



## Ionic Mixtures

### Threshold determination for its non-skin irritating properties

#### PREAMBLE

Metalworking Fluid concentrates (MWFs) are complex mixtures of substances intended to facilitate the various processes in the metal working industry. During the manufacturing process of such MWFs it is unavoidable that some of these substances unintentionally react with each other creating new substances, which are usually called "Ionic Mixtures". These unintended ionic mixtures cannot be separated from the original mixture and therefore form an intrinsic part of the MWF.

To avoid unnecessary testing of the entire MWF for classification purposes it is important that such properties of the ionic mixtures are known as well. By having such data available the irritation properties of MWFs can be calculated in a more appropriate manner and more relevant compared to traditional calculations which are based on individual added components.

#### TEST CONSIDERATIONS AND STATUS

Earlier studies conducted by Boomkamp et al. on behalf of UKLA in 2007 clearly showed that the major contributing factor for irritating properties of ionic mixtures is the carbon chain length of the acid involved and that the ionic mixture itself appears to be less irritating than its individual components. However it did not show clearly at which acid carbon chain length the irritating properties changed from irritating into non-irritating. All investigations were conducted on concentrated salts or complex mixtures.

However, the labelling calculation of the SDS requires data of pure substances. Therefore additional studies were carried out in 2012 and 2013 headed by Dr Martin Manikowski on behalf of UEIL. Its goal: Based on a selection of pure ionic mixtures, which were synthesized on laboratory scale, the skin-irritating properties of these ionic mixtures were determined by TNO-Triskelion in Zeist, Netherlands, using the globally accepted method for skin irritation according to OECD 439.

Since it was already established in 2007 that the threshold level of ionic mixtures using acids with a Carbon chain length between C9 (irritating) and C16 (non-irritating), the new tests were conducted on synthesized ionic mixtures using C12, C12-branched, C14 and C16 acids, whilst the bases used were MEA and MIPA.

#### TEST RESULTS AND CONCLUSION ON PURE SALTS (100%)

Mol. Form.	CAS RN	EC Nr	IUPAC Name	Trivial Name
<b>Acids used:</b>				
C <sub>12</sub> H <sub>24</sub> O <sub>2</sub>	143-07-7	205-582-1	Dodecanoic Acid	Lauric Acid
C <sub>12</sub> H <sub>24</sub> O <sub>2</sub>	27610-92-0	248-570-1	2-Butyloctanoic Acid	Butylcaprylic Acid
C <sub>14</sub> H <sub>28</sub> O <sub>2</sub>	544-63-8	208-875-2	Tetradecanoic Acid	Myristic Acid
C <sub>16</sub> H <sub>32</sub> O <sub>2</sub>	57-10-3	200-312-9	Hexadecanoic acid	Palmitic Acid
<b>Bases used:</b>				
C <sub>2</sub> H <sub>7</sub> NO	141-43-5	205-483-3	2-Aminoethanol	MonoEthanolAmine (MEA)
C <sub>3</sub> H <sub>9</sub> NO	78-96-6	201-162-7	1-Aminopropan-2-ol	MonolsoPropanolAmine (MIPA)

#### Overview of skin irritating properties for ionic mixtures based on acids & bases

C-length	CAS RN of acid	MEA Cas 141-43-5	MIPA Cas 78-96-6
C12	143-07-7	Skin irritant *	not tested
C12-br.	27610-92-0	Skin irritant *	not tested
C14	544-63-8	non-irritant	non-irritant
C16	57-10-3	non-irritant	not tested

Based on official tests to date, it can be concluded that ionic mixtures, based on MEA or MIPA in combination with acids with a carbon chain length of C14 and higher can be regarded as non-skin irritating substances. Please note that investigation into other remaining hazardous properties have not been carried out and should remain unaffected as a first approach.

Details of the referenced studies, which are intended for personal and confidential use only, can be requested by members of UEIL to the UEIL secretariat.

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\*) Skin irritant: DSD: Xi, R38; CLP: GHS07w (exclamation mark, warning), H315