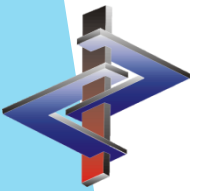


Transport

## Introduction:

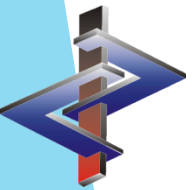
- Transport classifications are only to some extent based on formulae, as the legislation does not always provide formulae. The legislation is created in such a way that a certain level of human input is necessary.
- A classification can have different UN numbers that may be applicable.
- The legislation requires that the most exact UN number be used (except for the DOT where some exceptions exist). This specifically is where some human input is necessary as there cannot be criteria differentiating between many of the UN numbers.
- For example: Class 3, PG I could have UN1133 *Adhesives* or UN 1263 *Paint* or UN1993 *Flammable Liquid, N.O.S.*
- There are some variations between the various forms of transport legislation and the resulting classification for one substance.
- It is also possible that a substance is not classified for transport in all forms of the transport legislation.

**Please direct additional questions to our hotline**  
**Via telephone at +1 (902) 832-3425 or +43 2628 619 00**  
**Via email to [info@dr-software.com](mailto:info@dr-software.com)**



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# 1. Basic Transport Principles

**ADR:** European transport regulation for road transport

**RID:** European transport regulation for rail transport

**DOT:** Transport regulations for the USA

**TDG:** Transport regulations for Canada (classification identical to DOT)

**IMDG:** Transport regulations for the sea transport

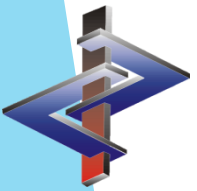
**IATA:** Transport regulations for the air transport

**UN Model Regulations:** contain the *UN Recommendations on the Transport of Dangerous Goods*

„ - “: A Hyphen marks a substance as not classified as hazardous for transportation for the respective transport legislation

**Empty Transport Screen:** An empty transport screen indicates that the transport classification has not been calculated or entered. It does not identify a substance as not hazardous for transportation.

- The transport classification is automatically calculated for preparations, but not for raw materials. The raw material transport classification can be calculated by pressing *Ctrl F10* in the Transport screen.
- ChemGes will always calculate the worst-case-scenario.
- ChemGes will choose the most exact UN Number that it can, based on the data provided (except for DOT exceptions).
- If a substance has its own UN Number, the description of that UN Number will be used for the transport description of that substance, if it is output as a Hazard Trigger in a preparation. If the substance does not have its own UN Number, then the S-marked description (*Standard description*) will be used, unless there is a T-marked description (*Transport description*) (*Maintenance of raw materials – Substance descriptions*).



## 2. General Settings for Transport

(Maintenance programs – Transport – General adjustments)

General transport adjustments

File Edit Help (46.0.7)

1 Transfer from substance without classification  100 %

2 Transport proposal for raw materials

3 DOT - Classification as Marine Pollutant according to GHS criteria

4 No calculation of the labeling with the symbol "fish & tree"

Symbol "fish & tree" at least for: 5 ADR (UN numbers 3077 and 3082)  6 ADR (All UN numbers)   
7 IMDG  8 IATA  9 DOT

10 No output of the various transport types in the SDS (except EU)

11 Output of the description next to the class in the SDS

12 Output of comments in the SDS

13 Output of the ADR code next to the ADR class

14 Transfer of class "-" to all other classes, if they are empty

15 Report after creation of the ADR proposal

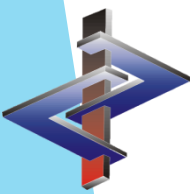
Expansion of the abbreviation ADR with (Classification is always identical) 16 /RID  17 /ADN

18 UN numbers for solids can be used for solutions

19 No classification in class 6.1 without classification in CLP class 3.1 (categories 1-3)

[←], [Esc] Exit

- **Transfer from substance without classification:** here you can define a percent limit for raw materials from which onwards the transport classification shall be adopted without any further calculation.
- **Transport proposal for raw materials:** this allows you to perform an automatic calculation of the transport classification as proposal for raw materials by pressing (Ctrl)(F10) in the transport screen of the raw material. This is also performed in the background, if the transport classification of a preparation that contains a raw material without transport classification, is calculated. To be informed about this procedure it is useful to activate the item **Report after creation of the ADR proposal**.
- **DOT – Classification as Marine Pollutant according to GHS criteria:** This item is *inactive by default*, which corresponds to the preferred procedure for the DOT. If this item is activated, the environmental hazard is calculated according to the GHS criteria, as with the remaining transport regulations. This option only becomes active if the option **No calculation of the labelling with the symbol "fish & tree"** is active.
  - **Symbol "fish & tree" at least for:** here you can define separately for each transport regulation, whether the symbol "fish and tree" shall be output.
- **No output of the various transport types in the SDS:** only the *UN number with description, Class and packing group* according to the UN Model Regulations is output in the SDSs for all countries, for which the GHS classification is activated. This setting has no effect on SDSs according to the CLP ("EU GHS", 1272/2008/EC), as there, all transport types are stated.
- **Output of the description next to the class in the SDS:** you can define whether the description of the hazard class shall be output next to the class number.
- **Output of comments in the SDS:** outputs the remarks entered in the field **Comment** in the screen **Land transport** in the SDS.
- **Output of the ADR code next to the ADR class:** sets whether the ADR classification code is stated in parenthesis next to the ADR class in the SDS under *Land transport*.
- **Transfer of class "-" to all other classes, if they are empty:** automatically adopts the entry "void" for all remaining transport regulations. If you, for example, enter "-" in the field **ADR Class** of the screen **Land transport**, the "-" and thus the entry "void" is automatically adopted in the SDS for the remaining transport regulations.
- **Expansion of the abbreviation ADR with (Classification is always identical) /RID or /AND:** here you can determine, whether the abbreviation(s) /RID or /ADN shall be additionally stated in Section 14 of the SDS.
- **UN numbers for solids can be used for solutions:** allows the application of UN numbers of solids, for solutions.
- **No classification in class 6.1 without classification in CLP class 3.1 (categories 1-3):** the classification in ADR Class 6.1 is skipped, if no classification in CLP Class 3.1 is present. According to ADR section 2.2.61.1.14 substances and mixtures (with the exception of those used as pesticides), which are not classified in CLP Class 3.1 (Categories 1-3), do not have to be classified in ADR Class 6.1.



### 3. UN-Number Facts

ChemGes contains all UN-numbers that have to do with chemicals, and their descriptions in several languages. This information can be viewed and edited in the screen **UN numbers** (*Maintenance programs – Transport – UN numbers*). Here, you can find the details for each UN-number and information about whether the number, or the description, is present in the ADR, the IMDG, IATA and/or the DOT.

- During the automatic calculation of the transport classification, a UN-number is automatically assigned. In many cases several UN-numbers are possible for a specific class, ADR-code and packing group. ChemGes selects the number, which is defined as the main number in the *Maintenance Program* or if no such number is defined, the general n.o.s. (not otherwise specified) entry is selected. As this cannot always be the most suitable number for the product, you can retrieve an overview of all UN-numbers (with description), which are allocated to the code and packing group (by selecting the field *UN-number* in any of the Transport screens), and there select the best matching number. If more than one description is admissible in the chosen type of transport, for the selected UN-number, you have to select the proper description as well.

#### Example 1:

- The product mainly consists of toxic organic phosphorus compounds.
- If the formulation contains more than one hazardous substance, the automatic classification program determines the general n.o.s. position *2811 Toxic liquid, organic, n.o.s.*, with ADR-class 6.1, code T2, packing group I, II or III.
- Let us assume that packing group II was calculated: If you select the field **UN-number**, the displayed overview contains, among others, the number *3278 Organic phosphorus compound, toxic, n.o.s.*
- If you select this number, the packing group and ADR-code remain the same – only the UN-number is changed in order to correspond to the chemism of your product.

#### Example 2:

- The product is a resin solution with a flash point below 23°C.
- The automatic classification program will display first class 3, code F1, packing group II and the UN-number, which has been set as the main number for this item, otherwise UN-number *1993 Flammable liquid, n.o.s.*
- The field **Name** contains this UN-description, supplemented by the hazard trigger (the solvent contained in the solution), and in this case, the necessary additional texts.
- If you select the field **UN number**, you will receive an overview of the UN-numbers for this classification. This overview also contains the number **1866 Resin solution**, which would be correct in this case.
- After you choose this number, the text will be corrected immediately, and a window will be displayed, in which you can set, which further fields shall be changed. The field **Name** now contains the description **1866 Resin Solution**. This name is not extended by hazard triggers, as UN-number '1866' is not a generic term and for this does not need to be supplemented. But it is supplemented by the same additional information for ADR, which was stated for UN '1993'. It might also be that you select a UN-number, for which this additional ADR-information is not intended, and in this case this information is no longer stated.

- The legislation requires that the most exact UN number is used (except for DOT exceptions). At times this is something that the program cannot know for you, especially if the exact UN-number refers to a use of substance such as *Paint* or *Adhesive*. Therefore, a certain amount of human input is necessary.
- The description of the UN-number is adopted into the field **Name** (=proper shipping name) of the transport window.
- In the case of a generic term (most of them ending with the abbreviation n.o.s.), to which hazard triggers have to be added (Special provision 274), the program will automatically complete it with one or two hazard triggers. If the product contains at least two hazardous components, two hazard triggers are stated. Not all n.o.s. numbers require a hazard trigger in all forms of transportation.

# 4. UN-Number Maintenance

UN-Number data is in the **Maintenance of UN-numbers** (Maintenance programs – Transport - UN numbers):

- Simply enter a UN number to access the description options. We have created sequential numbers for the individual description variants.
- All information available for this UN number, is included in this three-part screen:

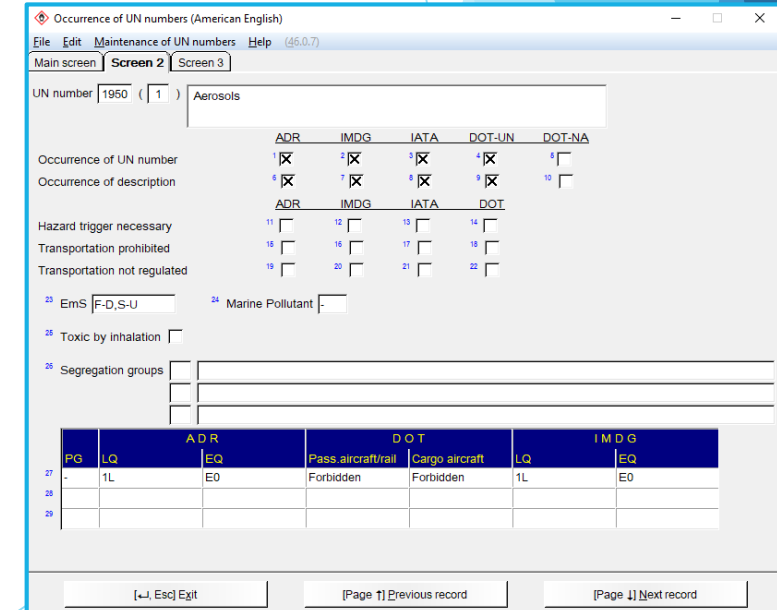
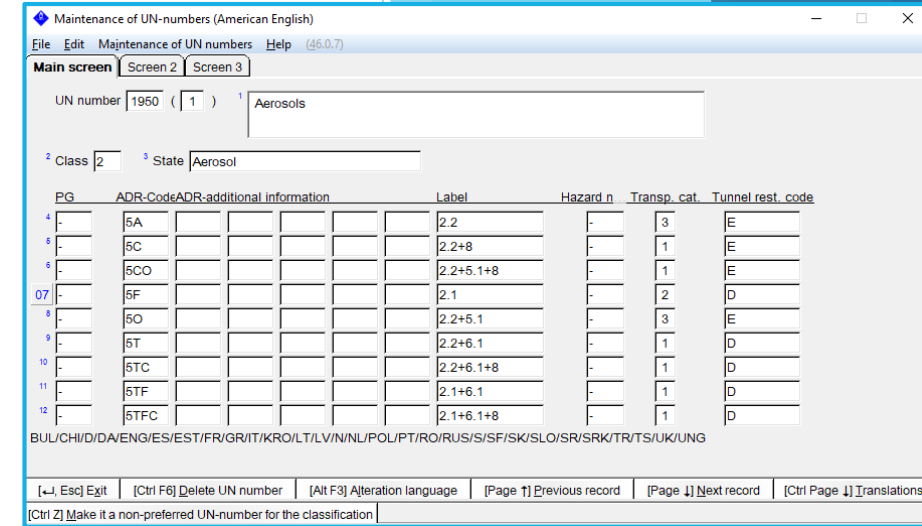
Please note that the classification code in most cases includes the state of aggregation, and therefore changes, if the state changes. Some UN numbers exist with two descriptions, one for liquid and one for solid; they also have different ADR-codes.

## Main screen:

- This screen contains the UN-number and the description. Here you can switch to other languages by pressing (Alt)(F3). The table contains all possible packing groups and other classification information.
- Several UN numbers can be permissible for a classification. Via the menu item Allocation of UN-numbers to ADR-classifications you can retrieve an overview of all permissible UN numbers for a specific Class, Packing Group and ADR Code and view or edit the allocated main UN-number.
- As many companies use certain UN numbers more frequently, it is possible to allocate such a UN-number as the main UN-number to an ADR classification, by pressing (Ctrl)(Z) **Preferred UN-number for the classification**. This allocated main UN number will always be output, if it fits the ADR classification details.
- If you select a UN number in the screen Land transport or Sea and air transport, a query will pop up inquiring whether you want to use this UN number as the standard UN number. Any allocation of a preferred UN-number applies to all modes of transportation and all substances to which the classification applies.
- To remove the allocation for a UN number, press the button (Ctrl)(Z) **Non-preferred UN-number for the classification** in the screen *Maintenance of UN-numbers*.

## Screen 2:

- Screen 2 indicates the types of transport regulations, in which the UN-number and the description occur, whether hazard triggers have to be stated and whether the material is forbidden or exempted in the individual transport types.
- The item **Toxic by inhalation**, supplements the proper shipping name with the information “toxic by inhalation”. This concerns all UN numbers that have an entry for SP354 in *Chapter 3.2, Table A*, as well as all UN numbers that are listed with the ADR code TF1 (note j) under ADR 2.2.61.3.
- There is also information on the IMDG (EmS-number, Marine pollutant entry (P for marine pollutants and PP for strong marine pollutants), and Segregation groups) as well as Quantity limitations for the ADR, DOT and IMDG.



### Screen 3:

- Screen 3 contains information that is important for solutions and mixtures, as well as the type of description.
- The following **types of description** exist:
  - **Description of a substance** - identifies substances or mixtures of substances. Only substance descriptions can be supplemented with the word *Solution* or *Mixture*.
  - **Generic description** - either a technical or application related description (e.g. 1263 Paint, 1133 Adhesives, etc.) or a chemical generic term (e.g. 3283 selenium compound, n.o.s., 2478 Isocyanates, flammable, toxic, n.o.s.).
  - **General n.o.s. entries** - these are n.o.s. descriptions that only contain the hazard type, but no information on the chemistry or the application (e.g. 1993 Flammable liquid, n.o.s.).
- The differentiation of the description types is particularly important, as during the classification of preparations the program can, most of the time, only select the general n.o.s. entries according to the hazard characteristics. But the user can check afterwards, whether a more exact description (generic or group description) applies. The legislation requires to always use the most specific description.
- In some cases the description already contains the word *solution* or *mixture*. In order to avoid that the program adds the words *solution* or *mixture* behind such a description, the fields **Part of the text** – *Solution* / *Mixture* are activated.
- There are UN-numbers, where the last part of the description indicates the state of aggregation (solid, liquid, dehydrated, etc.). In this case the field **Last word is state** is activated. With this it can be avoided that, for example, the description of a solution contains the words *solid, solution* or *liquid, solution*, but only *solution* behind the substance description.
- In addition, there are some substances that have a different UN-number as a solution or mixture than as a solid substance, and are classified differently.
  - This is the case for sodium hydroxide (UN 1823):
    - This substance is classified in class 8, packing group II, ADR-code C6.
    - Normally, ChemGes would classify a solution in water with the same UN-number and as *sodium hydroxide, solution*.
    - In this case, this is not allowed because of the different state.
    - Therefore, an n.o.s. entry would be selected.
    - But this solution actually has UN-number 1824, with packing group II and ADR-code C5.
    - To enable the program to classify correctly, the UN number 1824 with the description *sodium hydroxide solution* is entered in **UN numbers for solutions and mixtures** in this window.
    - In some cases the percentage is important for the classification of the solution or mixture; therefore a percentage limit can be entered here as well.

Structure of the description (American English)

File Edit Maintenance of UN numbers Help (46.0.7)

Main screen Screen 2 **Screen 3**

UN number 1950 ( 1 ) Aerosols

<sup>1</sup> Last word is state  <sup>4</sup> Kind of description  Description of a substance  
 Generic description  
 General n.o.s. entries

<sup>3</sup> Part of text: Solution   
Mixture

Percentage limits for class 8 <sup>5</sup> PG I 0.00 % <sup>6</sup> PG II 0.00 % <sup>7</sup> PG III 0.00 %

UN numbers for solutions and mixtures				State	Type	≥%
<sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

[←, Esc] Exit [Page ↑] Previous record [Page ↓] Next record

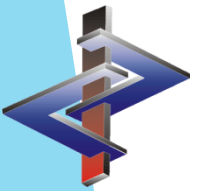


### UN-Numbers in other languages:

- All existing UN-numbers and their descriptions are available in the four languages of the ADR (English, French, German and Chinese).
- In addition, the descriptions of most of the UN-numbers are also present in all EU languages, as well as in Norwegian and Russian.
- For air- and sea transport, it is customary to use only the English description.
- In order to change the UN-number description, you can retrieve the item **UN-numbers** in this language and enter the corresponding translation yourself. Or, within a retrieved UN-number you can change the language by pressing (Alt)(F3)**Alteration language** in the Main Screen.

### Allocation of UN-numbers to ADR-classification:

- By filling in the class, packing group and classification code, you can see an overview of all UN-numbers that are available for this classification.
- Here it is possible to determine for each combination of class, packing group and code, which UN-number shall be displayed by default in the transport screen. For this select the desired number and activate the field **Main allocation** within the window.
- The program automatically selects the first item that is permitted for the transport type and the state.
  - For example:
    - For a paint company we recommend that you select the UN-number 1263 (paint) as default value under class 3, packing group II and III and code F1.
    - For adhesive materials the UN number 1133
    - For printing colors the UN number 1210.
- We have already performed default settings in the program, but you should check them.



## 5. Transport Classification Basics

1. For the classification, each formulation is broken down into its basic raw materials and the data from each substance that exceeds the consideration limit (by default 0.5%, but modifiable by the user), is used to calculate the formulation's transport classification.
2. For example, for the corrosive properties the quotient totals are used. For toxicity, the tox values are applied.
3. As there are not always consideration/classification limits for substances for the transport classification in preparations, we have determined general limits. These can also be changed by the user in the screen Limits for transport classification (*Maintenance programs – Transport – Limits for the classification*).
  - The first field states the consideration limit, below which a substance is not considered for classification.
  - In the field below, you can find the consideration limits for classes 1, 2, 4.1-4.3, 5.1, 5.2 - depending on the packing group.
  - The field **Limit for particularly hazardous substances** contains the limit above which the classification of these components is adopted for the classification of the whole preparation.
  - For corrosive substances of class 8, with substance-specific limit values, the **Limits for the transport classification** are calculated based on these limits and the standard limit value. By doing this, strong acids and bases are classified starting at lower concentrations. As already mentioned, if the *Maintenance of UN-numbers* contains specific limits for class 8, these specific limits are used for the calculation. (See slide on **Class 8** for details)
4. In addition, for each UN-number, specific limits for packing groups I, II and III for class 8 can be entered in the screen UN numbers (*Maintenance programs – Transport – UN Numbers*).
5. If a solid preparation contains a liquid raw material classified as class 4.1, you can activate here the use of UN 3175, from a certain percentage on.

Limits for transport classification (46.0.14)

File Edit Help (46.0.14)

<sup>1</sup> Raw materials have to be classified from  %

Limits of which classes 1, 2, 4.1 - 4.3, 5.1, 5.2 are taken into account

Packing group: <sup>2</sup> I  % <sup>3</sup> II  % <sup>4</sup> III  %

<sup>5</sup> Limit for particularly hazardous substances  %

Percentage limits for class 8

Packing group	I	II	III
I	<sup>6</sup> <input type="text" value="10.00"/>	<sup>7</sup> <input type="text" value="5.00"/>	<sup>8</sup> <input type="text" value="1.00"/>
II		<sup>9</sup> <input type="text" value="20.00"/>	<sup>10</sup> <input type="text" value="5.00"/>
III			<sup>11</sup> <input type="text" value="20.00"/>

<sup>12</sup> R35 => PG I, R34 => PG II

<sup>13</sup> H314: 1A => PG I, 1B => PG II, 1C => PG III

<sup>14</sup> Classify solids from  % liquid ingredients with Class 4.1 UN 3175 - solids with flammable liquids (0 = no)

[←, Esc] Exit

## 6. Calculating a Transport Classification

Additional information on transport classification

1 The product contains organic substances

2 The product is acidic

3 The product contains inorganic acids

4 The product is alkaline

5 The product contains inorganic bases

6 Hazardous reaction with water

7 Can spontaneously lead to intense reaction

8 Transport temperature  $\geq$  flash point

9 The product will be transported in a molten state

10 Transport temperature [?] °C

11 Temperature control necessary

12 Type of packaging  normal  
 IBC (Container)  
 tank

13 Corrosion rate on steel or aluminum  $\geq$  6,25 mm a year

14 The product is a pesticide

15 The product is a color additive

16 Solvent separation test < 3%

17 Volume > 1 l (aerosols)

18 Volume   $\leq$  5 litre  
  $\leq$  30 litre  
 > 30 and  $\leq$  450 litre  
 > 450 litre

19 No calculation of the classes 4.1-4.3 and 5.1

20 Pasty according to penetrometer test

21 Vapor pressure at 50°C   $\leq$  110 kPa  
 > 110 kPa

22 Transport includes sea transport

23 Not output of 'hazardous for the environment'

[Esc] Exit [F10] Classification [Ctrl F10] Classification results [Ctrl F8] Recalculate additional information

- The transport classification can generally only be calculated for classes 3, 6.1 and 6.2, 8, 9 and Aerosols of class 2.
- For the other classes, if all substances that are classified as hazardous have the same classification, this classification is adopted.
- If you **deactivate** the field *No calculation of the classes 4.1-4.3 and 5.1* in the screen **Additional information of transport classification**, these classes will be considered in the calculation, only on condition that they are present in combination with classes 3, 6.1, 8 or 9.

There are two ways to calculate the transport classification:

1. Via [F10] **Simplified Classification** (this is an actual calculation)
  - Classification for classes 3, 6, 8 and 9, as well as for aerosols of class 2 with consideration of substances of classes 4.1-4.3 and 5.1 (if the above-mentioned setting is activated).
  - If the automatic transport classification is activated, ChemGes does classify automatically, but in some cases additional information may be necessary. This information can be entered in the screen **Additional information for the transport classification** (see next slide).
    - Important to note here are: the pesticides option, the acids/bases options and the organic/inorganic options

**Note:** If a preparation is a liquid and contains only substances of class 4.1. besides substances of class 6.1., 8 and/or 9, the flammable properties, that might be present, are not considered for calculating the transport classification. We, therefore, recommend that you perform the automatic transport classification only for preparations with the state "solid".

Calculations

File Edit Help

(45.2.30) 67,718 disk operations, C

1 ADR-classification

2 UN numbers

3 Hazard number (Kemler number)

4 Label

5 Hazard trigger

6 Declaration

7 DOT

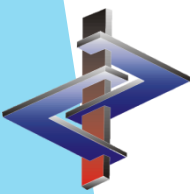
8 IMDG

9 IATA

[Esc] Exit [F10] Calculation [F1] All 'Yes'

[F2] All 'No'

1. Via [Ctrl F10] **Single calculations** (this is a transfer of data from the substances, not really a calculation)
  - The classification is limited to gases of class 2 and classes 3, 4, 5, 6.1, 8 and 9
  - For classes 1 and 4.1 only the class, not the classification code is calculated. Classes 6.2 and 7 cannot be calculated.



## Screen *Additional information on transport classification:*

- **Transport temperature >= flash point** - only important for products with a flash point above 60°C and for products, which are transported at a higher temperature.
- **The product will be transported in a molten state** - if activated, the transport description is automatically supplemented with the word "*molten*" or "*hot*".
- **Transport temperature** - is only important for products, which are transported hot and do not exhibit any other hazards. For liquids, temperatures above 100°C, and for solids, temperatures above 240°C, are relevant for the classification into class 9, as *Elevated temperature substances*.
- **Temperature control necessary** - you can determine, that ChemGes shall consider the temperature control, as defined in the ADR regulation, when deriving the transport classification from the GHS classification. If this item is activated, ChemGes applies the appropriate UN number, depending on the respective ADR requirements.
- **Corrosion rate on steel or aluminium >=6.25mm a year** - if this is deactivated and the preparation is not allocated to packing group I or II, due to its corrosive effect, the product is also no longer allocated to Class 8 (neither as main-, nor as secondary hazard).

Please note that preparations still have to be allocated to Class 8/packing group III, if they have a proven corrosive effect on skin tissue. Therefore, we recommend that this setting is only used in combination with item **R35=>PG I, R34=>PG II** in the screen Limits for the transport classification (*Maintenance programs – Transport – Limits for the classification*)

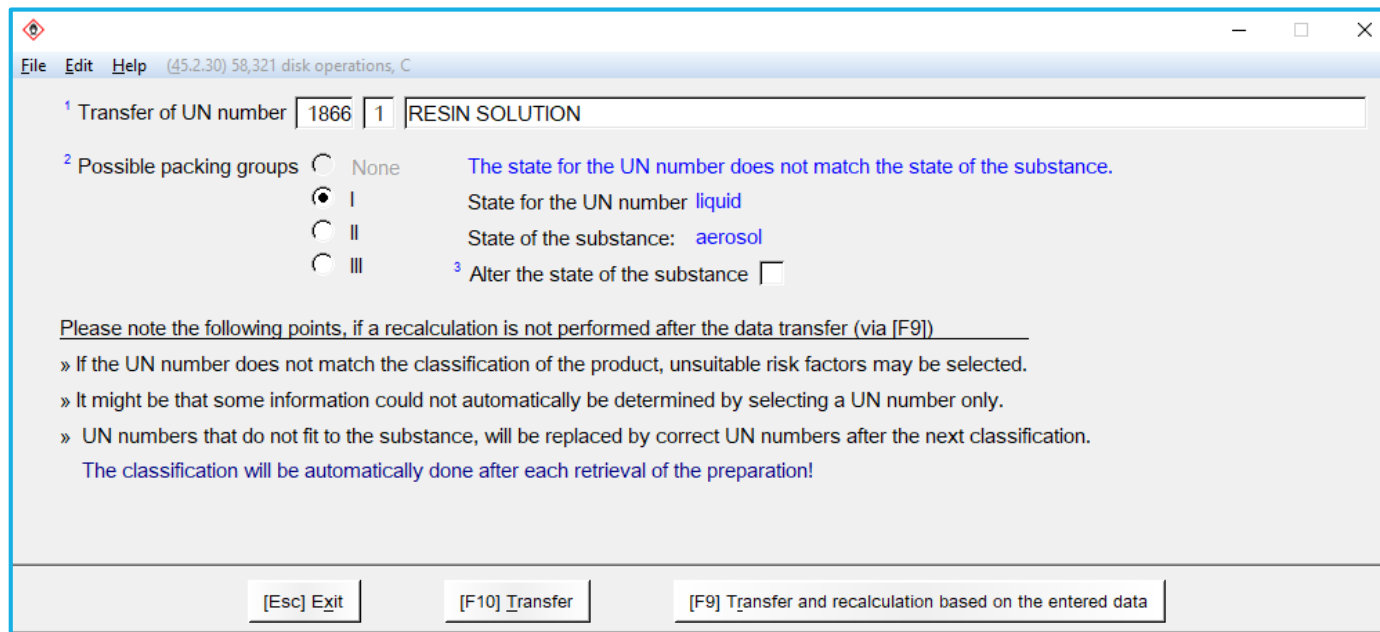
- **The product is a color additive** - solvent mixtures, which are usually classified with UN 1993 *Flammable liquid, n.o.s.* or with UN 1263 *Paint*, are classified with UN 1263 as *Paint related material*, via this option.
- **Volume > 1 litre** - is used for the classification of **aerosols**, as aerosols containing more than 1 litre are forbidden according to IATA and DOT.
- **Volume (<= 5 litre, <= 30 litre, > 30 and <= 450 litre, > 450 litre)** - concerns goods of ADR-class 3 with no additional hazards, with a flash point of 23 – 60°C, and with high viscosity, as they do not have to be classified in ADR class 3 in volumes up to 450 litres. However, according to IMDG 2003 exceptions at a high viscosity are only permitted for packaging up to 30 litres. This exception is only effective, if the field **Solvent separation test < 3%** is activated.
- **No calculation of the classes 4.1.-4.3. and 5.1.** - you can avoid, that the hazard potentials of the ingredients, which are allocated to one of these classes, are considered.
- **Pasty according to penetrometer test** – according to the transport regulations, a "solid" can also be a product, which – due to its fluidity (determined with the penetrometer test) – is pasty. If this option is activated for a liquid preparation, it is not allocated to UN1993 "FLAMMABLE LIQUID, N.O.S.", but to UN 3175 "SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S."
- **Vapor pressure at 50°C** – this is essential for correctly classifying some UN-numbers of class 3. For the transport in tanks the vapor pressure range must be included in the declaration of the good as "Special provision 640X" (X= "C to H"). If the option **Special Provision 640 shall always be used**, is activated in Settings for the declaration text (*Maintenance programs – Transport*), the text for SP 640 is output on the SDS.

This screen contains two selection fields for the **vapor pressure at 50°C (<= 110 kPa and >110 kPa)**. ChemGes automatically fills in this field according to the highest values of all raw materials above 5% (as far as data are available). For goods of class 3, which contain low-boiling components, it must be checked and adjusted, if necessary. If no values are available in the database, the lowest vapor pressure (max. 110 kPa) is set as default, as this is the most frequently occurring case.

If you press [Enter] or [F10] after checking these fields, the classification will be performed or an error message displayed, if classes are present, which cannot be calculated, or if the classification of raw materials is missing

## 7. Manually Entering a Transport Classification

- If you press [Ctrl U] **Transfer of all transport data from UN number**, ChemGes will open a screen where you can enter or choose from the overview, a UN Number and a Packing Group and then have the program either *Transfer* all of the data or *Transfer and recalculate based on the entered data*. If the UN Number does not fit with the classification, the recalculation option will remove the UN Number.
- If the state of aggregation of the desired UN Number does not match that of the substance, you can choose to **Alter the state of the substance**, with the option in this screen.
- If you wish to output a classification different from what ChemGes calculates, it is important to lock the transport classification by pressing [Ctrl X] *Lock*, after making the change.



The screenshot shows a software window titled "ChemGes" with a menu bar (File, Edit, Help) and a status bar. The main content area displays the following information:

<sup>1</sup> Transfer of UN number   RESIN SOLUTION

<sup>2</sup> Possible packing groups

- None
- I
- II
- III

The state for the UN number does not match the state of the substance.  
State for the UN number: liquid  
State of the substance: aerosol

<sup>3</sup> Alter the state of the substance

Please note the following points, if a recalculation is not performed after the data transfer (via [F9])

- » If the UN number does not match the classification of the product, unsuitable risk factors may be selected.
- » It might be that some information could not automatically be determined by selecting a UN number only.
- » UN numbers that do not fit to the substance, will be replaced by correct UN numbers after the next classification.

The classification will be automatically done after each retrieval of the preparation!

At the bottom, there are three buttons: [Esc] Exit, [F10] Transfer, and [F9] Transfer and recalculation based on the entered data.

## 8. Hazard Triggers/Marine Pollutants

- According to the regulations for the transport of hazardous goods, 2 hazard triggers have to be declared, if more than one hazardous ingredient is present. There is no mention of being able to leave out the second hazard trigger, thus in some cases the second hazard trigger may be a substance that is contained in small amounts and does not even contribute to the classification.
- These hazard triggers have to cover the main hazard and at least one secondary hazard.
- The Hazard Trigger is usually calculated automatically. But if you overwrite the calculated transport classification or wish to edit the calculated triggers, you can click into the description field.
- If you click on the field for the description according to the ADR (*field 06*) or according to the DOT (*field 22*) in the screen **Land transport** or according to IATA (*field 16*) or according to the IMDG (*field 07*) in the screen **Sea and air transport**, you will switch to the screen **Definition of hazard triggers**. Here you can define a substance as a hazard trigger and whether this information shall be **transferred into other types of transport**. Via the article overview you can search for substances.
- In addition, if the product is classified as a Marine Pollutant, according to the IMDG one of the hazard triggers has to be the Marine-Pollutant-substance.

In case of several dangerous components it is difficult to find the 2 most important substances. Therefore, we have developed a procedure, which considers both the hazard and the percentage of the components. The procedure for this calculation is very complex; the overview below shows the basic criteria:

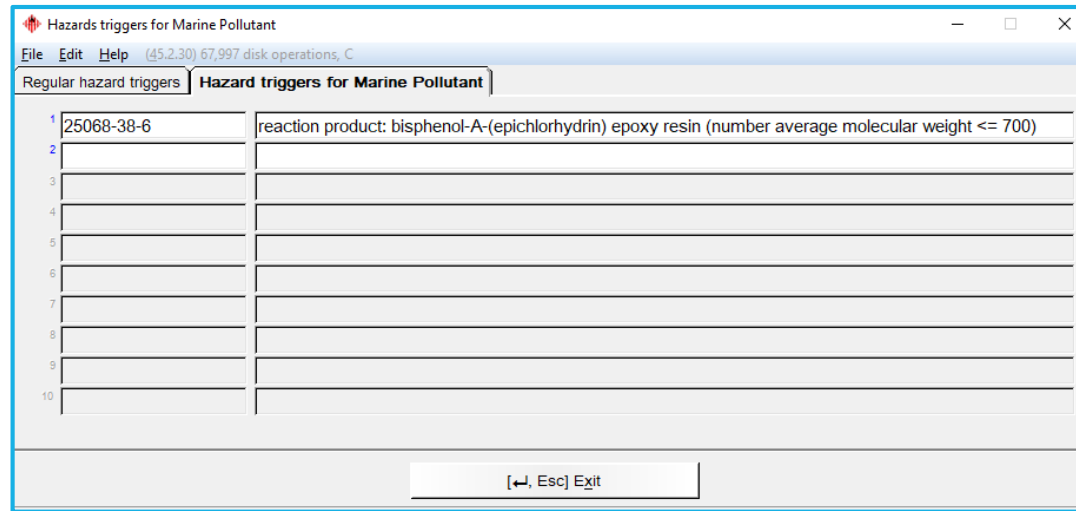
- The Hazard Label is the basis for the declaration of the components.
- If the Hazard Label only contains 1 hazard, the 2 most important substances with this hazard are stated. If only one substance with this hazard is present, but also substances with further hazards, the most important substance with the other hazard also has to be declared (e.g. also an environmentally hazardous substance of class 9). If required, the output of hazard triggers of class 9 in addition to another hazard trigger may be suppressed (see below).
- If the Hazard Label contains 2 hazards, the most important component for each of these hazards has to be declared.
- If the Hazard Label contains 3 hazards, the hazard triggers are selected from the first 2 hazards.
- If the product contains several substances of the same class, in class 3 the flash point and in class 8 their limit values for the classification into packing group III will be considered in addition to their percentages and the packing group. Substances with multiple hazards will be preferred.
- In case there is only one hazard and two hazardous components, of which one is present in only very low amounts, the one with the very low amount is not declared.
- For the calculation of the hazard triggers for a Marine Pollutant classification, ChemGes checks whether the calculated hazard triggers include the most important or the second most important Marine Pollutant component. If not, the most important Marine Pollutant is stated as the second hazard trigger.

Hazard trigger		
1	Mixture	<input type="checkbox"/>
2	Solution	<input type="checkbox"/>
3	141-78-6	ethyl acetate
4	67-63-0	propan-2-ol
5	78-92-2	butanol
6	1330-20-7/1	xylene
7		
8		
9		
10		
11		
12		

13 Transfer into the other types of transport

[Esc] Exit

- ChemGes contains circa 600 **Marine Pollutant** substances.
- In the IMDG some substances are marked as marine pollutants by the letter **P** for marine pollutants, or the letter **PP** for severe marine pollutant.
- These markings are included in the IMDG-part of the screen **Sea and air transport** of substances.
- A similar field can also be found in the IMDG-part of preparations, which is calculated automatically. This field is automatically activated, if the preparation contains more than 10% of substances marked with **P** or more than 1% of substances marked with **PP**.
- In the IMDG all Marine Pollutants are automatically classified into class 9 as being dangerous for the environment, as far as they do not fulfill the criteria of another class. But this is not valid for the remaining transport regulations.
- In the SDS the field **Marine pollutant** is automatically set to “**yes**” or “**no**”. For substances this field is additionally supplemented by the letters P or PP.
- You can select the **Hazard Triggers for Marine Pollutant** in the corresponding tab, accessed via the description field for the IMDG (*field 07*).



### Important information

When using **white spirit** please check your SDSs, to see whether the type you are using is a **marine pollutant**. According to the IMDG, white spirits with an **aromatic content of 15-20%** have to be classified as marine pollutants with the letter P. As we cannot generally presume this for all types of white spirit we did not mark them in our database. Please also check **highly aromatic naphtha (solvent naphtha)**, as well as all raw materials you have entered yourself.

## 9. Solutions and Mixtures

- Special cases for transport classification, are preparations, which contain besides the one hazardous substance only a harmless solvent (mainly water), or other harmless additives.
- In such cases the UN-number of the single hazardous substance, supplemented by the word **solution** or **mixture**, is used.

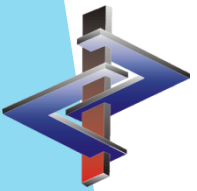
### **For example:**

- A preparation, which only consists of acetone (UN 1090) and water, is described as *1090 Acetone, solution*.
- This is only permitted, if the properties of the preparation lead to a similar classification. If such a solution reaches the flash point range 23 - 60°C, packing group II would no longer be correct, but it would have to be classified in packing group III, which does not exist for UN number *1090 Acetone*.
- The automatic classification program therefore calculates the classification normally first, which results in class 3, code F1, packing group III, UN 1993.
- Afterwards the program checks, whether the criteria for solutions and mixtures apply.
- If positive, it will be checked whether *1090 Acetone* exhibits packing group III, or if another number for *Acetone, solution* with packing group III is present.
- If not, the calculated classification with class 3, code F1, packing group III and UN 1993 is displayed, and the declaration will then read as follows:  
*1993 Flammable liquid, n.o.s., acetone.*

In some cases, the solution of a hazardous substance has a different code and a different UN-number than the substance itself. These cases are also considered.

### **For example:**

- *Sodium hydroxide, solid* is registered with UN-number 1823 in class 8, code C6, packing group II.
- The solution in water is registered with UN-number *1824 sodium hydroxide solution* in class 8, code C5, packing group II or III.
- In this case the program classifies automatically into packing group II or III (according to the concentration) and displays the UN-number *1824 sodium hydroxide solution*.
- As the word 'solution' is already contained in the UN-description, it is not attached to the name again.





## 10. Other Transport Classification Features:

### **Determining the Hazard number (Kemler code), the hazard Label and other fields:**

Even if the automatic transport classification cannot be used in full, and the ADR-class, code and packing group, or even the UN-number are corrected or simply filled in manually, it is possible to use the automatic determination of the Hazard number (Kemler code) and the Label. To perform these calculations press (Ctrl)(F10) within the transport screen. After that, a window will open, in which you can determine, which calculations shall be performed. These functions are not only active for preparations, but also for substances. This enables you to perform calculations for the remaining transport regulations as well.

### **Other transport classifications: IMDG, IATA and DOT:**

The automatic classification program also performs American DOT (Department of Transportation), IMDG (Sea transport), and IATA (Air transport) classifications.

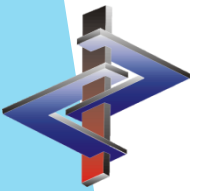
Due to the extensive harmonization between ADR, IMDG and IATA by the amendments of 2001, very few differences remain between these regulations. The hazard symbols have been standardized as well.

Examples of some differences:

- The hazard trigger requirements for different UN Numbers, differ among the various transport regulations.
- Some UN-numbers exist in the IMDG with the extension 'solid' and 'liquid' or 'solution', but not in ADR. Therefore, it might occur that a solution of a solid needs an allocation to an n.o.s. entry in ADR, while in IMDG the substance number with the addition 'solution' is stated.
- There are UN-numbers that represent a dangerous good in one transport regulation and in the remaining regulations they are optional.
- Some substances are not permitted for transport by some regulations.
- A substance might not be classified for transportation in one transport regulation, but classified in another.

### **Copying transport classifications:**

It is possible to copy all fields of the transport screen of one article (substance or preparation) to another article. This is particularly useful, if the transport fields have to be altered or filled in manually. To copy, switch to the transport screen of the new substance, to which the classification shall be copied, and press (Ctrl)(K). After that a window will open, where you can enter the number or the name of the substance to be copied. Please note that no check is made to see if the copied transport classification applies to the new substance.



# 11. Settings for the Transport Declaration:

## Automatic calculation of the declaration:

- This item is *activated automatically*.
- When opening the transport window for substances and preparations it **automatically** displays in the field **Name**, the text of the UN-number, including possible hazard triggers. This overrides the text that was previously displayed in this field. Also, with each change of the UN-number, the text is adapted accordingly.
- If you **do not** want this to happen, as you already have manual text in this field, which you do not want to delete, *deactivate* this item.
- If this item is *deactivated*, the program will ask you after each selection of the field *UN-number* whether the **Name** or other parts of the transport classification shall be altered. Thus, an alteration only takes place, if approved. In addition, the text in the field **Name** can be edited manually.

**Attention:** We would like to point out, that the automatic output of the hazard transport declaration in the SDS in the respective language (if available) is only done, if the item **Automatic calculation of the declaration** is activated. Only on this condition can the manually not editable text be adopted from the UN-number list in the corresponding language version.

## Minimization of number of hazard triggers depending on their considerability (*at own risk*):

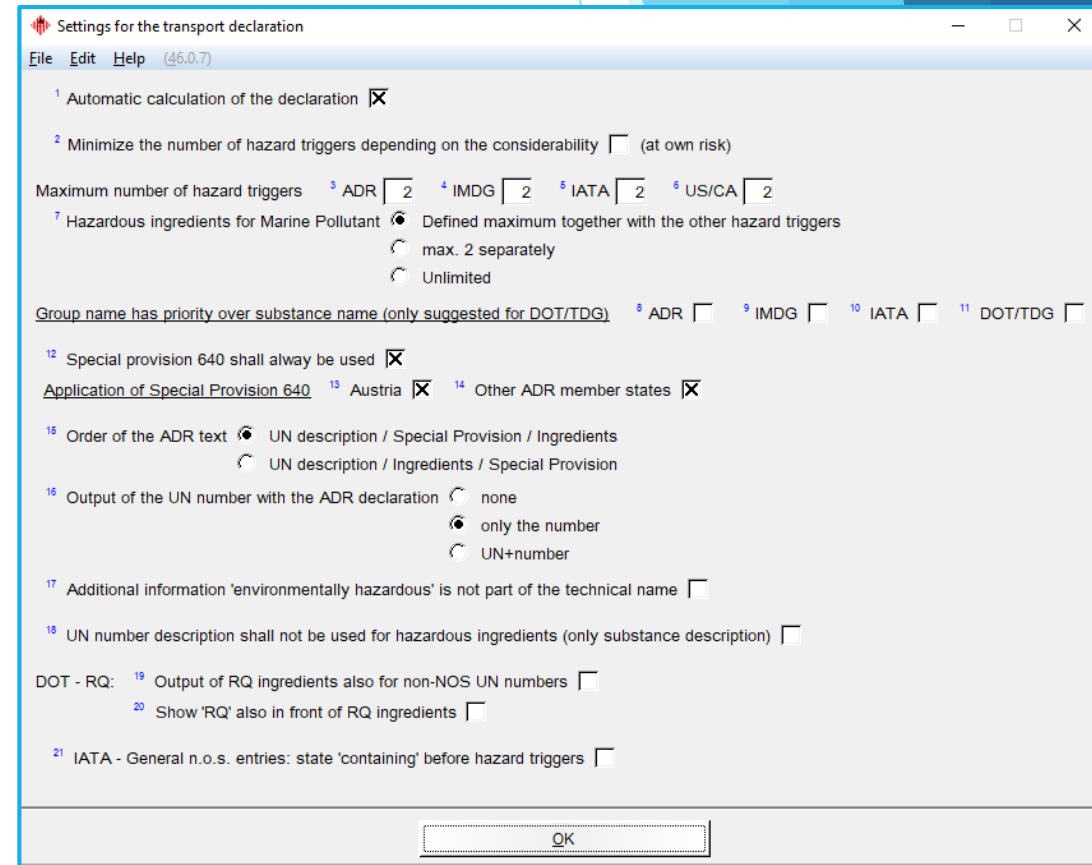
If activated, a second hazard trigger for the same hazard is suppressed, even if it is contained not in very low, but simply in lower amounts than the main hazardous substance. **This is in our opinion not in conformity with the law and therefore has to be used at your own risk.**

## Maximum number of hazard triggers:

With this item you can define the number of hazard triggers separately for each transport regulation (maximum: 10, default: 2).

## Hazardous ingredients for Marine Pollutant:

This setting lets you define the number and type of hazard triggers for Marine Pollutants, that are to be output (*defined maximum together with the other hazardous ingredients, max. 2 separately or unlimited*).



**Group name has priority over substance name (only suggested for DOT):**

If this item is activated, the UN-number (together with the transport description), which is determined according to the settings in the screen Allocation of UN-numbers to ADR-classification

is stated for the selected transport regulation.

*Example:*

The UN-number 1263 (paint) is defined for class 3, packing group I, II and III, as well as for ADR-code F1.

For a preparation consisting of Toluene and non-hazardous additions, the transport classification is stated with the UN-number and the description “1263 Paint”.

For transport regulations, for which the item **Group description has priority over substance name (only suggested for DOT)** is not activated, only the UN-number and the description “1294 Toluene” is allocated.

We would like to point out, that this possibility is only permissible in the American Road Transport regulation DOT and the Canadian transport regulations TDG. For the regulations ADR, IMDG and IATA the substance description (e.g. 1294 Toluene) has priority over the group description (even generic names, e.g. 1263 Paint).

**Special Provision 640 shall always be used:**

- If you deactivate this item, Special Provision 640 is not calculated. The application of SP 640 for a preparation is possible using the setting for *Vapor pressure* in the screen ***Additional information on transport classification***.
- This item lets you activate that the short information instead of the long ADR- additional texts shall be output in ***Austria*** and/or in the remaining ***ADR-member states***.

**Order of the ADR-text:**

For some flammable liquid substances (UN 1263 Paint, UN 1133 Adhesives, UN 1993 Flammable liquid n.o.s, etc.) the text on the *Special Provision 640* has to be stated. In ChemGes this text is output in the field for the *ADR-name* of the screen ***Land transport*** and is therefore also adopted into section 14 of an SDS. This output is done according to the following settings:

UN-description / Special Provision / Ingredients

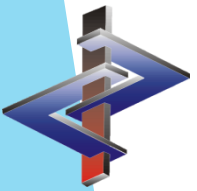
Output example:

UN 1993 FLAMMABLE LIQUID, N.O.S., Special Provision 604E (TOLUENE, ETHYLACETATE)

UN-description / Ingredients / Special Provision

Output example:

UN 1993 FLAMMABLE LIQUID, N.O.S., (TOLUENE, ETHYLACETATE), Special Provision 604E



### **Output of the UN number with the ADR classification:**

- Here, you can define how the UN number is output in section 14 of the SDS (heading 14.2 *UN proper shipping name*)
- Options (*None / Only the number / UN+number*)

### **Addl. information “environmentally hazardous” is not part of the technical name:**

This setting lets you influence the output of the text “*environmentally hazardous*” for technical names in the SDS under *UN “Model Regulation”*. This item is deactivated by default. If it is activated, the information “*environmentally hazardous*” is output at the end of the *UN “Model Regulation”*.

#### Example:

UN1866, RESIN SOLUTION, special provision 640E, 3, III, ENVIRONMENTALLY HAZARDOUS

*instead of (output, if setting is deactivated)*

UN1866, RESIN SOLUTION, special provision 640E, ENVIRONMENTALLY HAZARDOUS, 3, III

### **UN number description shall not be used for hazardous ingredients:**

In this option, you can activate that the substance names are used instead of the UN number description, for the output of hazard triggers. *Please note that this option was implemented by customer request and does not comply with legal requirements.*

### **DOT-RQ:**

Here you can activate the:

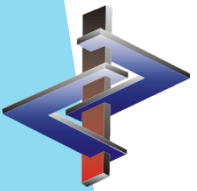
- **Output of RQ ingredients also for non-NOS UN numbers**

and

- **Show „RQ“ also in front of RQ ingredients.**

### **IATA – General n.o.s. entries: state ‘containing’ before hazard triggers:**

This option can be activated to output the word ‘containing’ before the list of hazard triggers.



## 12. Details to Classification Classes

### Class 3 – Flammable Liquids

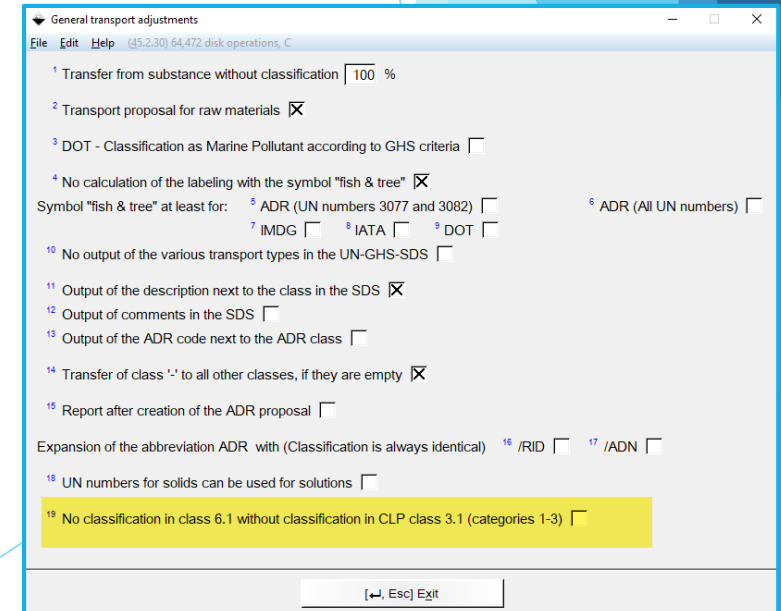
- The field **Viscosity** in the *Physical Data* screen of a preparation or raw material, is used for classifying a substance into class 3.

### Class 4 – 4.1 Flammable solids, 4.2 Substances liable to spontaneous combustion, 4.3 Substances which, in contact with water, emit flammable gases

- There are no rules for transport classifications in classes 4.1, 4.2, 4.3 and 5.1 available, which are comparable to those for the classes 3, 6.1 and 8.
- Therefore, it is only possible to calculate on the basis of the **Table for classification of mixtures** in the ADR/RID, IMDG and IATA, where no percentages are considered.
- So it may occur that if there are small additional amounts of substances of classes 4.1 – 4.3 and 5.1, these are overestimated.
- In such cases, it is possible to press (F10) *Simplified classification* and via the option *No calculation of the classes 4.1-4.3 and 5.1*, to suppress the calculation of these classes. Please take into account that in many cases only practical tests of the hazardous properties can lead to reliable results
- If a solid preparation contains a liquid raw material classified as class 4.1, you can activate in the screen *Limits for the transport classification* the use of UN 3175, from a certain percentage on.

### Class 6 – 6.1 Toxic Substances, 6.2 Infectious Substances

- According to ADR section 2.2.61.1.14 substances and mixtures (with the exception of those used as pesticides), that are not classified in CLP Class 3.1 (Categories 1-3), do not have to be classified in ADR Class 6.1.
- If this item is activated, the classification in ADR Class 6.1 is skipped, if no classification in CLP Class 3.1 is present.
- The ADR contains a calculation method for determining the toxicity of preparations based on the LD 50-values of their raw materials (table 2.2.61.7). ChemGes applies this method for class 6.1, as far as LD 50-values are available. If no LD 50-values are available, the calculation is performed according to the GHS/CLP guidelines based on ATEmix (*Acute Toxicity Estimates for Mixtures for GHS-Class 3.1*).



## Class 8 – Corrosive Substances

- If the item **H314: 1A=>PG I, 1B=>PG II, 1C=>PG III** is activated, items 06 to 11 are automatically inactive and the allocation to Class 8, packing group I, II and III is performed based on the classification with H314 and the Categories 1A, 1B and 1C of Class 3.2 *Skin corrosion /irritation*.
- If the item **R35=>PG I, R34=>PG II** is activated, the items 06, 07 and 09 are automatically inactive and the allocation to Class 8, packing group I or II (as main- or secondary hazard) is performed based on the classification with R34, or R35.
  - The allocation to packing group III is based on the limit concentrations according to entries in items 08, 10 and 11.
  - By activating this item, packing group III is limited to metal corrosion only.
  - However, preparations, for which an allocation to Class 8, packing group I or II is not permissible, are exempt from this rule.
    - This is the case, for example, for a solution with at least 5% sodium hydroxide. Although these preparations have to be classified with R35, they are allocated to packing group II (UN 1824 SODIUM HYDROXIDE SOLUTION). The reason for this is, that packing group I is not intended for UN-number 1824.
- If the *Maintenance of UN-numbers* contains specific limits for class 8, these specific limits are used for the calculation.
- For corrosive substances of class 8, with substance-specific limit values, the **Limits for the transport classification** are calculated based on these limits and the standard limit value.
- By doing this, strong acids and bases are classified starting at lower concentrations.

## Class 9 – Miscellaneous dangerous substances and articles

- Class 9 is the weakest class.
- A classification in this class only occurs, if no other class applies.
- Classification in class 9 results if the preparation contains at least 25% of substances of class 9, **UN 3077 or 3082**, or if it concerns **elevated temperature substances**, which are transported below their flash point (liquid substances: above 100°C; solids: above 240°C).

Limits for transport classification

File Edit Help (46.0.14)

<sup>1</sup> Raw materials have to be classified from  %

Limits of which classes 1, 2, 4.1 - 4.3, 5.1, 5.2 are taken into account

Packing group: <sup>2</sup> I  % <sup>3</sup> II  % <sup>4</sup> III  %

<sup>5</sup> Limit for particularly hazardous substances  %

Percentage limits for class 8

Packing group	I	II	III
I	<sup>6</sup> <input type="text" value="10.00"/>	<sup>7</sup> <input type="text" value="5.00"/>	<sup>8</sup> <input type="text" value="1.00"/>
II	<sup>9</sup> <input type="text" value="20.00"/>	<input type="text" value="5.00"/>	<sup>10</sup> <input type="text" value="5.00"/>
III			<sup>11</sup> <input type="text" value="20.00"/>

<sup>12</sup> R35 => PG I, R34 => PG II

<sup>13</sup> H314: 1A => PG I, 1B => PG II, 1C => PG III

<sup>14</sup> Classify solids from  % liquid ingredients with Class 4.1 UN 3175 - solids with flammable liquids (0 = no)

[←], [Esc] Exit

## 13. Understanding and making changes to your transport classification

The following options are available in the transport screen:

**[Ctrl U] *Transfer of all transport data from UN number:***

In this screen, you can enter a UN Number and choose a packing group, and thus have it and all of its applicable information appear in all forms of transportation.

**[Ctrl O] *'Non-hazardous' for all types of transportation:***

With the click of a button, you can activate that the substance is not classified for transportation for any of the types of transportation.

**[Ctrl F6] *Deletion of transport data:***

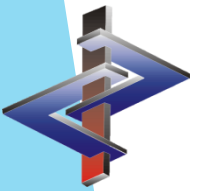
Here, you can easily remove all of the transport data entered for all fields in the two screens of transport classifications.

**[Ctrl X] *Lock:***

If you change the transport classification and you have activated the automatic calculation of the transport classification, you must **Lock** your changes, so that they are not removed upon recalculation.

**[Page ↓] *ADR-classification of contents:***

Here you can open an overview of the transport classification for the various components of the preparation. This helps for getting an understanding of the final classification of the preparation.



**More detailed Information can be found in the Manual to ChemGes**

**@ [www.dr-software.com](http://www.dr-software.com) - Downloads**