	J. Eysseltová

## EXPERIMENTAL VALUES:

Composition and properties of saturated solutions in the  $\text{NaH}_2\text{PO}_4$ -NaCl- $\text{H}_2\text{O}$  system.

mass% ---	$\text{NaH}_2\text{PO}_4$			NaCl			$\text{H}_2\text{O}$			density	
	mol/kg <sup>a</sup>	M <sup>b</sup>	c <sup>b</sup>	mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass% <sup>a</sup>	c <sup>b</sup>	n/cP	g cm <sup>-3</sup>	solid phase <sup>c</sup>
temp. = 298 K.											
5.94	0.71	12.80	10.59	24.49	6.01	108.08	69.61	827.3	2.547	1.231	"
11.46	1.42	25.72	20.46	21.72	5.56	99.98	66.82	795.5	2.724	1.256	"
23.55	3.21	57.79	42.81	15.34	4.29	77.19	61.11	740.8	4.846	1.324	"
23.64	3.22	58.03	43.04	15.25	4.27	76.80	61.11	741.69	5.390	1.331	B
26.00	3.59	64.76	47.94	13.77	3.91	70.32	60.23	740.31	6.574	1.350	"
27.59	3.87	69.81	49.08	13.13	3.79	68.12	59.28	739.57	6.195	1.340	C
31.53	4.51	81.19	60.03	10.23	3.00	54.04	58.24	739.37	6.959	1.352	"
39.40	5.84	105.18	81.39	4.39	1.33	24.05	56.21	773.78	11.35	1.397	"
48.03	7.70	138.63	100.0	----	----	----	51.97	721.35	24.40	1.446	"

(continued next page)

## AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The isothermal method was used. The mixtures were equilibrated for 13 hours at 298 K and for 8 hours at 323 K. The phosphate ion content was determined photocolorimetrically, the sodium ion photometrically and the chloride ion by difference. The composition of the solid phases was determined by the Schreinemakers' method.	The NaCl was of a special purity. Reagent grade $\text{NaH}_2\text{PO}_4$ was recrystallized twice before being used.
ESTIMATED ERROR:	
Nothing is stated.	
REFERENCES:	

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Sodium chloride; NaCl; [7647-14-5]  
 (3) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Girich, T.E.; Gulyamov, Yu.M.; Ganz, S.N.;  
 Miroshina, O.S.  
*Vopr. Khim. Khim. Tekhnol.* 1979, 57, 58-61.

## EXPERIMENTAL VALUES cont'd:

Composition and properties of saturated solutions in the  $\text{NaH}_2\text{PO}_4$ -NaCl- $\text{H}_2\text{O}$  system.

mass%	$\text{NaH}_2\text{PO}_4$			NaCl			$\text{H}_2\text{O}$			density		
	mol/kg <sup>a</sup>	M <sup>b</sup>	c <sup>b</sup>	mass%	mol/kg <sup>a</sup>	M <sup>b</sup>	mass% <sup>a</sup>	c <sup>b</sup>	n/cP	g cm <sup>-3</sup>	solid <sup>c</sup> phase	
temp. = 323 K.												
---	---	---	---	26.99	6.32	113.75	73.01	879.09	1.502	1.202	A	
7.34	0.88	15.91	13.20	23.52	5.82	104.68	69.14	829.07	2.589	1.248	"	
13.84	1.76	31.77	24.46	20.83	5.45	98.12	65.33	769.46	3.169	1.273	"	
19.43	2.59	46.74	34.19	18.22	5.00	89.96	62.35	731.43	3.064	1.311	"	
23.07	3.18	57.29	40.49	16.53	4.68	84.22	60.40	706.67	3.094	1.328	"	
27.82	3.99	72.00	48.80	14.23	4.20	75.54	57.95	677.77	4.117	1.452	"	
36.16	5.69	102.52	61.70	10.94	3.53	63.63	52.90	601.86	7.597	1.709	"	
45.82	8.01	144.30	77.37	6.54	2.34	42.21	47.64	536.18	----	1.921	"	
47.78	8.67	156.08	78.68	6.31	2.35	42.30	45.91	504.08	12.734	1.951	D	
52.25	9.97	179.53	88.15	4.09	1.60	28.85	43.66	479.88	17.800	1.559	"	
53.54	10.35	185.71	88.48	3.39	1.34	24.17	43.07	479.45	----	1.606	E	
54.05	10.45	188.18	90.19	2.87	1.13	20.47	43.08	479.28	18.263	1.471	"	
60.58	12.80	230.58	100.0	----	----	----	39.42	433.69	23.159	1.718	"	

<sup>a</sup>These values were calculated by the compiler.

<sup>b</sup>The concentration units are: M = mol/1000 mol  $\text{H}_2\text{O}$ ; c = mol/100 mol solute.

<sup>c</sup>The solid phases are: A = NaCl; B = NaCl +  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ;  
 D = NaCl +  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ ; E =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ .

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Kol'ba, V.I.; Zhikharev, M.I.; Sukhanov, L.P.
(2) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4]	<i>Zh. Neorg. Khim.</i> <u>1981</u> , 26, 828-30.
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

VARIABLES:	PREPARED BY:
Composition at 50°C.	J. Eyseltová

## EXPERIMENTAL VALUES:

Solubility isotherm in the  $\text{NaH}_2\text{PO}_4$ - $\text{NaNO}_3$ - $\text{H}_2\text{O}$  system at 50°C.

$\text{NaH}_2\text{PO}_4$ mass%	$\text{NaNO}_3^a$		$\text{H}_2\text{O}^a$		viscosity $10^6 \frac{\text{m}^2}{\text{s}} \text{ s}^{-1}$	solid phase
	mol/kg	mol% <sup>b</sup>	mass%	mol/kg	mass%	
61.16	13.12	100	----	----	38.84	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$
56.70	12.19	89.93	4.56	1.38	38.74	15.786
54.16	11.41	85.91	6.29	1.88	39.55	14.172
52.69	11.22	82.01	8.19	2.46	39.12	12.421
43.92	9.29	65.10	16.68	4.98	39.40	9.850
37.21	7.79	53.40	23.00	6.80	39.79	9.810
32.75	6.88	45.63	27.60	8.18	39.65	9.795
32.75	6.89	43.63	27.64	8.21	39.61	9.795
30.70	6.24	43.45	28.30	8.12	41.00	5.499
25.37	4.97	35.89	32.10	8.88	42.53	1.513
19.15	3.55	27.39	35.96	9.42	44.89	1.486
17.88	3.31	25.47	37.06	9.68	45.06	1.482
11.60	2.11	16.19	42.51	10.90	45.89	1.445
4.10	0.72	5.62	48.67	12.12	47.23	1.437
----	-----	-----	46.80	13.37	46.80	1.429
						1.436

<sup>a</sup>The mass% and mol/kg  $\text{H}_2\text{O}$  values were calculated by the compiler.<sup>b</sup>These values are actually mol/100 mol solute values (compiler).<sup>c</sup>Isothermal invariant point.

## AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The isothermal method was used. The mixtures were allowed to equilibrate for 7-8 hours with constant agitation. The $\text{H}_2\text{PO}_4^-$ content was determined colorimetrically, the sum of the salt content was determined by evaporation to dryness, and the nitrate content was determined by the difference. The composition of the solid phases was determined by the Schreinemakers' method. The viscosity was measured with the aid of an Ostwald viscometer. The density was measured by the use of calibrated 10ml pycnometers.	A pure form of $\text{NaNO}_3$ was used and the $\text{NaH}_2\text{PO}_4$ was of reagent grade quality.
ESTIMATED ERROR:	No details are given.
REFERENCES:	

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>								
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]			ORIGINAL MEASUREMENTS:					
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]								
(3) Sodium chloride; NaCl; [7647-14-5]								
(4) Potassium chloride; KCl; [7747-40-7]								
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]								
<b>VARIABLES:</b>								
Temperature and composition.			PREPARED BY:					
J. Eysseltova								
<b>EXPERIMENTAL VALUES:</b>								
Part 1. Solubility in the $\text{K}^+, \text{Na}^+  \text{Cl}^-$ , $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$ system.								
soln. no.	$\text{K}^+$ eq%	$\text{H}^+$ eq%	$\text{Cl}^-$ eq%	$\text{H}_2\text{O}$ concn. <sup>a</sup>	solid <sup>b</sup> phases			
temp. = 0°C								
1	17.65	14.31	78.58	682.5	A + B + C			
2	10.40	25.25	62.16	598.7	B + C + D			
3	18.93	8.77	86.80	731.1	A + B			
4	19.08	7.96	88.08	738.4	"			
5	67.33	11.73	82.36	1132	A + C			
6	52.28	12.46	81.31	1016	"			
7	35.16	12.95	80.64	876.7	"			
8	9.59	30.36	54.47	589.1	C + D			
9	8.76	38.93	41.57	555.8	"			
10	7.07	49.68	25.43	492.3	"			
11	5.51	24.28	63.52	627.6	B + D			
12	14.92	17.23	74.21	660.4	B + C			
13	11.38	22.80	65.80	618.5	"			
14	75.45	6.89	88.68	1241	A			
15	7.54	15.04	77.42	719.8	B			
16	50.20	44.64	33.05	1807	C			
17	49.60	44.76	32.96	1797	"			
18	60.52	29.38	56.00	1628	"			
19	44.64	36.48	46.85	1467	"			
20	29.13	58.27	12.60	1396	"			
21	58.45	20.36	69.47	1322	"			
22	26.01	52.02	21.97	1183	"			
23	22.73	45.45	31.82	1028	" (continued next page)			
<b>AUXILIARY INFORMATION</b>								
<b>METHOD/APPARATUS/PROCEDURE:</b>			<b>SOURCE AND PURITY OF MATERIALS:</b>					
Nothing is stated, but it probably is the same as in ref. (1).			Nothing is stated, but it probably is the same as in ref. (1).					
<b>ESTIMATED ERROR:</b>								
No information is given.								
<b>REFERENCES:</b>								
1. Brunisholz, G.; Bodmer, M. <i>Helv. Chim. Acta</i> 1963, 46, 288, 2566-74.								

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Sodium dihydrogenphosphate; NaH <sub>2</sub> PO <sub>4</sub> ; [7558-80-7]		Brunishloz, G.; Bodmer, M.		
(2) Potassium dihydrogenphosphate; KH <sub>2</sub> PO <sub>4</sub> ; [7778-70-0]		Helv. Chim. Acta <u>1963</u> , 46, 7, 289, 2575-86.		
(3) Sodium chloride; NaCl; [7647-14-5]				
(4) Potassium chloride; KCl; [7747-40-7]				
(5) Water; H <sub>2</sub> O; [7732-18-5]				

## EXPERIMENTAL VALUES cont'd:

Part 1. Solubility in the K<sup>+</sup>, Na<sup>+</sup>||Cl<sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>-</sup>-H<sub>2</sub>O system.

soln. no.	K <sup>+</sup> eq%	H <sup>+</sup> eq%	Cl <sup>-</sup> eq%	H <sub>2</sub> O concn. <sup>a</sup>	solid phases <sup>a</sup>
temp. = 0°C					
24	32.71	19.59	70.64	957.9	C
25	19.41	38.81	41.78	898.7	"
26	13.54	51.95	22.06	747.5	"
27	15.15	30.32	54.53	744.2	"
28	19.08	17.44	73.43	730.6	"
29	3.73	38.51	42.49	598.9	D
temp. = 25°C					
30	24.60	16.74	74.89	606.1	A + B + C
31	6.38	51.88	22.23	303.6	B + C + D
32	28.23	3.83	94.26	725.3	A + B
33	27.31	7.19	89.20	695.2	"
34	26.56	9.65	85.45	673.3	"
35	25.35	14.52	78.25	627.5	"
36	75.84	12.85	80.73	926.9	A + C
37	69.29	13.28	80.06	889.8	"
38	50.79	13.76	79.30	800.4	"
39	35.16	15.12	77.42	696.8	"
40	5.57	58.93	11.62	258.7	C + D
41	1.48	48.48	27.67	366.2	B + D
42	14.45	28.90	56.65	523.5	B + C
43	10.39	38.49	42.47	443.1	"
44	6.33	51.79	22.57	308.0	"
45	71.18	5.34	92.02	1002	A
46	58.43	6.82	89.82	896.0	"
47	39.70	7.00	89.55	791.0	"
48	4.31	8.61	87.08	794.0	B
49	10.27	20.55	69.18	638.5	"
50	5.07	40.42	39.41	443.4	"
51	57.90	34.84	47.68	1149	C
52	57.29	24.78	62.81	1015	"
53	45.76	34.22	48.71	987.7	"
54	35.72	42.47	36.46	913.9	"
55	29.73	59.45	10.82	881.5	"
56	33.80	31.30	53.20	823.1	"
57	39.91	21.71	67.44	806.1	"
58	26.63	52.67	21.00	786.4	"
59	23.27	46.55	30.18	713.0	"
60	19.87	39.75	40.48	639.4	"
61	16.28	32.57	51.15	564.3	"
62	12.17	51.63	22.43	466.5	"
63	6.39	59.08	11.62	283.7	"
64	2.76	56.71	14.89	296.5	D
temp. = 50°C					
65	29.62	21.36	68.07	518.5	A + B + C
66	5.01	64.08	3.86	131.9	B + C + E
67	37.76	0	100	702.8	A + B
68	33.65	9.72	85.34	621.1	"
69	19.84	32.95	50.70	444.0	B + C
70	12.81	45.67	31.63	336.0	"
71	6.15	62.03	7.00	162.0	"
72	5.10	64.00	3.89	133.2	"

## Sodium Dihydrogenphosphate

COMPONENTS:					ORIGINAL MEASUREMENTS:					
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]					Brunishloz, G.; Bodmer, M.					
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]					<i>Helv. Chim. Acta</i> 1963, 46, 7, 289, 2575-86.					
(3) Sodium chloride; NaCl; [7647-14-5]										
(4) Potassium chloride; KCl; [7747-40-7]										
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]										
EXPERIMENTAL VALUES cont'd:										
Part 1. Solubility in the $\text{K}^+$ , $\text{Na}^+  \text{Cl}^-$ , $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$ system.										
soln. no.	$\text{K}^+$ eq%	$\text{H}^+$ eq%	$\text{Cl}^-$ eq%	$\text{H}_2\text{O}$ concen. <sup>a</sup>	solid phases <sup>b</sup>					
temp. = 75°C										
73	31.14	29.73	55.47	402.2	A + B + C					
74	6.77	64.85	2.88	102.8	B + C + E					
75	39.70	10.85	83.70	556.5	A + B					
76	69.77	20.51	69.24	613.0	A + C					
77	54.56	23.08	65.46	534.6	"					
78	25.72	36.04	46.04	365.3	B + C					
79	21.08	42.16	36.76	317.9	"					
80	14.97	51.89	22.09	237.0	"					
81	9.74	61.15	8.15	149.8	"					
82	6.80	64.60	3.02	102.5	"					
83	61.31	10.06	84.90	649.7	A					
84	10.00	20.00	70.00	603.8	B					
85	15.63	31.26	53.11	457.8	"					
86	59.39	36.58	45.34	622.9	C					
87	38.70	46.08	30.90	503.7	"					
88	30.24	60.49	9.27	393.6	"					
89	28.42	56.84	14.74	381.9	"					
temp. = 100°C										
90	27.84	43.16	35.40	256.6	A + B + C					
91	8.47	65.27	2.10	71.6	B + C + E					
92	50.41	0	100	594.2	A + B					
93	44.56	11.88	82.22	418.6	"					
94	35.98	27.85	58.34	375.8	"					
95	24.04	48.08	27.88	223.5	B + C					
96	20.20	52.93	20.56	191.7	"					
97	15.15	59.27	10.85	138.1	"					
98	12.65	61.99	6.89	115.5	"					
99	12.10	62.73	5.74	105.6	"					
100	9.29	64.91	2.39	76.1	"					
101	8.70	65.11	2.30	74.4	"					
<sup>a</sup> The concentration units are: mol/100 eq% of solute.										
<sup>b</sup> The solid phases are: A = KCl; B = NaCl; C = $\text{KH}_2\text{PO}_4$ ; D = $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; E = $\text{NaH}_2\text{PO}_4$ .										
Part 2. The compiler has calculated the following results from the data in Part 1.										
soln. no.	$\text{K}^+$ mass%	$\text{Na}^+$ mol/kg	$\text{Na}^+$ mass%	$\text{Cl}^-$ mol/kg	$\text{Cl}^-$ mass%	$\text{H}_2\text{PO}_4^-$ mol/kg	$\text{H}_2\text{O}$ mass%			
temp. = 0°C										
1	3.83	1.44	8.68	5.53	15.46	6.38	3.84			
2	2.53	0.96	9.19	5.97	13.70	5.75	7.60			
3	3.88	1.44	8.72	5.49	16.14	6.58	2.23			
4	3.88	1.44	8.73	5.49	16.25	6.61	2.00			
5	9.78	3.30	1.78	1.03	10.82	4.03	2.11			
6	8.30	2.86	3.29	1.93	11.70	4.43	2.45			
7	6.30	2.23	5.46	3.29	13.10	5.10	2.87			
8	2.38	0.90	8.76	5.66	12.25	5.12	9.33			
9	2.30	0.88	8.06	5.23	9.88	4.14	12.67			
10	2.06	0.80	7.40	4.88	6.71	2.86	17.93			
11	1.30	0.49	9.75	6.22	13.60	5.61	7.12			
12	3.33	1.26	8.92	5.71	15.04	6.23	4.78			
13	2.69	1.02	9.15	5.91	14.11	5.90	6.69			
14	10.10	3.34	1.39	0.79	10.77	3.96	1.25			
15	1.59	0.58	9.62	5.98	14.83	5.96	3.94			

(continued next page)

## COMPONENTS:

- (1) Sodium dihydrogenphosphate:  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]
- (2) Potassium dihydrogenphosphate;  $\text{KH}_2\text{PO}_4$ ; [7778-70-0]
- (3) Sodium chloride; NaCl; [7647-14-5]
- (4) Potassium chloride; KCl; [7747-40-7]
- (5) Water:  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Brunishloz, G.; Bodmer, M.  
*Helv. Chém. Acta* 1963, 46, 7, 289, 2575-86.

## EXPERIMENTAL VALUES cont'd:

Part 2. The compiler has calculated the following results from the data in Part 1.

soln.	$\text{K}^+$	$\text{Na}^+$	$\text{Cl}^-$	$\text{H}_2\text{PO}_4^-$	$\text{H}_2\text{O}$				
no.	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%		
temp. = 0°C									
16	5.17	1.54	0.31	0.16	3.09	1.01	5.70	0.67	85.72
17	5.14	1.53	0.34	0.17	3.10	1.02	5.74	0.69	85.68
18	6.70	2.06	0.66	0.34	5.62	1.91	4.03	0.50	82.99
19	5.46	1.69	1.36	0.71	5.20	1.77	5.38	0.67	82.61
20	3.82	1.16	0.97	0.50	1.50	0.50	9.47	1.16	84.24
21	7.61	2.46	1.62	0.89	8.20	2.91	3.29	0.43	79.27
22	3.89	1.22	1.93	1.03	2.98	1.03	9.66	1.22	81.53
23	3.79	1.23	3.12	1.72	4.81	1.72	9.40	1.23	78.88
24	5.54	1.90	4.75	2.77	10.86	4.09	4.11	0.57	74.73
25	3.57	1.20	4.52	2.58	6.97	2.58	8.85	1.20	76.09
26	2.93	1.01	4.39	2.56	4.33	1.64	13.94	1.93	74.42
27	3.18	1.13	6.72	4.07	10.37	4.06	7.88	1.13	71.84
28	3.96	1.45	7.72	4.80	13.84	5.57	4.57	0.67	69.91
29	0.93	0.35	8.50	5.36	9.64	3.93	11.90	1.78	69.02
temp. = 25°C									
30	5.76	2.25	8.08	5.38	15.91	6.85	4.86	0.77	65.38
31	2.50	1.17	9.62	7.64	7.90	4.06	25.20	4.74	54.77
32	5.73	2.16	8.11	5.20	17.36	7.20	0.96	0.15	67.82
33	5.74	2.18	8.10	5.23	17.00	7.11	1.88	0.29	67.28
34	5.73	2.19	8.09	5.26	16.72	7.03	2.60	0.40	66.87
35	5.78	2.24	8.06	5.32	16.18	6.91	4.10	0.64	65.87
36	12.68	4.54	1.11	0.68	12.24	4.83	2.66	0.38	71.31
37	11.98	4.33	1.77	1.09	12.56	4.98	2.85	0.41	70.84
38	9.60	3.52	3.94	2.46	13.59	5.49	3.24	0.48	69.64
39	7.42	2.80	6.17	3.96	14.81	6.16	3.94	0.60	67.67
40	2.43	1.20	9.11	7.62	4.60	2.49	31.89	6.33	51.97
41	0.52	0.22	10.35	7.59	8.82	4.19	21.03	3.66	59.28
42	3.84	1.53	8.86	6.01	13.66	6.00	9.53	1.53	64.10
43	3.14	1.30	9.09	6.41	11.65	5.31	14.39	2.40	61.72
44	2.46	1.14	9.58	7.56	7.96	4.06	24.49	4.66	55.11
45	11.19	3.95	2.17	1.30	13.11	5.09	1.04	0.15	72.49
46	10.05	3.62	3.52	2.15	14.01	5.55	1.45	0.21	70.97
47	7.56	2.79	5.97	3.74	15.47	6.27	1.64	0.24	69.36
48	0.84	0.30	10.03	6.09	15.46	6.08	2.09	0.30	71.57
49	2.37	0.89	9.39	6.02	14.48	6.00	5.88	0.89	67.88
50	1.55	0.64	9.80	6.83	10.93	4.92	15.32	2.53	62.41
51	8.54	2.80	0.63	0.35	6.38	2.30	6.38	0.84	78.06
52	9.20	3.14	1.69	0.98	9.14	3.43	4.94	0.68	75.02
53	7.64	2.57	1.96	1.13	7.38	2.73	7.08	0.96	75.93
54	6.44	2.17	2.31	1.32	5.96	2.21	9.47	1.29	75.82
55	5.66	1.87	1.21	0.68	1.87	0.68	14.03	1.87	77.22
56	6.50	2.28	3.94	2.36	9.27	3.58	7.44	1.05	72.84
57	7.65	2.75	4.33	2.64	11.72	4.64	5.16	0.75	71.14
58	5.49	1.88	2.51	1.46	3.92	1.48	13.46	1.86	74.61
59	5.12	1.81	3.91	2.35	6.02	2.34	12.71	1.81	72.24
60	4.69	1.73	5.60	3.51	8.66	3.51	11.61	1.72	69.44
61	4.14	1.60	7.65	5.04	11.80	5.02	10.28	1.60	66.11
62	3.66	1.45	6.40	4.31	6.11	2.66	19.28	3.08	64.55
63	2.65	1.25	8.43	6.77	4.37	2.27	30.34	5.77	54.21
64	1.12	0.52	9.65	7.59	5.47	2.78	28.50	5.32	55.27
temp. = 50°C									
65	7.69	3.17	7.48	5.25	16.02	7.28	6.85	1.14	61.96
66	3.00	2.11	10.89	13.02	2.10	1.62	47.63	13.50	36.38
67	7.73	2.98	7.49	4.92	18.56	7.88	0	0	66.22
68	7.61	3.01	7.53	5.06	17.49	7.61	2.74	0.44	64.63
69	5.86	2.48	8.19	5.91	13.57	6.33	12.04	2.06	60.34

(continued next page)

## Sodium Dihydrogenphosphate

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Potassium dihydrogenphosphate;  $\text{KH}_2\text{PO}_4$ ; [7778-70-0]  
 (3) Sodium chloride; NaCl; [7647-14-5]  
 (4) Potassium chloride; KCl; [7747-40-7]  
 (5) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Brunishloz, G.; Bodmer, M.  
*Helv. Chim. Acta* 1963, 46, 7, 289, 2575-86.

## EXPERIMENTAL VALUES cont'd:

Part 2. The compiler has calculated the following results from the data in Part 1.

soln. no.	$\text{K}^+$ mass%	$\text{Na}^+$ mass%	$\text{Cl}^-$ mass%	$\text{H}_2\text{PO}_4^-$ mass%	$\text{H}_2\text{O}$ mass%
temp. = 50°C					
70	4.62	2.12	8.81	6.86	10.35
71	3.37	2.11	10.24	10.91	3.47
72	3.04	2.13	10.84	12.89	2.10
temp. = 75°C					
73	9.54	4.30	7.05	5.40	15.41
74	4.40	3.66	10.86	15.34	1.70
75	9.58	3.96	7.02	4.94	18.32
76	15.65	6.32	1.28	0.88	14.08
77	13.58	5.67	3.27	2.32	14.78
78	8.50	3.91	7.43	5.82	13.79
79	7.67	3.68	7.87	6.42	12.14
80	6.56	3.51	8.54	7.77	8.78
81	5.44	3.61	9.55	10.80	4.12
82	4.42	3.68	10.95	15.50	1.78
83	13.14	5.24	3.61	2.45	16.50
84	2.40	0.92	9.86	6.44	15.21
85	4.54	1.90	9.06	6.44	13.98
86	13.66	5.30	0.54	0.36	9.46
87	10.61	4.27	2.45	1.68	7.68
88	10.07	4.27	1.81	1.31	2.80
89	9.58	4.13	2.92	2.14	4.50
temp. = 100°C					
90	11.20	6.03	6.86	6.28	12.92
91	6.06	6.57	11.05	20.38	1.36
92	11.36	4.71	6.57	4.64	20.43
93	12.65	5.91	7.27	5.78	21.17
94	11.33	5.32	6.70	5.35	16.66
95	10.53	5.98	7.18	6.93	11.08
96	9.68	5.85	7.57	7.79	8.94
97	8.54	6.09	8.48	10.29	5.55
98	7.71	6.08	9.09	12.20	3.81
99	7.63	6.36	9.33	13.24	3.28
100	6.52	6.78	10.66	18.83	1.52
101	6.16	6.50	10.90	19.56	1.48

Part 3. The points of simultaneous crystallization of  $\text{NaCl} + \text{KH}_2\text{PO}_4 + \text{NaH}_2\text{PO}_4 \cdot x\text{H}_2\text{O}$ .

soln. no.	$t/^\circ\text{C}$	eq% $\text{K}^+$	eq% $\text{H}^+$	eq% $\text{Cl}^-$	conc $\text{H}_2\text{O}^a$	x
102	0	10.40	25.25	62.16	598.7	2
103	12.5	8.52	36.77	44.93	475.0	2
104	25	6.38	51.88	22.23	303.6	2
105	30	5.47	57.33	14.00	239.0	2
106	35	4.98	61.16	8.33	186.3	2
107	40	4.85	62.60	5.99	163.1	1
108	45	5.00	63.59	4.75	145.7	1
109	50	5.01	64.08	3.86	131.9	0
110	75	6.77	64.85	2.88	102.8	0
111	100	8.47	65.27	2.10	71.6	0 <sup>b</sup>
112	36.0	4.90	61.86	7.20	177.5	2+1 <sup>c</sup>
113	48.2	4.90	64.06	3.91	133.9	1+0

<sup>a</sup>The concentration unit is mol/100 eq% of solute.

<sup>b</sup>An invariant point, the solid phases being  $\text{NaCl} + \text{KH}_2\text{PO}_4 + \text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O} + \text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ .

<sup>c</sup>An invariant point, the solid phases being  $\text{NaCl} + \text{KH}_2\text{PO}_4 + \text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O} + \text{NaH}_2\text{PO}_4$ .

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]
- (2) Potassium dihydrogenphosphate;  $\text{KH}_2\text{PO}_4$ ; [7778-70-0]
- (3) Sodium chloride; NaCl; [7647-14-5]
- (4) Potassium chloride; KCl; [7747-40-7]
- (5) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Brunishloz, G.; Bodmer, M.

*Helv. Chém. Acta* 1963, 46, 7, 289, 2575-86.

## EXPERIMENTAL VALUES cont'd:

Part 4. The compiler has calculated the following values from the data in Part 3.

soln. no.	$\text{K}^+$		$\text{Na}^+$		$\text{Cl}^-$		$\text{H}_2\text{PO}_4^-$		$\text{H}_2\text{O}$
	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%
102	2.55	0.96	9.19	5.97	13.70	5.75	7.60	1.17	66.98
103	2.46	1.00	9.31	6.40	11.79	5.24	13.18	2.15	63.26
104	2.50	1.17	9.62	7.64	7.90	4.06	25.20	4.74	54.77
105	2.47	1.27	9.89	8.65	5.74	3.25	32.15	6.66	49.74
106	2.57	1.49	10.26	10.10	3.89	2.48	39.07	9.11	44.20
107	2.66	1.65	10.50	11.09	2.98	2.04	42.66	10.67	41.20
108	2.88	1.91	10.64	11.98	2.48	1.81	45.37	12.11	38.63
109	3.00	2.11	10.89	13.02	2.10	1.62	47.63	13.50	36.38
110	4.40	3.66	10.86	15.34	1.70	1.55	52.25	17.50	30.78
111	6.06	6.57	11.05	20.38	1.36	1.62	57.94	25.32	23.59
112	2.59	1.53	10.32	10.40	3.45	2.25	40.51	9.68	43.14
113	2.92	2.03	10.88	12.88	2.11	1.62	47.35	13.29	36.74

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>		<b>ORIGINAL MEASUREMENTS:</b>																																																																																																																																																																		
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]		Babenko, A.M.; Vorob'eva, T.A. <i>Zh. Prikl. Khim.</i> 1976, 49, 1502-6.																																																																																																																																																																		
(2) Ammonium dihydrogenphosphate; $\text{NH}_4\text{H}_2\text{PO}_4$ ; [7722-76-1]																																																																																																																																																																				
(3) Diammonium hydrogenphosphate; $(\text{NH}_4)_2\text{HPO}_4$ ; [7783-28-0]																																																																																																																																																																				
(4) Water; $\text{H}_2\text{O}$ ; [7732-18-5]																																																																																																																																																																				
<b>VARIABLES:</b>		<b>PREPARED BY:</b>																																																																																																																																																																		
Temperature and concentration of $\text{NaH}_2\text{PO}_4$ in a mixture containing a mol ratio of $\text{NH}_4\text{H}_2\text{PO}_4 / (\text{NH}_4)_2\text{HPO}_4 = 1$ .		J. Eyseltová																																																																																																																																																																		
<b>EXPERIMENTAL VALUES:</b>																																																																																																																																																																				
Part 1. Points of simultaneous crystallization of two or three solid phases in the $\text{NH}_4\text{H}_2\text{PO}_4 - (\text{NH}_4)_2\text{HPO}_4 - \text{NaH}_2\text{PO}_4 - \text{H}_2\text{O}$ system.																																																																																																																																																																				
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mixture <sup>a</sup>	$\text{NH}_4\text{H}_2\text{PO}_4$	$(\text{NH}_4)_2\text{HPO}_4$	$\text{NaH}_2\text{PO}_4$	mass%	mass% <sup>b</sup>	mass% <sup>b</sup>	mass%	mol/kg <sup>b</sup>	$t/^\circ\text{C}$	solid phases <sup>c</sup>																																																																																																																																																										
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An improved polythermic method (1) was used.				Reagent grade salts were recrystallized and dried before use. The ammonium salts were dried at 40-50°C. The sodium salt was dried at 105°C. The material designated "mixture" was prepared by mixing equimolar amounts of $\text{NH}_4\text{H}_2\text{PO}_4$ and $(\text{NH}_4)_2\text{HPO}_4$ and homogenizing them by grinding in a mortar.																																																																																																																																																																
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				1. Erajzer, L.N.; Kaganskii, I.M., Zavod. Lab. 1967, 1, 119.																																																																																																																																																																

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ;	[7558-80-7]	Babenko, A.M.; Vorob'eva, T.A.	
(2) Ammonium dihydrogenphosphate; $\text{NH}_4\text{H}_2\text{PO}_4$ ;	[7722-76-1]	Zh. Prikl. Khim. 1976, 49, 1502-6.	
(3) Diammonium hydrogenphosphate; $(\text{NH}_4)_2\text{HPO}_4$ ;	[7783-28-0]		
(4) Water; $\text{H}_2\text{O}$ ; [7732-18-5]			

## EXPERIMENTAL VALUES cont'd:

Part 1. Points of simultaneous crystallization of two or three solid phases in the  $\text{NH}_4\text{H}_2\text{PO}_4-(\text{NH}_4)_2\text{HPO}_4-\text{NaH}_2\text{PO}_4-\text{H}_2\text{O}$  system.

mixture <sup>a</sup>	$\text{NH}_4\text{H}_2\text{PO}_4$	$(\text{NH}_4)_2\text{HPO}_4$	$\text{NaH}_2\text{PO}_4$				solid phases <sup>c</sup>
mass%	mol/kg <sup>b</sup>	mass%	mass%	mass%	mol/kg <sup>b</sup>	$t/^\circ\text{C}$	
24.0	2.27	11.17	12.83	33.2	6.46	56.0	C + D
20.0	2.02	9.31	10.69	40.0	8.33	55.0	C + D
20.0	2.20	9.31	10.69	43.2	9.78	67.0	C + D
0.0	0.0	0.0	0.0	56.0	10.60	40.2	B + E
1.8	0.17	0.84	0.96	55.0	10.61	43.5	B + E
4.75	0.45	2.21	2.54	52.5	10.23	46.0	B + E
8.0	0.82	3.72	4.28	52.44	11.04	42.0	D + E
8.0	0.88	3.72	4.28	55.2	12.50	50.5	D + E
8.9	1.01	4.14	4.76	55.5	12.99	49	D + E + F
0.0	0.0	0.0	0.0	60.8	12.92	57.2	E + F
1.6	0.17	0.74	0.86	60.0	13.02	59.8	E + F
4.2	0.45	1.96	2.24	58.0	12.78	63.5	E + F
11.25	1.35	5.24	6.01	55.0	13.58	68.4	E + F

Part 2. Solubility isotherms in the  $\text{NH}_4\text{H}_2\text{PO}_4-(\text{NH}_4)_2\text{HPO}_4-\text{NaH}_2\text{PO}_4-\text{H}_2\text{O}$  system.

mixture <sup>a</sup>	$\text{NH}_4\text{H}_2\text{PO}_4$	$(\text{NH}_4)_2\text{HPO}_4$	$\text{NaH}_2\text{PO}_4$	$\text{H}_2\text{O}$	$(\text{N} + \text{P}_2\text{O}_5)$	
mass%	mol/kg <sup>b</sup>	mass%	mass%	mol/kg <sup>b</sup>	mass%	mass%
temp. = -5°C						
0.0	0.0	0.0	0.0	35.4	4.56	64.6
6.7	0.45	3.12	3.58	33.0	4.56	60.3
12.0	0.79	5.59	6.41	26.4	3.57	61.6
2.392	0.17	1.11	1.28	40.2	5.83	57.408
22.0	1.43	10.24	11.76	15.6	2.08	62.4
33.4	2.25	15.55	17.85	6.66	0.92	59.94
40.2	2.72	18.71	21.48	0.0	0.0	59.8
temp. = 0°C						
0.0	0.0	0.0	0.0	37.6	5.02	62.4
14.0	0.94	6.51	7.48	25.8	3.57	60.2
6.58	0.45	3.06	3.52	34.2	4.81	59.22
2.38	0.17	1.11	1.27	41.87	6.26	55.87
24.4	1.63	11.36	13.04	15.12	2.08	60.48
33.6	2.28	15.64	17.96	6.64	0.92	59.76
42.6	3.00	19.83	22.77	0.0	0.0	57.4
temp. = 10°C						
0.0	0.0	0.0	0.0	42.2	6.08	57.8
6.38	0.45	2.97	3.41	36.2	5.25	57.42
19.0	1.36	8.85	10.15	24.3	3.57	56.7
29.0	2.06	13.50	15.50	14.18	2.08	56.72
2.28	0.17	1.06	1.22	44.8	7.05	52.992
40.0	3.00	18.62	21.38	6.0	0.92	54.0
47.0	3.59	21.88	25.12	0.0	0.0	53.0

<sup>a</sup>"Mixture" is an equimolar mixture of  $\text{NH}_4\text{H}_2\text{PO}_4$  and  $(\text{NH}_4)_2\text{HPO}_4$ .

<sup>b</sup>These values were calculated by the compiler.

<sup>c</sup>The solid phases are: A = ice; B =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{NH}_4\text{H}_2\text{PO}_4$ ; D =  $(\text{NH}_4)_2\text{HPO}_4$ ; E =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ ; F =  $\text{NaH}_2\text{PO}_4$ .

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Khalilieva, Sh.D.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0]	Izv. Akad. Nauk Turkm. SSR, Ser. Fiz.-Tekh., Khim. Geol. Nauk 1977, 3, 125-8.
(3) Sodium chloride, NaCl; [7647-14-5]	
(4) Potassium chloride; KC1; [7747-40-7]	
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	
<b>VARIABLES:</b>	<b>PREPARED BY:</b>
Composition at 40°C.	J. Eysseltova

**EXPERIMENTAL VALUES:**Part 1. Solubility in the  $\text{Na}^+, \text{K}^+ || \text{Cl}^-$ ,  $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$  system at 40°C.Janecke's indices<sup>a</sup>

soln. no.	$\text{Na}^+$	$\text{K}^+$	$\text{Cl}^-$	$\text{H}_2\text{PO}_4^-$	$\text{H}_2\text{O}$	solid phase <sup>b</sup>
1	64.75	35.25	100	-----	752.69	A + B
2	64.85	35.15	96.20	3.80	725.80	"
3	64.80	35.20	93.08	6.92	697.90	"
4	65.06	34.94	90.78	9.22	696.95	"
5	65.58	34.42	89.82	10.18	694.38	"
6	66.30	33.70	88.93	11.07	680.58	"
7	66.27	33.73	88.68	11.32	660.76	"
8	68.31	31.69	87.57	12.43	657.31	"
9	68.40	31.60	87.55	12.45	633.20	A + B + C
10	-----	100	92.42	7.55	990.59	B + D
11	16.72	83.28	91.84	8.16	860.17	"
12	26.80	73.20	90.95	9.05	853.50	"
13	43.45	56.55	89.83	10.17	766.98	"
14	56.15	43.85	89.16	10.84	762.84	"
15	63.94	36.05	88.19	11.81	716.00	"
16	83.92	16.08	-----	100	449.24	C + D
17	84.43	15.57	5.93	94.07	441.34	"
18	84.01	15.99	15.52	84.48	394.02	"
19	84.38	15.62	23.46	76.54	446.46	"
20	83.87	16.13	30.41	69.59	484.40	"
21	83.83	16.17	34.66	65.34	465.75	"
22	83.62	16.38	43.12	56.88	595.07	"

(continued next page)

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>
The standard isothermal method was used. The mixtures were stirred until the liquid phase had a constant composition. The chloride ion content was determined argentimetrically, potassium was determined as potassium tetraphenylborate, phosphorus was determined by differential colorimetry on an FEK-56 apparatus, and sodium was determined by difference.	No information is given.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Khallieva, Sh.D.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0]	Izv. Akad. Nauk Turton. SSR, Ser. Fiz.-Tekh., Khim. Geol. Nauk 1977, 3, 125-8.
(3) Sodium chloride; NaCl; [7647-14-5]	
(4) Potassium chloride; KCl; [7747-40-7]	
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd:

Part 1. Solubility in the  $\text{Na}^+ \parallel \text{Cl}^-$ ,  $\text{H}_2\text{PO}_4^- - \text{H}_2\text{O}$  system at 40°C.

Jänecke's indices<sup>a</sup>

soln. no.	$\text{Na}^+$	$\text{K}^+$	$\text{Cl}^-$	$\text{H}_2\text{PO}_4^-$	$\text{H}_2\text{O}$	solid <sup>b</sup> phase
23	83.28	16.72	47.78	52.22	578.00	C + D
24	82.42	17.58	56.32	43.68	629.80	"
25	80.03	19.97	69.54	30.48	624.76	"
26	74.85	25.15	79.28	20.72	640.42	"
27	70.02	29.98	83.72	16.28	662.04	"

<sup>a</sup>The units are: mol/100 mol of solute.

<sup>b</sup>The solid phases are: A = NaCl; B = KCl; C =  $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ ; D =  $\text{KH}_2\text{PO}_4$ .

Part 2. The compiler has calculated the following results from the data in Part 1.

soln. no.	$\text{Na}^+$		$\text{K}^+$		$\text{Cl}^-$		$\text{H}_2\text{PO}_4^-$		$\text{H}_2\text{O}$	
	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%	
1	7.44	4.78	6.90	2.60	17.76	7.38	0.00	0.00	67.88	
2	7.55	4.96	6.98	2.69	17.31	7.36	1.85	0.29	66.31	
3	7.67	5.16	7.08	2.80	17.02	7.41	3.43	0.55	64.78	
4	7.65	5.19	7.00	2.78	16.50	7.24	4.54	0.73	64.31	
5	7.71	5.25	6.89	2.75	16.32	7.19	5.01	0.81	64.06	
6	7.88	5.41	6.82	2.75	16.33	7.26	5.50	0.90	63.46	
7	8.02	5.57	6.95	2.84	16.58	7.46	5.73	0.95	62.72	
8	8.28	5.77	6.54	2.68	16.40	7.40	6.30	1.05	62.48	
9	8.48	6.00	6.68	2.77	16.78	7.68	6.46	1.09	61.60	
10	0.00	0.00	15.19	5.61	12.73	5.18	2.82	0.42	69.27	
11	1.66	1.08	14.06	5.38	14.06	5.93	3.38	0.53	66.84	
12	2.68	1.74	12.48	4.76	14.06	5.92	3.79	0.59	66.99	
13	4.71	3.15	10.44	4.10	15.04	6.51	4.61	0.74	65.20	
14	6.16	4.09	8.19	3.19	15.10	6.49	4.97	0.79	65.59	
15	7.28	4.96	7.58	3.03	15.52	6.84	5.63	0.92	63.98	
16	9.52	10.38	3.11	1.99	0.00	0.00	47.43	12.37	39.96	
17	9.82	10.63	3.09	1.96	1.06	0.75	45.77	11.84	40.26	
18	10.53	11.85	3.42	2.25	3.01	2.19	44.30	11.91	38.74	
19	10.32	10.50	3.25	1.94	4.43	2.92	39.16	9.52	42.83	
20	10.06	9.56	3.32	1.85	5.67	3.49	35.12	7.98	45.84	
21	10.43	10.00	3.43	1.93	6.66	4.13	34.01	7.79	45.46	
22	9.47	7.81	3.16	1.53	7.55	4.02	26.95	5.31	52.87	
23	9.71	8.00	3.32	1.61	8.61	4.59	25.48	5.02	52.88	
24	9.41	7.27	3.42	1.55	9.93	4.97	20.86	3.85	56.38	
25	9.54	7.12	4.06	1.78	12.80	6.18	15.20	2.71	58.40	
26	9.03	6.49	5.17	2.18	14.77	6.88	10.45	1.80	60.58	
27	8.36	5.88	6.10	2.52	15.44	7.03	8.13	1.37	61.98	



<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (3) Sodium chloride; NaCl; [7647-14-6] (4) Potassium chloride; KCl; [7747-40-7] (5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Solov'ev, A.P.; Balashova, E.F.; Verendjakina, N.A.; Zjzina, L.F. Resp. Sb. Nauchn. Tr.-Yaroslav. Gos. Pedagog. In-t. <u>1978</u> , 169, 79-84.
<b>VARIABLES:</b> Composition at 25°C.	<b>PREPARED BY:</b> J. Eysseltová

## **EXPERIMENTAL VALUES:**

Solubility in the  $K^+$ ,  $Na^+||Cl^-$ ,  $H_2PO_4^-$ - $H_2O$  system at 25°C.

NaCl		NaH <sub>2</sub> PO <sub>4</sub>		KCl		KH <sub>2</sub> PO <sub>4</sub>		K <sup>+</sup>	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	solid phase <sup>c</sup>
mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	mass%	mol/kg <sup>a</sup>	ion% <sup>b</sup>	ion% <sup>b</sup>	
15.13	4.33	25.01	3.48	----	----	----	----	44.63	A + B	
13.74	4.31	27.72	4.23	----	----	4.01	0.54	5.95	52.58	"
12.85	4.47	30.72	5.20	----	----	7.22	1.08	10.04	58.46	A + B + C
----	----	46.65	8.71	----	----	9.14	1.51	14.79	100.0	B + C
5.93	2.21	39.75	7.21	----	----	8.37	1.34	12.45	79.48	"
17.73	5.01	11.57	1.56	----	----	10.18	1.23	15.78	36.11	A + C
21.11	5.64	----	----	4.16	0.87	10.70	1.23	27.22	15.93	"
18.62	4.75	----	----	8.69	1.74	5.62	0.62	33.15	8.68	A + C + D
19.49	4.86	----	----	8.23	1.61	3.67	0.39	29.38	5.96	A + D
20.90	5.22	----	----	10.58	2.07	----	----	28.44	----	"
14.75	3.67	----	----	11.00	2.14	5.22	0.56	42.46	8.76	C + D
7.78	1.87	----	----	16.85	3.18	4.34	0.49	65.96	8.15	"
----	----	----	----	23.50	4.28	2.90	0.29	100.0	6.33	"

<sup>a</sup>The mol/kg H<sub>2</sub>O values were calculated by the compiler.

<sup>b</sup>The authors' ion% values are to be understood as mol/100 mol solute.

<sup>c</sup>The solid phases are: A = NaCl; B =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ ; C =  $\text{KH}_2\text{PO}_4$ ; D = KCl.

#### AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	The method of invariant points was used. A third component was added to eutectic systems until a new solid appeared. The solid and liquid phases were each analyzed.	SOURCE AND PURITY OF MATERIALS:	Chloride ion content was determined by the Volhard method. $\text{H}_2\text{PO}_4^-$ ions were precipitated as $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$ , the excess of $\text{Mg}^{2+}$ being titrated compleximetrically (1). $\text{NH}_4^+$ ions were removed and the excess of base used was titrated with 0.1 M HCl.
ESTIMATED ERROR:		ESTIMATED ERROR:	No information is given.
REFERENCES:			1. Shemjakin, F.M.; Zelenina, E.N. <u>Zavod. Lab.</u> <u>1969</u> , 6.

## Sodium Dihydrogenphosphate

<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Girich, T.E.; Guljamov, Yu.M.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]	Vopr. Khim. Khim. Tekhnol. 1979, 57, 54-7.
(3) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4]	
(4) Potassium nitrate; $\text{KNO}_3$ ; [7757-79-1]	
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	
<b>VARIABLES:</b>	<b>PREPARED BY:</b>
Composition and temperature.	J. Eysseltova

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the  $\text{K}^+ \parallel \text{Na}^+ \mid \text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$  system.

soln. no.	$\text{K}^+$ ion%	$\text{NO}_3^-$ ion%	$\text{H}_2\text{O}$ conc. <sup>a</sup>	solid phases <sup>b</sup>
temp. = 323 K				
1	91.54	89.68	633.0	A + C
2	81.09	90.22	534.2	"
3	67.25	90.20	458.7	"
4	61.59	90.47	437.2	"
5	56.26	90.87	390.7	"
6	52.33	90.87	285.5	"
7	47.09	92.09	285.5	"
8	42.68	92.44	260.3	"
9	40.89	93.02	244.5	"
10	39.25	92.14	217.1	"
11	37.10	93.42	192.9	A + B + C
12	38.95	100.0	208.2	A + B
13	37.98	98.25	193.8	"
14	37.81	95.99	193.0	"
15	16.57	0.00	365.9	C + E
16	14.29	18.01	283.0	"
17	13.88	27.98	292.4	"
18	14.93	37.85	280.3	"
19	16.88	42.92	276.1	B + C + E
20	16.99	47.60	245.9	B + C
21	20.66	59.33	238.0	"
22	25.22	76.45	219.8	"
23	33.67	90.92	208.2	"

(continued next page)

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>
The isothermal method was used. Equilibrium was ascertained by repeated analysis of the solid and liquid phases. The dihydrogen-phosphate ion content was determined photocolorimetrically, the sodium and potassium ion content was determined by flame photometry, and the nitrate ion content was determined by titration with $\text{FeSO}_4$ .	The solids were chemically pure and were recrystallized twice before being used.
<b>ESTIMATED ERROR:</b>	
No details are given.	
<b>REFERENCES:</b>	

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Potassium dihydrogenphosphate;  $\text{KH}_2\text{PO}_4$ ; [7778-70-0]  
 (3) Sodium nitrate;  $\text{NaNO}_3$ ; [7631-99-4]  
 (4) Potassium nitrate;  $\text{KNO}_3$ ; [7757-79-1]  
 (5) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Girich, T.E.; Guljamov, Yu.M.

Vopr. Khim. Khim. Tekhnol. 1979, 57, 54-7.

## EXPERIMENTAL VALUES cont'd:

Composition of saturated solutions in the  $\text{K}^+$ ,  $\text{Na}^+ | \text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$  system.

soln. no.	$\text{K}^+$ ion%	$\text{NO}_3^-$ ion%	$\text{H}_2\text{O}$ conc. <sup>a</sup>	solid phases <sup>b</sup>
temp. = 323 K				
24	0.00	38.43	373.1	B + E
25	5.59	40.89	318.0	"
26	11.35	41.33	291.7	"
temp. = 348 K				
27	100.00	95.31	373.4	A + C
28	85.49	94.68	302.1	"
29	74.33	94.36	271.4	"
30	64.73	94.37	227.0	"
31	55.08	94.30	193.5	"
32	46.39	94.17	165.3	"
33	47.01	100.0	149.0	A + B
34	46.13	96.73	148.0	"
35	44.62	94.04	147.4	A + B + C
36	42.98	92.94	156.2	B + C
37	40.83	90.53	178.0	"
38	36.91	85.19	192.5	"
39	34.44	82.00	201.4	"
40	31.00	75.19	206.2	"
41	25.11	64.30	211.7	"
42	21.83	55.68	219.8	"
43	20.91	47.29	226.3	"
44	29.06	40.92	234.0	B + C + D
45	20.05	38.47	243.5	C + D
46	21.31	29.19	258.7	"
47	21.28	19.44	266.0	"
48	21.70	11.09	276.4	"
49	20.52	0.00	289.1	"
50	0.00	51.14	267.2	B + D
51	5.31	50.00	256.0	"
52	11.15	45.96	247.3	"
53	15.31	44.96	239.5	"
temp. = 373 K				
54	100.00	97.08	245.0	A + C
55	99.68	97.08	213.2	"
56	83.91	96.83	191.7	"
57	70.53	95.35	176.3	"
58	60.85	95.18	142.8	"
59	52.95	95.03	113.5	"
60	51.90	100.0	95.7	A + B
61	51.32	97.75	93.0	"
62	50.35	94.97	92.4	A + B + C
63	49.02	91.24	94.6	B + C
64	47.52	82.85	112.5	"
65	45.01	74.71	117.8	"
66	42.46	63.76	130.0	"
67	36.87	54.88	139.5	"
68	33.82	47.00	147.0	"
69	31.22	44.73	156.3	"
70	29.53	42.27	161.5	B + C + D
71	29.01	38.09	164.0	C + D
72	28.03	34.04	176.2	"
73	25.78	28.26	181.4	"
74	23.45	18.88	189.0	"
75	25.43	5.30	196.1	"
76	25.44	0.00	205.0	"

(continued next page)

## Sodium Dihydrogenphosphate

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Girich, T.E.; Guljamov, Yu.M.
(2) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-70-0]	Vopr. Khim. Khim. Tekhnol. 1979, 57, 54-7.
(3) Sodium nitrate; $\text{NaNO}_3$ ; [7631-99-4]	
(4) Potassium nitrate; $\text{KNO}_3$ ; [7757-79-1]	
(5) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd:

Composition of saturated solutions in the  $\text{K}^+$ ,  $\text{Na}^+ | \text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ - $\text{H}_2\text{O}$  system.

soln. no.	$\text{K}^+$ ion%	$\text{NO}_3^-$ ion%	$\text{H}_2\text{O}$ conc. <sup>a</sup>	solid phases <sup>b</sup>
temp. = 373 K				
77	0.00	55.26	229.8	B + D
78	2.66	54.97	225.6	"
79	10.00	50.22	201.3	"
80	18.36	45.95	190.0	"

<sup>a</sup>The concentration units are: mol  $\text{H}_2\text{O}/100$  g equiv of dry salts.

<sup>b</sup>The solid phases are: A =  $\text{KNO}_3$ ; B =  $\text{NaNO}_3$ ; C =  $\text{KH}_2\text{PO}_4$ ; D =  $\text{NaH}_2\text{PO}_4$ ; E =  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ .

The compiler has calculated the following values from the data given above.

soln. no.	conc. of $\text{K}^+$ mass%	conc. of $\text{K}^+$ mol/kg	conc. of $\text{Na}^+$ mass%	conc. of $\text{Na}^+$ mol/kg	conc. of $\text{NO}_3^-$ mass%	conc. of $\text{NO}_3^-$ mol/kg	conc. of $\text{H}_2\text{PO}_4^-$ mass%	conc. of $\text{H}_2\text{PO}_4^-$ mol/kg
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temp. = 323 K

1	16.47	8.03	0.89	0.74	25.59	7.87	4.60	0.90
2	16.04	8.43	2.19	1.96	28.30	9.38	4.79	1.01
3	14.46	8.14	4.14	3.96	30.76	10.92	5.22	1.18
4	15.60	7.82	4.99	4.88	31.70	11.49	5.22	1.21
5	13.12	7.99	6.00	6.21	33.62	12.92	5.28	1.29
6	13.82	10.18	7.40	9.27	38.07	17.68	5.98	1.77
7	12.54	9.16	8.28	10.29	38.91	17.91	5.22	1.53
8	11.80	9.10	9.32	12.23	40.54	19.72	5.18	1.61
9	11.58	9.29	9.84	13.43	41.79	21.13	4.90	1.58
10	11.52	10.04	10.48	15.54	42.91	23.57	5.72	2.01
11	11.33	10.68	11.29	18.11	45.26	26.90	4.98	1.89
12	11.82	10.39	10.90	16.29	48.16	26.68	0.00	0.00
13	11.72	10.88	11.26	17.77	48.12	28.16	1.34	0.50
14	11.61	10.88	11.23	17.90	46.78	27.63	3.05	1.15
15	3.43	2.51	10.17	12.66	0.00	0.00	51.45	15.18
16	3.34	2.80	11.80	16.82	6.69	3.53	47.64	16.09
17	3.28	2.63	11.99	16.36	10.51	5.31	42.32	13.68
18	3.65	2.95	12.25	16.86	14.70	7.50	37.77	12.31
19	4.19	3.39	12.14	16.72	16.91	8.63	35.17	11.48
20	4.41	3.83	12.69	18.75	19.63	10.75	33.80	11.83
21	5.55	4.82	12.54	18.52	25.30	13.84	27.13	9.49
22	7.20	6.37	12.56	18.90	34.64	19.32	16.68	5.95
23	10.04	8.98	11.63	17.69	43.01	24.26	6.71	2.42
24	0.00	0.00	13.23	14.89	34.38	5.72	38.66	9.16
25	1.33	0.97	13.24	16.49	34.99	7.14	34.93	10.32
26	2.77	2.16	12.74	16.88	35.59	7.87	32.84	11.17

temp. = 348 K

27	23.00	14.87	0.00	0.00	34.77	14.18	2.67	0.69
28	21.56	15.72	2.15	2.66	37.87	17.41	3.32	0.97
29	19.66	15.21	3.99	5.25	39.59	19.31	3.70	1.15
30	18.30	15.84	5.86	8.63	42.32	23.09	3.94	1.37
31	16.47	15.81	7.90	12.89	44.74	27.07	4.23	1.63
32	14.59	15.59	9.91	18.01	46.99	31.64	4.55	1.95
33	15.39	17.52	10.20	19.74	51.94	37.28	0.00	0.00
34	15.00	17.31	10.30	20.22	49.89	36.31	2.63	1.22
35	14.44	16.81	10.53	20.87	48.27	35.44	4.78	2.24
36	13.71	15.28	10.69	20.28	47.04	33.05	5.58	2.51
37	12.57	12.74	10.71	18.46	44.23	28.25	7.23	2.95
38	11.03	10.65	11.09	18.20	40.39	24.58	10.98	4.27
39	10.11	9.50	11.32	18.08	38.20	22.61	13.11	4.96
40	8.92	8.35	11.68	18.59	34.33	20.25	17.72	6.68

(continued next page)

## COMPONENTS:

- (1) Sodium dihydrogenphosphate;  $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]  
 (2) Potassium dihydrogenphosphate;  $\text{KH}_2\text{PO}_4$ ; [7778-70-0]  
 (3) Sodium nitrate;  $\text{NaNO}_3$ ; [7631-99-4]  
 (4) Potassium nitrate;  $\text{KNO}_3$ ; [7757-79-1]  
 (5) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Girich, T.E.; Guljamov, Yu.M.  
*Vopr. Khim. Khim. Tekhnol.* 1979, 57, 54-7.

## EXPERIMENTAL VALUES cont'd:

The compiler has calculated the following values from the data given above.

soln. no.	conc. of $\text{K}^+$ mass%, mol/kg	conc. of $\text{Na}^+$ mass%, mol/kg	conc. of $\text{NO}_3^-$ mass%, mol/kg	conc. of $\text{H}_2\text{PO}_4^-$ mass%, mol/kg
temp. 348 K				
41	7.03	6.58	12.32	19.65
42	5.94	5.51	12.51	19.75
43	5.54	5.13	12.32	19.41
44	7.45	6.89	10.69	16.84
45	5.10	4.57	11.96	18.24
46	5.21	4.57	11.32	16.89
47	5.05	4.44	11.00	16.44
48	5.00	4.36	10.62	15.73
49	4.57	3.94	10.42	15.27
50	0.00	0.00	15.30	20.79
51	1.38	1.15	14.56	20.54
52	2.90	2.50	13.59	19.96
53	3.99	3.55	12.99	19.64
temp. = 373 K				
54	26.73	22.67	0.00	0.00
55	27.74	25.97	0.05	0.08
56	24.45	24.31	2.75	4.66
57	21.25	22.22	5.22	9.28
58	19.46	23.67	7.36	15.23
59	17.89	25.91	9.34	23.02
60	18.34	30.12	9.99	27.92
61	18.10	30.65	10.10	29.08
62	17.65	30.27	10.23	29.85
63	16.96	28.78	10.37	29.93
64	15.62	23.46	10.14	25.91
65	14.38	21.22	10.33	25.93
66	12.97	18.14	10.34	24.58
67	10.93	14.68	11.00	25.14
68	9.76	12.78	11.23	25.01
69	8.87	11.09	11.49	24.44
70	8.30	10.15	11.65	24.24
71	8.05	9.82	11.58	24.04
72	7.59	8.83	11.46	22.69
73	6.86	7.89	11.61	22.73
74	6.06	6.89	11.64	22.50
75	6.31	7.20	10.88	21.12
76	6.17	6.89	10.64	20.20
77	0.00	0.00	16.18	24.17
78	0.73	0.65	15.78	23.96
79	2.78	2.75	14.75	24.83
80	5.08	5.36	13.30	23.87

COMPONENTS: (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) 2-Propanone (acetone); $\text{C}_3\text{H}_6\text{O}$ ; [67-64-1] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]			ORIGINAL MEASUREMENTS: Ferroni, G.; Galea, J.; Antonetti, G. <i>Bull. Soc. Chim. Fr.</i> 1974, 12, (Pt. 1), 273-81.																																																																																																		
VARIABLES:  Composition at 25°C.			PREPARED BY:  J. Eysseltová																																																																																																		
EXPERIMENTAL VALUES:																																																																																																					
A miscibility gap was found in the $\text{NaH}_2\text{PO}_4\text{-C}_3\text{H}_6\text{O-H}_2\text{O}$ system.  The results for the isothermal binodal curve at 25°C are:																																																																																																					
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">upper layer</th> <th colspan="3" style="text-align: center;">lower layer</th> <th rowspan="2" style="vertical-align: middle; font-size: small;">solid<sub>α</sub> phase</th> </tr> <tr> <th style="text-align: center;"><math>\rho/\text{g cm}^{-3}</math></th> <th style="text-align: center;"><math>\text{NaH}_2\text{PO}_4</math> mass%</th> <th style="text-align: center;"><math>\text{C}_3\text{H}_6\text{O}</math> mass%</th> <th style="text-align: center;"><math>\text{H}_2\text{O}</math> mass%</th> <th style="text-align: center;"><math>\rho/\text{g cm}^{-3}</math></th> <th style="text-align: center;"><math>\text{NaH}_2\text{PO}_4</math> mass%</th> <th style="text-align: center;"><math>\text{C}_3\text{H}_6\text{O}</math> mass%</th> <th style="text-align: center;"><math>\text{H}_2\text{O}</math> mass%</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.7940</td> <td style="text-align: center;">~0</td> <td style="text-align: center;">100</td> <td style="text-align: center;">~0</td> <td style="text-align: center;">----</td> <td style="text-align: center;">----</td> <td style="text-align: center;">----</td> <td style="text-align: center;">----</td> <td style="text-align: center;">A</td> </tr> <tr> <td style="text-align: center;">0.8032</td> <td style="text-align: center;">0.10</td> <td style="text-align: center;">92.99</td> <td style="text-align: center;">6.91</td> <td style="text-align: center;">1.5317</td> <td style="text-align: center;">54.81</td> <td style="text-align: center;">0.98</td> <td style="text-align: center;">44.21</td> <td></td> </tr> <tr> <td style="text-align: center;">0.8343</td> <td style="text-align: center;">0.23</td> <td style="text-align: center;">75.74</td> <td style="text-align: center;">24.03</td> <td style="text-align: center;">1.4930</td> <td style="text-align: center;">52.24</td> <td style="text-align: center;">1.18</td> <td style="text-align: center;">46.58</td> <td></td> </tr> <tr> <td style="text-align: center;">0.8941</td> <td style="text-align: center;">1.10</td> <td style="text-align: center;">51.85</td> <td style="text-align: center;">47.05</td> <td style="text-align: center;">1.4684</td> <td style="text-align: center;">50.51</td> <td style="text-align: center;">1.25</td> <td style="text-align: center;">48.24</td> <td></td> </tr> <tr> <td style="text-align: center;">0.9066</td> <td style="text-align: center;">1.38</td> <td style="text-align: center;">41.16</td> <td style="text-align: center;">57.45</td> <td style="text-align: center;">1.4125</td> <td style="text-align: center;">46.44</td> <td style="text-align: center;">1.66</td> <td style="text-align: center;">51.89</td> <td></td> </tr> <tr> <td style="text-align: center;">0.9304</td> <td style="text-align: center;">2.42</td> <td style="text-align: center;">34.12</td> <td style="text-align: center;">63.47</td> <td style="text-align: center;">1.2694</td> <td style="text-align: center;">34.17</td> <td style="text-align: center;">2.19</td> <td style="text-align: center;">63.64</td> <td></td> </tr> <tr> <td style="text-align: center;">0.9807</td> <td style="text-align: center;">5.75</td> <td style="text-align: center;">21.35</td> <td style="text-align: center;">72.90</td> <td style="text-align: center;">1.1344</td> <td style="text-align: center;">21.53</td> <td style="text-align: center;">7.15</td> <td style="text-align: center;">71.32</td> <td></td> </tr> <tr> <td style="text-align: center;">1.1022</td> <td style="text-align: center;">18.44</td> <td style="text-align: center;">9.44</td> <td style="text-align: center;">72.22</td> <td colspan="3" style="text-align: center;">critical solution</td><td></td><td style="text-align: center;">B</td> </tr> <tr> <td style="text-align: center;">1.5576</td> <td style="text-align: center;">56.10</td> <td style="text-align: center;">0</td> <td style="text-align: center;">43.90</td> <td colspan="3"></td><td></td><td style="text-align: center;">C</td> </tr> </tbody> </table>						upper layer			lower layer			solid <sub>α</sub> phase	$\rho/\text{g cm}^{-3}$	$\text{NaH}_2\text{PO}_4$ mass%	$\text{C}_3\text{H}_6\text{O}$ mass%	$\text{H}_2\text{O}$ mass%	$\rho/\text{g cm}^{-3}$	$\text{NaH}_2\text{PO}_4$ mass%	$\text{C}_3\text{H}_6\text{O}$ mass%	$\text{H}_2\text{O}$ mass%	0.7940	~0	100	~0	----	----	----	----	A	0.8032	0.10	92.99	6.91	1.5317	54.81	0.98	44.21		0.8343	0.23	75.74	24.03	1.4930	52.24	1.18	46.58		0.8941	1.10	51.85	47.05	1.4684	50.51	1.25	48.24		0.9066	1.38	41.16	57.45	1.4125	46.44	1.66	51.89		0.9304	2.42	34.12	63.47	1.2694	34.17	2.19	63.64		0.9807	5.75	21.35	72.90	1.1344	21.53	7.15	71.32		1.1022	18.44	9.44	72.22	critical solution				B	1.5576	56.10	0	43.90					C
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<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7]	Ferroni, G.; Galea, J.; Antonetti, G. <i>Bull. Soc. Chim. Fr.</i> 1974, 12, (Pt. 1), 273-81.
(2) Sodium perchlorate; $\text{NaClO}_4$ ; [7601-89-0]	
(3) 2-Propanone (acetone); $\text{C}_3\text{H}_6\text{O}$ ; [67-64-1]	
(4) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	
<b>VARIABLES:</b>	<b>PREPARED BY:</b>
Concentration of $\text{NaClO}_4$ at 25°C.	J. Eyseltova

EXPERIMENTAL VALUES: Composition of the saturated solutions at 25°C.						
1 mol $\text{NaClO}_4/\text{dm}^3$			3 mols $\text{NaClO}_4/\text{dm}^3$			
$\text{H}_2\text{O}$	$\text{NaH}_2\text{PO}_4$	solid	$\text{NaH}_2\text{PO}_4$	solid		
c <sup>a</sup>	mol/dm <sup>3</sup>	phase	mol/dm <sup>3</sup>	phase		
100	4.912	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$	2.400	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$		
90.9	1.089	binodal curve	0.741	binodal curve		
83.3	0.241	" "	0.029	" "		
66.7	0.026	" "	0.0052	" "		
50.0	0.0061	" "	0.0024	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$		
33.3	$\sim 7.5 \times 10^{-4}$	" "	$4.2 \times 10^{-4}$	"		
9.1	$\sim 6 \times 10^{-6}$	" "	$5 \times 10^{-6}$	"		
0.0	$10^{-6}$	$\text{NaH}_2\text{PO}_4$	$10^{-7}$	$\text{NaH}_2\text{PO}_4$		

<sup>a</sup>The concentration units are: mol/100 mols of solvent.

#### AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>
The mixtures were equilibrated by stirring in a thermostat for 48 hours. This was done in the dark to prevent photo-decomposition. The dihydrogenphosphate ion content was determined by an automatic potentiometric pH titration after evaporating the solution to dryness and then dissolving the residue in bidistilled water. The 2-propanone content was determined iodometrically using a potentiometric titration.	Reagent grade materials were used. The $\text{NaH}_2\text{PO}_4$ was dehydrated at 100°C and stored in a vacuum over NaOH. The water was bidistilled and deaerated.
	<b>ESTIMATED ERROR:</b> The temperature was constant to within $\pm 0.1$ K. The analyses had a precision of $\pm 0.5\%$ .
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>EVALUATOR:</b> J. Eyseltová Charles University Prague, Czechoslovakia May 1985
<b>CRITICAL EVALUATION:</b>	
<b>THE BINARY SYSTEM</b>	
<p>Solubility data have been reported for the temperature interval 273-373 K (1), for the 272-313 K interval (2), and at 273, 291 and 298 K (3). Wendrow and Kobe (4) report their own extrapolated data as well as data obtained by others (5). Older data (7-13) are cited in the article by D'Ans and Schreiner (6). But these data appear to have a systematic error and were eliminated from consideration during the first graphical examination of the material. On the other hand, some data from studies of multicomponent systems (14-19) were consistent with those reported by others (1-3) and were included in the evaluation procedure.</p>	
<p>Several hydrates of disodium hydrogenphosphate have been reported. Wendrow and Kobe (4) stated that the transition temperatures of the dodecahydrate to the heptahydrate and of the heptahydrate to the dihydrate were 308.7 and 321.2 K, respectively. A more precise determination of these values (6) gives transition temperatures of 308.55 and 321.55 K, respectively. There is also a report of the existence of two forms of the dodecahydrate with a transition temperature of 302.8 K (2), but this has not been confirmed by any other investigators. The transition temperature of the dihydrate to the anhydrous salt was said to be 368.2 K (4).</p>	
<p>All the experimental data that were not eliminated in the first graphical examination were evaluated by the method described in chapter 3. The data were fitted to equation [1]. The precision of the published data was estimated to be about the same as</p>	
· $\ln \frac{x}{x_0} = A \cdot (1/T - 1/T_0) + B \cdot \ln(T/T_0) + C \cdot (T - T_0)$ [1]	
<p>that for sodium dihydrogenphosphate and hence, the criteria for the selection of relevant points were the same as those used in chapter 3. However, these criteria could be applied completely only to the data for the dodecahydrate. For the heptahydrate and the dihydrate the data in the different reports were not in sufficiently good agreement and the selection of values for <math>x_0</math> was based on the results of only one report (1). Table I is a summary of the solubility data.</p>	
<p>During the iteration procedure practically all the data except those of Shiomi (1) were eliminated. Therefore, the results of this procedure are considered to be tentative.</p>	
<p>The values for the parameters of equation [1] are given in Table II while in Table III the solubility values calculated from equation [1] are given.</p>	
<b>MULTICOMPONENT SYSTEMS</b>	
<p>Solubility data have been reported for several ternary and quaternary systems but in only a few instances have data for a given system been reported by more than one investigator(s). In three of the systems solid phases other than the components or their hydrates have been reported.</p>	
<p>Two reports (3,15) give data for the <math>\text{Na}_2\text{HPO}_4\text{-H}_2\text{O}_2\text{-H}_2\text{O}</math> system at 273 K but a comparison of the two reports cannot be made because the concentration range studied in one report (3) is too narrow. The other article (15) reports the presence of the two compounds <math>\text{Na}_2\text{HPO}_4 \cdot 1.5\text{H}_2\text{O}_2</math> [13769-82-9] and <math>\text{Na}_2\text{HPO}_4 \cdot 2.5\text{H}_2\text{O}_2</math> [13769-83-0] at <math>\text{H}_2\text{O}_2</math> concentrations greater than 27 mass% for this system.</p>	
<p>Data for the <math>\text{Na}_2\text{HPO}_4\text{-H}_3\text{BO}_3\text{-H}_2\text{O}</math> system at 298 K have been reported by Beremzhanov, et al. (20). The results are analogous to those for the <math>\text{NaH}_2\text{PO}_4\text{-NaBO}_2\text{-H}_2\text{O}</math> system reported by the same authors (21) and discussed in chapter 4. The appearance of <math>\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}</math> [61028-24-8] as a solid phase suggests that the system should be treated as part of the <math>\text{Na}_2\text{O-B}_2\text{O}_3\text{-P}_2\text{O}_5\text{-H}_2\text{O}</math> system.</p>	
<p>A similar situation exists with respect to the <math>\text{Na}_2\text{HPO}_4\text{-Na}_2\text{SiO}_3\text{-H}_2\text{O}</math> system. Data for this system at 293 K were reported by Manvelyan, et al. (22). The formation of <math>\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}</math> [10101-89-0] in this system is an indication of its pseudo-ternary character.</p>	
<p>There is no evidence for the formation of solid solutions and/or ternary compounds in the other multicomponent systems for which data are available.</p>	
<p>There is only one report giving data for the systems <math>\text{Na}_2\text{HPO}_4\text{-Na}_2\text{H}_2\text{EDTA-H}_2\text{O}</math> (17), <math>\text{Na}_2\text{HPO}_4\text{-NaNO}_3\text{-H}_2\text{O}</math> (23) and <math>\text{Na}_2\text{HPO}_4\text{-NaCl-H}_2\text{O}</math> (24). All these data were obtained at 298 K. Makin and his co-workers have reported data for several systems containing <math>\text{Na}_2\text{HPO}_4</math> as a component. There are two reports for the <math>\text{Na}_2\text{HPO}_4\text{-Na}_2\text{SO}_4\text{-H}_2\text{O}</math> system at 298 K (18, 19). This group has also published data for two quaternary systems: the <math>\text{Na}_2\text{HPO}_4\text{-NaNO}_3\text{-Na}_2\text{SO}_4\text{-H}_2\text{O}</math> system (25); and the <math>\text{Na}_2\text{HPO}_4\text{-NaNO}_3\text{-NaCl-H}_2\text{O}</math> system (26), both at</p>	
(continued next page)	

COMPONENTS:				EVALUATOR:			
(1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4]				J. Eyseltová Charles University Prague, Czechoslovakia			
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]				May 1985			

## CRITICAL EVALUATION:

Table I. Solubility of  $\text{Na}_2\text{HPO}_4$  in water.

T/K	mass%	ref.	init/final	T/K	mass%	ref.	init/final
$\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$							
268.5	1.43	2	1/1	298.30	10.74	1	1/1
273.2	1.605	3	2/0	298.30	10.72	1	2/2
273.2	1.6	15	2/0	298.60	10.97	1	1/1
273.8	1.71	1	2/0	298.60	10.98	1	1/1
279.7	2.66	2	1/1	298.60	10.96	1	1/1
283.41	3.43	1	1/0	298.70	11.05	1	1/1
283.41	3.42	1	1/0	298.70	11.04	1	1/1
283.51	3.46	1	4/0	298.70	11.09	1	1/1
288.26	4.97	1	1/1	301.0	12.40	2	1/0
288.26	4.96	1	1/1	301.8	13.70	2	1/0
291.2	5.985	3	1/0	302.2	13.82	2	1/0
293.10	6.77	2	1/0	302.7	14.66	2	1/0
293.39	7.30	1	1/0	303.3	16.28	2	1/0
293.39	7.32	1	1/0	303.36	17.22	1	1/1
293.39	7.31	1	2/0	303.36	17.27	1	1/1
295.92	8.20	2	1/0	303.41	17.76	1	3/0
297.30	8.70	2	1/0	303.41	17.78	1	1/0
298.2	10.829	3	1/0	303.41	17.74	1	1/0
298.2	10.59	17	1/1	303.41	17.44	1	1/0
298.2	10.32	18, 19	2/0	303.41	17.77	1	1/0
298.2	10.80	16	1/0	303.91	18.98	1	1/0
298.2	10.4	14	1/0	303.91	18.96	1	1/0
298.2	10.60	17	1/1	303.91	18.97	1	1/0
				306.19	23.59	1	2/2
				306.29	23.89	1	1/1
				306.29	23.88	1	1/1
$\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$							
309.42	31.20	1	7/7	313.44	35.42	1	2/0
309.42	31.21	1	1/1	313.44	35.41	1	1/0
309.42	31.22	1	1/1	318.29	40.68	1	1/1
309.42	31.23	1	1/1	318.29	40.69	1	1/1
310.42	32.23	1	3/3	318.29	40.71	1	1/1
310.42	32.19	1	2/2	318.29	40.72	1	1/1
310.42	32.18	1	1/1	320.5	43.37	1	1/1
310.42	32.22	1	1/1	320.5	43.36	1	1/1
313.44	35.46	1	2/0	321.3	44.45	1	2/2
313.44	35.43	1	1/0	321.3	44.48	1	1/1
$\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$							
323.37	44.57	1	1/1	343.41	46.83	1	1/1
323.37	44.55	1	1/1	353.54	48.65	1	2/0
323.37	44.54	1	1/1	353.54	48.67	1	1/0
323.37	44.56	1	1/1	362.89	50.70	1	1/1
328.32	44.86	1	1/1	362.89	50.71	1	1/1
328.32	44.88	1	1/1	367.90	51.76	1	1/0
328.42	44.94	1	1/1	367.90	51.78	1	1/0
328.42	44.95	1	1/1	367.90	51.77	1	1/0
333.38	45.36	1	2/2	369.01	51.71	1	2/0
333.38	45.35	1	1/1	370.01	51.20	1	1/1
343.41	46.84	1	1/1	370.01	51.22	1	1/1
343.41	46.86	1	1/1	372.92	50.52	1	1/0
				372.92	50.53	1	2/0

(Table continued on next page)

COMPONENTS:	EVALUATOR:
(1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	J. Eyseltová Charles University Prague, Czechoslovakia May 1985

## CRITICAL EVALUATION:

Table II. Parameters for equation [1].

Parameter	$\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$		$\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$		$\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$	
	value	$\sigma^\alpha$	value	$\sigma^\alpha$	value	$\sigma^\alpha$
A	$-1.989 \times 10^6$	5000	$-7.56 \times 10^5$	300	$-1.546 \times 10^5$	500
B	$-1.379 \times 10^4$	50	$-4.79 \times 10^3$	20	887	5
C	24.0	0.1	7.63	0.03	-1.264	0.005
$x_o$	0.014714		0.064963		0.10040	
$T_o$	298.2		313.4		343.4	

<sup>a</sup>The standard deviation for the parameter.Table III. Tentative values, calculated from equation [1], for the solubility of  $\text{Na}_2\text{HPO}_4$  in water.

$\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$			
T/K	mole fraction	mole/kg	mass%
273.2	0.0021371	0.12	1.66
278.2	0.0037242	0.21	2.87
283.2	0.0055018	0.31	4.19
288.2	0.0074979	0.42	5.63
293.2	0.010172	0.57	7.51
298.2	0.014714	0.83	10.55
303.2	0.024149	1.37	16.34
308.2	0.047504	2.77	28.25
309.45 <sup>a</sup>	0.058234	3.43	32.80
$\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$			
309.45	0.058234	3.43	32.80
311.2	0.058862	3.47	33.06
313.2	0.064287	3.82	35.17
315.2	0.070110	4.19	37.32
317.2	0.076443	4.60	39.53
319.2	0.083431	5.06	41.82
321.2 <sup>b</sup>	0.091254	5.58	44.23
321.6 <sup>b</sup>	0.092892	5.69	44.71

<sup>a</sup>The dodecahydrate to heptahydrate transition temperature.<sup>b</sup>The heptahydrate to dihydrate transition temperature.

Both transition temperatures were found graphically by the evaluator.