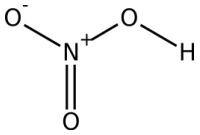
NITRIC ACID - Substance Identification Profile

Proposal

SIEF REACH Registration substance sameness proposal **		
Date:		26/01/10
Type of substance	Composition	mono-constituent
	Origin	inorganic
Reference EC number (s)		231-714-2
Other EC numbers considered to be the same substance		/
EC name		Nitric acid
CAS number (s)		7697-37-2
SMILES		- O=N(=O)O
Molecular formula		HNO3
Structural formula		
Molecular weight (or range)		63.0128 g/mol

** Note: this proposal is based on §5 of the Guidance Document "identification and naming under REACH".

Composition			
Purity (%)	Typical purity of substance	≥ 99,5 %	expressed as % dry weight, that is excluding water
	Lower content	≥ 98 %	
	Higher content	100 %	
Impurities in the substance *	The Registration Dossier prepared will address the pure substance. Each registrant will have to specify separately the impurities in their own product, in the company-specific (confidential) part. The Registration Dossier, and in particular the Classification and Labelling proposals and hazard assessment will assume that substance as placed on the market conforms to: • All impurities > 1% are other related inorganic substances, similar to the Registered substance, and which do not significantly affect its toxicological and ecotoxicological properties • All hazardous impurities are < 0.1% If a Registrant's substance does not conform to the above specifications then the Registrant will have to justify that the differences do not modify the IUCLID5 and CSR conclusions and do not require a different Classification and Labelling or different exposure scenarios. This information will be reported in the company-specific (confidential) part of the registration dossier. <u>The potential impurities which may be identified (on dry basis) are :</u> Nitrite ion (NO_2^-) : 0 - 0,5 % which may be described within IUCLID as HNO_2 Each trace element should be below 0,1 %		

Proposed tonnage band	
The Lead Registrant is currently planning to prepare registration for this substance conform to the REACH deadline for the following tonnage band	> 1,000 tonnes/year

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Proposal for analytical methods

Identification of Nitric acid	• The acid-base titration is an analysis of H+ and not of NO3- , so this cannot be a proof of identity. The curve of potentiometric titration presenting only one equivalent point can only give the proof of a mono-acid , but not which of them . • The grouping of the result of this titration with a result obtained by determination of density would be able to comfort the result but it cannot give a proof of identity. It is even more difficult because, as explained in the following item, there is no Standard about this subject. • Ionic chromatography, because of the dilutions prescribed by the technic cannot be a method of identification by a correct titration of NO3- . **Nevertheless, using ionic chromatography could permit to demonstrate that NO3- is the major anion and so that the acid can only be nitric acid.**
Concentration of nitric acid	Today, it does not exist any NF, EN or ISO Standard for the determination of the concentration of nitric acid or any other acid, since the NF EN 20251 Standard of determination of the "approximate concentration" by measure of density was cancelled. So , the proposal can be as following : « Determination of the concentration using an acid-base titration : • titration with a pH electrode and a standard solution of NaOH • or titration by a standard solution of NaOH using a Tashiro colored indicator consisting in a solution of methyl red and methylen blue in ethanol . » .
Nitrous acid HNO_2 or nitrite ions NO_2^-	The method of determination by oxidation with potassium permanganate ISO 1981 (1977) Standard was cancelled in 2002 and the NFT 20-293(1968) Standard was cancelled in 2005 . But there are Standards for the analysis of NO2- in ammonium nitrate or water that can be used for nitric acid : • NFT 20-582 (1965) Standard of analysis of nitrites in ammonium nitrate : - Diazotation of sulfanilic acid by nitrites - Creation of a colored compound by reaction between the diazoïc and the α-naphtylamine - Spectrophotometric analysis at 530 nm . • Standards for analysis of nitrites in water by reaction at 37°C with sulfanilamide and N-napthyl-1-ethylen diamine dichlorhydrate followed by an analysis at 520 nm : - analysis by continuous flux : ISO 13395 (1996) - manual spectrophotometric analysis : ISO 6777 (1984) . To apply these methods to nitric acid, it is only necessary to dilute and neutralize the obtained solution with NaOH . **It seems better to indicate in the REACH document the references of the existing Standards NFT 20-582 (1965), ISO 13395 (1996) and ISO 6777 (1984).**
Trace elements	There is not any Standard for this analysis. **So it is necessary to make a proposal for an ICP analysis**.

Proposal for spectral data

Spectral data is a mandatory requirement for each registrant under REACH (Article 11 Joint submission of data by multiple registrants): each registrant shall subsequently submit separately the information specified in Articles 10(a)(i),(ii),(iii) and (x) and in Article 10(ii) and the identity of the substance as specified in section 2 of Annex VI: 2.3.5 Spectral data (ultra-violet, infra-red, nuclear magnetic resonance or mass spectrum), 2.3.6 High-pressure liquid chromatogram, gas chromatogram.
Due to their physico-chemical properties, the spectral method used to provide structural data is considered to be inadequate on its own. The supporting evidence using other methods is included below.

XRD	Not applicable. Can only be used only for solids.
UV (*Ultraviolet and Visible Absorption Spectroscopy*)	Not applicable. U.V analysis is unusefull Nitric acid, because it will not provide a spectrum usable for the identification of the substance.
RMN (*Nuclear Magnetic Resonance Spectroscopy*)	Not applicable. For soluble materials: According to the ECHA guidance document; 'Guidance for Substance Identification and naming in REACH', Section 4.2.1.3 the requirements for spectroscopic and analytical methods, as defined in Annex VI, Section 2.3.5 of Regulation (EC) No. 1907/2006, may be amended if more suitable methods are available. As Nitric acid is a nitrogen-containing substance, it is technically possible to conduct 31P NMR, however this would only provide confirmation that nitrogen is present within the substance and would not provide a detailed description of the composition of the material. It is therefore not deemed necessary to provide this data as other methods that are more suited to inorganic substances have also been provided and show a level of analytical and compositional data greater than can be achieved by this method.
MS (*Mass Spectroscopy*)	According to the ECHA guidance document; 'Guidance for Substance Identification and naming in REACH', Section 4.2.1.3 the requirements for spectroscopic and analytical methods, as defined in Annex VI, Section 2.3.5 of Regulation (EC) No. 1907/2006, may be amended if more suitable methods are available. As Nitric acid is an inorganic substance, mass spectroscopy is not a recommended method and would not yield any usable information. The inorganic state make ionisation of the substance not possible. Standard ionisation techniques within MS are not applicable to this substance. It is therefore not deemed necessary to provide this data as other methods that are more suited to inorganics have also been provided and show a level of analytical and compositional data greater than can be achieved by this method.
IR (*Infra Red Spectroscopy*)	Not possible, Nitric acid would destroy the cells of measure.
IC (*Ionic Chromatography*)	**For Nitric acid, the only one possibility to identify the acid is to identify the major anion. This can be done by IC, after a suitable dilution in water.**