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**COMMITTEE OF EXPERTS ON THE TRANSPORT OF  
DANGEROUS GOODS AND ON THE GLOBALLY  
HARMONIZED SYSTEM OF CLASSIFICATION  
AND LABELLING OF CHEMICALS**

**Sub-Committee of Experts on the  
Transport of Dangerous Goods**  
(Nineteenth session, 2-6 July 2001,  
agenda item 7(d))

**LISTING AND CLASSIFICATION**

**Miscellaneous amendment proposals (Parts 2 and 3)**

**Provision for calcium hypochlorite in tablet form**

**Transmitted by the expert from South Africa**

**Background**

Calcium hypochlorite is used in large quantities all over the world and is manufactured in only about six countries. The historical demand for this chemical has mostly been for the granular form and generally for swimming pool applications. However, significant global shifts in use patterns towards calcium hypochlorite in tablet form are currently taking place which necessitate a review of the current transport regulations.

The shift in demand has increasingly been driven for disaster relief operations, water purification and sanitization, as well as in specialized agricultural applications. Means of chlorination such as liquid chlorine gas and sodium hypochlorite are wholly unsuitable for such applications as a result of their inherent danger, or the logistical difficulties associated with transportation and storage. At the same time, new technology for dispensing calcium hypochlorite in tablet form has made this chemical much more accessible to specialized users.

South Africa is one of the largest manufacturers of calcium hypochlorite in the world. Several hundred tons of calcium hypochlorite in tablet form are manufactured and transported annually. One of the reasons for the increase in demand for the tablet form is that controlled dosing of chlorine can be achieved by the user.

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The bulk of the demand for tablets is for low volume applications where an immediate but short term need has to be filled. A typical example would be a requirement for disaster relief during floods or for refugee camps. Dispensing systems that utilize tablets are ideally suited for such applications.

### **Hazard profile of calcium hypochlorite tablets**

The subdued hazard characteristics shown by tablets compared to that of granules can be attributed to three main factors:

#### **a) Reactive surface**

It is an established scientific fact that particle size and surface area are fundamental determinants of the rate of chemical activity. It thus follows that a given amount of calcium hypochlorite granules will react more vigorously than the same amount of calcium hypochlorite compressed into tablets.

Oxidizing solids are tested in accordance with Test 0.1 *Test for oxidizing solids* of the UN *Manual of tests and criteria*. According to the test the tablets have to be ground and intimately mixed with cellulose. The result of such a test cannot be scientifically extrapolated to the actual shape (tablet) of the substance to be transported. Testing to determine the packing group for calcium hypochlorite tablets therefore creates a problem.

#### **b) Heat transfer properties**

To work effectively and to maintain their integrity during transportation and handling, calcium hypochlorite tablets are compressed under forces of at least 20 tons per square inch. Thus, the heat transfer properties of a stack of 50 kg drums would be quite different when compared to a stack of the same mass made up of plastic tubes containing ten tablets each.

The higher density of the tablets, combined with the small size of each package, and the ratio of air to mass of the stack, effectively negate the hazard of self-heating in a cargo made up of tablets.

#### **c) Effect of compression**

The instability of calcium hypochlorite when contaminated or blended is a constant cause of concern. While these concerns are well founded when the material in question is in the granular form, they should not extend to the compressed form. The reason for this is the fact that, when calcium hypochlorite is compressed under the type of pressures needed (20-40 tons per square inch) to ensure proper lamination of the material, any contaminant that may have found its way into the material would react instantaneously. Compression simulates heat, and the process may therefore be likened to a built-in quality control "hurdle" which prohibits contaminated material from passing through.

However, even if the tablet would have been contaminated after compression, the large particle size and high density will result in an insignificant, transient reaction on the surface of the tablet only. Compression therefore effectively negates the traditional concerns about instability of contaminated or blended raw material.

## Classification

The current UN regulations do not accommodate the fact that the material is also available in tablet form.

Given the lower hazard profile of calcium hypochlorite tablets compared to that of the granules, as well as the increasing global shift in demand towards the tablets, the expert of South Africa is of the opinion that a separate entry for calcium hypochlorite tablets should be considered in the dangerous goods list of the UN Model Regulations.

## Packaging

The tablets are mostly used in special chlorine dispensing systems that utilise sealed chlorine canisters. These vary in size and mass but fall within a range of 700 g to 2 kg, and contain tablets ranging from 70 g to 200 g each. These tablet sizes and masses are relatively standardized across the world.

The demand for calcium hypochlorite via airfreight is increasing rapidly, particularly by relief aid organizations. The IATA packing instruction 509 currently creates the situation whereby a 5 kg packaging containing 10 x 500 g plastics jars of granules are permitted for transportation. Since no provision is made for calcium hypochlorite in tablet form, a 4.2 kg packaging containing 6 x 700 g plastic tubes of tablets is not permitted for air transport although they present a lower degree of hazard.

The packing instructions of the IMDG code and the UN Model Regulations for calcium hypochlorite granules can be applied to tablets.

## Proposals

1. It is proposed that calcium hypochlorite in tablet form be considered for inclusion in the dangerous goods list as follows:

UN No.	Name and description	Class or division	Subsidiary risk	PG	SP	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provisions	Portable tank instruction	Portable tank SPs
3xxx	CALCIUM HYPOCHLORITE, DRY, TABLETS with more than 39 % available chlorine (8.8 % available oxygen)	5.1		III		1 kg	P002 IBC08	B2, B3, B4		

2. That the word "GRANULAR" be added to the proper shipping names of UN 1748 and UN 2208 if proposal 1 is adopted.