

## **RAMCALC 1.5 User Guide**

The RAMCALC spread sheet contains four worksheets. The Data Entry sheet is the sheet used to input information whilst the Package Composition and Summary sheets provide summary information. The validation certificate details the validation provided for the spread sheet.

### **Data Entry**

#### **Entering nuclide information**

When you click on a cell in the Nuclide column a drop down list of available nuclides will appear. As you type this list will attempt to automatically complete the name of the nuclide. You can move through the list using the arrow keys.

Pressing escape will exit the drop down list and allow you to move between cells using the arrow keys. To quickly delete the selected nuclide press escape and then delete.

For any row where a nuclide has been entered but no activity, or an activity but no nuclide, the nuclide and activity columns will be highlighted red.

Concentration may be entered manually, or if a value for Net Weight has been entered then the concentration will be automatically calculated. If a value for concentration is entered then this value will be used in any calculations in preference to the calculated concentration value. If no concentrations have been entered and the net weight has been left blank then certain calculations which rely on this information, such as the exempt concentration check, will not be made.

For fissile nuclides the Fissile Weight Entered column will turn white showing that you may enter a value. If you enter a value then this will override the Fissile Weight Calculated value for that nuclide.

#### **Consignment Reference**

The value entered here will appear on the Summary page.

#### **Options**

##### **Units**

From the units drop down list you can select Bq, KBq, MBq, GBq or TBq. This determines the units used in the Activity column as well as the units used to display several of the calculated values.

##### **Special Form**

Select Yes or No from the drop down list. If you select Yes then you will be asked to enter a Certificate Number and Expiry Date. These are displayed on the Summary page.

#### Net Weight

This should be entered in grams.

#### Physical State

Depending on the selection for Special Form, the options selectable from the drop down list will be Solid (Special form), Liquid, Gas (Tritium), Gas (Special form) or Solid (Other forms), Liquid, Gas (Tritium), Gas (Other forms).

#### Instrument or Article

Select Yes or No from the drop down list.

#### Are there any subsidiary risks

Select Yes or No from the drop down list. If you select Yes then a warning message is displayed.

#### Is this going to the USA

Select Yes or No from the drop down list. If you select Yes then some extra checks will be performed (HRCQ and RQ), the results of which are displayed on the Summary page.

#### Is this a source

Select Yes or No from the drop down list. This is for information only.

### **Package Compliance**

#### Dose Rate on Contact

This value is used to decide what label category should be used.

#### Dose Rate @ 1m

This value is used to calculate the Transport Index.

#### Dose Rate @ 2m

This is for information only.

#### Contamination

There are six values to enter for Contamination. These values are used to determine the correct SCO level.

### **Transport Index**

#### Freight container, tank or unpackaged LSA-I/SCO-I

Select Yes or No from the drop down list. This helps determine the Transport Index.

#### Size of Load

Select a value from the drop down list. The available options are size  $\leq 1\text{m}^2$ ,  $1\text{m}^2 < \text{size} \leq 5\text{m}^2$ ,  $5\text{m}^2 < \text{size} \leq 20\text{m}^2$ ,  $20\text{m}^2 < \text{size}$ . This helps determine the Transport Index.

#### Transport Index

This is calculated based on the values entered into the form.

### CSI

This is the Criticality Safety Index.

### **Calculated Values**

#### Total Activity

This is the sum of all the activities entered into the Activity column. The value is displayed in the same units that were selected at the top of the form.

#### Fissile Mass

This is the sum of the fissile mass either calculated or entered. For each nuclide the value from the Calculated column is used unless a value is entered in the Entered column.

#### Total Concentration

This is the sum of all the concentrations entered.

#### Specific Activity

There are two variations on Specific Activity: the Bq/g which is the Total Activity divided by the Net Weight and the number of A1 or A2s per gram which is the Number of A1 or A2s divided by the Net Weight.

#### Number of A1 or A2s

This is the sum of the number of A1 or A2s for each nuclide.

### Derived A1 or A2 for Mixture

This value is displayed in the same units as were selected at the top of the form. If the Total Activity exceeds this value then "Exceeded" will be displayed next to the value and the package cannot be classed as Type A.

### Derived Activity Concentration for Exempt Material

If the Total Concentration exceeds this value then "Exceeded" will be displayed next to the value and the package cannot be an Exempt Material.

### Derived Activity Limit for an Exempt Consignment

This value is displayed in the same units as were selected at the top of the form. If the Total Activity exceeds this value then "Exceeded" will be displayed next to the value and the package cannot be an Exempt Consignment.

### Activity Limits for Excepted Packages

#### Package Limit

This is the maximum number of A1 or A2s which the package may contain in order to be an Excepted Package. If the number of A1s or A2s exceeds this then "Exceeded" will be displayed next to the value. The limit depends on the Physical State and whether or not it is an Instrument or Article.

#### Item Limit

This value is only calculated if the Instrument or Article field is set to Yes. The number of A1 or A2s for any single item must not exceed this limit if it is to be an Excepted Package.

### Radiation Level Limit on the Surface for Excepted Package

This value is always the same. If the Dose Rate on Contact exceeds this value then "Exceeded" is displayed next to it and the package may not be classified as an Excepted Package.

### LSA

This is the LSA level determined for the package. It can be LSA-I, LSA-II, LSA-III or Non-compliant. The LSA level is based on the physical state and the specific activity.

### SCO

This is the SCO level determined for the package. It can be SCO-I, SCO-II or Non-compliant. The SCO level is based on the physical state of the package

and the contamination levels. If all contamination levels haven't been entered then "Missing data" is displayed.

## **Package Composition**

This sheet shows two charts. The first shows each nuclide and its fraction of the total activity.

The second chart shows each nuclide and its fraction of the total numbers of A1/A2s.

## **Summary**

The Summary sheet shows information entered on the Data Entry sheet as well as some summary values.

## **Activity and A1/A2 Distribution**

All nuclides entered on the Data Entry sheet will be listed along with the activity (in Bq and the units selected), the concentration, the A1/A2 value, the proportion of total activity and the proportion of A1/A2. The three nuclides with the highest proportion of A1/A2 will be highlighted. Total activity and A1/A2 values are also shown.

## **Classification Output**

Apart from the following fields these values are taken directly from the Data Entry sheet:

### Exempt Concentration

States whether or not the package contains an exempt concentration.

### Exempt Consignment

States whether or not the package is an exempt consignment

## **Package Options**

Apart from the following fields these values are taken directly from the Data Entry sheet:

### Excepted

States whether or not the package may be an Excepted package. This is determined by checking the Excepted Package Activity Limit and the Radiation Level Limit on the Surface.

### Unpackaged

States whether or not the package may be Unpackaged. This is determined by looking at the LSA and SCO groups.

#### Industrial

States whether or not the package may be an Industrial package. This is determined by looking at the LSA and SCO groups.

#### Type A

States whether or not the package may be Type A. This is determined by looking at the total activity and the derived A1/A2 value.

#### Type B

States whether or not the package may be Type B.

#### Labelling Category

States the Labelling Category for the package. This is determined by looking at the TI and the radiation level on the surface.

#### HCDG

Displays 'yes' if the number of A2s is greater than or equal to 3,000 (see ADR 2015 1.10.3.1.3) or 'no' if it is less than 3,000.

In addition, if the package contains any nuclide in Table 1.10.3.1.3 (ADR 2015) then the calculation defined in 1.10.3.1.4 will also be checked.

#### HRCQ (USA only)

This states whether or not the package is a Highway Route Controlled Quantity. This is determined by looking at the activity and the derived A1/A2 value.

#### RQ (USA only)

This states whether or not the package contains any Reportable Quantities.

#### **Package Compliance**

These values are taken directly from the Data Entry sheet.

#### **Special Form**

These values are taken directly from the Data Entry sheet.

