

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

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Item 5 (a) of the provisional agenda

Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods: fuels in machinery or equipment

DGAC Discussion paper on SP363/UN3166 in relation with ST/SG/AC.10/C.3/2013/67

Transmitted by the Dangerous Goods Advisory Council (DGAC)

- A. **Objective:** To establish harmonized requirements for machinery with internal combustion engines with integral fuel tanks containing fuel.
- B. Problems/issues with the current UN requirements.
- Most regulations use UN3166 for machinery with fuel;
 - Large machinery with integral fuel tanks may contain large quantities of fuel (e.g., sometimes 3000L) and UN 3166 does not provide for communicating the presence of the fuel hazard;
 - SP363 provides for hazard communication but creates a conflict in that it applies to machinery when more than a limited quantity of fuel is present and would require machinery to be transported under entries such as UN1202, 1203 even though many regulations currently require use of UN3166;
 - SP363 does not address other dangerous goods that are integral to machinery so that certain safety issues are not addressed if SP363 is used;
 - RID/ADR does not use UN3166 based on its exemption of vehicles.
- C. Method of Work
- Review the issues above based on analysis of the various regulations – IMDG, ICAO TI, ADR/RID, 49CFR, Canadian TDG;
 - Develop options that address the concerns and invite comments with the objective of developing a consensus decision.
- D. Review of the Regulations
- Question 1.** What is the current status of UN3166 and SP363 in the regulations? Is machinery covered by UN 3166 when it is used?

	<i>IMDG(E&T decisions 4/13)</i>	<i>ICAO</i>	<i>ADR/RID</i>	<i>49CFR</i>	<i>TDG</i>
UN3166; is it used?	Yes, for fuel amounts up to ¼ tank, 250L	Yes	No	Yes	Yes, air only
Is machinery included in UN3166?	Yes	Yes	N/A	Yes	Yes
SP363; is it used?	Yes, when more than ¼ tank, 250L (based on E&T 4/2013)	No	Yes, when more than 60 L, minimal requirements when less than 60L	No	No, but see Q2

Question 2. What is the basis for including (or excluding) machinery from UN3166?

- Regulations that use UN3166 regulate machinery with integral fuel tanks under this entry, reasoning that the fuel accompanying the internal combustion engine is what poses a hazard. Vehicles, engines and machinery all pose a common dangerous goods transport risk.
- ADR/RID do not regulate machinery or equipment (see exemption 1.1.3.1(b) unless specified and do not regulate vehicles (see exemption 1.1.3.3(b)). On this basis UN3166 has traditionally not been used by ADR/RID.

Question 3. How are large amounts of fuel in integral fuel tanks addressed?

	<i>IMDG</i>	<i>ICAO</i>	<i>ADR/RID</i>	<i>49CFR</i>	<i>TDG</i>
Method of regulating	SP363	Not Allowed	SP363	Air – No more than 500ml; Vessel -No more than ¼ full; less than 418L diesel unregulated; Road/rail – no limit provided certain conditions are met	Gasoline – machinery with tanks no more than 200 L are exempted (section 1.34.1); Diesel/gasoline – only labels/placards on tanks up to 2000L tank capacity (section 1.35.1). Fully regulated as dangerous goods in higher tank capacities. (note it seems less stringent requirements apply for gasoline than Diesel in tank capacities of 200L or less)
Issues/ Concerns	Does not address other DG with machinery	N/A		Higher amounts in machinery tanks by air and vessel are only authorized by competent authority approval	

Question 4. What additional safety requirements are applied by other regulations to machinery transported under UN3166? (synopsis only)

	<i>IMDG</i>			<i>49CFR – 49 CFR</i>	
	<i>Ref SP 962</i>	<i>ICAO Ref PI 950</i>	<i>ADR/RID</i>	<i>173.220</i>	<i>TDG</i>
Max amount of fuel allowed	Lesser of ¼ tank/250L; E&T: up to 450L liquid with a flash above 38C not subject to regulations provided certain requirements are met	Fuel system must be emptied of fuel to maximum extent;	N/A	Air -No more than 500ml; Vessel -No more than ¼ full tank; less than 418L diesel unregulated; Road/rail – no upper limit provided conditions are met	Same requirements as ICAO for purposes of air transport
Batteries	Protected against damage, short circuit and accidental activation; lithium batteries – UN tested	Installed to protect from damage and short circuit; spillable batteries- installed against leakage or removed; lithium batteries – UN tested; sodium batteries must meet additional requirements (ICAO A94)	N/A	Protected against damage and short circuit; Wet batteries in an upright position; Lithium batteries – UN tested	
Other dangerous goods needed for operation	Securely mounted	Securely mounted	N/A	Securely mounted	

E. Questions to provide a basis for harmonization

Question 5. Considering that regulations that use UN3166 include machinery under UN3166 and the hazard of machinery corresponds to that of vehicles and engines also covered by UN3166, is it appropriate to clarify the UNMR so that there is no doubt that machinery is included under UN3166?

Proposed answer: yes – see proposal to add MACHINERY proper shipping names below

Question 6. Is it appropriate to adopt, in the UNMR requirements for UN3166, safety measures (e.g., requirements identified in question 4) from other regulations for machinery independent of the quantity of fuel?

Proposed answer: Yes, these requirements should be relevant independent of the amount of fuel. See proposal below.

Question 7. There is general agreement that when an integral tank contains more than a specified amount of fuel, the fuel tank must be either labeled or placarded. The limit is generally higher than the SP363 limited quantity amount (ADR/RID-60 L; IMDG - greater than ¼ tank or 250L except greater than 450L when flashpoint is 38C or higher; Canada -

200L). Is it reasonable to replace the current UN LQ limit to a higher threshold fuel amount so that the quantity is multimodally harmonized and tanks with fuel amounts above the threshold must be labeled/placarded?

Proposed answer: Yes. Values of 60L, 200L, 250L and for fuels with a flashpoint higher than 38C, 450L are possible thresholds. A value of 250L is used in further discussion but it should be regarded as in square brackets pending further discussion.

Observation 1. For transport by vessel, limits on the amount of fuel are included in the regulations (SP962 -lesser of ¼ tank/250L). Germany (paper to DSC 18) has proposed, for IMDG purposes, that the competent authority may authorize higher amounts of fuel than authorized under requirements for UN3166. Competent authority approvals would be expected to take into account the need to apply additional safeguards in order to ensure an equivalent level of safety. These added safeguards could possibly provide for a higher level of safety than simply applying SP363 to larger amounts of fuel. If Germany's proposal is adopted for IMDG, it essentially would mean that there would be no fuel limit for UN3166 under IMDG in that the competent authority could authorize higher limits than provided in the regulations.

F. Recommended Amendments to the UNMR based on the above questions/responses (conceptual only)

1. Amend column 2 of the DGL to authorize new alternative proper shipping names for UN 3166 of MACHINERY, INTERNAL COMBUSTION or MACHINERY, FLAMMABLE LIQUID POWERED.

2. Introduce a new special provision XXX for UN3166 to adopt general safety requirements applicable to UN3166 as follows:

“XXX The following provisions apply to this entry:

– The amount of fuel in integral fuel tanks is limited [note: this condition may not be needed; to be determined based on the option chosen; not needed for option 1 below]

– Batteries

• All batteries must be securely installed and protected against short circuit;

• Wet batteries that are spillable must be installed in an upright position or removed;

• Lithium batteries must have been tested in accordance with UN test requirements.

– Other dangerous goods that are necessary for the operation of the machinery must be securely mounted.”.

G. Discussion of Options

I. Option 1 – Regulate all machinery regardless of fuel quantity under UN 3166; apply requirements in SP363 to machinery under UN3166 once a threshold fuel quantity [250L] is exceeded.

a) Amendments needed for option 1:

UNMR amendments for option 1

Assign SP363 to UN3166 and remove from UN 1202, 1203 etc. and revised to read as follows:

“363 When an integral means of fuel containment for machinery or equipment other than a vehicle, contains more than 250L of a fuel, the following additional requirements apply:

- (a) The means of containment shall be in compliance with the construction requirements of the competent authority where the machinery or equipment is manufactured;
- (b) Any valves or openings (e.g. venting devices) in the means of containment containing dangerous goods shall be closed during transport;
- (c) The machinery or equipment shall be loaded in an orientation to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the machinery or equipment to prevent any movement during transport which would change the orientation or cause it to be damaged;
- (d) Where the means of containment contains not more than 250 litres of fuel, the labeling requirements of 5.2.2 shall apply and where the capacity is greater than 450 litres but not more than 1 500 litres the machinery or equipment shall be labelled on all four external sides in accordance with 5.2.2. The label used shall correspond to the hazard of the fuel. Labels may be applied to the machinery where application to the means of containment is not practicable or does not ensure visibility of the label(s);
- (e) Where the means of containment contains more than 1500 litres of fuel, the machinery or equipment shall be placarded on all four external sides in accordance with 5.3.1.1.2. The placards used shall correspond to hazard of the fuel.”

ADR/RID amendments for option 1

Introduce UN 3166 into the ADR/RID Dangerous Goods List but excluding “Vehicle” proper shipping names.

Add a revised SP363 against UN3166 stating the following:

“363 Irrespective of 1.1.3.1(b), machinery or equipment is subject to the following requirements: [insert UNMR text for SP 363 above]

b) Discussion of Advantages and Disadvantages for Option 1

Advantages of Option 1

- (a) Consistent with current way machinery is handled in regulations other than ADR/RID;
- (b) Keeps all machinery under one UN number independent of fuel quantity.

Disadvantages of Option 1

- (a) May not be acceptable for ADR/RID;
- (b) When large fuel amounts are involved the primary hazard is the fuel and some would argue the real hazard is not reflected. But the hazard would be identified through visible labels/placards so this argument is questionable;
- (c) Class 3 labels on a Class 9 article is precedent setting.

II. Option 2 – Regulate machinery with small amounts of fuel under UN3166 but once a threshold amount [250L] is reached, regulate machinery with larger amounts under a fuel entry (e.g., gasoline).

(a) Amendments needed to implement option 2

UNMR amendments for option 2

- (a) Add to the proposed special provision XXX above the following:
“Applicability of UN 3166 to machinery with an integral fuel tank is limited to fuel amounts of 250L or less. Quantities exceeding this amount shall be transported under the shipping name of the fuel (see SP 363).”.
- (b) Retain the existing SP363 applicable to fuels (UN 1202, 1203 etc.) and add to SP363:
“Other than the 250L limit, the requirements of special provision XXX apply.”.

Other regulations would also need revision under option 2

(b) Discussion of Advantages and Disadvantages for Option 2

Advantages of Option 2

- (a) Consistent with current way machinery is handled under ADR/RID.
- (b) Regulates machinery with large quantities of fuel under the primary hazard.

Disadvantages of Option 2

- (a) A piece of machinery could be reclassified based on the amount of fuel in the tank. One day it could be regulated as class 9 and after refilling the tank, it could be regulated as class 3. (labels and placards may need to be added or removed)
- (b) Existing regulations already use different fuel limits – e.g., up to 450 liters of diesel in a tank (flashpoint greater than 38C) is unregulated under IMDG for UN 3166 (based on E&T 4/2013). If Germany’s proposal is adopted by IMO, higher amounts could be allowed under UN3166 based on competent authority, making this approach unworkable for IMDG.
- (c) The approach for vehicles (unlimited fuel amounts) would be inconsistent with that for machinery (limited fuel amounts).

III. Option 3 – Regulate all machinery under UN 3166 irrespective of the amount of fuel. But when a threshold is exceed require that the machinery also be transported under the proper shipping name of the fuel.

Advantages of Option 3

This approach is similar to what is done when you have a combination package with two or more dangerous goods

UNMR amendments for option 3.

1. Add a new special provision against UN3166 indicating:
- When the fuel tank contains more than [60L PG I or II fuel] or [450L PG III fuel] or more than ¼ tank, the machinery must be consigned as UN 3166 and the UN number of the fuel in accordance with the following:
 - (a) The tank need not meet the performance requirements of Part 6;
 - (b) Markings in accordance with Chapter 5.2 are not required;
 - (c) Labeling and placarding are as required by the current SP363;

(d) Transport document to identify both UN 3166 and the UN number of the fuel and indicate transport in accordance with this special provision.

Advantages of Option 3

- Most consistent approach with existing requirements;
- Recognizes the hazard of the fuel and the other hazards of dangerous goods included in machinery;
- Eliminates regulatory precedents of option 1 and 2.

IV. Option 4 – regulate all machinery under the fuel contained – disregarded – to no one’s advantage/significant changes to existing regulations

DGAC Recommendation – Option 1 or 3 – It accommodates large fuel amounts and correctly communicates the primary hazard through labels and placards.
