



**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****Sixty-second session**

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Item 3 of the provisional agenda

Listing, classification and packing**Status of UN 1362 (CARBON, ACTIVATED) and its
redefinition to provide greater clarity****Transmitted by the European Chemical Industry Council (Cefic)*****Introduction**

1. This document is provided by the Cefic sector group the Activated Carbon Producers Association (ACPA). ACPA members are globally significant manufacturers of ACTIVATED CARBON (UN 1362). Total global annual production of ACTIVATED CARBON exceeds two million tonnes. ACTIVATED CARBON is traded globally, with most manufacture occurring in Asia, which entails significant levels of shipment by road, rail and air, but in the majority of instances sea freight is involved. It is an essential material used in a wide variety of critical processes, including:

- (a) treatment/purification of drinking water;
- (b) food and drink production;
- (c) pharmaceutical manufacturing processes;
- (d) pollution control processes such as flue gas treatment, odour control, H₂S removal, solvent recovery and emission control devices for vehicles;
- (e) energy generation and storage applications;
- (f) manufacture of personal protection equipment; and
- (g) medical devices.

It is therefore a critical supporting industry for modern society.

* A/77/6 (Sect. 20), table 20.6



Background

2. In the *Model Regulations*, the Sub-Committee currently classifies ACTIVATED CARBON as UN 1362 with the description ‘CARBON, ACTIVATED’.

3. The definition of products as ACTIVATED CARBON is also contained in other regulations, such as Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), enacted by the European Union. Following registration, ACTIVATED CARBON is assigned specific substance numbers in the EC inventory, according to the material’s skeletal density (see paragraph 6 below).

4. There are a variety of methods for the manufacture of activated carbon, but in practical commercial terms, these involve:

(a) Physical or steam activation. In this process an organic char of a material high in fixed carbon content (e.g. nut-shell, coal, lignite, peat or wood), is exposed to high temperature ($> 800\text{ }^{\circ}\text{C}$) in a controlled gas environment, and steam is used as a promoter in the activation process. These are generally referred to as high skeleton density materials. Physical or steam activated carbon constitutes approximately 85% of global production, according to our calculations.

(b) Chemical activation. In this process, an uncarbonized material high in fixed carbon and lignin content (e.g. wood) is intimately mixed with a chemical promoter (typically phosphoric acid or zinc chloride) and exposed to heat at lower temperatures ($400\text{-}600\text{ }^{\circ}\text{C}$). A combined process of charring and activation is undertaken in a single process step. These are generally referred to as low density skeleton materials. Chemically activated carbon constitutes approximately 15% of global production, according to our calculations.

In all cases the word ‘activation’ refers to the development of an extensive internal pore structure where the surface area is $> 400\text{ m}^2/\text{g}$.

5. The physico-chemical characteristics, and the surface reactivity of these substances are very different because of the raw material used, but more importantly the activation process applied.

(a) Steam activated carbon consists generally of a high degree of oxidised internal surface that is predominately microporous ($< 2\text{ nm}$ in diameter). This results in a product of low surface reactivity and low propensity to exhibit self-heating properties.

(b) Chemically activated carbon consists generally of a low degree of oxidised internal surface that is predominately mesoporous ($> 2\text{ nm}$ in diameter). This results in a product of moderate reactivity and known propensity to exhibit self-heating properties, unless adequately weathered and subject to other shipment provisions (see paragraph 7 below).

Regulatory status

6. As aforementioned, within recently developed regulatory frameworks such as REACH, activated carbon is assessed as two different and distinct substances, and assigned specific number in the inventory:

Substance	REACH nomenclature	EC number
Steam activated carbon	High density skeleton activated carbon	931-328-0
Chemically activated carbon	Low density skeleton activated carbon	931-334-3

This method of classification under REACH has been adopted because the two substances are different, but they cannot be considered as a unique chemical substance due to their common characteristics as aforementioned

7. Under UN 1362, CARBON, ACTIVATED is classed under 4.2 Self-heating substances. Within this classification special provisions apply to UN 1362 in Chapter 3.2 of the *Model Regulations* (Dangerous Goods List):

- (a) Within the *Model Regulations*, special provision (SP) 223 provides the ability to exempt goods from the provisions of the relevant shipping code when testing of the material does not result in confirmation of the dangerous goods properties defined. Individual modes of transport provide further guidance on testing regimes that are applicable.
- (b) Within the International Maritime Dangerous Goods (IMDG) regulations SP 925 is available to provide exemption from the requirements of the code.
- (c) At the time of writing SP 925 remains available but is due to be replaced with a new SP (working title SP9xb) for UN 1362. This will follow consideration at the Editorial and Technical group (E&T) of the IMO sub-committee on the carriage of cargoes and containers in its thirty-eighth session, and subsequently at the Carriage of Containers and Cargo (CCC) in its ninth session of the International Maritime Organisation (IMO) during 2023 and included in revision of the IMDG code 42-24. Adjustments to other dangerous goods codes of other modes of transport is expected as a consequence of the activity of the IMO.
- (d) The current text of SP 925 states:

“The provisions of this Code do not apply to:

- non-activated carbon blacks of mineral origin;*
- a consignment of carbon if it passes the tests for self-heating substances as reflected in the UN Manual of Tests and Criteria (see 33.4.3.3), and is accompanied by a certificate from a laboratory accredited by the competent authority, stating that the product to be loaded has been correctly sampled by trained staff from that laboratory and that the sample was correctly tested and has passed the test; and*
- carbons made by a steam activation process.”*

The text for SP 9xb is not yet finalised, however, it is expected that the general wording will be similar to the proposal devised by Cefic sector group ACPA as follows, and proposed by the E&T group of IMO CCC:

“This special provision applies to consignments of UN 1362, CARBON ACTIVATED, and permits exemption from the provisions of this Code where the product is:

- (i) Declared to be of chemically activated carbon that has passed the test for self-heating substances as reflected in the UN Manual of Tests and Criteria (see 33.4.6). In the case of chemically activated carbon, the shipper provides a certificate from a laboratory [accredited] [recognized] by the competent authority, stating that the consignment of the product to be loaded has passed the test, [based on the sample declared by the shipper to be representative of the concerned consignment and correctly tested by trained staff from that laboratory]. The certificate shall be submitted together with the above stated documentation to fulfil the requirements of declaration of exempted cargoes.*
- (ii) Declared to be of steam activated carbon and to fulfil the requirements of declaration of exempted cargoes.”*

(e) Within ADR and RID regulations SP 646 is applicable. SP 646 states “Carbon made by steam activation process is not subject to the requirements of ADR.” ADR refers to the *Model Regulations* and thereafter to the *Manual for Tests and Criteria*

for testing for other substances in this class but without a specific absolute exemption i.e. steam activated carbon.

(f) Under ADN regulations, as with ADR/RID, SP 646 is applicable as indicated in (e) above.

(g) Under the International Air Transport Association (IATA) dangerous goods regulations, special provision A3 applies. SP A3 states “*The chemical or physical property of a substance covered by this description are such that when tested if it does not meet any criteria for any class or division in DG regulations then it is Non DG*”. By extension, the IATA regulations refer to *Model Regulations* and thereafter to the *Manual for Tests and Criteria* for testing. Steam activated carbon invariably return a negative test under these protocols, i.e. absence of self-heating.

8. Therefore, within regulation for all modes of transport advised above there is an absolute exemption for UN 1362 CARBON, ACTIVATED when manufactured by a steam activation method. Indeed, STEAM ACTIVATED CARBON is generally not considered to be dangerous goods. Testing in accordance with the *Manual for Tests and Criteria* 33.4.6 invariably returns a negative test result advising that the substance is not subject to self-heating. Furthermore, no safety incidents during transportation due to the characteristics of STEAM ACTIVATED CARBON are known to have occurred (except in the case of misdeclarations).

9. CHEMICALLY ACTIVATED CARBON, on the other hand is subject to testing requirements to demonstrate its stability and suitability for shipment, with volume restrictions applied according to conducting the prescribed UN N.4 test (*Manual of Tests and Criteria* section 33.4.6).

10. A clear and definite distinction between these two similarly named, but very different substances would be beneficial. There are clear inconsistencies between interpretation of the *Model Regulations* in relation to UN 1362 CARBON, ACTIVATED. However, perhaps the most significant inconsistency is caused by the grouping together of two quite different substances within one class, and then providing one of them an almost absolute exemption.

11. Indeed, this absolute exemption (not only of UN 1362, CARBON, ACTIVATED but to many other substances) has recently been discussed at length by the IMO at the CCC seventh and eighth sessions. This resulted in the establishing of a correspondence group that reported to CCC eighth session in their document CCC8/6/1.

12. Due to the ambiguity, there is confusion related to these two substances. The consequence of this is that shipping lines regularly request shippers to declare non-dangerous goods as dangerous goods. This is clearly contrary to the regulations provided by the United Nations. To continue in this manner, there is a significant risk of setting a precedent which has impact on global trade of this essential commodity.

13. The main item of concern is the provision of evidence of exemption from the provision of the IMDG code by shippers, so that shipping lines and their agents can safely transport goods consigned to them.

14. Within document CCC8/6/1 and subsequently discussed at the drafting group established by the sub-committee, it was found necessary to modify chapter 5.4.4 to insert new clauses, as these parts of the code were found to be inadequate. This is still a subject for consideration by both CCC ninth session and its E&T thirty-eighth session.

15. In practical terms, the description of goods with an absolute exemption from the provisions of a dangerous goods shipping code after they are first classified as dangerous goods, and then further having to attest to that exemption status creates significant impact. Confusion exists among transporters in all modes, preventing the flow of free trade of materials, the potential for use of less sustainable transport methods, and ultimately lost productivity amongst commercial operations involved in the provision of this essential commodity used ubiquitously, worldwide.

Proposal

16. Cefic kindly requests the Sub-Committee to consider the redefinition of UN 1362 CARBON, ACTIVATED, as relating only to CHEMICALLY ACTIVATED CARBONS, by a change in the description from ‘UN 1362, CARBON, ACTIVATED’ to ‘UN 1362 CARBON, CHEMICALLY ACTIVATED’.

17. With this redefinition, STEAM ACTIVATED CARBON would no longer have a schedule in the *Model Regulations* and therefore could be removed from the special provisions of each of the modal codes. This would allow these special provisions to be more pertinent and relevant to potentially dangerous goods.

18. Cefic would also like to propose the review of similar substances that have an absolute exemption from the requirements of individual transport codes, by means of a special provision to assist in clarification and support of global trade activity of these affected commodities.
