Rescue Sheet - How to create it?

Guidelines following requirements from ISO 17840 Part 1 and Euro NCAP

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Purpose of this document

• To specify, illustrate the expectations of content and layout for a Rescue Sheet fulfilling ISO 17840 (Part 1:2015 and then updated in 2020 + Part 3 and Part 4). Like this, the rescue sheet will be compliant with Euro NCAP 2020 requirements.

• Some examples are presented. They can come from official rescue sheets or they can be made “by hand” just to illustrate the expectations.

• These examples will be presented with a specific layout:

• Purpose is to use less text as possible in the Rescue Sheet. The rescue sheet (ISO 17840 part 1) is “quick information” for the first responders on the accident scene. If something is not clear, the ISO 17840 part 3 Emergency Response Guide (ERG) gives “in-depth information” (by adding text in addition to the pictures or pictograms coming from the Rescue Sheet).

• The ERG contains crucial and in-depth information linked to the Rescue Sheet to inform, train and develop rescue procedures by first responders. The headings/contents of the Rescue Sheet and the ERG information are aligned with each other, i.e. the ERG information works as an extension of the related Rescue Sheet.

• The ERG and the Rescue Sheet follow a flowchart of the main actions to take for first and second responders arriving at the accident scene or performing towing and other activities afterwards.
Recommendations

• It is recommended to use as little text as possible, and instead use the pictograms defined in ISO 17840 – Part 1 and/or Part 3
  • Like, this the information is straightforward for the first responders
  • And the effort to edit the version in all the different languages will be less.

• Always use pictograms coming from ISO 17840- Part 1 and/or Part 3.

• Ensure the quality of the picture / drawing / photo / pictogram follow the General recommendations in ISO 3864-1. This is to ensure that they are readable and clear to understand.

• Information:
  • Hazards/Danger Red border RGB: 255/0/0 all in Red capital letters
  • Recommendation Green border RGB: 0/176/80 all in Black capital letters
Colour code from ISO

• Each coloured rectangle in the table below is made with the appropriate colour (RGB code) defined by ISO 17840.

<table>
<thead>
<tr>
<th>Colour</th>
<th>RGB code</th>
<th>Components/functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>RGB: 255,255,0</td>
<td>Low voltage electrical system/components, including SRS control unit</td>
</tr>
<tr>
<td>Orange</td>
<td>RGB: 255,165,0</td>
<td>High voltage (class B voltage) electrical system/components</td>
</tr>
<tr>
<td>Blue</td>
<td>RGB: 77,77,255</td>
<td>Occupant protection system, e.g. airbags</td>
</tr>
<tr>
<td>Purple</td>
<td>RGB: 152,48,143</td>
<td>Seat belt pretensioner</td>
</tr>
<tr>
<td>Red</td>
<td>RGB: 255,0,0</td>
<td>Surrounding colour for triggered systems e.g. airbag, gas inflator or preloaded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spring actively triggered by sensor or similar</td>
</tr>
<tr>
<td>Lime green</td>
<td>RGB: 0,255,0</td>
<td>Gas, liquid and pre-tensioned spring components</td>
</tr>
<tr>
<td>Sea green</td>
<td>RGB: 0,128,128</td>
<td>High strength zones</td>
</tr>
<tr>
<td>Grey</td>
<td>RGB: 127,127,127</td>
<td>Liquid group 1 (Diesel, Bio Diesel, ...) tank/lines</td>
</tr>
<tr>
<td>Dark red</td>
<td>RGB: 139,0,0</td>
<td>Liquid group 2 (Petrol/Gasoline, Ethanol, ...) tank/lines</td>
</tr>
<tr>
<td>Green</td>
<td>RGB: 0,176,80</td>
<td>Gas tank/lines (generic)</td>
</tr>
<tr>
<td>White</td>
<td>RGB: 255,255,255</td>
<td>Cryogenic Gas Group (LNG, ...) tank/lines</td>
</tr>
<tr>
<td>Light blue</td>
<td>RGB: 0,176,240</td>
<td>Hydrogen tank/lines</td>
</tr>
<tr>
<td>Purple</td>
<td>RGB: 204,0,204</td>
<td>Air-condition components/lines</td>
</tr>
<tr>
<td>Brown</td>
<td>RGB: 183,120,29</td>
<td>Oil tank/lines</td>
</tr>
<tr>
<td>White</td>
<td>RGB: 255,255,255</td>
<td>Air tank</td>
</tr>
</tbody>
</table>

* RGB colour components as expressed in terms of digital 8-bit per channel (from 0 to 255).

• This colour code is important to respect in order to understand and classify the parts, equipment and dangers at a first glance.
In the next slides, each part of the 1st page will be detailed.

<table>
<thead>
<tr>
<th>Logo of brand</th>
<th>Name of manufacturer and vehicle model</th>
<th>Body type(s) covered by the rescue sheet (year of start of production – year of end of production*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO part 4</td>
<td></td>
<td>Note: Leave blank when LHD and RHD are covered by the same rescue sheet.</td>
</tr>
</tbody>
</table>

Legend standardized (picto and text) so that the 1st responders all around the world can read all the rescue sheets published.

Source ISO 17840 Part 1

Legend:

- Field may be used for additional information, e.g. applicable country or region for the vehicle model.
Do not forget to put the name of the brand together with the model name, even if the logo shows the brand in full letter.

Do not forget to check the name of the model is not different in one specific country.

Do not forget the body types of the model covered by this rescue sheet. For example: 3 doors-5 doors, 5 seaters vs 7 seaters, hatchback, sedan...
ISO part 4 symbol: ISO propulsion energy identification

Some examples:
Never put the 2 pictograms at the same time!
Purpose of this pictogram is to inform that the RHD rescue sheet contains significant differences from the LHD version and therefore 2 distinct Rescue Sheets are needed. In most of the vehicles this distinction is not needed.

As a consequence, the pictogram should not be used if there is no Rescue Sheet for the other hand of drive.
Ensure the quality of the picture is minimum 300 dpi
And the size of the pictures is enough to be able to
distinguish the details for a first responder trying to
identify the car to ensure this is the right Rescue Sheet.

ISO standard asks for 2 pictures, not less, not more.

It can be a photo of a real car, it can be a digital, virtual
representation of the model.
Page 1 - Top and side views

Use the pictograms as shown in the legend of Part 1. See example in next slides.

If you need to use pictograms from Part 3, do not forget to add a line in the legend to display them (see page 16).

The technology of the HV battery shall be stated (e.g. Li-ion or Ni-MH), and to help even more the first responders as shown in page 13. The voltage may be mentioned, because the actions in case of a rescue could be different.
Page 1 - Top and side views

• Do not deform (stretch) existing symbols but draw realistic adapted components (e.g. HV battery)

• Show seats

• Draw realistic shape components (e.g. airbag)

• Do not show unnecessary components
Page 1 - Top and side views

To highlight specific items, you can combine the double frame rectangle with the reference to the chapter number together with its colour code:

It is also recommended to inform here about the type of HV battery and its Voltage. It can be done via an arrow and a text box.

EXAMPLE(S)

Li-ion 400V
Page 1 – Top and side views

Double frame rectangle

To highlight specific items, you can combine the double frame rectangle with the reference to the chapter number together with its colour code.

- It can be displayed on the 2nd part of header or on the top or side view
- It is recommended to do so for any new equipment the first responders are not used to see in the accidents.

- Example below show the case for the far side airbag (also called centre airbag - CeAB). This airbag will be more and more popular in the coming years because Euro NCAP is now giving points to this new device (protection in Far Side impact or in occupant to occupant interaction in case of a lateral crash). But it will be scarcely present in the accident for the coming years due to market penetration of new models. So it’s important to highlight this new location to first responders
Gas strut

The colour code defined initially the red as the symbol of a triggered equipment (via pyrotechnic) as shown in the extract of ISO 17840 Part 1: 2015.

| Red     | RGB: 255,0,0 | Surrounding colour for triggered systems e.g. airbag, gas inflator or preloaded spring actively triggered by sensor or similar |

But for long time, the gas struts have been displayed in the Rescue Sheets with a red contoured pictogram. The first responders are used to see this equipment like this.

- Initially, before ISO 17840 creation, the red contour was used to distinguished between a pre-loaded spring and a gas-strut.
- This distinction was considered crucial because in case of fire the gas strut can be a real danger compared to a pre-loaded spring.

For this reason, the ISO Working Group decided to change the definition of the red colour code, in order to keep the red contour for any gas strut in the ISO 17840 Part 1 new version (to be published soon).

| Red     | RGB: 255,0,0 | Surrounding colour for triggered systems e.g. airbag, gas inflator, a triggered preloaded spring / gas strut, or a non-triggered gas strut |

In conclusion, use:

- For pre-loaded spring
- For non-triggered gas strut
- For triggered pre-loaded spring
- For triggered gas strut
Page 1 - Legend

The full and EXACT legend of ISO 17840-Part 1:2015 must be displayed. This is a requirement from this version of the standard. Otherwise, the Rescue Sheet is not compliant with ISO and therefore not compliant with Euro NCAP requirements.

If you need to use pictograms from Part 3, add a line in the legend to display them.

See example below:

![Legend Diagram]
Do not forget the total number of pages in the footer.
# Page 2 to 4 - headers with colour

1. Identification / recognition

2. Immobilisation / stabilisation / lifting

3. Disable direct hazards / safety regulations

4. Access to the occupants

5. Stored energy / liquids / gases / solids

6. In case of fire

7. In case of submersion

8. Towing / transportation / storage

9. Important additional information

10. Explanation of pictograms used

If there is no specific information to give in one chapter, then the header of the chapter does not need to be displayed. But the next chapter will still keep the chapter number as displayed above. There is no renumbering.

RGB colours are imposed by ISO 17840 Part 3.
If a hazard is applicable to several chapters, the general principle is that it should be repeated under each chapter.

We expect BEV, HEV, PHEV, Hydrogen, Fuel Cell to be the ones where almost all the chapters will be filled in. But even for a traditional ICE (Internal Combustion Engines e.g. Diesel or Gasoline) vehicle, some information are relevant to be presented in the Rescue Sheet, such as:

- 48 Volt battery
- New type of airbags (such as CeAB (= Occupant to Occupant Side Airbag))
- Other new active or passive safety technology/items
- Special constructions/materials that has been used
- New types of access to the vehicle
- New types of communication V2X
- ...

**Maximum 4 pages to be used in the Rescue Sheet!!!**

- It is up to the car manufacturer to be creative beside the recommendations in this document to display the information that he thinks is needed to ensure safe and effective interventions for the responders. Using ISO 17840 pictograms and clear pictures should optimize the space needed to show the instructions and information.
- Remember that the ISO 17840 ERG is made to be used as a direct link with the ISO 17840 Rescue Sheet to give more in depth information. The combination of the 2 documents can be therefore very effective.
It is a good solution to insert a small header on each of the additional pages: the brand / model / type and validity

Source ISO 17840 Part 1
1. Identification / recognition

When applicable, please start with the following recommendation (for Electric, Hybrid, Fuel Cell vehicles)

**FIRST**: General safety remarks are needed to approach safely the vehicle and give the possibility to identify/recognize safely the vehicle model.

**SECOND**: All relevant information with applicable symbols/drawings/pictures/photo’s for the full identification of the vehicle
Information concerning symbols, model name, etc. on the vehicle ➔ **brand logo, model logo**
Information to recognize the propulsion system:
- Information of what to identify under the hood
- Information of what to identify on the dashboard
- Specific information to recognize this vehicle (e.g. hybrid, EV, FCEV, or other identification)
- Specific REESS or alternative propulsion fluid / energy source
- Identification of the type of battery: chemistry family, voltage class, location in vehicle
- Inclusion of applicable ISO 17840 pictograms
ELECTRIC POWERED VEHICLE

1. Identification / recognition

LACK OF ENGINE NOISE DOES NOT MEAN VEHICLE IS OFF. SILENT MOVEMENT OR INSTANT RESTART CAPABILITY EXISTS UNTIL VEHICLE IS FULLY SHUT DOWN. WEAR APPROPRIATE PPE.

Brand logo

Model name

Source pictures/drawings
LYNK&CO

Source pictures/drawings
KVO/AUDI
2. Immobilisation / stabilisation / lifting

- Relevant information for immobilisation and/or stabilisation actions on/around the vehicle
- Provide images/illustrations of these elements
- Appropriate vehicle specific stabilisation-lifting points
- Prohibited vehicle specific stabilisation-lifting points

It is recommended to separate the 2 main items such as:

A- Immobilize the vehicle

Generally recommend to:
- block the wheels
- Set the parking brake
- Put the car in “P” for automatic gearbox
- Use pictures to show parking brake location and gear lever location

B- Lifting Points

Generally a bottom view of the car to show the jack points and the High Voltage cables if any

Use the titles above (A and b) to be consistent with other Rescue Sheets.
**EXAMPLE ELECTRIC POWERED VEHICLE**

2. **Immobilization / stabilization / lifting**

Immobilize vehicle:
1. Block wheels and set parking brake;
2. Push the P (park) button to select the P (park) position;

Stabilisation-lifting points:

Source pictures/drawings LYNK&CO

- **Source pictures/drawings TESLA**

- Appropriate stabilisation-lifting points
- Appropriate stabilisation points vehicle on side
- High voltage battery
Purpose is to avoid to put a lot of text because then it will be needed to translate it for all EU countries. This is why we recommend the extensive use of the pictograms from ISO 17840- Part 3. These pictograms can be on the left side of the page to symbolise the actions to take and where to do them (see example in slide 22).

It is important as well to define if the process needs to be done with PPE or not. So, care should be taken of the right use of the following pictograms.

Generally, there are some main actions and then some different alternatives, for the hazard disabling. In this case, it is better to clearly mention it is an alternative. Otherwise the firefighters will consider they have to do the ALL the actions before rescuing the occupants. It can be difficult or impossible to do. So do separate clearly the alternatives, such as:

- MAIN DISABLING METHOD
- ALTERNATIVE DISABLING METHOD(S)
- ACCESS

*Use the text above to be consistent with other rescue sheets*

Content can be:

- How to eliminate immediate danger, which safety requirements are needed
- Including “preferred” procedure and “alternative” procedure(s) for disabling direct hazards (e.g. disabling high voltage or shutting off gas pressure)
- Procedure when EV / PHEV are connected on charging
- Provide detailed images of “specific type” of disconnections, with necessary information
EXAMPLE CNG POWERED VEHICLE

3. Disable direct hazards / safety regulations

**MAIN METHOD**

A) SHUT POWER OFF

B) MANUALLY CLOSE VALVES ON THE GAS TANKS

**OVERVIEW CNG TANKS**

If required, the shut-off valves can be manually closed on the gas tanks as follows:

1. Raise the rear of the vehicle so that the covers for the natural gas tank are accessible.

2. Use the handwheel -T50026- (SKODA special tool) or pliers to close the shut-off valves on both natural gas tanks in the direction of the arrow shown.

Source pictures/drawings SKODA
EXAMPLE ELECTRIC POWERED VEHICLE

3. Disable direct hazards / safety regulations

MAIN METHOD

ALTERNATIVE METHOD

ACCESS TO 12V BATTERY

Be aware that not every high voltage component is labelled. Always wear the appropriate PPE. Do not attempt to open the high voltage battery

Source pictures/drawings TOYOTA
Content:
A) Glass types (All windows)
   1 Laminated glass.
   2 Tempered glass.

It is also possible to add information in this chapter when
the car as very specific features that are not located in the
same place as many other cars or that are not operated in
the same way as many other cars (e.g. steering wheel
adjustment operated through command in the centre
screen).
For this reason, in addition to A), there could be some
information about:
B) Seat adjustment (electric/mechanical)
C) Steering column adjustment
D) High strength steel in body
E) Door latches / command
4. Access to the occupants

High strength steel in body

Seat adjustment

Steering column adjustment

Glass types:
A. Laminated glass.
B. Tempered glass.

Source pictures/drawings LYNK&CO
Using pictograms should be enough (a more detailed table will be present in the ERG so it is not needed in the Rescue Sheet).

A) List of stored energy/ liquids/Gases/Solids with mention of the dangers with the use of ISO 17840 pictograms:
   - Batteries with mention of voltage
   - Propulsion fuel tank with mention of content in litre
   - Propulsion gas tanks with mention of content in litre
   - Solar cells with mention of voltage
   - Carbon / Magnesium / Titanium used in vehicle
   - Dangers when broken/leaks/dust (e.g. Carbon fibres)
   - HV battery pack coolant
   - Specific air-conditioning coolant

   - Do not mention braking fluids, motor oil,... if no specific hazard

For specific materials mentioned above, location must be displayed on the 1st page with a double frame rectangle and the reference to this chapter.
### EXAMPLE

<table>
<thead>
<tr>
<th><strong>C</strong></th>
<th><img src="" alt="Risk Symbols" /></th>
<th>Full body</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="" alt="Chemical Symbols" /></td>
<td><img src="" alt="Risk Symbols" /></td>
<td>48 V</td>
</tr>
<tr>
<td><strong>Li-ion</strong></td>
<td><img src="" alt="Risk Symbols" /></td>
<td>400V</td>
</tr>
<tr>
<td><strong>H₂</strong></td>
<td><img src="" alt="Risk Symbols" /></td>
<td>700 bar</td>
</tr>
<tr>
<td><img src="" alt="Solid Symbols" /></td>
<td><img src="" alt="Risk Symbols" /></td>
<td>50 l</td>
</tr>
<tr>
<td><img src="" alt="Gas Symbols" /></td>
<td><img src="" alt="Risk Symbols" /></td>
<td>0,9 l</td>
</tr>
</tbody>
</table>

*When coolant leaks from the battery pack, it can become unstable with risk of thermal runaway. Check battery pack temperature with thermal imaging camera.*
6. In case of fire

Just use pictures as much as possible to present the following:

A) Extinguish method: recommendations specific for this type/model (e.g.)
   - How to put water into the HV battery (eg. Fireman access, direction of jet of water for better efficiency...)
   - Clear warning if it is not recommended to apply a certain-methodology to extinguish fire (eg. not to put the car into container with water)

B) Hazards specific for this type/model

C) Hazards also after fire (e.g. Carbon Fibres, reignition)

D) Recommendations specific for this model e.g. venting direction of the CNG or of the HV battery, if any.
EXAMPLE ELECTRIC POWERED VEHICLE

6. In case of fire

USE LARGE AMOUNTS OF WATER

BATTERY RE-IGNITION!

DO NOT SUBMERGE VEHICLE TO EXTINGUISH BATTERY
EXAMPLE CNG POWERED VEHICLE

6. In case of fire

Temperature Pressure Release Device (TPRD) opens at 110°C (loud hissing noise)
90 seconds before all CNG gas is released from a tank

NEVER PUT WATER ON TPRD
6. In case of fire

EXAMPLE FUEL CELL POWERED VEHICLE

Temperature Pressure Release Device (TPRD) opens at 110°C (loud hissing noise)

- USE LARGE AMOUNT OF WATER ON BATTERY PACK
- NEVER PUT WATER ON TPRD
- BATTERY RE-IGNITION
7. In case of submersion

It may be just a reference to see Chapter 3.

It can be more detailed if some specific functions exist in the vehicle.
The possible contents are:
   A. What to do in case of immersion in water, the specific danger
   B. Which procedure to follow concerning e.g. high voltage
**EXAMPLE ELECTRIC POWERED VEHICLE**

Wear appropriate PPE. Remove the vehicle from the water and continue with normal high voltage (see chapter 3). Vehicles submerged in salt water should be handled with a greater potential risk of a HV battery fire.

Tilt the vehicle to one side to allow water to drain out of the vehicle and the high voltage battery.
Present the location of the towing hook tool, and where to secure this tool in the car (front and rear):

A) Towing/transportation method specific for this type/model or general
B) Storage method specific for this type/model or general
C) Hazards specific for this type/model or general
D) Recommendations specific for this type/model or general

This section is specially made for second responders as towing, garage technicians,...
EXAMPLE ELECTRIC POWERED VEHICLE

8. Towing / transportation / storage

Recovery hook storage
Location front hook
Location rear hook

STORE AT SAFE DISTANCE FROM OTHER VEHICLES!

BATTERY RE-IGNITION!

Source pictures/drawings LYNK&CO
If this chapter is not needed, then it does not need to be displayed.
But the information that can be displayed here are:
   A) Contact information manufacturer
   B) Link to ERG (effective working link)

In addition, when a new restraint system, such as a new type or location of airbag eg. CeAB (=Occupant to Occupant airbag) is available in the car, apart from the well known restraint system, it is strongly recommended to show more details about it, such as its deployed shape.
Attention can be drawn to the first responders thanks to a double frame rectangle and the reference to this chapter (or to chapter 3) that will be displayed on the 1st page as mentioned in page 14.
When there is enough space to fit this chapter inside the Rescue Sheet (remember, no more than 4 pages), it is good practice to insert a table with all the pictograms that are not yet presented in the legend displayed in the 1st page. Otherwise if not possible, insert the link to the ISO 17840 ERG where they will all be displayed and defined.
## 10. Explanation of pictograms used

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Smart key distance" /></td>
<td>Risk of flammability</td>
</tr>
<tr>
<td><img src="image" alt="Warning high voltage" /></td>
<td>Risk of damaging human health</td>
</tr>
<tr>
<td><img src="image" alt="Caution" /></td>
<td>Risk of acute toxicity</td>
</tr>
<tr>
<td><img src="image" alt="Warning low temperature" /></td>
<td>Risk of an explosion</td>
</tr>
<tr>
<td><img src="image" alt="Air-conditioning component" /></td>
<td>Risk of corrosive material / substances</td>
</tr>
<tr>
<td><img src="image" alt="Hybrid Gasoline vehicle" /></td>
<td>Use water to extinguish the fire</td>
</tr>
<tr>
<td><img src="image" alt="Use IR Camera (thermal imaging)" /></td>
<td>Bonnet</td>
</tr>
<tr>
<td><img src="image" alt="Use IR Camera (thermal imaging)" /></td>
<td>Trunk</td>
</tr>
</tbody>
</table>