

Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

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Item 7 of the provisional agenda

New proposals for amendments to the Model

Regulations on the Transport of Dangerous Goods

Revised name and description for Sodium dithionite (UN1384)

Transmitted by the expert from Canada

Purpose

1. To amend the current name and description of UN1384 SODIUM DITHIONITE to UN1384 SODIUM DITHIONITE, SOLID to better communicate that the solid or anhydrous form is the regulated dangerous goods.

Introduction

2. The expert from Canada recommends that the name and description for Sodium Dithionite (UN1384) explicitly state that the solid or anhydrous form is the regulated dangerous goods. This change is recommended to avoid situations where solutions of sodium dithionite may be mistakenly considered and handled as dangerous goods.

Background

3. Sodium dithionite, also referred to as sodium hydrosulfite or sodium hydrosulphite, is an important industrial chemical. As a strong reducing agent, sodium dithionite is often used as a bleaching agent in the textile and paper industries. Similarly, the chemical has proven successful in the treatment of heavy metal waste¹.

4. Solid anhydrous sodium dithionite decomposes exothermically in air on prolonged exposure to temperatures above 90°C to yield sodium sulphate (Na₂SO₄) and sulfur dioxide (SO₂). Above 150°C, in exclusion of air, vigorous decomposition occurs, yielding mainly sodium sulphite (Na₂SO₃), sodium thiosulfate (Na₂S₂O₃), sulfur dioxide (SO₂) and

¹ <http://www.tandfonline.com/doi/abs/10.1080/10426507.2014.914939#.VD7AZ2OZiPU>

small amounts of sulfur². Sulfur dioxide is known as a respiratory irritant to humans and is regulated as dangerous goods (i.e., UN1079).

5. Sodium dithionite, as an anhydrous solid, is known to undergo rapid exothermic decomposition in air on contact with a small amount of moisture. This reaction could give rise to such intense heat that it burns with a flame and ignites nearby combustible materials. Given the highly exothermic nature of the decomposition reaction, sodium dithionite (in its solid form) has been classified as Class 4.2, Packing Group II – substances liable to spontaneous combustion.

6. Sodium dithionite, in solution, decomposes/disproportionates to sulfite, sulfur dioxide, and sodium thiosulfate as major decomposition products. The rate of decomposition proceeds faster under acidic conditions and oxygen consumption. For instance, decomposition was found to be rapid at pH values less than 5.53. Although the decomposition reaction can release sulfur dioxide under strongly acidic conditions, this is not likely to occur under normal natural environmental conditions⁴. Similarly, it is unlikely that sodium dithionite would be transported under conditions that would promote a decomposition reaction. The other major decomposition products are not considered as dangerous goods.

7. Stable sodium dithionite solutions (i.e., limited rate of decomposition) can be maintained with cooled, alkaline and oxygen-excluded environments.

8. Recently, in Canada, an incident occurred where a tank spilled sodium dithionite in solution. The emergency responder contacted Transport Canada's CANUTEC⁵ office to determine the most appropriate emergency measures for the situation. CANUTEC provided measures to address sodium dithionite (solid form), as the respondent did not specify the form of the chemical (i.e., solution versus solid). Sodium dithionite in solution is not regulated as dangerous goods.

9. The applicable special provision (i.e., TP33) for sodium dithionite (UN1384) supports the UN Model Regulations' intent to have the solid form of the chemical regulated as dangerous goods.

10. Inappropriate response could harm the reputation of a company and ultimately affect its operations. It is therefore important that these types of situations be avoided.

11. Therefore, it is recommended that the reference to sodium dithionite (UN1384) in the UN Model Regulations be clarified by explicitly referencing the chemical in its solid form. This will help ensure that the most appropriate emergency measures can be accessed and provided to those responding to future incidents (e.g., tank rollovers and spills).

Proposal

The "Name and Description" should be changed for Sodium Dithionite. Changes have been highlighted in red.

² <http://www.inchem.org/documents/sids/sids/7775146.pdf>

³ <http://www.inchem.org/documents/sids/sids/7775146.pdf>

⁴ <http://www.inchem.org/documents/sids/sids/7775146.pdf>

⁵ CANUTEC is the Canadian Transport Emergency Centre operated by the Transportation of Dangerous Goods Directorate of Transport Canada. The Directorate's overall mandate is to promote public safety in the transportation of dangerous goods by all modes.

UN No.	Name and description	Class or division	Subsidiary risk	UN Packing group	Special provisions	Limited and excepted quantities		Packaging		Portable tanks and bulk containers	
						(7a)	(7b)	Packaging Instructions	Special Packing Provisions	Instructions	Special Provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
-	3.1.2	2.0	2.2	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.2.5 / 4.3.2	4.2.5
1384	SODIUM DITHIONITE, SOLID ; or SODIUM HYDROSULPHITE, SOLID	4.2		II		0	E2	P410 IBC06	B2	T3	TP33