	<b>IL-B2001</b> High Temperature Cooling Liquid Product No. 00103.6010 <b>Technical Data Sheet</b>	Date	2019-12-18
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## Identity:


Product name	1-Ethyl-3-methylimidazolium tetrafluoroborate, stabilized
Trade name	IL-B2001
CAS number	143314-16-3
Registration number (REACH)	01-2120086816-43-0000

## Specifications:

assay dialkylimidazolium <sup>+</sup> (HPLC) <sup>1</sup>	≥ 93%w
assay BF <sub>4</sub> <sup>-</sup> (titration)	≥ 93%w
stabilizer (HPLC)	4.5 – 5.5%w
fluoride (ion chromatography)	≤ 1.5%w
H <sub>2</sub> O (Karl Fischer titration)	≤ 1%w
pH(50) <sup>2</sup>	5.5 – 8.0
refractive index	1.4100 – 1.4250
weight loss at 200°C (TGA, 24h, Ar)	≤ 7%w
aspect according to Ph.Eur.5.0	clear to faintly turbid, viscous liquid
color according to Ph.Eur.5.0	light yellow to brown


<sup>1</sup> Sum 1,3-Dimethylimidazolium, 1-Ethyl-3-methylimidazolium, 1,3-Diethylimidazolium

<sup>2</sup> pH of a freshly prepared 50%w aqueous solution at 20°C

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## Thermal properties:

operating temperature	50°C to 200°C
thermal stability (in a closed system with nitrogen)	200°C for at least 2 years 250°C for up to 3 hours
flash point	no flash point according to EU-Method A.9
melting point	≤ - 10°C
boiling point	no boiling point according to OECD 103 and EU method A.2
Enthalpy of thermal decomposition	+689.2 J/g (endothermal) with T <sub>Onset</sub> = 418°C (TGA-DSC, 2K/min, Ar)
Specific heat capacity	1.67 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (20°C) 1.71 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (40°C) 1.74 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (60°C) 1.77 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (80°C) 1.81 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (100°C) 1.85 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (120°C) 1.88 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (140°C) 1.91 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (160°C) 1.95 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (180°C) 1.99 ±0.1 J·g <sup>-1</sup> K <sup>-1</sup> (200°C)
Volumetric heat capacity	2.09 ±0.1 J·cm <sup>-3</sup> K <sup>-1</sup> (20°C) 2.13 ±0.1 J·cm <sup>-3</sup> K <sup>-1</sup> (40°C) 2.18 ±0.1 J·cm <sup>-3</sup> K <sup>-1</sup> (100°C) 2.21 ±0.1 J·cm <sup>-3</sup> K <sup>-1</sup> (140°C) 2.25 ±0.1 J·cm <sup>-3</sup> K <sup>-1</sup> (200°C)
Thermal conductivity	0.157 W·m <sup>-1</sup> K <sup>-1</sup> (20°C) 0.162 W·m <sup>-1</sup> K <sup>-1</sup> (100°C)
Thermal-expansion coefficient	6.61·10 <sup>-4</sup> K <sup>-1</sup>

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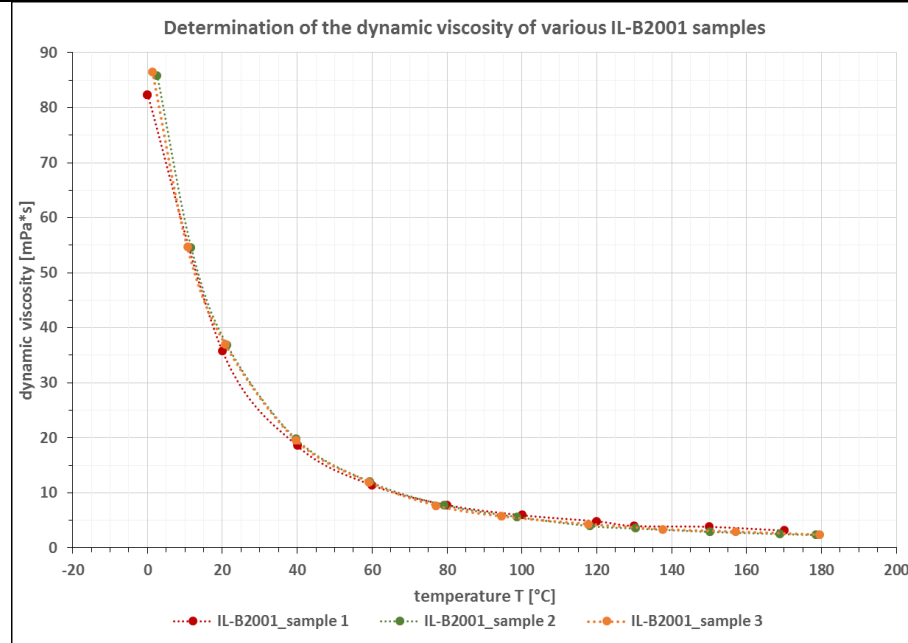
### Other properties:

Density	1.2571 g·cm <sup>-3</sup> (20°C) 1.2520 g·cm <sup>-3</sup> (40°C) 1.2091 g·cm <sup>-3</sup> (100°C) 1.1778 g·cm <sup>-3</sup> (140°C) 1.1352 g·cm <sup>-3</sup> (200°C)
Partitioning coefficient <i>n</i> -octanol / water (log POW)	-1.932 at 25°C
Vapor pressure	2.20·10 <sup>-6</sup> Pa (20°C) <sup>3</sup> 4.30·10 <sup>-6</sup> Pa (25°C) 1.16·10 <sup>-3</sup> Pa (75°C) 5.77·10 <sup>-3</sup> Pa (90°C) 1.35·10 <sup>-2</sup> Pa (105°C) 6.22·10 <sup>-2</sup> Pa (120°C) 8.50·10 <sup>0</sup> Pa (200°C)
Viscosity	115 mPas (0°C) 18.9 mPas (40°C) 5.04 mPas (100°C)
Surface tension	50.7 mN·m <sup>-1</sup> at 20°C

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<sup>3</sup> Calculated from a linear fit  $y = -5075,7x + 11,657$  with  $y$  being  $\log P$  in [log Pa] and  $x$  being  $1/T$  in [1/K] derived from the four experimental values between  $T = 75^\circ\text{C}$  and  $120^\circ\text{C}$ , with a coefficient of correlation  $r^2 = 0.9872$ .

### Dynamic viscosity




temperature T [°C]	viscosity [mPa*s]	temperature T [°C]	viscosity [mPa*s]	temperature T [°C]	viscosity [mPa*s]
IL-B2001_sample 1	IL-B2001_sample 1	IL-B2001_sample 2	IL-B2001_sample 2	IL-B2001_sample 3	IL-B2001_sample 3
0	82,41	2,5	85,88	1,4	86,55
0	82,41	11,6	54,55	10,7	54,65
20	35,75	21,2	36,83	20,8	36,98
40	18,57	39,6	19,81	39,7	19,54
60	11,43	59,4	12,02	59,1	11,93
80	7,82	79,1	7,81	77,0	7,67
100	5,99	98,7	5,66	94,5	5,70
120	4,87	118,2	3,99	117,8	4,28
130	4,03	130,3	3,55	137,7	3,35
150	3,87	150,1	2,95	157,1	2,89
170	3,19	168,9	2,54	179,5	2,35
		178,50	2,37		

### Corrosion test

at 200°C for 1 month in a closed system with nitrogen

Material	St52	X6	A101	A965	Cu	Monel 400
Corrosion Δd/t [mm/year]	< 0.08	< 0.01	< 0.01	< 0.03	<0.02	<0.02

>0,1mm not recommended, ≤0,1mm acceptable, ≤0,05mm good, ≤ 0,02mm excellent

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**Comment:**

Values presented are results of careful measurements on representative batches of IL-B2001. New batches, in full compliance with the specifications, may result in slightly divergent values and may change over time during operation. However, this will not affect their full operability and is a result of normal batch-to-batch variations and aging processes.