

COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. May 1986
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## CRITICAL EVALUATION:

Quantitative solubility data for the system toluene (1) and water (2) have been reported in the references listed in Table 1.

TABLE 1: Quantitative Solubility Studies of the  
Toluene (1) - Water (2) System

Reference	T/K	Solubility	Method
Jaeger (ref 1)	353-573	(1) in (2)	synthetic
Fühner (ref 2)	289	(1) in (2)	titration
Uspenskii (ref 3)	283,295	mutual	titration, analytical
Rosenbaum and Walton (ref 4)	283-323	(2) in (1)	analytical
Gross and Saylor (ref 5)	303	(1) in (2)	interferometric
Tarassenkow and Poloshinzewa (ref 6,7)	264-366	(2) in (1)	synthetic
Booth and Everson (ref 8)	298	(1) in (2)	residue volume
Andrews and Keefer (ref 9) (ref 9)	298	(1) in (2)	spectrophotometric
Klevens (ref 10)	298	(1) in (2)	spectrophotometric
Bohon and Claussen (ref 11)	273-318	(1) in (2)	spectrophotometric
Morrison and Billet (ref 12)	298	(1) in (2)	analytical
Wing and Johnston (ref 13)	298	(2) in (1)	radiotracer
Caddock and Davis (ref 14)	293	(2) in (1)	radiotracer
Guseva and Parnov (ref 15,16)	363-497	(1) in (2) <sup>a</sup>	synthetic?
Jones and Monk (ref 17)	298	(2) in (1)	radiotracer
McAuliffe (ref 18)	298	(1) in (2)	GLC
Hoegfeldt and Bolander (ref 19)	298	(2) in (1)	Karl Fischer
Englin <i>et al.</i> (ref 20)	273-323	(2) in (1)	analytical
Connolly (ref 21)	553-583 <sup>b</sup>	(1) in (2)	cloud point
Johnson <i>et al.</i> (ref 22)	298	(2) in (1)	Karl Fischer
McAuliffe (ref 23)	298	(1) in (2)	GLC
Gregory <i>et al.</i> (ref 24)	298	(2) in (1)	Karl Fischer
Benkovski <i>et al.</i> (ref 26)	303	(2) in (1)	Karl Fischer
Glaseo and Schultz (ref 28)	288-303	(2) in (1) <sup>a</sup>	Karl Fischer
Pierotti and Liabastre (ref 29)	278-318	(1) in (2)	GLC
Bradley <i>et al.</i> (ref 31)	298-328 <sup>b</sup>	(1) in (2)	spectrophotometric
Polak and Lu (ref 32)	273-298	mutual	GLC, Karl Fischer

(Table 1 continued next page)

COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia.  May 1986
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## CRITICAL EVALUATION: (continued)

(Table 1 continued)

Reference	T/K	Solubility	Method
Brown and Wasik (ref 33)	278-293	(1) in (2)	GLC
Krasnoshchekova and Gubergrits (ref 34)	298	(1) in (2)	GLC
Mackay and Shiu (ref 35)	298	(1) in (2)	GLC
Sada <i>et al.</i> (ref 36)	298	(1) in (2)	titration
Sutton and Calder (ref 37)	298	(1) in (2)	GLC
Price (ref 39)	298	(1) in (2)	GLC
Korenman and Aref'eva (ref 40,41)	293,298	(1) in (2)	titration
Krzyzanowska and Szeliga (ref 42)	298	(1) in (2)	GLC
Banerjee <i>et al.</i> (ref 43)	298	(1) in (2)	radiotracer
Schwarz (ref 44)	297	(1) in (2)	chromatographic
Rossi and Thomas (ref 45)	298	(1) in (2)	GLC
Sanemasa <i>et al.</i> (ref 46)	288-318	(1) in (2)	spectrophotometric
Sanemasa <i>et al.</i> (ref 47)	288-318	(1) in (2)	spectrophotometric
Sanemasa <i>et al.</i> (ref 48)	298	(1) in (2)	spectrophotometric

a Data also given for D<sub>2</sub>O

b Pressure also varied, see Table 4

The original data in all of the publications listed in Table 1 are compiled in the Data Sheets immediately following this Critical Evaluation.

As indicated in the footnotes to Table 1, quantitative solubility data for toluene in heavy water (ref 15) and D<sub>2</sub>O in toluene (ref 28), have been reported. However, since no other comparable data are available, no critical evaluation of the reliability of these data can be made. The interested user is referred to the relevant Data Sheets for experimental solubilities. Solubility values reported by Price (ref 30) were not available for inspection. Solubility data may also be calculated from the calorimetric data of Gill *et al.* (ref 38).

Critical point data have been reported by Alwani and Schneider (ref 25) and Roof (ref 27) and are discussed in section 3 below.

In the toluene-water system the mutual solubilities are sufficiently low to enable data reported in w/v fractions (or equivalent) to be converted to mass percent solubilities with reasonable precision by assuming solution densities to be the same as the pure solvents. These conversions are given  
(continued next page)

COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia.  May 1986
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CRITICAL EVALUATION: (continued)

in the Data Sheets and the data are included in this Evaluation. The data of Jaeger (ref 1), Booth and Everson (ref 8), Wing and Johnston (ref 13), Jones and Monk (ref 7) and Sada *et al.* (ref 36) given in v/v fractions have not been converted and so have been excluded from this Evaluation.

In the Tables which follow, values obtained by the Evaluator by graphical interpolation or extrapolation of the original measurements given in the Data Sheets are indicated by an asterisk (\*). "Best" values have been obtained by simple averaging. The uncertainty limits ( $\sigma_n$ ) attached to these values do not have statistical significance and should be regarded only as a convenient representation of the spread of values rather than as error limits. The letter (R) indicates "Recommended" data. Data are "Recommended" if two or more apparently reliable studies are in reasonable agreement ( $\pm 5\%$  relative). All other data are regarded as "Tentative". For convenience, further discussion of this system will be divided into three parts.

1. THE SOLUBILITY OF TOLUENE (1) IN WATER (2)

The solubility of toluene in water has been investigated on numerous occasions (Table 1).

The large amount of data at 298K enables a particularly critical assessment of the reported values. Data have been rejected if they deviated significantly ( $> 3 \sigma_n$ ) from the average value. Thus, at 298K, the value of Krasnoshchekova and Gubergrits (ref 34), which is markedly lower than all other values, and Bohon and Claussen (ref 11), Pierotti and Liabastre (ref 29), Korenman and Aref'eva (ref 41), Banerjee *et al.* (ref 43) and Schwarz (ref 44, 297K), which are higher, have all been rejected. The datum of Krzyzanowska and Szeliga (ref 42) has not been included in the Critical Evaluation because it does not appear to be independent of that of Price (ref 38).

At temperatures other than 298K, the data of Fühner (ref 2) and Uspenskii (ref 3) are markedly lower than all other values and are rejected. All other data are included in Table 2 except for the high temperature data which are discussed in section 3 below.

Agreement among the studies (ref 11,29,33,46,47) which report solubilities over a range of temperatures below 323K is disappointing (see Table 2 and Figure 1). For example, although the solubility data of Pierotti and Liabastre (ref 29) are usually markedly higher than Recommended values in well-characterised systems (e.g. benzene in water) their toluene results lie

(continued next page)

COMPONENTS: (1) Toluene, C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. May 1986
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## CRITICAL EVALUATION: (continued)

within the range of values reported by other workers. Even the averaged "Best" solubilities, which usually show a smoother variation with temperature than individual data sets, show a good deal of scatter (e.g. compare Figure 1 with the analogous diagram for benzene and water).

TABLE 2: Recommended (R) and Tentative Values of the Solubility of Toluene (1) in Water (2)

T/K	Solubility values ( $\pm \sigma_n$ )		
	Reported values $10^2 g(1)/100g \text{ sln}$	"Best" values $10^2(1)/100g \text{ sln}$	$10^4 x_1$
273	6.60* (ref 11), 7.24 (ref 32)	$6.9 \pm 0.3$	1.35
278	6.42* (ref 11), 6.36 (ref 29), 6.08* (ref 33)	$6.3 \pm 0.1$	1.23
283	6.28* (ref 11), 6.32 (ref 29), 5.82* (ref 33), 5.24 (ref 46)	$5.9 \pm 0.4$	1.15
293	6.18* (ref 11), 6.06 (ref 29), 5.67 (ref 33), 5.7 (ref 40), 5.45 (ref 46), 5.18* (ref 47)	$5.7 \pm 0.3$	1.11
298	5.3 (ref 9), 5.00 (ref 10), 5.36 (ref 12), 5.38 (ref 18), 5.15 (ref 23), 5.47 (ref 31), 5.73 (ref 32), 5.20 (ref 35), 5.35 (ref 37), 5.54 (ref 39), 5.07 (ref 45), 5.57 (ref 46), 5.25 (ref 47), 5.19 (ref 48)	$5.3 \pm 0.2$ (R)	1.04 (R)
303	5.7 (ref 5), 6.40 (ref 11), 6.5* (ref 29), 5.7* (ref 31), 5.73* (ref 46), 5.32* (ref 47)	$5.9 \pm 0.4$	1.15
313	6.82* (ref 11), 6.7* (ref 29), 6.6* (ref 31), 6.12* (ref 46), 5.57 (ref 47)	$6.4 \pm 0.5$	1.25
318	7.15* (ref 11), 6.72 (ref 29), 7.22 (ref 31), 6.35 (ref 46), 5.78 (ref 47)	$6.6 \pm 0.5$	1.29
328	8.6 (ref 31)	8.6	1.68

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## COMPONENTS:

(1) Toluene;  $C_7H_8$ ; [108-88-3](2) Water;  $H_2O$ ; [7732-18-5]

## EVALUATOR:

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## CRITICAL EVALUATION: (continued)

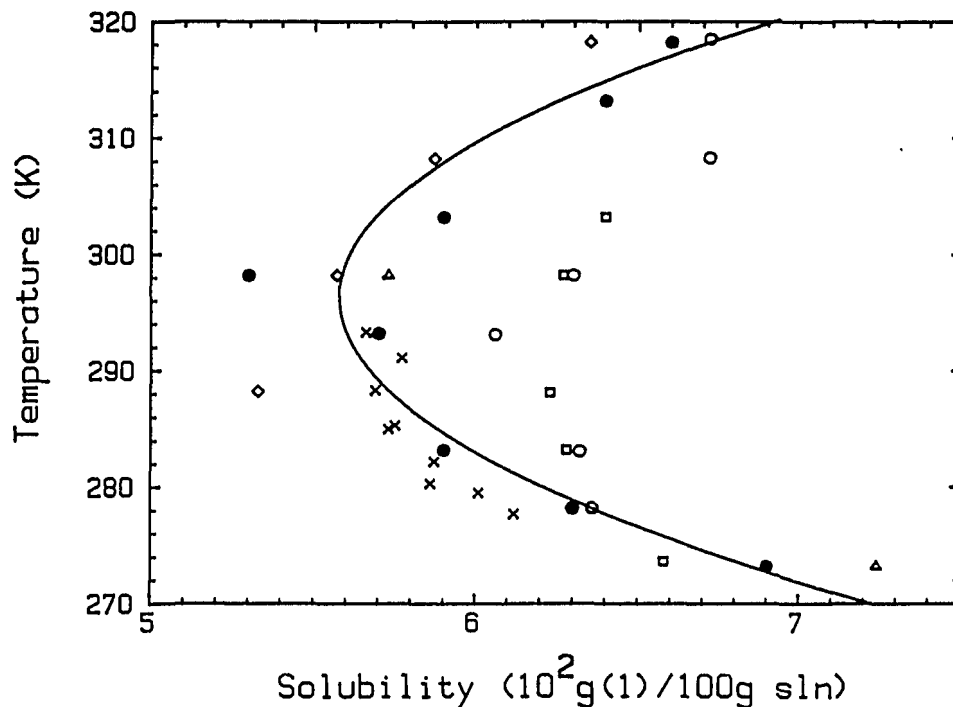


FIGURE 1. Solubility of toluene in water, selected data: ref 11 ( $\square$ ); ref 29 ( $\circ$ ); ref 32 ( $\Delta$ ); ref 33 ( $\times$ ); ref 46 ( $\diamond$ ); "Best" values ( $\bullet$ , full line).

Thermodynamic data calculated by application of the van't Hoff equation to the variable temperature solubility studies are summarized in Table 3. As might be expected from the scatter in the reported solubilities none of the derived thermodynamic functions agree closely with reliable calorimetric values (Table 3). Even the averaged "Best" solubilities which should show minimal systematic (temperature dependent) errors give a disappointing value for  $\Delta C_{p,sln}$ .

(continued next page)

COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. May 1986
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CRITICAL EVALUATION: (continued)

TABLE 3: Thermodynamic Functions Calculated  
from Solubility Data

Reference	$\Delta H_{sln}$ kJ mol <sup>-1</sup>	$\Delta C_{p,sln}$ J K <sup>-1</sup> mol <sup>-1</sup>
Bohon and Claussen (ref 11)	2.3	292
Guseva and Parnov (ref 15,16)	35.3	-62
Pierotti and Liabastre (ref 29)	1.5	168
Brown and Wasik (ref 33)	4.7	590
Sanemasa <i>et al.</i> (ref 46)	3.7	160
Sanemasa <i>et al.</i> (ref 47)	2.1	181
"Best" values (Table 2)	1.7	566
Gill <i>et al.</i> (ref 38)	1.73 ± 0.04 <sup>a</sup>	263 ± 13 <sup>a</sup>

<sup>a</sup> Calorimetric data

## 2. THE SOLUBILITY OF WATER (2) IN TOLUENE (1)

A reasonable amount of data is available for the solubility of water in toluene over the temperature range 273-323K.

In spite of the difficulties of accurate analysis at the relatively low concentrations involved, the results are generally in good agreement and a number of "Best" values have been "Recommended" (Table 4).

Except for the low temperature ( $T < 313K$ ) values of Tarassenkow and Poloshinzewa (ref 6,7) and the datum of Benkovski *et al.* (ref 26), which are markedly lower than all other values and are therefore rejected, all the available data are listed in Table 4. Selected data are also plotted in Figure 2 (on the next page but one).

(continued next page)

COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. May 1986
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CRITICAL EVALUATION: (continued)

TABLE 4: Recommended (R) and Tentative Values of the Solubility of Water (2) in Toluene (1)

T/K	Solubility values		
	Reported values 10 <sup>2</sup> g(2)/100g sln	"Best" values (± σ <sub>n</sub> ) 10 <sup>2</sup> g(2)/100g sln	10 <sup>3</sup> x <sub>2</sub>
273	2.74 (ref 20), 2.28 (ref 32)	2.5 ± 0.2	1.3
283	4.26 (ref 3), 3.35 (ref 4), 3.16 (ref 10)	3.6 ± 0.5	1.8
293	5.1* (ref 3), 4.50 (ref 4), 4.6 (ref 14), 4.60 (ref 20), 4.7* (ref 28)	4.7 ± 0.2 (R)	2.4 (R)
298	5.6* (ref 3), 5.7 (ref 4), 5.4 (ref 19), 5.3* (ref 20), 5.72 (ref 22), 5.60 (ref 24), 5.45 (ref 28), 5.43 (ref 32)	5.5 ± 0.1 (R)	2.8 (R)
303	6.00 (ref 4), 6.15 (ref 20), 6.15 (ref 28)	6.1 ± 0.1 (R)	3.1 (R)
313	7.33 (ref 4), 7.3* (ref 6,7), 7.50 (ref 20)	7.4 ± 0.1 (R)	3.8 (R)
323	9.53 (ref 4), 10.2* (ref 6,7), 9.65 (ref 20)	9.8 ± 0.3 (R)	5.0 (R)
333	15.0* (ref 6,7)	15	7.7
343	21.0* (ref 6,7)	21	11
353	28.7* (ref 6,7)	29	15

Despite the relatively small differences between the data of Tarassenkow and Poloshinzewa (ref 6,7) and the "Best" values of Table 4 (see Figure 2 on next page), application of the van't Hoff equation yields quite different values for  $\Delta H_{\text{sln}}$  (31 and 21 kJ mol<sup>-1</sup>) and  $\Delta C_{\text{p,sln}}$  (-24 and +239 J K<sup>-1</sup> mol<sup>-1</sup>, respectively). Comparison with similar reactions (e.g. water in benzene:  $\Delta H_{\text{sln}} = 24$  kJ mol<sup>-1</sup> and  $\Delta C_{\text{p,sln}} = 99$  J K<sup>-1</sup> mol<sup>-1</sup>) suggests the "Best" values may be more reliable.

(continued next page)

## COMPONENTS:

- (1) Toluene;  $C_7H_8$ ; [108-88-3]  
 (2) Water;  $H_2O$ ; [7732-18-5]

## EVALUATOR:

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CRITICAL EVALUATION: (continued)

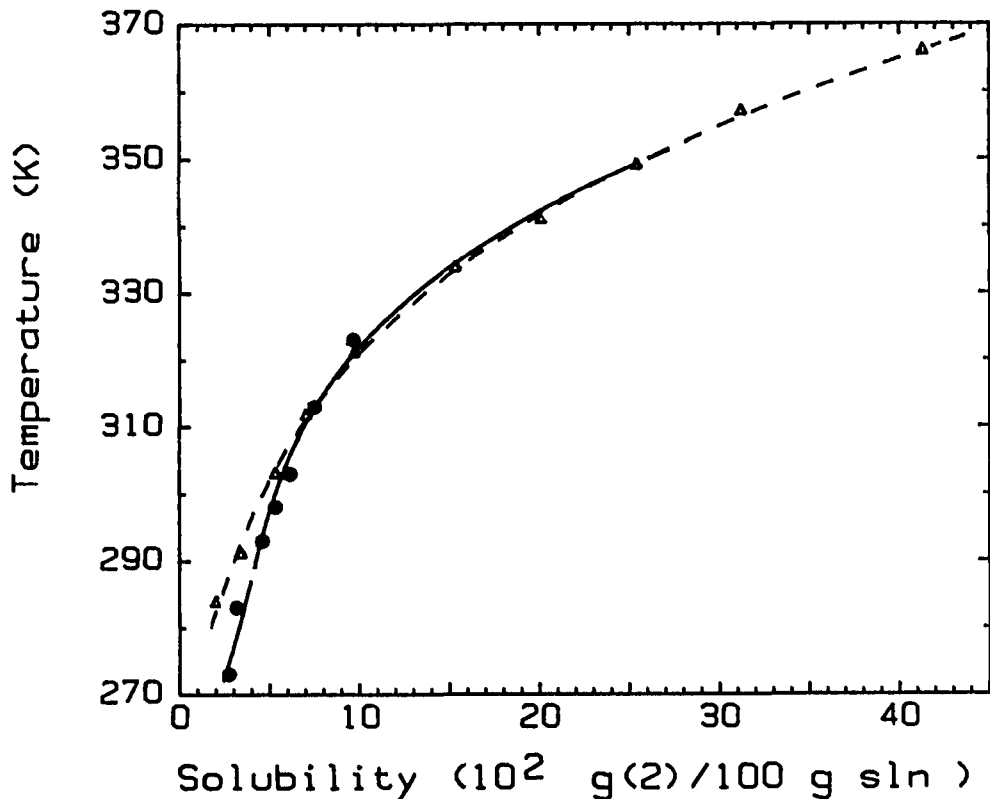


FIGURE 2. Solubility of water in toluene: ref 6,7 ( $\Delta$ , broken line); Table 3 "Best" values ( $\bullet$ , full line).

### 3. MUTUAL SOLUBILITIES OF TOLUENE (1) AND WATER (2) AT ELEVATED PRESSURES

Solubilities in the toluene + water system have been studied at higher than atmospheric pressure in a few publications but the system lacks a comprehensive study. Table 5 gives the range of conditions under which the system has been studied.

As can be seen there is little overlap between the various workers and a meaningful comparison cannot be made. The interested user is referred to the relevant Data Sheets for experimental solubilities. However, it should be noted that thermodynamic functions calculated from the data of Guseva and Parnov (ref 15,16) disagree markedly with other values and are unlikely to be correct.

(continued next page)



COMPONENTS: (1) Toluene, C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. C.L. Young, Department of Physical Chemistry, University of Melbourne, Vic., Australia. May 1986
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## CRITICAL EVALUATION: (continued)

The phase behaviour of this system is similar to that of benzene + water. Here are two critical loci, one starting at the critical point of water and eventually approaching high pressure. The second starts at the critical point of toluene and ends in a critical end point on a three phase line. The topology of the pressure - temperature projection is similar to that given for benzene + water except that the temperature at which the vapor pressures of the two pure components are equal is considerably lower than in the benzene + water system.

In the region above the three phase line on the pressure - temperature projection, the pressure is greater than the vapor pressure and then a maximum of two liquid phases is possible. There may be one or two liquid phases depending on the overall composition. To the left of the critical line starting at toluene it is possible to have one or two phases present depending on the overall composition.

Roof (ref 27) has determined the temperature and pressure of the critical end point in this system to be  $T = 558.1\text{K}$ ,  $P = 10.10\text{MPa}$ .

TABLE 5: Solubility Studies of the Toluene + Water System at Elevated Pressures

Reference	$p/\text{MPa}$	$T/\text{K}$	Solubility
Guseva and Parnov (ref 15,16)	- <sup>a</sup>	363-497	(1) in (2)
Connolly (ref 21)	15-45	553-583	(1) in (2)
Alwani and Schneider (ref 25)	- <sub>b</sub>	- <sub>b</sub>	- <sub>b</sub>
Roof (ref 27)	- <sub>b</sub>	- <sub>b</sub>	- <sub>b</sub>
Bradley <i>et al.</i> (ref 31)	1,100	273-303	(1) in (2)

<sup>a</sup> Along three phase line

<sub>b</sub> Critical point data only

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COMPONENTS: (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A. Australia. May 1986
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CRITICAL EVALUATION: (continued)

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<p>COMPONENTS:</p> <p>(1) Toluene; C<sub>7</sub>H<sub>8</sub>; [108-88-3]</p> <p>(2) Water; H<sub>2</sub>O; [7732-18-5]</p>	<p>EVALUATOR:</p> <p>G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia.</p> <p>May 1986</p>
<p>CRITICAL EVALUATION: (continued)</p>	
<p>REFERENCES (continued)</p> <p>32. Polak, J.; Lu, B.C-Y. <i>Can. J. Chem.</i> <u>1973</u>, <i>51</i>, 4018-23.</p> <p>33. Brown, R.L.; Wasik, S.P. <i>J. Res. Natl. Bur. Stds. A</i> <u>1974</u>, <i>78</i>, 453-60.</p> <p>34. Krasnoshchekova, R.Ya.; Gubergrits, M.Ya. <i>Vodnye. Resursy.</i> <u>1975</u>, <i>2</i>, 170-3.</p> <p>35. Mackay, D.; Shiu, W.Y. <i>Can. J. Chem. Eng.</i> <u>1975</u>, <i>53</i>, 239-41.</p> <p>36. Sada, E.; Kito, S.; Ito, Y. <i>J. Chem. Eng. Data</i> <u>1975</u>, <i>20</i>, 373-5.</p> <p>37. Sutton, C.; Calder, J.A. <i>J. Chem. Eng. Data</i> <u>1975</u>, <i>20</i>, 320-2.</p> <p>38. Gill, S.J.; Nichols, N.F.; Wadso, I. <i>J. Chem. Thermodyn.</i> <u>1976</u>, <i>8</i>, 445-52.</p> <p>39. Price, L.C. <i>Am. Assoc. Petrol. Geol. Bull.</i> <u>1976</u>, <i>6</i>, 213-44.</p> <p>40. Korenman, I.M.; Aref'eva, R.P. USSR Patent 553 534, 1977. 04.05; C.A. 87:87654.</p> <p>41. Korenman, I.M.; Aref'eva, R.P. <i>Zh. Prikl. Khim.</i> <u>1978</u>, <i>51</i>, 957-8.</p> <p>42. Krzyzanowska, T.; Szeliga, J. <i>Nafta (Katowice)</i> <u>1978</u>, <i>34</i>, 413-7.</p> <p>43. Banerjee, S.; Yalkowski, S.H.; Valvani, S.C. <i>Env. Sci. Technol.</i> <u>1980</u>, <i>14</i>, 1227-9.</p> <p>44. Schwarz, F.P. <i>Anal. Chem.</i> <u>1980</u>, <i>52</i>, 10-15.</p> <p>45. Rossi, S.S.; Thomas, W.H. <i>Env. Sci. Technol.</i> <u>1981</u>, <i>15</i>, 715-6.</p> <p>46. Sanemasa, I.; Araki, M.; Deguchi, T.; Nagai, H. <i>Chem. Lett.</i> <u>1981</u>, 225-8.</p> <p>47. Sanemasa, I.; Araki, M.; Deguchi, T.; Nagai, H. <i>Bull. Chem. Soc. Jpn.</i> <u>1982</u>, <i>55</i>, 1054-62.</p> <p>48. Sanemasa, I.; Arakawa, S.; Araki, M.; Deguchi, T. <i>Bull. Chem. Soc. Jpn.</i> <u>1985</u>, <i>57</i>, 1539-44.</p>	
<p>ACKNOWLEDGEMENT</p>	
<p>The Evaluator thanks Dr Brian Clare for the graphics and Dr Marie-Claire Haulait-Pirson for valuable comments. Section 3 was written jointly with C. L. Young, Department of Physical Chemistry, University of Melbourne, Australia.</p>	

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Jaeger, A. <i>Brennst. Chem.</i> <u>1923</u> , 4, 259.										
<b>VARIABLES:</b> Temperature: 100-300°C	<b>PREPARED BY:</b> A. Maczynski										
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in water</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>mL(1)/100 mL(2)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">150</td> <td style="text-align: center;">0.2</td> </tr> <tr> <td style="text-align: center;">200</td> <td style="text-align: center;">0.7</td> </tr> <tr> <td style="text-align: center;">250</td> <td style="text-align: center;">2.8</td> </tr> <tr> <td style="text-align: center;">300</td> <td style="text-align: center;">13.0</td> </tr> </tbody> </table>		<u>t/°C</u>	<u>mL(1)/100 mL(2)</u>	150	0.2	200	0.7	250	2.8	300	13.0
<u>t/°C</u>	<u>mL(1)/100 mL(2)</u>										
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200	0.7										
250	2.8										
300	13.0										
<b>AUXILIARY INFORMATION</b>											
<b>METHOD/APPARATUS/PROCEDURE:</b>  The solubility of (1) in (2) was determined in sealed glass tubes.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) not specified. (2) not specified.  <b>ESTIMATED ERROR:</b> not specified.  <b>REFERENCES:</b>										

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Fuhner, H. <i>Ber. Dtsch. Chem. Ges.</i> <u>1924</u> , 57, 510-5.
<b>VARIABLES:</b>  One temperature: 16°C	<b>PREPARED BY:</b>  A. Maczynski, Z. Maczynska and A. Szafranski
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water at 16°C was reported to be 0.047 g(1)/100 g sln.  The corresponding mole fraction, $x_1$ , calculated by the compilers is $9.2 \times 10^{-5}$ .	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  In a stoppered volumetric cylinder, pipetted volumes or weighed amounts of (1) were added with shaking to 50, 100, or 1000 cm <sup>3</sup> (2) until a completely clear solution was no longer obtained at the experimental temperature.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) source not specified; commercial grade; used as received, (2) not specified.  <b>ESTIMATED ERROR:</b>  Not specified.  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Uspenskii, S.P. <i>Neft. Khoz.</i> <u>1929</u> , 11-12, 713-7.																		
<b>VARIABLES:</b> Temperature: 10 and 22°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																		
<b>EXPERIMENTAL VALUES:</b>  <div style="text-align: center;">Solubility of toluene in water</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>g(1)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>5</sup>x<sub>1</sub></u> (compiler)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">0.0368 ± 0.0002</td> <td style="text-align: center;">7.20</td> </tr> <tr> <td style="text-align: center;">22</td> <td style="text-align: center;">0.0492 ± 0.0003</td> <td style="text-align: center;">9.62</td> </tr> </tbody> </table>  <div style="text-align: center;">Solubility of water in toluene</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>g(2)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>3</sup>x<sub>2</sub></u> (compiler)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">0.0426 ± 0.0011</td> <td style="text-align: center;">2.18</td> </tr> <tr> <td style="text-align: center;">22</td> <td style="text-align: center;">0.0526 ± 0.0016</td> <td style="text-align: center;">2.68</td> </tr> </tbody> </table>		<u>t/°C</u>	<u>g(1)/100 g sln</u>	<u>10<sup>5</sup>x<sub>1</sub></u> (compiler)	10	0.0368 ± 0.0002	7.20	22	0.0492 ± 0.0003	9.62	<u>t/°C</u>	<u>g(2)/100 g sln</u>	<u>10<sup>3</sup>x<sub>2</sub></u> (compiler)	10	0.0426 ± 0.0011	2.18	22	0.0526 ± 0.0016	2.68
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<b>AUXILIARY INFORMATION</b>																			
<b>METHOD/APPARATUS/PROCEDURE:</b>  The solubility of (1) in (2) was determined by titration. The solubility of (2) in (1) was determined by Clifford's (ref 1), method. Dried air was passed through the vessel with a saturated solution of (2) in (1) and U-tubes with CaCl <sub>2</sub> and next the adsorbed (2) was weighed.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) source not specified; b.p. 109.8°C at 752 mm Hg, d <sub>4</sub> <sup>22</sup> 0.8636, d <sub>4</sub> <sup>10</sup> 0.8743.  (2) not specified.  <b>ESTIMATED ERROR:</b>  soly. see experimental values above.  <b>REFERENCES:</b>  1. Clifford, C.W. <i>Ind. Eng. Chem.</i> <u>1921</u> , 13, 628.																		

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water, H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Rosenbaum, C.K.; Walton, J.H. <i>J. Am. Chem. Soc.</i> <u>1939</u> , 52, 3568-73.																		
<b>VARIABLES:</b> Temperature: 10-50°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																		
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of water in toluene</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ\text{C}</math></th> <th style="text-align: center;"><math>\text{g}(2)/100 \text{ g}(1)</math></th> <th style="text-align: center;"><math>10^3 x_2</math> (compiler)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">0.0335</td> <td style="text-align: center;">1.71</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">0.0450</td> <td style="text-align: center;">2.30</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">0.0600</td> <td style="text-align: center;">3.06</td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">0.0733</td> <td style="text-align: center;">3.74</td> </tr> <tr> <td style="text-align: center;">50</td> <td style="text-align: center;">0.0953</td> <td style="text-align: center;">4.85</td> </tr> </tbody> </table>		$t/^\circ\text{C}$	$\text{g}(2)/100 \text{ g}(1)$	$10^3 x_2$ (compiler)	10	0.0335	1.71	20	0.0450	2.30	30	0.0600	3.06	40	0.0733	3.74	50	0.0953	4.85
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<b>AUXILIARY INFORMATION</b>																			
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The organic phase was first saturated by shaking with water in a flask at a high temperature and then allowing the flask to cool in a thermostat to the desired temperature, with the resulting separation of excess water. After one day or more the solution was allowed to react with added calcium hydride in dry solvent. Hydrogen was evolved and the gas volume was read.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; purified by keeping over mercury, refluxing with phosphorus pentoxide and fractionating; b.p. range 110.4-110.6°C (760 torr). (2) not specified. <b>ESTIMATED ERROR:</b> not specified. <b>REFERENCES:</b>																		

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Gross, P.M.; Saylor, J.H.  <i>J. Am. Chem. Soc.</i> <u>1931</u> , <i>53</i> , 1744-51.
<b>VARIABLES:</b>  One temperature: 30°C	<b>PREPARED BY:</b>  A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water at 30°C was reported to be 0.57 g(1)/kg(2) and 0.0062 mol(1)/kg(2).  The corresponding mass percent and mole fraction, $x_1$ , calculated by the compilers are 0.057 g(1)/100 g solution and $1.12 \times 10^{-4}$ .	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  Saturated solutions were prepared by shaking in a thermostat and were analyzed by means of an interferometer. The instrument used was a combination liquid and gas interferometer made by Zeiss.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Baker's CP analyzed grade; distilled; b.p. 110.74 ± 0.02°C  (2) distilled.  <b>ESTIMATED ERROR:</b>  soly. 2.0% (from values of duplicate determinations)  <b>REFERENCES:</b>



<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Tarassenkow, D.N.; Poloshinzewa, E.N. <i>Ber. Dtsch. Chem. Ges.</i> <u>1932</u> , 65B, 184-6.																																							
<b>VARIABLES:</b> Temperature: (-9)-93°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																																							
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of water in toluene</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>g(2)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>3</sup>x<sub>2</sub></u> (compiler)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">-9</td><td style="text-align: center;">0.002</td><td style="text-align: center;">0.1</td></tr> <tr><td style="text-align: center;">-3.5</td><td style="text-align: center;">0.005</td><td style="text-align: center;">0.3</td></tr> <tr><td style="text-align: center;">10.5</td><td style="text-align: center;">0.020</td><td style="text-align: center;">1.0</td></tr> <tr><td style="text-align: center;">18</td><td style="text-align: center;">0.034</td><td style="text-align: center;">1.7</td></tr> <tr><td style="text-align: center;">30</td><td style="text-align: center;">0.053</td><td style="text-align: center;">2.7</td></tr> <tr><td style="text-align: center;">38.5</td><td style="text-align: center;">0.070</td><td style="text-align: center;">3.6</td></tr> <tr><td style="text-align: center;">48</td><td style="text-align: center;">0.097</td><td style="text-align: center;">4.9</td></tr> <tr><td style="text-align: center;">60.5</td><td style="text-align: center;">0.153</td><td style="text-align: center;">7.8</td></tr> <tr><td style="text-align: center;">68</td><td style="text-align: center;">0.201</td><td style="text-align: center;">10.2</td></tr> <tr><td style="text-align: center;">76</td><td style="text-align: center;">0.254</td><td style="text-align: center;">12.9</td></tr> <tr><td style="text-align: center;">84</td><td style="text-align: center;">0.312</td><td style="text-align: center;">15.8</td></tr> <tr><td style="text-align: center;">93</td><td style="text-align: center;">0.413</td><td style="text-align: center;">20.8</td></tr> </tbody> </table>		<u>t/°C</u>	<u>g(2)/100 g sln</u>	<u>10<sup>3</sup>x<sub>2</sub></u> (compiler)	-9	0.002	0.1	-3.5	0.005	0.3	10.5	0.020	1.0	18	0.034	1.7	30	0.053	2.7	38.5	0.070	3.6	48	0.097	4.9	60.5	0.153	7.8	68	0.201	10.2	76	0.254	12.9	84	0.312	15.8	93	0.413	20.8
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<b>METHOD/APPARATUS/PROCEDURE:</b> Alexejew's method was used (ref 1). No additional details were reported in the paper.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Kahlbaum, CP; dried over calcium chloride and distilled from sodium; purity not specified. (2) not specified. <hr/> <b>ESTIMATED ERROR:</b> soly. ± 0.01% (not specified). <hr/> <b>REFERENCES:</b> 1. Alexejew, W. <i>Wied. Ann.</i> <i>Physik</i> <u>1886</u> , <i>28</i> , 35.																																							

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Booth, H.S.; Everson, H.E. <i>Ind. Eng. Chem.</i> <u>1948</u> , <i>40</i> , 1491-3.
<b>VARIABLES:</b> One temperature: 25.0°C (298.2 K)	<b>PREPARED BY:</b> G.T. Hefter
<b>EXPERIMENTAL VALUES:</b> The solubility of toluene in water at 25.0°C was reported to be 0.04 mL (1)/100 mL (2).  The solubility of (1) in 40.0% (w/w?) aqueous sodium xylenesulfonate solution was also reported to be 1.20 mL (1)/100 mL sulfonate sln.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> A known volume of water, typically 50 mL, was placed in a stoppered Babcock tube having a neck graduated from 0 to 1.6 mL in steps of 0.02 mL. An excess of solute was added and the mixture allowed to come to equilibrium in a constant temperature bath then centrifuged. The amount of solute dissolved was determined by subtracting the undissolved solute, measured directly in the tube, from the total added.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) "Highest grade commercial sample available"; no other details given. (2) Distilled.  <b>ESTIMATED ERROR:</b> Not specified.  <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Andrews, L.J.; Keefer, R.M. <i>J. Am. Chem. Soc.</i> <u>1949</u> , 71, 3644-77.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b>  A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b>  <p>The solubility of toluene in water at 25°C was reported to be 0.053 g(l)/100 g sln.</p> <p>The corresponding mole fraction, <math>x_1</math>, calculated by the compilers is <math>1.04 \times 10^{-4}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  A mixture of (1) and (2) was rotated for twenty hours in a constant temperature bath at 25°C. A sample (5-20 mL) of the aqueous phase was withdrawn and extracted with a measured volume of hexane (10-50 mL) by shaking in a glass-stoppered Erlenmeyer flask. Next, the absorbance of the hexane phase was measured against a hexane blank on the Beckman spectrophotometer.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Eastman Kodak Co. best grade; washed successively with concentrated sulfuric acid, water, and dilute sodium hydroxide; dried, and distilled; b.p. 110.4°C.  (2) not specified.
	<b>ESTIMATED ERROR:</b>  not specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Klevens, H.B. <i>J. Phys. Chem.</i> <u>1950</u> , 54, 283-98.
<b>VARIABLES:</b> Temperature: 25°C	<b>PREPARED BY:</b> M.C. Haulait-Pirson
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 0.500 g(1) dm<sup>-3</sup> sln and 0.00543 mol(1) dm<sup>-3</sup> sln.</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by the compiler assuming a solution density of 1.00 g/mL are 0.05 g(1)/100 g sln and <math>9.80 \times 10^{-5}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The solubility of (1) in (2) was determined by shaking small amounts of (1) in 1 liter of (2) for as long as three months. Aliquots were removed and concentrations determined by spectra.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) not specified. (2) not specified. <hr/> <b>ESTIMATED ERROR:</b> not specified. <hr/> <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Bohon, R.L.; Claussen, W.F. <i>J. Am. Chem. Soc.</i> <u>1951</u> , <i>73</i> , 1571-8.																																										
<b>VARIABLES:</b>  Temperature: 0.4-45.3°C	<b>PREPARED BY:</b>  G.T. Hefter																																										
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of Toluene in water</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ\text{C}</math></th> <th style="text-align: center;"><math>\text{g}(1)/100\text{g sln}^a</math> (compiler)</th> <th style="text-align: center;"><math>10^4 x_1</math> (compiler)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.4</td><td style="text-align: center;">0.0658</td><td style="text-align: center;">1.29</td></tr> <tr><td style="text-align: center;">3.6</td><td style="text-align: center;">0.0646</td><td style="text-align: center;">1.26</td></tr> <tr><td style="text-align: center;">10.0</td><td style="text-align: center;">0.0628</td><td style="text-align: center;">1.23</td></tr> <tr><td style="text-align: center;">11.2</td><td style="text-align: center;">0.0624</td><td style="text-align: center;">1.22</td></tr> <tr><td style="text-align: center;">14.9</td><td style="text-align: center;">0.0623</td><td style="text-align: center;">1.22</td></tr> <tr><td style="text-align: center;">15.9</td><td style="text-align: center;">0.0621</td><td style="text-align: center;">1.21</td></tr> <tr><td style="text-align: center;">25.0</td><td style="text-align: center;">0.0627<sup>b</sup></td><td style="text-align: center;">1.23<sup>b</sup></td></tr> <tr><td style="text-align: center;">25.6</td><td style="text-align: center;">0.0625</td><td style="text-align: center;">1.22</td></tr> <tr><td style="text-align: center;">30.0</td><td style="text-align: center;">0.0640</td><td style="text-align: center;">1.25</td></tr> <tr><td style="text-align: center;">30.2</td><td style="text-align: center;">0.0642</td><td style="text-align: center;">1.25</td></tr> <tr><td style="text-align: center;">35.2</td><td style="text-align: center;">0.0657</td><td style="text-align: center;">1.28</td></tr> <tr><td style="text-align: center;">42.8</td><td style="text-align: center;">0.0701</td><td style="text-align: center;">1.37</td></tr> <tr><td style="text-align: center;">45.3</td><td style="text-align: center;">0.0717</td><td style="text-align: center;">1.40</td></tr> </tbody> </table> <p><sup>a</sup>Solubilities of (1) in (2) were reported as "optical density" (absorbance) measurements. Solubilities were calculated by the compiler using the Beer-Lambert law, the stated cell path-length (1 cm) and the authors' "extinction coefficients" (absorptivities) and corrected optical densities. This gave a solubility of g(1)/L sln which was then converted to g(1)/100g sln by assuming a solution density of 1.00 kg/L.</p> <p><sup>b</sup>Given in the original paper as 0.627g(1)/L sln.</p>		$t/^\circ\text{C}$	$\text{g}(1)/100\text{g sln}^a$ (compiler)	$10^4 x_1$ (compiler)	0.4	0.0658	1.29	3.6	0.0646	1.26	10.0	0.0628	1.23	11.2	0.0624	1.22	14.9	0.0623	1.22	15.9	0.0621	1.21	25.0	0.0627 <sup>b</sup>	1.23 <sup>b</sup>	25.6	0.0625	1.22	30.0	0.0640	1.25	30.2	0.0642	1.25	35.2	0.0657	1.28	42.8	0.0701	1.37	45.3	0.0717	1.40
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<b>METHOD/APPARATUS/PROCEDURE:</b>  A round-bottomed flask containing about 4 mL of (1) and 400 mL of (2) was evacuated, suspended in a thermostat, shaken for 24h and then allowed to settle for at least another 24h. Next, desired quantities of the water layer were syphoned into 6 glass-stoppered Erlenmeyer flasks. These 6 flasks had previously been tared, partially filled with a suitable amount of diluent water, and reweighed. Weighed portions of the samples were inserted into a quartz cuvette and measured in a Beckman DU spectrophotometer. Absorbances were corrected for adsorption of (1) onto the walls of the cuvette.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Phillips Petroleum Co., 99+%, used as received. (2) Air-free conductivity water, no further details given.  <b>ESTIMATED ERROR:</b>  Temp. $\pm 0.02^\circ\text{C}$ Soly. $\pm 0.5\%$ relative  <b>REFERENCES:</b>																																										

<b>COMPONENTS:</b> (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Morrison, T.J.; Billett, F. <i>J. Chem. Soc.</i> <u>1952</u> , 3819-22.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 0.00582 mol(1)/1000 g(2).</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by compilers are 0.0536 g(1)/100 g sln and <math>x_1 = 1.05 \times 10^{-4}</math>.</p> <p>The compiler's calculations assume a solution density of 1.00 g/mL.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>After an excess of (1) had been shaken with about 1 dm<sup>3</sup> of (2) for about a week, a known volume of saturated solution was made slightly alkaline, and a stream of pure air passed through to drive off the (1). After passage through a silica tube packed with cupric oxide and heated to redness, the (2) was removed by concentrated sulfuric acid and calcium chloride and the carbon dioxide absorbed and weighed in soda-asbestos. The precautions usual in organic combustions were taken.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; purest obtainable material; distilled; purity not specified. (2) not specified. <b>ESTIMATED ERROR:</b> temp. $\pm$ 0.1 K soly. $\pm$ 0.5% (mean of large numbers of determinations) <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Wing, J.; Johnston, W.H. <i>J. Am. Chem. Soc.</i> <u>1957</u> , <i>79</i> , 864-5.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of water in toluene at 25°C was reported to be 0.0334 mL(2)/100 mL sln.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>A small amount of (2) was equilibrated with 20 mL of (1) using a Teflon stirrer in a 100 mL flask in a Sargent constant temperature bath. At the end of two hours, the mixture was poured into a test tube immersed in the bath and the organic phase separated from water by gravitation. The determination of THO in the organic phase was done by isotopic dilution with a large excess of H<sub>2</sub>O. The tritium activities in the tritiated water samples were determined by the acetylene method described in ref 1.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified, chemical grade; redistilled in a column of 50 theoretical plates; purity not specified. (2) Tracerlab, Inc., tritiated water with an activity of approximately 1 μCi/mL.
<b>ESTIMATED ERROR:</b> temp. ± 0.02 K soly. 0.8% (st. dev. from 5 determinations).	
<b>REFERENCES:</b> 1. Wing, J; Johnson, W.H. <i>Science</i> <u>1955</u> , <i>121</i> , 674.	

<b>COMPONENTS:</b>  (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Caddock, B.D.; Davies, P.L. <i>J. Inst. Petrol.</i> <u>1960</u> , <i>46</i> , 391-6.
<b>VARIABLES:</b>  One temperature: 20°C	<b>PREPARED BY:</b>  A. Maczynski
<b>EXPERIMENTAL VALUES:</b>  The solubility of water in toluene at 20°C was reported to be 46 mg(2)/100 g(1).  The corresponding mass percent and mole fraction, $x_2$ , calculated by the compiler are 0.046 g(2)/100 g sln and 0.0023.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  A sample of (1) was equilibrated at 20°C with an air stream containing a known amount of water vapor tagged with HTO. At equilibrium a sample of (1) was taken and its (2) content determined by liquid scintillation counting.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) not specified. (2) not specified.  <b>ESTIMATED ERROR:</b>  temp. $\pm$ 0.01 K  <b>REFERENCES:</b>



<b>COMPONENTS:</b> (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Guseva, A.N.; Parnov, E.I. <i>Vestn. Mosk. Univ. Khim</i> <u>1963</u> , 18, 76-9. <i>Radiokhimiya</i> <u>1963</u> , 5, 507-9.																								
<b>VARIABLES:</b> Temperature: 90-224°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																								
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of toluene in water</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ C</math></th> <th style="text-align: center;"><math>g(l)/100\ g\ soln</math></th> <th style="text-align: center;"><math>10^3 x_1</math> (compiler)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">90</td><td style="text-align: center;">0.42</td><td style="text-align: center;">0.83</td></tr> <tr><td style="text-align: center;">114</td><td style="text-align: center;">0.823</td><td style="text-align: center;">1.619</td></tr> <tr><td style="text-align: center;">147</td><td style="text-align: center;">1.640</td><td style="text-align: center;">3.248</td></tr> <tr><td style="text-align: center;">169</td><td style="text-align: center;">2.387</td><td style="text-align: center;">4.737</td></tr> <tr><td style="text-align: center;">183</td><td style="text-align: center;">2.790</td><td style="text-align: center;">5.579</td></tr> <tr><td style="text-align: center;">207</td><td style="text-align: center;">4.113</td><td style="text-align: center;">8.314</td></tr> <tr><td style="text-align: center;">224</td><td style="text-align: center;">5.072</td><td style="text-align: center;">10.336</td></tr> </tbody> </table>		$t/^\circ C$	$g(l)/100\ g\ soln$	$10^3 x_1$ (compiler)	90	0.42	0.83	114	0.823	1.619	147	1.640	3.248	169	2.387	4.737	183	2.790	5.579	207	4.113	8.314	224	5.072	10.336
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<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The measurements were made in sealed glass tubes. No details were reported in the paper.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; $n_D^{20}$ 1.4970. (2) doubly distilled. <b>ESTIMATED ERROR:</b> not specified. <b>REFERENCES:</b>																								

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Jones, J.R.; Monk, C.B. <i>J. Chem. Soc.</i> <u>1963</u> , 2633-5.								
<b>VARIABLES:</b> Temperature: 25-35°C	<b>PREPARED BY:</b> A. Maczynski, Z. Maczynska and A. Szafranski								
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of water in toluene</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>10<sup>4</sup> mL(2)/mL(1)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">4.0</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">4.8</td> </tr> <tr> <td style="text-align: center;">35</td> <td style="text-align: center;">5.9</td> </tr> </tbody> </table>		<u>t/°C</u>	<u>10<sup>4</sup> mL(2)/mL(1)</u>	25	4.0	30	4.8	35	5.9
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25	4.0								
30	4.8								
35	5.9								
<b>AUXILIARY INFORMATION</b>									
<b>METHOD/APPARATUS/PROCEDURE:</b>  In a thermostatted glass-stoppered flask 10-25 mL(1) was shaken for min 4 hrs with tritiated water (a few mL of HTO equivalent to ca. 2 mc/mL) and decanted. A 5-mL aliquot was reshaken for 4 hrs with 5 mL H <sub>2</sub> O in a 10-mL flask, sampled and assayed with a Nuclear Enterprises type 8301 liquid scintillation counter. The two-stage process eliminates quenching effects (due to solvent) on the scintillator.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) 'AnalaR' grade; repurified by conventional methods, ref 1. (2) not specified.  <b>ESTIMATED ERROR:</b> soly. ± 5% to ± 1% (average deviation)  <b>REFERENCES:</b> 1. Vogel 'Practical Organic Chemistry', Longmans, Green and Co., London, 1956.								

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> McAuliffe, C. <i>Nature (London)</i> <u>1963</u> , 200, 1092-3.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 0.0538 g(l)/100 g sln.</p> <p>The corresponding mole fraction, <math>x_1</math>, calculated by the compilers is <math>1.05 \times 10^{-4}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The saturated solution of (1) in (2) was prepared by either shaking vigorously on a reciprocal shaker or stirring for several days with a magnetic stirrer.</p> <p>A 0.05 mL or 0.10 mL sample of the hydrocarbon-saturated water was injected directly into a gas liquid chromatograph.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Phillips Petroleum Co.; 99+%; used as received. (2) distilled.
	<b>ESTIMATED ERROR:</b> temp. $\pm$ 1.5 K soly. 0.0017 (standard deviation of mean)
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Hoegfeldt, E.; Bolander, B. <i>Ark. Kemi</i> , <u>1964</u> , <i>21</i> , 161-86.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of water in toluene was reported to be 0.026 mol(2) dm<sup>-3</sup> sln.</p> <p>The corresponding mass percent and mol fraction, <math>x_2</math>, calculated by the compilers are 0.054 g(2)/100 g sln and <math>2.8 \times 10^{-3}</math>.</p> <p>The assumption that 1 dm<sup>3</sup> sln = 862 g sln was used in the calculation.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The water determination was carried out according to Johansson's modification of the Karl Fischer titration in ref 1, 2.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Kebo; purity 99.0%; used as received. (2) not specified.
	<b>ESTIMATED ERROR:</b> temp. ± 0.3 K soly. ± 0.001 mol(2) dm <sup>-3</sup> sln (type of error not specified)
	<b>REFERENCES:</b> 1. Hardy, C.J.; Greenfield, B.F.; Scargill, D. <i>J. Chem. Soc.</i> <u>1961</u> , 90. 2. Johansson, A. <i>Sv. Papperstidn.</i> <u>1947</u> , <i>11B</i> , 124.

<b>COMPONENTS:</b>  (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Englin, B.A.; Plate, A.F.; Tugolukov, V.M.; Pryanishnikova, M.A.  <i>Khim. Tekhnol. Topl. Masel</i> <u>1965</u> , 10, 42-6.																					
<b>VARIABLES:</b>  Temperature: 0-50°C	<b>PREPARED BY:</b>  A. Maczynski and Z. Maczynska																					
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of water in toluene</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>g(2)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>3</sup>x<sub>2</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0.02704</td> <td style="text-align: center;">1.382</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">0.0316</td> <td style="text-align: center;">1.61</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">0.0460</td> <td style="text-align: center;">2.35</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">0.0615</td> <td style="text-align: center;">3.14</td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">0.0750</td> <td style="text-align: center;">3.82</td> </tr> <tr> <td style="text-align: center;">50</td> <td style="text-align: center;">0.0965</td> <td style="text-align: center;">4.92</td> </tr> </tbody> </table>		<u>t/°C</u>	<u>g(2)/100 g sln</u>	<u>10<sup>3</sup>x<sub>2</sub> (compiler)</u>	0	0.02704	1.382	10	0.0316	1.61	20	0.0460	2.35	30	0.0615	3.14	40	0.0750	3.82	50	0.0965	4.92
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<b>AUXILIARY INFORMATION</b>																						
<b>METHOD/APPARATUS/PROCEDURE:</b>  Component (1) was introduced into a thermostatted flask and saturated for 5 hr. with (2). Next, calcium hydride was added and the evolving hydrogen volume measured and hence the concentration of (2) in (1) was evaluated.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) not specified. (2) not specified.																					
	<b>ESTIMATED ERROR:</b>  Not specified.																					
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COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]		Connolly, J.F. <i>J. Chem. Eng. Data</i> <u>1966</u> , 11, 13-6.		
VARIABLES:		PREPARED BY:		
Temperature: 280-310°C Pressure: 150-600 atm		A. Maczynski and Z. Maczynska		
EXPERIMENTAL VALUES:				
Solubility of toluene in water				
$t/^{\circ}\text{C}$	$p/\text{atm}$	$p/\text{MPa}$ (compiler)	$g(1)/100\text{ g sln}$	$x_1$ (compiler)
280	150	15.2	6.8	0.0141
	250	25.3	6.8	0.0141
	410	41.5	6.6	0.0136
300	600	60.8	5.8	0.0119
	170	17.2	14.2	0.0313
	250	25.3	14.1	0.0311
305	300	30.4	14.0	0.0308
	160	16.2	18.0	0.0411
	180	18.2	19.0	0.0438
310	200	20.3	19.5	0.0452
	250	25.3	19.0	0.0438
	285	28.9	18.0	0.0411
310	145	14.7	18.0	0.0411
	150	15.2	19.6	0.0455
	155	15.7	21.7	0.0514
	165	16.7	23.9	0.0578
	170	17.2	26.7	0.0590
	175	17.7	29.6	0.0759
	180	18.2	33.1	0.0882
	180	18.2	36.3	0.1002
	270	27.3	50.5	0.1663
	265	26.9	48.6	0.1560
(continued)				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
Measurements were carried out in a 100 mL stainless-steel cell. The cell was loaded with 15 g (2) and brought to temperature. Mixing was started and (1) was injected until either a cloud or a small droplet of a second phase appeared at the top of the cell. Then mercury was injected to change pressure, more (1) was injected and the measurement was repeated.		(1) Phillips reagent grade; better than 99.8 %; used as received.		
		(2) distilled and deaerated.		
		ESTIMATED ERROR:		
		temp. $\pm$ 0.02 K pressure $\pm$ 2 atm.		
		REFERENCES:		

## COMPONENTS:

## ORIGINAL MEASUREMENTS:

(1) Toluene; C<sub>7</sub>H<sub>8</sub>; [108-88-3]

Connolly, J.F.

(2) Water; H<sub>2</sub>O; [7732-18-5]*J. Chem. Eng. Data* 1966,  
11, 13-6.

## Solubility of toluene in water

<u>t/°C</u>	<u>p/atm</u>	<u>p/MPa</u> <u>(compiler)</u>	<u>g(l)/100 g sln</u>	<u>x<sub>1</sub></u> <u>(compiler)</u>
	260	26.3	46.5	0.1452
	260	26.3	44.3	0.1346
	260	26.3	41.9	0.1236
	260	26.3	39.2	0.1119
	260	26.3	36.3	0.1002
310	260	26.3	33.1	0.0882
	275	27.9	29.6	0.0759
	295	29.9	26.7	0.0665
	325	32.9	23.8	0.0575
	405	41.0	19.5	0.0452
	455	46.1	11.0	0.0411

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (3) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Johnson, J.R.; Christian, S.D.; Affsprung, H.E. <i>J. Chem. Soc. A.</i> <u>1966</u> , 77-8.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of water in toluene at 25°C was reported to be 0.0274 mol(2) dm<sup>-3</sup> sln.</p> <p>The corresponding mass percent and mole fraction, <math>x_2</math>, calculated by the compilers are 0.0572 g(2)/100 g sln and <math>2.92 \times 10^{-3}</math>.</p> <p>The assumption that 1 dm<sup>3</sup> sln = 862 g sln was used in the calculation.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The apparatus described in ref 1 was used without modification. Samples were equilibrated in a constant-temperature water-bath maintained at 25 ± 0.1°C. Water solubilities were determined by using a Beckman Model KF-3 Aquameter.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; certified or reagent grade; distilled through a 30-plate Oldershaw column. (2) not specified.  <b>ESTIMATED ERROR:</b> temp. ± 0.1 K soly. ± 0.0005 mol(2) dm <sup>-3</sup> sln (type of error not specified)  <b>REFERENCES:</b> 1. Christian, S.P.; Affsprung, H.E.; Johnson, J.R.; Worley, J.D. <i>J. Chem. Educ.</i> <u>1963</u> , 40, 419.



<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3]  (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  McAuliffe, C.  <i>J. Phys. Chem.</i> <u>1966</u> , <i>70</i> , 1267-75.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski, Z. Maczynska, and A. Szafranski
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water at 25°C was reported to be 515 g(1)/10 <sup>6</sup> g(2). The corresponding mass percent and mole fraction, $x_1$ , calculated by the compilers are 0.0515 g(1)/100 g sln and $1.01 \times 10^{-4}$ .	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  In a 250-mL bottle, 10-20 mL of (1) was vigorously shaken for 1 hr, or magnetically stirred for 1 day, with 200 mL of (2) at 25°C. The bottle was set aside for 2 days to allow droplets of undissolved (1) to separate. Absence of emulsion was checked microscopically. A sample of the hydrocarbon-saturated water was withdrawn with a Hamilton syringe and gas liquid chromatographed in conjunction with a flame-ionization detector.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Phillips Petroleum or Columbia Chemical; used as received.  (2) distilled.  <b>ESTIMATED ERROR:</b> temp. $\pm 1.5$ K soly. 17 g(1)/10 <sup>6</sup> g(2) (standard deviation of mean)  <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Gregory, M.D.; Christian, S.D.; Affsprung, H.E.  <i>J. Phys. Chem.</i> <u>1967</u> , <i>71</i> , 2283-9.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b>  A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b>  The solubility of water in toluene at 25°C was reported to be 0.0268 mol(2) dm <sup>-3</sup> sln.  The corresponding mass percent and mole fraction, $x_2$ , calculated by the compilers are 0.0560 g(2)/100 g sln and $2.86 \times 10^{-3}$ .  The assumption that 1 dm <sup>3</sup> sln = 863 g sln was used in the calculation.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  A solution of (2) in (1) was obtained using solute isopiestic equilibrators described in ref 1. Water concentration was determined with a Beckman KF-3 aquameter by the Karl Fischer analysis.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) source not specified, reagent grade; fractionally distilled using a 30-plate Oldershaw,  (2) not specified.  <b>ESTIMATED ERROR:</b>  temp. ± 0.05 K  <b>REFERENCES:</b>  1. Christian, S.D.; Affsprung, H.E.; Johnson, J.R.; Warley, J.D. <i>J. Chem. Educ.</i> <u>1963</u> , <i>40</i> , 419.

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Benkovski, V.G.; Nauruzov, M.H.; Bogoslovskaya, T.M.  <i>Tr. Inst. Khim. Nefti Prir. Solei          Akad. Nauk Kaz. SSR 1970, 2,          25-32.</i>
<b>VARIABLES:</b>  One temperature: 303 K	<b>PREPARED BY:</b>  A. Maczynski
<b>EXPERIMENTAL VALUES:</b>  The solubility of water in toluene at 303 K was reported to be 0.0273 g(2)/100 g sln. The corresponding mole fraction, $x_2$ , value calculated by compiler is 0.0739.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  Equal volumes of (1) and (2) were placed in a glass cylinder and periodically shaken for 6 h, then sampled and analyzed by the Karl Fischer method.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) source not specified; purified; purity not specified.  (2) distilled.  <b>ESTIMATED ERROR:</b>  Not specified  <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Glasoe, P.K.; Schultz, S.D. <i>J. Chem. Eng. Data</i> , <u>1972</u> , 17, 66-8.																
<b>VARIABLES:</b>  Temperature: 15-30°C	<b>PREPARED BY:</b>  A. Maczynski and Z. Maczynska																
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of water in toluene</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>mol(2) dm<sup>-3</sup> sln</u></th> <th style="text-align: center;"><u>g(2)/100 g sln (compiler)</u></th> <th style="text-align: center;"><u>10<sup>3</sup> x<sub>2</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">0.0200 ± 0.0006</td> <td style="text-align: center;">0.0413</td> <td style="text-align: center;">2.11</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">0.0261 ± 0.0004</td> <td style="text-align: center;">0.0545</td> <td style="text-align: center;">2.78</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">0.0293 ± 0.0004</td> <td style="text-align: center;">0.0615</td> <td style="text-align: center;">3.14</td> </tr> </tbody> </table> <p>The compilers calculations assume a solution density of 0.862 g/mL.</p>		<u>t/°C</u>	<u>mol(2) dm<sup>-3</sup> sln</u>	<u>g(2)/100 g sln (compiler)</u>	<u>10<sup>3</sup> x<sub>2</sub> (compiler)</u>	15	0.0200 ± 0.0006	0.0413	2.11	25	0.0261 ± 0.0004	0.0545	2.78	30	0.0293 ± 0.0004	0.0615	3.14
<u>t/°C</u>	<u>mol(2) dm<sup>-3</sup> sln</u>	<u>g(2)/100 g sln (compiler)</u>	<u>10<sup>3</sup> x<sub>2</sub> (compiler)</u>														
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<b>AUXILIARY INFORMATION</b>																	
<b>METHOD/APPARATUS/PROCEDURE:</b>  Dried (1) was saturated with (2) by allowing it to stand in contact with (2) in a closed system, protected from atmospheric moisture.  This two-phase system was kept in a pyrex storage bottle which was immersed in a constant temperature water bath.  The concentration of (2) in (1) was determined by the Karl Fischer method.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) source not specified; reagent grade; purified by distillation and dried over molecular sieve, (2) distilled in a pyrex system.  <b>ESTIMATED ERROR:</b>  soly. as indicated above. (type of error not specified)  <b>REFERENCES:</b>																

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3]  (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Pierotti, R.A.; Liabastre, A.A.  "Structure and properties of water solutions." U.S. Nat. Tech. Inform. Serv., PB Rep., <u>1972</u> , No. 21163, 113 p.																					
<b>VARIABLES:</b>  Temperature: 278.16-318.46 K	<b>PREPARED BY:</b>  M.C. Haulait-Pirson																					
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene (2) in water (1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>T/ K</u></th> <th style="text-align: center;"><u>g(1)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>3</sup>x<sub>1</sub></u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">278.16</td> <td style="text-align: center;">0.06357 ± 0.0017</td> <td style="text-align: center;">0.1243</td> </tr> <tr> <td style="text-align: center;">283.06</td> <td style="text-align: center;">0.06324 ± 0.0016</td> <td style="text-align: center;">0.1236</td> </tr> <tr> <td style="text-align: center;">293.06</td> <td style="text-align: center;">0.06606 ± 0.0018</td> <td style="text-align: center;">0.1292</td> </tr> <tr> <td style="text-align: center;">298.16</td> <td style="text-align: center;">0.06299 ± 0.0013</td> <td style="text-align: center;">0.1232</td> </tr> <tr> <td style="text-align: center;">308.26</td> <td style="text-align: center;">0.06721 ± 0.0011</td> <td style="text-align: center;">0.1314</td> </tr> <tr> <td style="text-align: center;">318.46</td> <td style="text-align: center;">0.06717 ± 0.0020</td> <td style="text-align: center;">0.1313</td> </tr> </tbody> </table>		<u>T/ K</u>	<u>g(1)/100 g sln</u>	<u>10<sup>3</sup>x<sub>1</sub></u>	278.16	0.06357 ± 0.0017	0.1243	283.06	0.06324 ± 0.0016	0.1236	293.06	0.06606 ± 0.0018	0.1292	298.16	0.06299 ± 0.0013	0.1232	308.26	0.06721 ± 0.0011	0.1314	318.46	0.06717 ± 0.0020	0.1313
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<b>METHOD/APPARATUS/PROCEDURE:</b>  10 mL of (2) were placed along with 4-10 drops of (1) in 10 mL serum bottles, which were then tightly capped, and placed in the rotating basket and rotated for 24 hours. The bottles were then hand shaken to remove (1) droplets from the stoppers and then replaced in the bath with the tops down for an additional 24 hours. The solute concentrations were determined by use of a flame-ionization gas chromatograph. Many details about equipment, operating conditions and calculation are given in the paper.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Fisher Scientific Co., Chromatoquality; 99+mole%; used as received.  (2) laboratory distilled water.  <b>ESTIMATED ERROR:</b>  soly.: standard deviation from at least 15 measurements are given above.  <b>REFERENCES:</b>																					

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Bradley, R.S.; Dew, M.J.; Munro, D.C. <i>High Temp. High Press.</i> <u>1973</u> , 5, 169-76.																																			
<b>VARIABLES:</b>  Temperature: 25-55°C Pressure: 1-1200 bar	<b>PREPARED BY:</b>  G.T. Hefter																																			
<b>EXPERIMENTAL VALUES:</b>  <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ\text{C}</math></th> <th style="text-align: center;"><math>p/\text{bar}^b</math></th> <th colspan="3" style="text-align: center;">Solubility of toluene in water</th> </tr> <tr> <th style="text-align: center;">—</th> <th style="text-align: center;">—</th> <th style="text-align: center;">mol/L sln</th> <th style="text-align: center;">g(1)/100g sln<sup>a</sup> (compiler)</th> <th style="text-align: center;"><math>10^4 x_1^a</math> (compiler)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0.00595</td> <td style="text-align: center;">0.0547</td> <td style="text-align: center;">1.07</td> </tr> <tr> <td style="text-align: center;">45</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0.00785</td> <td style="text-align: center;">0.0722</td> <td style="text-align: center;">1.41</td> </tr> <tr> <td style="text-align: center;">55</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0.0094</td> <td style="text-align: center;">0.086</td> <td style="text-align: center;">1.68</td> </tr> <tr> <td style="text-align: center;">45</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">0.0121</td> <td style="text-align: center;">0.111</td> <td style="text-align: center;">2.17</td> </tr> <tr> <td style="text-align: center;">55</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">0.0131</td> <td style="text-align: center;">0.121</td> <td style="text-align: center;">2.37</td> </tr> </tbody> </table> <p><sup>a</sup> Assuming a solution density of 1.00kg/L at all temperatures and pressures.</p> <p><sup>b</sup> 1 bar = 0.1 MPa exactly.</p> <p>Data at other pressures are presented in graphical form. Data are also presented for the solubility of (1) in aqueous solutions of AgNO<sub>3</sub> and KNO<sub>3</sub> at various temperatures and pressures.</p>		$t/^\circ\text{C}$	$p/\text{bar}^b$	Solubility of toluene in water			—	—	mol/L sln	g(1)/100g sln <sup>a</sup> (compiler)	$10^4 x_1^a$ (compiler)	25	1	0.00595	0.0547	1.07	45	1	0.00785	0.0722	1.41	55	1	0.0094	0.086	1.68	45	1000	0.0121	0.111	2.17	55	1000	0.0131	0.121	2.37
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<b>METHOD/APPARATUS/PROCEDURE:</b>  The solubility of (1) in (2) at room temperature and pressure was determined in a stoppered 1mm silica cuvette placed in a Unicam SP500 spectrophotometer and stirred magnetically. Measurements were made until a constant concentration was reached. The value was cross-checked against a 2-L sample of saturated solution which had been equilibrated for some months.  Solubilities at higher temperatures and pressures were similarly determined in a special cell fitted into the spectrophotometer. Many details of the apparatus are given in the paper.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Not specified (2) Distilled, air-free  <b>ESTIMATED ERROR:</b>  Not specified  <b>REFERENCES:</b>																																			

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Polak, J.; Lu, B.C.-Y. <i>Can. J. Chem.</i> <u>1973</u> , <i>51</i> , 4018-23.																								
<b>VARIABLES:</b> Temperature: 0-25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																								
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in water</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>t/°C</u></th> <th style="text-align: center;"><u>mg(1)/kg(2)</u></th> <th style="text-align: center;"><u>g(1)/100 g sln (compiler)</u></th> <th style="text-align: center;"><u>10<sup>4</sup>x<sub>1</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td>0 (a)</td> <td style="text-align: center;">724 (c)</td> <td style="text-align: center;">0.0724</td> <td style="text-align: center;">1.42</td> </tr> <tr> <td>25 (b)</td> <td style="text-align: center;">573 (c)</td> <td style="text-align: center;">0.0573</td> <td style="text-align: center;">1.12</td> </tr> </tbody> </table> <p style="text-align: center;">Solubility of water in toluene</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>t/°C</u></th> <th style="text-align: center;"><u>mg(2)/kg(1)</u></th> <th style="text-align: center;"><u>g(2)/100 g sln (compiler)</u></th> <th style="text-align: center;"><u>10<sup>3</sup>x<sub>2</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td>0 (a)</td> <td style="text-align: center;">228 (d)</td> <td style="text-align: center;">0.0228</td> <td style="text-align: center;">1.17</td> </tr> <tr> <td>25 (b)</td> <td style="text-align: center;">543 (e)</td> <td style="text-align: center;">0.0543</td> <td style="text-align: center;">2.77</td> </tr> </tbody> </table> a <sup>-e</sup> see "ESTIMATED ERROR"		<u>t/°C</u>	<u>mg(1)/kg(2)</u>	<u>g(1)/100 g sln (compiler)</u>	<u>10<sup>4</sup>x<sub>1</sub> (compiler)</u>	0 (a)	724 (c)	0.0724	1.42	25 (b)	573 (c)	0.0573	1.12	<u>t/°C</u>	<u>mg(2)/kg(1)</u>	<u>g(2)/100 g sln (compiler)</u>	<u>10<sup>3</sup>x<sub>2</sub> (compiler)</u>	0 (a)	228 (d)	0.0228	1.17	25 (b)	543 (e)	0.0543	2.77
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<b>AUXILIARY INFORMATION</b>																									
<b>METHOD/APPARATUS/PROCEDURE:</b>  Approximately 50 mL of (1) together with (2) were placed in a 125 mL Hypo-vial which was closed with a teflon coated rubber septum and placed in a constant-temperature water bath. The system was stirred magnetically for 24 hr and left in the bath for 3 days or was kept in the bath without stirring for 7 days, before samples were taken for analysis. The solubility of water in the organic layer was determined by Karl Fischer titration and the solubility of hydrocarbon in the water layer was determined by gas chromatography.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Matheson, Coleman and Bell, spectroquality grade reagent; shaken three times with distilled water. (2) distilled.  <b>ESTIMATED ERROR:</b> temp. (a) ± 0.02 K, (b) ± 0.01 K soly. (c) ± 1.7%, (d) ± 4.7%, (e) ± 3.1% (from two or three determinations)  <b>REFERENCES:</b>																								

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Brown, R.L.; Wasik, S.P. <i>J. Res. Natl. Bur. Stds.</i> <u>1974</u> , 78, 453-60.																														
<b>VARIABLES:</b> Temperature: 4.5-20.1°C (277.7-293.3 K)	<b>PREPARED BY:</b> G.T. Hefter																														
<b>EXPERIMENTAL VALUES:</b> Solubility of toluene in water: <table data-bbox="306 554 1108 923" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><i>t</i>/°C</th> <th style="text-align: center;">g(1)/100 g sln<sup>a</sup></th> <th style="text-align: center;">10<sup>4</sup> <i>x</i><sub>1</sub> (compiler)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">4.5</td><td style="text-align: center;">0.0612 ± 0.0010</td><td style="text-align: center;">1.20</td></tr> <tr><td style="text-align: center;">6.3</td><td style="text-align: center;">0.0601 ± 0.0011</td><td style="text-align: center;">1.18</td></tr> <tr><td style="text-align: center;">7.1</td><td style="text-align: center;">0.0586 ± 0.0018</td><td style="text-align: center;">1.15</td></tr> <tr><td style="text-align: center;">9.0</td><td style="text-align: center;">0.0587 ± 0.0011</td><td style="text-align: center;">1.15</td></tr> <tr><td style="text-align: center;">11.8</td><td style="text-align: center;">0.0573 ± 0.0014</td><td style="text-align: center;">1.12</td></tr> <tr><td style="text-align: center;">12.1</td><td style="text-align: center;">0.0575 ± 0.0012</td><td style="text-align: center;">1.13</td></tr> <tr><td style="text-align: center;">15.1</td><td style="text-align: center;">0.0569 ± 0.0013</td><td style="text-align: center;">1.11</td></tr> <tr><td style="text-align: center;">17.9</td><td style="text-align: center;">0.0577 ± 0.0013</td><td style="text-align: center;">1.13</td></tr> <tr><td style="text-align: center;">20.1</td><td style="text-align: center;">0.0566 ± 0.0011</td><td style="text-align: center;">1.11</td></tr> </tbody> </table> <p><sup>a</sup> Errors given as standard deviations.</p>		<i>t</i> /°C	g(1)/100 g sln <sup>a</sup>	10 <sup>4</sup> <i>x</i> <sub>1</sub> (compiler)	4.5	0.0612 ± 0.0010	1.20	6.3	0.0601 ± 0.0011	1.18	7.1	0.0586 ± 0.0018	1.15	9.0	0.0587 ± 0.0011	1.15	11.8	0.0573 ± 0.0014	1.12	12.1	0.0575 ± 0.0012	1.13	15.1	0.0569 ± 0.0013	1.11	17.9	0.0577 ± 0.0013	1.13	20.1	0.0566 ± 0.0011	1.11
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<b>AUXILIARY INFORMATION</b>																															
<b>METHOD/APPARATUS/PROCEDURE:</b> Solubilities were calculated from partition coefficient measurements for the hydrocarbon between an aqueous solution and its vapor using headspace chromatography  The apparatus and the method of obtaining the partition coefficients are described in detail in the paper. Basically, the hydrocarbon was introduced as a vapor (to avoid emulsification) into a glass equilibration cell containing about 45 cm <sup>3</sup> of water. The vapor was subsequently analysed by gas chromatography using He as the carrier. Possible sources of error are discussed in detail although the source of vapor pressure data used to calculate solubilities are not given.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) 99.99 mole per cent purity; source and methods of purification not specified. (2) Distilled.  <b>ESTIMATED ERROR:</b> Temperature: ±0.01°C Solubility: see Table above  <b>REFERENCES:</b>																														



<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Krasnoshchekova, R.Ya.; Gubergrits, M.Ya. <i>Vodnye. Resursy.</i> 1975, 2, 170-3.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 0.220 mg(1) cm<sup>-3</sup> sln.</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by the compiler are 0.022 g(1)/100 g sln and <math>4.3 \times 10^{-5}</math>.</p> <p>The compiler's calculations assume a solution density of 1.00 g/mL.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The solubility of (1) in (2) was determined by glc.          A Czech-made Chrom-2 chromatograph was used, equipped with a 5% Apiezon L/Chromosorb G column operated at 90-140°C.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) described in ref (1). (2) distilled. <hr/> <b>ESTIMATED ERROR:</b> temp. ± 1 K <hr/> <b>REFERENCES:</b> 1. Krasnoshchekova, P.Ya.; Gubergritz, M.Ya. <i>Neftekhimiya</i> 1973, 13, 885.

<b>COMPONENTS:</b>  (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Mackay, D.; Shiu, W.Y. <i>Can. J. Chem. Eng.</i> <u>1975</u> , <i>53</i> , 239-41.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b>  M.C. Haulait-Pirson
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water at 25°C was reported to be 0.5195 g(l) $dm^{-3}$ . The corresponding mass percent and mole fraction, $x_1$ , calculated by the compiler are 0.05195 g(l)/100 g sln and $1.015 \times 10^{-4}$ . The compiler's calculations assume a solution density of 1.00 g/mL.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  The solubility of (1) in (2) was determined by gas chromatography. The gas chromatograph was Hewlett-Packard Model 5750 equipped with a hydrogen flame ionization detector. Many details are given in the paper.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Phillips Petroleum Co.; research grade; 99.9+%; used as received. (2) not specified.  <b>ESTIMATED ERROR:</b> temp. $\pm$ 0.1 K soly. $\pm$ 0.0096 g(l) $dm^{-3}$  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Sada, E.; Kito, S.; Ito, Y. <i>J. Chem. Eng. Data</i> <u>1975</u> , <i>20</i> , 373-5.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be .          0.5633 mL(1)/1000 mL(2).</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>Sudan IV was used to dye (1). The experimental apparatus and procedure used in this work were similar to those of Sobotka and Khan (ref 1). To make the measurements more accurate, the apparatus used consisted of a 1-liter dissolution flask and a 2-mL microburet. The scale was calibrated in advance by use of mercury. The dissolution flask was immersed in a water bath controlled thermostatically at 25°C. To avoid condensation of (1) from the gas phase, the temperature of gas phase in the dissolution flask was kept 1°C higher than that of the liquid phase. The dissolution flask and the microburet were connected tightly.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; reagent grade; used as received; purity not specified. (2) pure.
<b>ESTIMATED ERROR:</b> temp. ± 0.01 K soly. less than 0.008 mL(1)/1000 mL sln (type of error not specified)	
<b>REFERENCES:</b> 1. Sobotka, H.; Kahn, J. <i>J. Am. Chem. Soc.</i> <u>1948</u> , <i>53</i> , 2935.	

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Sutton, C.; Calder, J.A. <i>J. Chem. Eng. Data</i> 1975, 20, 320-2.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water at 25°C was reported to be 534.8 mg(1)/kg(2). The corresponding mass percent and mole fraction, $x_1$ , calculated by the compilers are 0.05348 g(1)/100 g sln and $1.046 \times 10^{-4}$ .	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> The concentration of (1) in (2) was determined by gas chromatography.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Aldrich Chemical Co. or Matheson Coleman and Bell 99+%. (2) distilled.  <b>ESTIMATED ERROR:</b> temp. $\pm$ 0.1 K soly. 4.9 mg(1)/kg(2) (the standard deviation of the mean for six replicates)  <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Price, L.C. <i>Am. Assoc. Petrol. Geol. Bull.</i> <u>1976</u> , 60, 213-44.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b>  M.C. Haulait-Pirson
<b>EXPERIMENTAL VALUES:</b>  <p>The solubility of toluene in water at 25°C and at system pressure was reported to be 554.0 mg(1)/kg(2). The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by the compiler are 0.0554 g(1)/100 g sln and <math>1.08 \times 10^{-4}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  <p>The solubility was determined at laboratory temperatures by use of screw-cap test tubes. The (1) phase floated on top of the water and insured saturation of the (2) phase in 2 to 4 days. Analyses were carried out by GSC using a Hewlett-Packard model 5751 gas chromatograph with dual-flame ionization detectors. Many details are given in the paper.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) Phillips Petroleum Company; Chemical Samples Company or Aldrich Chemical Company; 99+%.  (2) distilled.  <b>ESTIMATED ERROR:</b>  temp. $\pm$ 1 K soly. $\pm$ 15 mg(1)/kg(2)  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Korenman, I.M.; Aref'eva, R.P. Patent USSR, 553 524, 1977.04.05 C.A. 87:87654
<b>VARIABLES:</b> One temperature: 20°C	<b>PREPARED BY:</b> A. Maczynski
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 20°C was reported to be 0.57 g(1)dm<sup>-3</sup>(2).</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by the compiler are 0.057 g(1)/100 g sln and <math>1.11 \times 10^{-4}</math>.</p> <p>The compiler's calculations assume a solution density of 1.00 g/mL.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>About 100-500 mL(2) was placed in a glass cylinder and 10-50 mg of an insoluble indicator was added and (1) was microburetted until the indicator floated to form a colored thin layer on the cylinder wall 2-3 cm above the liquid layer. After each drop of (1), the mixture was vigorously mixed for 0.5-1.5 min.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) not specified. (2) not specified.  <b>ESTIMATED ERROR:</b> not specified.  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Korenman, I.M.; Aref'eva, R.P. <i>Zh. Prikl. Khim.</i> <u>1978</u> , 51, 957-8.
<b>VARIABLES:</b> Temperature: 25°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 0.65 g(l)dm<sup>-3</sup> sln.</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by the compilers are 0.065 g(l)/100 g sln and <math>1.27 \times 10^{-4}</math>.</p> <p>The compilers' calculations assume a solution density of 1.00 g/mL.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>About 200-500 mL(2) was placed in a ground-joint glass cylinder and 20-50 mg of an insoluble indicator (dithizon, phenolphthalein, etc.) was added, and (1) was microburetted until the indicator floated to form a colored thin layer on the cylinder wall above the liquid layer. Blanks were made to determine the excess of (1).</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) not specified. (2) not specified.  <b>ESTIMATED ERROR:</b> soly. $\pm 0.01$ g(l)dm <sup>-3</sup> sln (standard deviation from 6 determinations).  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Krzyzanowska, T.; Szeliga, J. <i>Nafta (Katowice)</i> , <u>1978</u> , 12, 413-7.
<b>VARIABLES:</b> One temperature: 25°C	<b>PREPARED BY:</b> M.C. Haulait-Pirson
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in water at 25°C was reported to be 554.0 mg(1)/kg(2).</p> <p>The corresponding mass percent and mole fraction, <math>x_1</math>, calculated by compiler are 0.0554 g(1)/100 g sln and <math>1.08 \times 10^{-4}</math>.</p> <p>Editor's Note: Based on the results for this and other hydrocarbon-water systems, uncertainty exists about whether the datum compiled here is independent of that of Price for the same system.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> The saturated solutions of (1) in (2) were prepared in two ways. First, 200 $\mu$ L of (1) was injected into 20 mL of (2) and thermostatted at 25°C. Second, the mixture of (1) and (2) as above was thermostatted at 70°C and then cooled to 25°C. The time required to obtain equilibrium was three weeks. The solubility of (1) in (2) was measured by glc. A Perkin-Elmer model F-11 gas chromatograph equipped with a 100-150 mesh Porasil column (70°C) and a flame ionization detector was used. Saturated solutions of heptane in (2) were used as standard solutions.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) not specified. (2) not specified.  <b>ESTIMATED ERROR:</b> soly. 11.0 mg(1)/kg(2) (standard deviation from 7-9 determinations).  <b>REFERENCES:</b>



<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Banerjee, S.; Yalkowsky, S.H.; Valvani, S.C.  <i>Environ. Sci. Technol.</i> <u>1980</u> , 14, 1227-9.
<b>VARIABLES:</b>  One temperature: 25°C	<b>PREPARED BY:</b>  G.T. Hefter
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in water was reported to be $1.68 \times 10^{-2}$ mol/L sln. Assuming a solution density of 1.00 kg/L the corresponding mass per cent and mole fraction ( $x_1$ ) solubilities, calculated by the compiler, are 0.155 g(1)/100 g sln and $3.04 \times 10^{-4}$ respectively.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  Experiments were performed in sealed stainless steel centrifuge tubes. An excess of <sup>14</sup> C labelled toluene was added to a tube containing distilled water, and the tube was sealed and allowed to equilibrate at 25 ± 0.2°C with constant or intermittent shaking. Equilibration was generally complete within 1 week. The mixture was then centrifuged at 10,000 rpm for 60 min in a head preequilibrated to 25 ± 0.3°C, following which aliquots of the solution were removed for analysis by liquid scintillation counting. The entire procedure was carried out at least twice, and each analysis was also conducted in duplicate.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) <sup>14</sup> C-labelled toluene; New England Nuclear, used without further purification. (2) Distilled.  <b>ESTIMATED ERROR:</b> Temperature: ±0.2 K Solubility: ±2.3% rel. (representing one std. dev.)  <b>REFERENCES:</b>

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Schwarz, F.P. <i>Anal. Chem.</i> <u>1980</u> , 52, 10-15.						
<b>VARIABLES:</b>  One temperature: 23.5°C	<b>PREPARED BY:</b>  M.C. Haulait-Pirson						
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in water at 23.5°C</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>g(1)/100 g sln</u></th> <th style="text-align: center;"><u>10<sup>4</sup>x<sub>1</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.0670 ± 0.0015</td> <td style="text-align: center;">1.31</td> </tr> <tr> <td style="text-align: center;">0.0660 ± 0.0006</td> <td style="text-align: center;">1.29</td> </tr> </tbody> </table>		<u>g(1)/100 g sln</u>	<u>10<sup>4</sup>x<sub>1</sub> (compiler)</u>	0.0670 ± 0.0015	1.31	0.0660 ± 0.0006	1.29
<u>g(1)/100 g sln</u>	<u>10<sup>4</sup>x<sub>1</sub> (compiler)</u>						
0.0670 ± 0.0015	1.31						
0.0660 ± 0.0006	1.29						
<b>AUXILIARY INFORMATION</b>							
<b>METHOD/APPARATUS/PROCEDURE:</b>  An elution chromatography method was used where (1) was the stationary phase and (2) the mobile phase. A transparent column was packed with an inert support (chromosorb P) coated with a known amount of the liquid solute (1). This solute column was connected to a water reservoir (connected to a compressed gas regulator). Water was forced through the column by the pressure of the compressed gas (ca. 14 kPa). As the total volume of water flowing through the column increased, a solute depleted zone, different in color from the stationary phase, developed and increased in length. The solubility is calculated from the amount of solute removed from the column, i.e. length of the solute depleted zone, and the volume of water passed through the column. Many details about preparation of the solute column and calculation are given in the paper.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) 99.9% purity used without further purification (2) distilled  <b>ESTIMATED ERROR:</b> temp. ± 1.5°C soly. 1.5% (average std. dev.)  <b>REFERENCES:</b>						

<b>COMPONENTS:</b> (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Water; $H_2O$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Rossi, S.S.; Thomas, W.H. <i>Env. Sci. Technol.</i> <u>1981</u> , <i>15</i> , 715-6.
<b>VARIABLES:</b> One temperature: 25°C (298 K)	<b>PREPARED BY:</b> G.T. Hefter
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in distilled water at 25°C was reported to be 506.7 $\mu\text{g/g}$ , corresponding to a mole fraction, $x_1$ , of $5.5 \times 10^{-6}$ . The corresponding mass per cent calculated by the compiler is 0.0507 g(l)/100 g sln.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> 500 mL of water and an excess of (1) were equilibrated for at least 24 h in a 1 L Erlenmeyer flask placed in a constant temperature ( $\pm 0.1^\circ\text{C}$ ) gyrotary shaker (200 rpm). After a 12 h stationary equilibration period, 100 mL of saturated solution was drained through a glass-wool plug into a calibrated separatory funnel. Toluene was extracted (>99%) by passing known volumes through 0.6 x 6 cm columns of a superficially porous bonded $C_{18}$ stationary-phase adsorbent and eluted with trichlorofluoromethane. Toluene levels in eluates were determined on a Hewlett-Packard Model 5840A gas chromatograph equipped with a flame ionisation detector and an electronic integrator using a $\frac{1}{8}$ in x 8 ft stainless-steel column of 10% TCEP on 10/120 Chromosorb or a WCOTSP-2100 glass column (0.25 mm x 30 m). Hydrocarbon concentrations in eluates were additionally determined by UC spectrophotometry.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Burdick & Jackson; purified by triple distillation in glass. (2) Doubly distilled in all-glass apparatus; free of trace organics.
<b>ESTIMATED ERROR:</b> Temperature: $\pm 0.1^\circ\text{C}$ Solubility: $\pm 6.1 \mu\text{g/g}$ (std. dev. for 6 determinations).	
<b>REFERENCES:</b>	

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Sanemasa, I.; Araki, M.; Deguchi, T.; Nagai, H.  <i>Chem. Lett.</i> <u>1981</u> , 225-8.																				
<b>VARIABLES:</b>  Temperature: 15-45°C	<b>PREPARED BY:</b>  M.C. Haulait-Pirson and G.T. Hefter																				
<b>EXPERIMENTAL VALUES:</b>  <div style="text-align: center;">Solubility of toluene in water</div> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>g(l)/L</u></th> <th style="text-align: center;"><u>g(l)/100 g sln<sup>a</sup></u></th> <th style="text-align: center;"><u>10<sup>4</sup>x<sub>1</sub><sup>a</sup></u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">0.533 ± 0.017</td> <td style="text-align: center;">0.0533</td> <td style="text-align: center;">1.04</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">0.557 ± 0.007</td> <td style="text-align: center;">0.0559</td> <td style="text-align: center;">1.09</td> </tr> <tr> <td style="text-align: center;">35</td> <td style="text-align: center;">0.587 ± 0.015</td> <td style="text-align: center;">0.0590</td> <td style="text-align: center;">1.16</td> </tr> <tr> <td style="text-align: center;">45</td> <td style="text-align: center;">0.635 ± 0.019</td> <td style="text-align: center;">0.0641</td> <td style="text-align: center;">1.25</td> </tr> </tbody> </table> <p><sup>a</sup> Assuming the solution density to be that of pure water at the same temperature (ref. 1).</p>		<u>t/°C</u>	<u>g(l)/L</u>	<u>g(l)/100 g sln<sup>a</sup></u>	<u>10<sup>4</sup>x<sub>1</sub><sup>a</sup></u>	15	0.533 ± 0.017	0.0533	1.04	25	0.557 ± 0.007	0.0559	1.09	35	0.587 ± 0.015	0.0590	1.16	45	0.635 ± 0.019	0.0641	1.25
<u>t/°C</u>	<u>g(l)/L</u>	<u>g(l)/100 g sln<sup>a</sup></u>	<u>10<sup>4</sup>x<sub>1</sub><sup>a</sup></u>																		
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<b>AUXILIARY INFORMATION</b>																					
<b>METHOD/APPARATUS/PROCEDURE:</b>  The apparatus used for attaining solubility equilibrium is described in detail in the paper. Liquid (1) and redistilled (2) were placed in a vessel and a thermostatted funnel respectively. The solute vapor, generated by bubbling air through the liquid solute was introduced into the funnel and circulated by means of a pump. The circulation rate was 2 L/min. Solubility equilibria were attained within 5 min. Then portions of 10 mL of the aqueous sln were transferred into funnels to which 10 mL of chloroform had been added. Experimental procedures involved in spectrophotometric measuring the chloroform extracts were not reported. The solubility runs were made such that the temperature of solute reservoir was made to vary while that of solvent phase was held constant. The solubility obeys Henry's law at constant solvent temperature. Solubility values were calculated from Henry's law constants.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) analytical reagent grade used as purchased.  (2) redistilled.  <b>ESTIMATED ERROR:</b>  soly. : given above  <b>REFERENCES:</b>  1. CRC Handbook of Chemistry and Physics, R.C. Weast, Editor, CRC Press, Florida, 63rd edn., 1982, pF-11.																				

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Sanemasa, I.; Araki, M.; Deguchi, T.; Nagai, H. <i>Bull. Chem. Soc. Jpn.</i> <u>1982</u> , <i>55</i> , 1054-62.																				
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<b>METHOD/APPARATUS/PROCEDURE:</b> <p>The apparatus is similar to an earlier design (ref 2) and is described in detail in the paper. 100-200 cm<sup>3</sup> of (2) and 10-20 cm<sup>3</sup> of liquid (1) were placed in separate but connected thermostated flasks. After thermal equilibrium was established a recirculating stream of air was used to vaporize liquid (1) and to transport the vapor to the flask containing (2). Five 10 cm<sup>3</sup> aliquots were withdrawn into separatory funnels. The concentration of (1) in (2) was then determined by extraction into chloroform followed by UV-spectrophotometry. Standards for the spectrophotometry were prepared by weight from pure liquid solutes.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) Analytical reagent grade (Wako Pure Chemical Ind. Ltd.), stated purity 99.0%, used without further purification. (2) Redistilled; no further details given. <b>ESTIMATED ERROR:</b> soly. see table, type of error not specified. temp. ± 0.01°C. <b>REFERENCES:</b> 1. Kell, G.S. <i>J. Chem. Eng. Data</i> <u>1975</u> , <i>20</i> , 97. 2. Sanemasa, I.; Araki, M.; Deguchi, Y.; Nagai, H. <i>Chem. Lett.</i> <u>1981</u> , 225-8.																				

<p>COMPONENTS:</p> <p>(1) Toluene; C<sub>7</sub>H<sub>8</sub>; [108-88-3]  (2) Water; H<sub>2</sub>O; [7732-18-5]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Sanemasa, I.; Arakawa, S.;  Araki, M.; Deguchi, T.  <i>Bull. Chem. Soc. Jpn.</i> <u>1984</u>, 57 ,  1539-44.</p>
<p>VARIABLES:</p> <p>One Temperature: 25°C</p>	<p>PREPARED BY:</p> <p>G.T. Hefter</p>
<p>EXPERIMENTAL VALUES:</p> <p>The solubility of toluene in water at 25°C was reported to be <math>5.65 \times 10^{-3}</math> mol(1)/dm<sup>3</sup> sln. Assuming a solution density of 1.00 kg/dm<sup>3</sup> this corresponds to a solubility of 0.0521 g(1)/100 g sln, <math>x_1 = 1.02 \times 10^{-4}</math>, calculated by the compiler.</p>	
<p>AUXILIARY INFORMATION</p>	
<p>METHOD/APPARATUS/PROCEDURE:</p> <p>The apparatus used is described in detail in ref 1. The method involves the introduction of solute vapor(1) into liquid (2) by bubbling air through liquid (1) using a recirculating pump in a closed system. After solubility equilibrium was attained an aliquot of the saturated aqueous solution was withdrawn and analysed by solvent extraction - UV spectrophotometry.</p>	<p>SOURCE AND PURITY OF MATERIALS:</p> <p>(1) Analytical reagent grade source and purity not stated, used without further purification.  (2) Deionized and redistilled; no further details given.</p> <hr/> <p>ESTIMATED ERROR:</p> <p>Not specified.</p> <hr/> <p>REFERENCES:</p> <p>1. Sanemasa, I., Araki, M.;  Deguchi, T.; Nagai, H.  <i>Bull. Chem. Soc. Jpn.</i> <u>1982</u>, 55 ,  1054-62.</p>

<b>COMPONENTS:</b>  (1) Toluene; $C_7H_8$ ; [108-88-3] (2) Deuterium oxide, (Heavy water); $D_2O$ ; [7789-20-0]	<b>ORIGINAL MEASUREMENTS:</b>  Guseva, A.N.; Parnov, E.I. <i>Radiokhimiya</i> <u>1963</u> , 5, 507-9.															
<b>VARIABLES:</b>  Temperature: 87-203°C	<b>PREPARED BY:</b>  A. Maczynski															
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in Deuterium oxide</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ C</math></th> <th style="text-align: center;"><math>10^3 x_1</math></th> <th style="text-align: center;"><math>g(1)/100 g \text{ sln (compiler)}</math></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">87</td> <td style="text-align: center;">0.682</td> <td style="text-align: center;">0.313</td> </tr> <tr> <td style="text-align: center;">123</td> <td style="text-align: center;">1.81</td> <td style="text-align: center;">0.828</td> </tr> <tr> <td style="text-align: center;">164.5</td> <td style="text-align: center;">4.22</td> <td style="text-align: center;">1.91</td> </tr> <tr> <td style="text-align: center;">203</td> <td style="text-align: center;">7.51</td> <td style="text-align: center;">3.37</td> </tr> </tbody> </table>		$t/^\circ C$	$10^3 x_1$	$g(1)/100 g \text{ sln (compiler)}$	87	0.682	0.313	123	1.81	0.828	164.5	4.22	1.91	203	7.51	3.37
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<b>METHOD/APPARATUS/PROCEDURE:</b>  The solubility of (1) in (2) was determined in sealed glass tubes. Details were reported in ref 1.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) not specified. (2) distilled.  <b>ESTIMATED ERROR:</b>  Not specified.  <b>REFERENCES:</b>  1. Khazanova, P.E. <i>Tr. Gos. inst. azotn. promyshl.</i> <u>1954</u> , 4, 5.															

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Deuterium oxide, (heavy water); D <sub>2</sub> O; [7789-20-0]	<b>ORIGINAL MEASUREMENTS:</b> Glasoe, P.K.; Schultz, S.D. <i>J. Chem. Eng. Data</i> , <u>1972</u> , 17, 66-8.																
<b>VARIABLES:</b> Temperature: 15-30°C	<b>PREPARED BY:</b> A. Maczynski and Z. Maczynska																
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of deuterium oxide in toluene</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>t/°C</u></th> <th style="text-align: center;"><u>mol(2) dm<sup>-3</sup> sln</u></th> <th style="text-align: center;"><u>g(2)/100 g sln (compiler)</u></th> <th style="text-align: center;"><u>10<sup>3</sup> x<sub>2</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">0.0162</td> <td style="text-align: center;">0.0372</td> <td style="text-align: center;">1.71</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">0.0213</td> <td style="text-align: center;">0.0504</td> <td style="text-align: center;">2.31</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">0.0240</td> <td style="text-align: center;">0.0560</td> <td style="text-align: center;">2.57</td> </tr> </tbody> </table> <p>The compilers calculations assume a solution density of 0.862 g/mL.</p>		<u>t/°C</u>	<u>mol(2) dm<sup>-3</sup> sln</u>	<u>g(2)/100 g sln (compiler)</u>	<u>10<sup>3</sup> x<sub>2</sub> (compiler)</u>	15	0.0162	0.0372	1.71	25	0.0213	0.0504	2.31	30	0.0240	0.0560	2.57
<u>t/°C</u>	<u>mol(2) dm<sup>-3</sup> sln</u>	<u>g(2)/100 g sln (compiler)</u>	<u>10<sup>3</sup> x<sub>2</sub> (compiler)</u>														
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<b>AUXILIARY INFORMATION</b>																	
<b>METHOD/APPARATUS/PROCEDURE:</b> <p>Dried (1) was saturated with (2) by allowing it to stand in contact with (2) in a closed system, protected from atmospheric moisture.</p> <p>This two-phase system was kept in a pyrex storage bottle which was immersed in a constant temperature water bath.</p> <p>The concentration of (2) in (1) was determined by the Karl Fischer method.</p>	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) source not specified; reagent grade; purified by distillation and dried over molecular sieve, (2) distilled in a pyrex system. <b>ESTIMATED ERROR:</b> soly ± 0.0004 mol(2) dm <sup>-3</sup> sln (type of error not specified) <b>REFERENCES:</b>																



COMPONENTS:		EVALUATOR:	
(1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3]		D.G. Shaw	
(2) Seawater		Institute of Marine Science	
		University of Alaska	
		Fairbanks, Alaska USA	
		December 1982	
CRITICAL EVALUATION:			
The solubility of toluene (1) in seawater (2) at 298 K has been reported as follows:			
<u>Authors</u>	<u>Method</u>	<u>Salinity g salts/kg sln</u>	<u>10<sup>2</sup> g(1)/100 g sln</u>
Mackay and Shiu (ref 2)	GLC	35.0	3.79
Sada <i>et al.</i> (ref 3)	Cloud Point	28.72	3.48
Sutton and Calder (ref 4)	GLC	34.5	3.793
Price (ref 5)	GLC	34.47	4.02
Rossi and Thomas (ref 6)	GLC	35	4.2
At 298 K and a salinity of 35 g salts/kg sln, the values of Mackay and Shiu, Sutton and Calder, and Price are in very good agreement. Each group of workers has also determined the solubility of toluene in pure water and obtained results within experimental error of the value recommended in this volume. Therefore, the mean of the reported values, $3.87 \times 10^{-2}$ g(1)/100 g sln, is accepted as the recommended value at the indicated temperature and salinity. Mackay and Shiu measured solubility over a range of salinities and reported their data in terms of the Setschenow equation. Their values may be used to interpolate solubilities at other salinities up to 200 g salts/kg sln.			
Brown <i>et al.</i> (ref 1) determined the solubility of toluene in seawater at a salinity of 34.42 g salts/kg sln over the temperature range 273 to 293 K. Linear extrapolation by the evaluator of these results to 298 K gives a value of $3.80 \times 10^{-2}$ g(1)/100 g sln. This suggests that the results of Brown <i>et al.</i> may be consistent with the recommended value. The values reported by Sada <i>et al.</i> and by Rossi and Thomas are in poorer agreement with the remaining data.			
<u>SOLUBILITY OF TOLUENE (1) IN SEAWATER (2)</u>			
<u>RECOMMENDED VALUE</u>			
<u>T/K</u>	<u>g salts/kg sln</u>	<u>g(1)/100 g sln</u>	
298	35	$3.87 \times 10^{-2}$	
REFERENCES			
1. Brown, R.L.; Wasik, S.P. <i>J. Res. Natl. Bur. Stds. A</i> <u>1974</u> , <i>78</i> , 453-60.			
2. Mackay, D.; Shiu, W.Y. <i>Can. J. Chem. Eng.</i> <u>1975</u> , <i>53</i> , 239-42.			
3. Sada, E.; Kito, S.; Ito, Y. <i>J. Chem. Eng. Data</i> <u>1975</u> , <i>20</i> , 373-5.			
4. Sutton, C.; Calder, J.A. <i>J. Chem. Eng. Data</i> <u>1975</u> , <i>20</i> , 320-2.			
5. Price, L.C. <i>Am. Assoc. Petrol. Geol. Bull.</i> <u>1976</u> , <i>60</i> , 213-44.			
6. Rossi, S.S.; Thomas, W.H. <i>Environ. Sci. Technol.</i> <u>1981</u> , <i>15</i> , 715-6.			

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Artificial seawater	<b>ORIGINAL MEASUREMENTS:</b> Brown, R.L.; Wasik, S.P. <i>J. Res. Natl. Bur. Stds. A.</i> <u>1974</u> , 78, 453-60.																		
<b>VARIABLES:</b> Temperature: 0-20°C Salinity: 34.42 g salts/kg sln	<b>PREPARED BY:</b> G.T. Hefter and D.G. Shaw																		
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of toluene in artificial seawater</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><i>t</i>/°C</th> <th style="text-align: center;">g(1)/100 g sln<sup>a</sup></th> <th style="text-align: center;"><u>10<sup>5</sup> x<sub>1</sub> (compiler)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.19</td> <td style="text-align: center;">0.0449 (0.0006)</td> <td style="text-align: center;">9.0</td> </tr> <tr> <td style="text-align: center;">5.32</td> <td style="text-align: center;">0.0429 (0.0007)</td> <td style="text-align: center;">8.60</td> </tr> <tr> <td style="text-align: center;">10.05</td> <td style="text-align: center;">0.0416 (0.0008)</td> <td style="text-align: center;">8.34</td> </tr> <tr> <td style="text-align: center;">14.96</td> <td style="text-align: center;">0.0405 (0.0008)</td> <td style="text-align: center;">8.12</td> </tr> <tr> <td style="text-align: center;">20.04</td> <td style="text-align: center;">0.0397 (0.0008)</td> <td style="text-align: center;">7.96</td> </tr> </tbody> </table> <p><sup>a</sup> numbers in parentheses are standard deviations from 4 observations</p>		<i>t</i> /°C	g(1)/100 g sln <sup>a</sup>	<u>10<sup>5</sup> x<sub>1</sub> (compiler)</u>	0.19	0.0449 (0.0006)	9.0	5.32	0.0429 (0.0007)	8.60	10.05	0.0416 (0.0008)	8.34	14.96	0.0405 (0.0008)	8.12	20.04	0.0397 (0.0008)	7.96
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<b>AUXILIARY INFORMATION</b>																			
<b>METHOD/APPARATUS/PROCEDURE:</b> Solubilities were calculated from partition coefficient measurements for the hydrocarbon between an aqueous solution and its vapor using headspace chromatography.  The apparatus and the method of obtaining the partition coefficients are described in detail in the paper. The hydrocarbon was introduced as a vapor (to avoid emulsification) into a glass equilibration cell containing about 45 cm <sup>3</sup> of water. The vapor was subsequently analysed by gas chromatography using He as the carrier. Possible sources of error are discussed in detail although the source of vapor pressure data used to calculate solubilities are not given.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) 99.99 mole per cent purity; source and methods of purification not specified. (2) Prepared according to ref. 1. Purity not specified.  <b>ESTIMATED ERROR:</b> Temperature: ±0.01 K Solubility: see Table above  <b>REFERENCES:</b> 1. Sverdrup, H.U.; Johnson, M.W.; Fleming, R.H.; <i>The Oceans</i> , 1942, Prentice-Hall, Englewood Cliffs, New Jersey p186.																		

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Mackay, D.; Shiu, W.Y. <i>Can. J. Chem. Eng.</i> <u>1975</u> , <i>53</i> , 239-42.
<b>VARIABLES:</b> One temperature: 25°C Salinity: 0-200 g(2)/kg sln	<b>PREPARED BY:</b> M. Kleinschmidt and D. Shaw
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of toluene in solutions of sodium chloride is reported in terms of the Setschenow equation:</p> $\log(S_0/S) = K_S C_S$ <p>where, S<sub>0</sub> is the solubility of toluene in water (mg/L)          S is the solubility of toluene in solution (mg/L)          K<sub>S</sub> is the Setschenow constant (L/mol)          C<sub>S</sub> is the concentration of sodium chloride (mol/L)</p> <p>evaluating the equation for S over the range of C<sub>2</sub> 0-4 mol/L,          K<sub>S</sub> = 0.2052 ± 0.0056 (standard error) with S<sub>0</sub> = 519.5 ± 9.6.</p> <p>The corresponding mass percent and mole fraction, x<sub>1</sub>, at salinity = 35 g(2)/kg sln calculated by the compilers are 3.79 x 10<sup>-2</sup> g(10)/100 g sln and 7.743 x 10<sup>-5</sup> assuming a density of 1.025 kg/L.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> Solubility was determined by vapor phase extraction and gas chromatographic analysis. This method does not require the preparation of saturated solutions and thus avoids one of the major sources of error of other methods.	<b>SOURCE AND PURITY OF MATERIALS:</b> (1) research grade, 99.9+%, from Phillips Petroleum Co. (2) and (3) not specified.  <b>ESTIMATED ERROR:</b> Temp. ±0.1 K Soly. 95% confidence limit is about 8%  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Sada, E.; Kito, S.; Ito, Y.  <i>J. Chem. Eng. Data</i> <u>1975</u> , 20 373-5.																									
<b>VARIABLES:</b> One temperature: 25°C Salinity: 29 - 108 g(3)/kg sln	<b>PREPARED BY:</b> M. Kleinschmidt and D. Shaw																									
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in aqueous sodium chloride solutions</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">mol(2)/L</th> <th style="text-align: center;">g(2)/kg sln<sup>a</sup></th> <th style="text-align: center;">L(1)/10<sup>3</sup> L sln</th> <th style="text-align: center;">Mass%(1)<sup>a</sup></th> <th style="text-align: center;">10<sup>5</sup>x<sub>1</sub><sup>a</sup></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.5011</td> <td style="text-align: center;">28.72</td> <td style="text-align: center;">0.410</td> <td style="text-align: center;">0.0348</td> <td style="text-align: center;">6.95</td> </tr> <tr> <td style="text-align: center;">0.9991</td> <td style="text-align: center;">56.14</td> <td style="text-align: center;">0.298</td> <td style="text-align: center;">0.0248</td> <td style="text-align: center;">5.06</td> </tr> <tr> <td style="text-align: center;">1.4933</td> <td style="text-align: center;">82.66</td> <td style="text-align: center;">0.223</td> <td style="text-align: center;">0.0182</td> <td style="text-align: center;">3.76</td> </tr> <tr> <td style="text-align: center;">1.9933</td> <td style="text-align: center;">107.9</td> <td style="text-align: center;">0.169</td> <td style="text-align: center;">0.0136</td> <td style="text-align: center;">2.87</td> </tr> </tbody> </table> <p><sup>a</sup> calculated by compilers using density and other physical data for NaCl solutions from ref 1 and the assumption that the density of (1) is 0.8669 kg/L.</p>		mol(2)/L	g(2)/kg sln <sup>a</sup>	L(1)/10 <sup>3</sup> L sln	Mass%(1) <sup>a</sup>	10 <sup>5</sup> x <sub>1</sub> <sup>a</sup>	0.5011	28.72	0.410	0.0348	6.95	0.9991	56.14	0.298	0.0248	5.06	1.4933	82.66	0.223	0.0182	3.76	1.9933	107.9	0.169	0.0136	2.87
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<b>AUXILIARY INFORMATION</b>																										
<b>METHOD/APPARATUS/PROCEDURE:</b>  Experimental apparatus and procedure used similar to those in ref 2.  Toluene stained with 0.1% by weight Sudan IV was added dropwise from a microburet into aqueous salt solution retained in a 1-L dissolution flask which was kept at 25.00° ± 0.01°C in a thermostatically controlled water bath. The aqueous salt solution was violently stirred by a magnetic stirring device. Before saturation was reached, the Sudan IV was precipitated and floated on the surface as a solid. At saturation, the excess toluene appeared as immiscible red liquid droplets suspended in the aqueous solution. To ensure complete saturation, 24 hr was allowed for equilibration.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1), (2): reagent grade, source not specified.  (3): not specified.  <b>ESTIMATED ERROR:</b> Soly 0.008 x 10 <sup>-3</sup> L (1)/L sln.  <b>REFERENCES:</b>  1. Weast, R.C. CRC Handbook of Chemistry and Physics, 59th Ed. <u>1978</u> , CRC Press, pp D299 - D300. 2. Sobotka, H.; Kahn, J. <i>J. Am. Chem. Soc.</i> <u>1948</u> , 53, 2935.																									

<b>COMPONENTS:</b> (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Artificial seawater (ref 1)	<b>ORIGINAL MEASUREMENTS:</b> Sutton, C.; Calder, J.A. <i>J. Chem. Eng. Data</i> <u>1975</u> , 20, 320-2.
<b>VARIABLES:</b> One temperature: 25.0°C One salinity: 34.5 g salts/kg sln	<b>PREPARED BY:</b> M. Kleinschmidt
<b>EXPERIMENTAL VALUES:</b>  The solubility of toluene in artificial seawater is reported to be 379.3 mg(1)/kg sln. The corresponding mass percent and mole fraction, $x_1$ calculated by the compiler are 0.03793 g(1)/100 g sln and $7.61 \times 10^{-5}$ assuming the artificial seawater composition of ref 1.	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  A test tube containing (1) was placed in a flask containing (2) thus allowing for equilibration through the vapor phase. The saturated solution was extracted with hexane and analyzed by gas chromatography.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) from either Aldrich Chemical Co. or Matheson Coleman and Bell, 99+% pure.  (2) made from doubly distilled water and salts 99+% pure.  <b>ESTIMATED ERROR:</b> temp. $\pm$ 0.1 K soly. 2.8 (std. dev.)  <b>REFERENCES:</b> 1. Lyman, J.; Fleming, R.H.; <i>J. Mar. Res.</i> <u>1940</u> , 3, 135.

<b>COMPONENTS:</b>  (1) Toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Price, L.C.  <i>Am. Assoc. Petrol. Geol. Bull.</i> <u>1976</u> , 60, 213-44.																											
<b>VARIABLES:</b>  One temperature: 25°C Salinity: 1-360 g(2)/kg sln	<b>PREPARED BY:</b>  M. Kleinschmidt and D. Shaw																											
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of Toluene in Aqueous NaCl</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Salinity g(2)/kg sln</th> <th style="text-align: center;">Mass Percent g(1)/100 g sln</th> <th style="text-align: center;">Mole fraction, 10<sup>5</sup>x<sub>1</sub> (compilers)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">1.002</td><td style="text-align: center;">0.0526</td><td style="text-align: center;">10.3</td></tr> <tr><td style="text-align: center;">10.000</td><td style="text-align: center;">0.0490</td><td style="text-align: center;">9.65</td></tr> <tr><td style="text-align: center;">34.472<sup>a</sup></td><td style="text-align: center;">0.0402</td><td style="text-align: center;">8.04</td></tr> <tr><td style="text-align: center;">50.030</td><td style="text-align: center;">0.0359</td><td style="text-align: center;">7.26</td></tr> <tr><td style="text-align: center;">125.100</td><td style="text-align: center;">0.0182</td><td style="text-align: center;">3.85</td></tr> <tr><td style="text-align: center;">199.900</td><td style="text-align: center;">0.0106</td><td style="text-align: center;">2.34</td></tr> <tr><td style="text-align: center;">279.800</td><td style="text-align: center;">0.00538</td><td style="text-align: center;">1.24</td></tr> <tr><td style="text-align: center;">358.700</td><td style="text-align: center;">0.00372</td><td style="text-align: center;">0.890</td></tr> </tbody> </table> <p><sup>a</sup>Artificial seawater, composition not specified but probably similar to ref 1.</p>		Salinity g(2)/kg sln	Mass Percent g(1)/100 g sln	Mole fraction, 10 <sup>5</sup> x <sub>1</sub> (compilers)	1.002	0.0526	10.3	10.000	0.0490	9.65	34.472 <sup>a</sup>	0.0402	8.04	50.030	0.0359	7.26	125.100	0.0182	3.85	199.900	0.0106	2.34	279.800	0.00538	1.24	358.700	0.00372	0.890
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<b>METHOD/APPARATUS/PROCEDURE:</b>  Details given in source. (1) was equilibrated with NaCl solution for one month. An aliquot was analyzed directly by gas chromatography.	<b>SOURCE AND PURITY OF MATERIALS:</b>  (1) commercial, 99 + % pure  <b>ESTIMATED ERROR:</b>  Temperature ± 1 K Solubility ± 10 relative %  <b>REFERENCES:</b>  1. Lyman, J.; Fleming, R.H.; <i>J. Mar. Res.</i> <u>1940</u> , 3, 135.																											

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<b>VARIABLES:</b> Temperature: 15 - 25°C Salinity: 35 g/kg sln	<b>PREPARED BY:</b> W.Y. Shiu, D. Mackay																
<b>EXPERIMENTAL VALUES:</b>  <p style="text-align: center;">Solubility of toluene in seawater</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><math>t/^\circ\text{C}</math></th> <th style="text-align: center;"><math>\mu\text{g}(l)/\text{g sln}</math></th> <th style="text-align: center;">Mass percent <math>\text{g}(l)/100 \text{ g sln}</math></th> <th style="text-align: center;">Mole fraction <math>10^5 x_1</math></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">410</td> <td style="text-align: center;">0.041</td> <td style="text-align: center;">8.2</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">410</td> <td style="text-align: center;">0.041</td> <td style="text-align: center;">8.2</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">418.5</td> <td style="text-align: center;">0.042</td> <td style="text-align: center;">8.4</td> </tr> </tbody> </table>		$t/^\circ\text{C}$	$\mu\text{g}(l)/\text{g sln}$	Mass percent $\text{g}(l)/100 \text{ g sln}$	Mole fraction $10^5 x_1$	15	410	0.041	8.2	20	410	0.041	8.2	25	418.5	0.042	8.4
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<b>AUXILIARY INFORMATION</b>																	
<b>METHOD/APPARATUS/PROCEDURE:</b>  Saturated solution was prepared by equilibrating seawater with an excess of hydrocarbon for 24 hrs. in a constant temperature gyrotary shaker followed by 12 hrs. stationary period. A 100 mL-aliquot was extracted three times with n-hexane. The concentrated hexane extract was analyzed by a gas chromatograph equipped with a flame ionization detector to determine the hydrocarbon concentration.	<b>SOURCE AND PURITY OF MATERIALS:</b>  toluene: from Burdick and Jackson, triple distilled in glass. n-hexane: doubly distilled in glass. seawater: collected off Scripps pier and was filtered twice through 0.22 $\mu\text{m}$ membrane and twice extracted with n-hexane then its salinity adjusted to 35‰.  <b>ESTIMATED ERROR:</b>  temp. $\pm$ 0.1 K soly. $\pm$ 2%  <b>REFERENCES:</b>																