



**EUROPEAN NEW CAR ASSESSMENT PROGRAMME  
(Euro NCAP)**



**RESCUE, EXTRICATION & SAFETY  
TEST & ASSESSMENT PROTOCOL**

Version 2.1  
June 2022

**Copyright ©Euro NCAP** 2022 - This work is the intellectual property of Euro NCAP. Permission is granted for this material to be shared for non-commercial, educational purposes, provided that this copyright statement appears on the reproduced materials and notice is given that the copying is by permission of Euro NCAP. To disseminate otherwise or to republish requires written permission from Euro NCAP.

## CONTENTS

1	INTRODUCTION.....	2
2	DEFINITIONS.....	3
3	SCORING SCHEME.....	4
4	RESCUE SHEET & EMERGENCY RESPONSE GUIDE .....	5
5	EXTRICATION .....	6
6	POST-CRASH TECHNOLOGY - ADVANCED eCall.....	12
7	POST-CRASH TECHNOLOGY – MULTI COLLISION BRAKE .....	14
8	POST-CRASH TECHNOLOGY – VEHICLE SUBMERGENCE .....	15

Where text is contained within square brackets this denotes that the procedure being discussed is currently being trialled in Euro NCAP. Its incorporation in the Test Protocol will be reviewed at a later date.

**DISCLAIMER:** Euro NCAP has taken all reasonable care to ensure that the information published in this protocol is accurate and reflects the technical decisions taken by the organisation. In the unlikely event that this protocol contains a typographical error or any other inaccuracy, Euro NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

# 1 INTRODUCTION

Rescue services require detailed but readily-understood information regarding the construction of individual vehicles to extract trapped occupants as quickly and safely as possible. This is becoming more pressing as vehicles become stronger (e.g. use of high strength steels or composite materials), use different sources of power (e.g. electric/hybrid, hydrogen) and are equipped with an increasing number of safety devices (e.g. airbags, pre-tensioners, active pedestrian protection bonnets).

Through the application of this protocol and the “Euro Rescue” app, Euro NCAP in collaboration with the International Association of Fire & Rescue Services (CTIF) promotes the appropriate availability of ISO 17840 compliant rescue sheets and response guides for new car models. To further assist the extrication efforts of first responders, the correct functioning of automatic door locks, i.e., unlocking after a crash, is checked. Also, incentives are given for availability of technology that supports rescue activities and helps to prevent any further collisions with oncoming traffic or roadside structures, after the initial impact. Finally, vehicle submergence countermeasures are assessed to check if occupants can promptly exit a vehicle that has entered water and are not hindered by non-functioning door latches or side windows.

The assessments to be performed in the areas of Rescue, Extrication and Safety contribute to the adult occupant protection rating. The requirements detailed in this protocol are divided into three areas:

1. **Rescue:** Information for First Responders – Rescue Sheet & Emergency Response Guide (ERG)
2. **Extrication:** Unlocking of automatic door locking, door opening forces, seat belt unbuckling forces, compliance with ECE regulations post-crash for EV vehicles and accuracy of eCall data. Markings on vehicles to help with disabling direct hazards by rescuers attending the vehicle.
3. **Safety:** Advanced eCall, Multi Collision Brake technology and Vehicle Submergence.

## 2 DEFINITIONS

- 2.1 Rescue Sheet (ISO 17840 part 1): Operational Summary sheet for a vehicle produced for rescue services containing relevant information on vehicle hazards such as electrical systems, pyrotechnic devices, material location and properties (high strength steel etc), fuel storage location and properties etc. Rescue Sheet is the main document that first and second responders use at the scene of an accident.
- 2.2 Emergency Response Guide (ERG ISO 17840 part 3): a template for more in-depth emergency response information to be used in combination with the Rescue Sheet for non-conventional engine vehicle. It is generally used by first and second responders as a source of information for training on non-conventional engine vehicles.
- 2.3 ISO standard 17840 - Road vehicles - Information for first and second responders – Containing the following 4 parts: Rescue sheet for passenger cars and light commercial vehicles (Part 1), buses, coaches and heavy commercial vehicles (Part 2), ERG template with all the needed pictograms in ERG and in Rescue Sheet (Part 3) and a standard for identification of the propulsion fuel or energy (Part 4).
- 2.4 Automatic Door Locking (ADL): System in the vehicle whereby the door latches automatically lock once the vehicle has reached a certain speed. They should also automatically unlock in the event of an accident, post impact. Short term deactivation for one single journey is permitted.
- 2.5 eCall: System fitted to a vehicle that sends an automatic message to an emergency call centre in case of a crash of the vehicle. eCall technology capable of sending advanced content, beyond what is legally specified (ECE 144), is referred to as eCall+ or Advanced eCall.
- 2.6 TPS eCall
  - 2.6.1 Third party services supported eCall' or 'TPS eCall' means an in-vehicle emergency call to a third party service provider, made either automatically by means of the activation of in-vehicle sensors or manually, which carries, by means of public mobile wireless communications networks, the MSD and establishes an audio channel between the vehicle and the third party service provider.
  - 2.6.2 Third party service provider means an organisation recognised by national authorities as being allowed to receive a TPS eCall and to forward the MSD to the eCall PSAP.
- 2.7 Minimum Set of Data (MSD) contains information on the accident vehicle and is transmitted at the beginning of the call in the voice channel opened between in-vehicle system and public safety answering point. Transmitting MSD to TPS may be done by voice channel and/or SMS and/or other data coding.
- 2.8 Multi Collision Brake (MCB): System fitted to a vehicle that applies the brakes to prevent or mitigate a subsequent impact when a vehicle has been involved in a collision. In response to a primary collision (usually if the airbag is fired), information is sent to the electronic stability control system to brake the vehicle. It must not be possible to deactivate the MCB by the driver.
- 2.9 Event Data Recorder (EDR): An Event Data Recorder or EDR is a function or device installed in a vehicle that records technical vehicle and occupant information for a brief period of time before, during and after a collision, for the purpose of monitoring and assessing vehicle safety system performance.

### 3 SCORING SCHEME

- 3.1 The score achieved from the Rescue, Extrication & Safety assessment is directly applied to Adult Occupant Protection (Box1) without scaling. The score ranges from -2 points to +4 points.
- 3.2 A penalty (-2 points) will be applied if an ISO compliant Rescue Sheet is not available for all cars currently on sale (2020 released cars onwards) **or** if an ISO compliant Rescue Sheet is not available for the tested vehicle according to Chapter 4. Compliance with 3.2 is a pre-requisite for scoring rescue points. *(Rescue sheets are only required for full type approved passenger vehicles and not low volume, non full type approved vehicles).*
- 3.3 A penalty (-1 point) will be applied, where the ISO compliant ERG is not available for the tested vehicle according to Chapter 4. Compliance with 3.3 is a pre-requisite for scoring points.
- 3.4 A maximum -1 point penalty can be applied in accordance with the Extrication requirements in Chapter 5 of this protocol.
- 3.5 If for the tested vehicle, ISO compliant Rescue Sheet and ERG are available and meeting the requirements of Chapter 4, a maximum of 4 points can be scored:

- **1 point** if the vehicle is equipped with Advanced eCall (based on 112 eCall) in accordance with the requirements in Chapter 6:

**2023:**

Potential number of occupants	0.50 points
Recent locations N1 & N2	0.50 points
Direction of impact & Delta V	0.00 points

**2024:**

Potential number of occupants	0.33 points
Recent locations N1 & N2	0.33 points
Direction of impact & Delta V	0.33 points

- **1 point** maximum for Third Party Service eCall (TPS eCall) in accordance with the requirements in Chapter 6:

Multi-language communication	0.5 points
Hazard detection	0.5 points
Transfer of paired mobile number	0.5 points
Transfer of vehicle type	0.5 points
Additional functions (subject to acceptance by Euro NCAP and CTIF)	0.5 points

- **1 point** Vehicle Submergence countermeasures in accordance with the requirements in Chapter 8:

Door opening with vehicle 12V disabled	0.5 points
Window opening functionality	0.5 points

- **1 point** can be scored when the vehicle is equipped with Multi-Collision Brake technology in accordance with the requirements in Chapter 7. If these technologies are optional equipment they must meet the Vehicle Selection, Specification, Testing and Retesting (VSSTR) protocol fitment requirements to be awarded.

### 3.6 Worked examples showing possible scoring scenarios (2024):

	Type of point	Car A		Car A1		Car B		Car C		Car D	
		No	-2	Yes		Yes		Yes		Yes	
<i>ISO Rescue sheet available for tested model?</i>	<i>Pre-requisite</i>	No	-2	Yes		Yes		Yes		Yes	
<i>ISO Rescue sheet available for all other models?</i>	<i>Pre-requisite</i>	Yes		No	-2	Yes		Yes		Yes	
<i>ISO ERG available for tested model?</i>	<i>Pre-requisite</i>	Yes		Yes		No	-1	Yes		Yes	
<i>Extrication issue? (Chapter 5)</i>	<i>Penalty -1</i>	No		No		No		No		No	
<b>Advanced eCall :</b> <i>Potential number of occupants</i> <i>Recent locations N1 &amp; N2</i> <i>Direction of impact &amp; Delta V</i>	+0.33 +0.33 +0.33	Yes Yes Yes		Yes Yes Yes		Yes Yes Yes		No Yes Yes	0 0.33 0.33		1
<b>Third Party Service eCall</b> <i>Multi-language communication</i> <i>Hazard detection</i> <i>Transfer of paired mobile number</i> <i>Transfer of vehicle type</i> <i>Any new function</i>	+0.50 +0.50 +0.50 +0.50 +0.50	Yes Yes Yes Yes Yes		Yes Yes Yes Yes Yes		Yes Yes Yes Yes Yes		Yes No No No No	0.5	Yes Yes Yes Yes Yes	1
<b>Vehicle Submergence:</b> <i>Door opening check</i> <i>Window opening check</i>	+0.50 +0.50	Yes Yes		Yes Yes		Yes Yes		Yes Yes	1		1
<b>MCB</b>	+1.00	Yes		Yes		Yes		Yes	1		1
<b>Total Rescue points</b>			<b>-2</b>		<b>-2</b>		<b>-1</b>		<b>3.16</b>		<b>4</b>

## 4 RESCUE SHEET & EMERGENCY RESPONSE GUIDE

- 4.1 The Rescue Sheet(s) (the model variant rated by Euro NCAP as well as other variants covered by the rating) must be submitted before inspection with additional information for database in accordance with TB 030 (rescue sheet in different languages and pictures of the vehicle, if available: QR Code).
- 4.2 These Rescue Sheets (final version after inspection) must be available to the general public for the model variant rated by Euro NCAP as well as all the other variants covered by the rating that are available at the time of publication.
- 4.3 Each Rescue Sheet must be provided in PDF format, with the correct filename according to TB 030, as a unique document i.e. one file per model variant and per language. Each Rescue Sheet should be no more than four A4 sized pages when printed. Where commercial licences and/or exclusive publishing rights exist, these should not infringe on the rights of Euro NCAP and its members to make Rescue Sheets available at no cost to the general public.
- 4.4 Rescue Sheets must be supplied in all languages covering the Euro NCAP Application Area/EAA (see TB 002) from the start of 2023. The ERGs must be supplied in English, German, French and Spanish from the start of 2023.
  - 4.4.1 The Rescue Sheet(s) must meet ISO 17840 Part 1 format (layout, order of information and pictograms) and must include an Emergency Response Guide (ERG) following ISO 17840 Part 3.
  - 4.4.2 One unique ERG that covers all the cars from the same brand is accepted. It is possible for the OEM to produce just one ERG covering all models for a brand or one ERG for each model range, that is at the discretion of the OEM. In chapter 0 of the ERG the scope of the document should be mentioned – it should be clear which car models/energy types the ERG applies to.

- 4.4.3 Content must be correct - Rescue Sheet will be checked during normal post-crash inspection on tested vehicles. The vehicle manufacturer will be permitted to make corrections before publication, as long as all material issued by the company is updated as well. (Copy of Rescue Sheet checklist is available as a separate document for download from the Euro NCAP website along with a Technical Bulletin offering guidance on how to create an ISO complaint Rescue Sheet - TB030 - Technical Bulletin Rescue Sheet Guidelines).

## **5 EXTRICATION**

### **5.1.0 Automatic Door Locking**

Euro NCAP understands the need for vehicles to be equipped with automatic locking doors due to such issues as security when stopped in traffic. However, in the event of an accident the locked doors should automatically unlock, post impact, to allow the occupants to exit but also for entry by first responders.

- 5.1.1 The Euro NCAP Secretariat will check with the OEM if their vehicle is fitted with automatic locking door latches as standard and inform the test laboratory accordingly.
- 5.1.2 If ADL is fitted as standard and by default always ON then the doors will be locked by the lab personnel prior to ALL full-scale tests. The test lab will be informed by the OEM of the procedure to ensure the doors are manually locked for the tests.
- 5.1.3 If ADL is not fitted as standard, or not by default always ON, but fitted to the test variant then doors will be locked in the frontal MPDB test and the side oblique Pole test. The doors will be left unlocked in the frontal Full Width test and Side Barrier test. If the ADL activates by itself in the Full width frontal test that is not an issue.
- 5.1.4 Post-test the lab personnel will immediately check if any of the side doors in the front crash tests and any of the non-struck side doors in the side crash tests has remained locked/has not automatically unlocked. A maximum -1 point penalty will be applied if this issue is identified in at least one of the two tests where the doors were locked pre impact. This will follow the procedure for door opening in 5.2.

### **5.2 Door opening forces**

- 5.2.1 The post impact door opening forces are measured after the two frontal impact tests. Only the side doors (not the tailgate for example) will be checked.
- 5.2.2 The unlatching/unlocking of the side doors will already have been checked as part of the automatic door locking section.
- 5.2.3 Using a gauge attached to the door handle pull the door handle until a maximum force of 750N is registered. The opening force should be applied perpendicular to the door, in a horizontal plane, unless this is not possible. If the door opens before the 750N level is reached note down the opening force. If the door does still not open upon reaching 750N then use tools to open the door.
- 5.2.4 When dealing with a sliding door the opening force of [750N]\* shall be applied in a direction following the vehicle centreline – door should be pulled in this direction once the door unlatching forces have been carried out (as mentioned



previously the unlatching/unlocking check of the side doors will already have been checked as part of the automatic locking doors section.)

- 5.2.5 An open hinged door is defined as a door that is opened to an angle of at least 45° relative to the door hinge axis, allowing enough room for occupant extraction.
- 5.2.6 An open sliding door is defined as a door that, when opened, presents a minimum opening of at least 500mm compared to the closed position of the door, that would allow the extrication of an occupant.
- 5.2.7 To summarise there are 2 stages to the door opening forces procedure: Load gauge up to 750N and then tools.
- 5.2.8 Penalty only applied if load exceeds 750N and tools are required to open a door.
- 5.2.9 A maximum -1 point penalty will be applied if this issue is identified for at least one of the side doors in at least one of the two frontal tests.  
\*Force shown is monitored for sliding doors at present, value may be adjusted depending on test experience.

### 5.3 **Additional requirements for Electric door handles or handles retracting into door panel and having no possibility for physical grip**

More and more vehicles are now coming to the market with electric retracting door handles that sink into the door panel flush/level with the door panel surface. Obviously this can create an issue in an emergency situation where first responders need to be able to use the door handle to open the door.

- 5.3.1 The door handle should be in the retracted / vehicle in motion position for the test.
- 5.3.2 The OEM should inform both the Euro NCAP Secretariat and the test laboratory if any special action is needed, for example if the engine must be running for the retracting door handles to operate as normal in the test.
- 5.3.3 For a retracting door handle it is permitted to apply special actions at the handle to have access to it. For example, pushing in one corner to pivot it and then hold the handle (if no tools are needed at all). This needs to be discussed with Euro NCAP Secretariat prior to tests and it must be explained in the Rescue Sheet and also in the vehicle handbook.
- 5.3.4 For the full scale tests, with the exception of the struck side doors in the side impacts, the handles of all side doors must be in the extended/ready to open (as explained in 5.3.3) position immediately after the test. It is assumed that by design the door handles will extend outwards ready for use when the SRS system deploys any airbag/detects a severe impact or the door handle remains in its retracted position but can be grabbed nevertheless by the first responder without any tool. The test laboratory personnel will note down the status of each door handle post impact.
- 5.3.5 A maximum penalty of -1 point will be applied where any of the side door handles listed in 5.3.4 cannot be used as normal or accessed without tools after the test.
- 5.3.6 It is not acceptable to direct the user/owner/rescuer of the vehicle to a cable release for the door in the luggage area for example or to have to connect a slave battery to the vehicle in order to extend the door handles. A vehicle equipped with electric door handles will not be given any special treatment compared to a vehicle with conventional door handles.

- 5.4 **Seat belt buckle unlatching** (defined force to open a seat belt buckle)  
No extrication assessment would be complete without also dealing with the belted occupants and ensuring that the seat belt itself can be unlatched as normal to allow extrication of the occupant.
- 5.4.1 Any position where the seat belt is used for the full scale tests shall be checked post-test once all of the door opening forces have been measured. (For both adult **and** child if car seatbelt is used to restrain child dummy and/or CRS in test).
- 5.4.2 **Frontal and Side impacts** - The seat belt buckle shall completely open under a load of no more than 60N for frontal impact tests and 100N for side impacts applied directly to the centre point and in the direction of the opening movement of the buckle release button. The operator shall hold the buckle with one hand ensuring the application of the force measurement in the correct orientation with the other hand to measure in the axis of the buckle opening movement. The metal probe of the measurement device should only make contact with the button of the belt buckle and not the surrounding material of the buckle body. The application of force shall be conducted slowly and constantly. The measurement device shall provide load versus time information, with a frequency of at least 200Hz. This will identify potential measurement artefacts of the opening behaviour, which could be derived from a second contact of the buckle release button after release with the buckle housing. In such a case the maximum value of force before the first quick drop shall be interpreted as the opening force. It is permitted to move the adult dummy, child dummy or CRS in order to access the buckle.
- 5.4.3 No further steps will be taken to open the buckle or tools allowed to cut the belt, unbolt the buckle from the car etc.
- 5.4.4 The test laboratory should note the load at which each buckle releases.
- 5.4.5 A maximum penalty of -1 will be applied where any of the buckles used in the frontal or side tests open beyond the limits defined in 5.4.2.
- 5.5 **EV and hybrid vehicle compliance with ECE regulations regarding electrical vehicle safety**
- 5.5.1 After the official Euro NCAP crash tests a compliance check will be made to assess if the **post-crash requirements** from ECE R94, ECE R95, ECE R135 and ECE R137 for EVs and Hybrids have been met.
- 5.5.2 A maximum -1 point penalty will be applied if it is not compliant.
- 5.6 **Identification of Direct Hazard Disabling Equipment**  
The making safe/disabling of on-board energy in vehicles (high-voltage electricity, pressurised or liquified gas etc) is a major challenge for the safe execution of emergency operations. As part of good practice, many vehicle manufacturers have taken the initiative to position stickers on vehicles, specifying for some, the type of energy on board, and for others the location and/or action to be carried out (e-plug handling, service plug handling, valve handling, isolation loop section etc). In response to the increasing number of

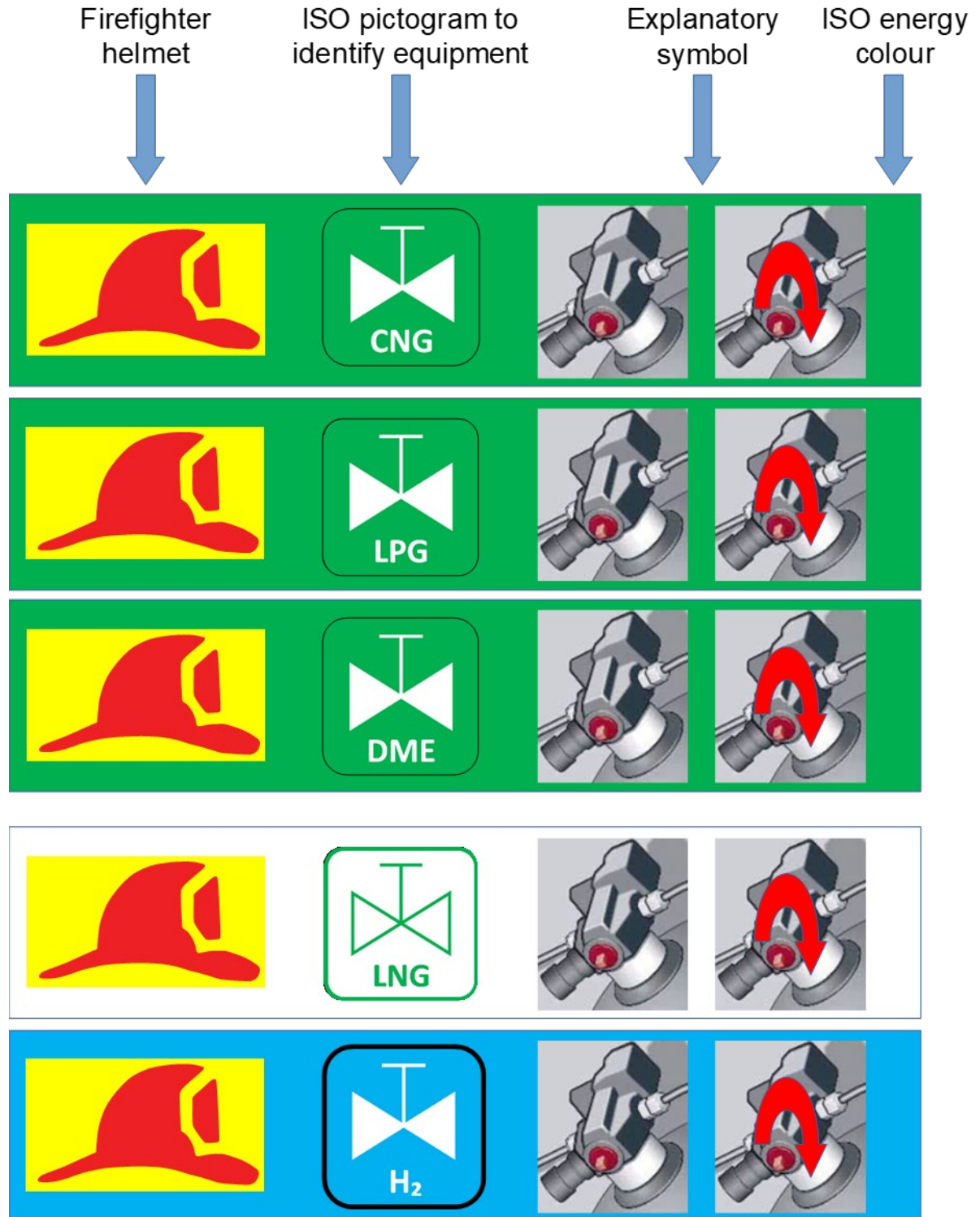
manufacturers' differing instructions on energy neutralisation and the absence of harmonisation of procedures, there is a need for OEMs to produce common markings and in turn aid rescuers attending the vehicle.

- 5.6.1 A maximum -1 point penalty will be applied if hazards are not correctly marked on the vehicle.
- 5.6.2 In order to aid first responders stickers/markings should be present on the vehicle in order to identify the disabling equipment (shown on the Rescue Sheet under heading 3 for disabling equipment of high-voltage electricity and / or pressurised or liquified gas), with symbols and colours from ISO 17840:
- Background - ISO energy colour
  - First pictogram - Firefighter helmet (specific pictogram used up to OEM)
  - Second pictogram – ISO pictogram used to identify equipment
  - Third pictogram – Explanatory symbol – not mandatory

The stickers/markings are recommended for low voltage batteries (from 24V to 60V), if specific instructions to disable the hazard are shown under heading 3 in the rescue sheet.

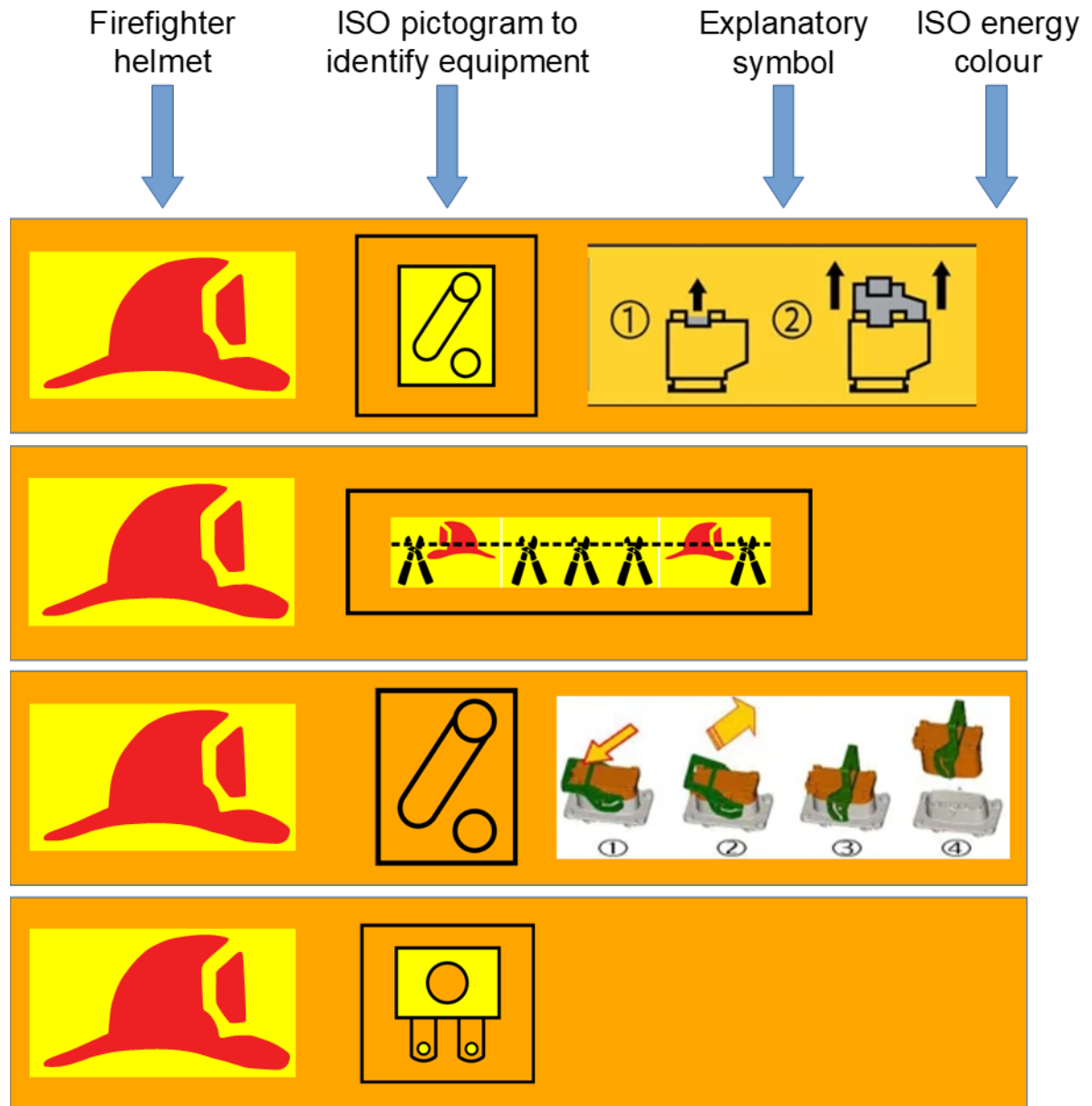
### 5.6.3 Gaseous fuel vehicles:

The fire helmet may be replaced with another fire helmet appropriate to cultural requirements.



### 5.6.4 Battery electric and hybrid vehicles:

The fire helmet may be replaced with another fire helmet appropriate to cultural requirements.



## 6 POST-CRASH TECHNOLOGY - ADVANCED eCall

6.1 Functions that qualify are listed in the table below:

Function	Description	Points (2023)	Points (2024)
Potential Number of occupants	Send information about likely number of occupants involved in impact (e.g. using belt use)	0.50	0.33
Recent vehicle locations N1 & N2	N1, Known location of the vehicle some time before the generation of the data for the MSD message and N2, known location of the vehicle some time before recent vehicle location N1	0.50	0.33
Direction of Impact & Delta V	Indicate the type of impact (frontal, lateral driver side, lateral passenger side, rear*, rollover*) and Delta Vx and Delta Vy (single values coded as signed integer sent by eCall). Delta V means the cumulative change in velocity of the vehicle in these two directions, starting from crash time zero and ending at 0.25 seconds, captured every 0.01 seconds. (* <i>Optional</i> )	0.00	0.33

**TB 040 “eCall Additional Data Concept Triggering Incident” v1.0.0 June 2022** defines the format to code the ‘optional additional data’ (listed in the table above) of the eCall MSD. TB 040 must be followed for mandatory and optional information.

Pre-requisite for scoring of points for the functions Direction of Impact & Delta V:

### 6.2 Vehicle Post Crash Data Accuracy

- 6.2.1 The data sent through the eCall system (Delta Vx in the frontal impacts, monitoring only for Vy in lateral impacts) must be within a tolerance of +/- 10km/h from the reference data.
- 6.2.2 The reference data will be the results of the official Euro NCAP crash tests and they will be compared to the data sent by the eCall system. If the MSD sent by the eCall system cannot be read by the lab the EDR output should be used, possibly with the help of the OEM.

### 6.3 Third Party Service eCall (TPS eCall)

- 6.3.1 In order to score points for TPS, it is needed to have the number of occupants and the 2 recent locations N1 and N2.
- 6.3.2 The TPS eCall shall be free of charge and available at least for the first six years, depending on network technology. Functions that qualify in 2023 are listed in the table below (this list is non exclusive):

Function	Description	Points awarded (2023)
Multi-language communication	Bilateral communication with agent in at least 4 languages depending on the vehicle settings (EN, DE, FR, ES)	0.5
Hazard detection	Fire, leakage of fuel or gas, smoke, battery thermal runaway etc	0.5
Transfer of paired mobile number (or other contact information)	Phone call possible even when the customer has left the car	0.5
Transfer of vehicle identification information	For better identification the make, model, colour, model year of the car will be delivered	0.5
Any new function	The benefit of any new function to be validated by Euro NCAP and CTIF	0.5

**The total points available for this section is a maximum of 1 point.**

### 6.4 Advanced eCall and eCall TPS dossier

- 6.4.1 Euro NCAP will require the following data regarding Advanced eCall from the OEM:
- Extract of ECE 144 approval document or (EU)2015/758 approval document
  - Copy of the MSD content (*the text message/SMS as sent by the car to the PSAP*)
- 6.4.2 Euro NCAP will require a dossier from the OEM describing each function within their TPS.
- TPS should be available in countries where the Euro NCAP star rating is applicable. If it is not allowed due to governmental laws / regulations to use the TPS eCall in a specific country then only the legislative eCall needs to be applied.

## 7 POST-CRASH TECHNOLOGY – MULTI COLLISION BRAKE

- 7.1 In the past, in order to qualify for a Euro NCAP “Advanced” reward OEM’s needed to provide a dossier containing data on how their Multi Collision Braking (MCB) system worked and also how it was tested in-house to prove that it functioned correctly. This was done with both simulations and full scale testing. It is now the intention for the OEM to provide a similar set of data for the MCB system to be awarded points. This in-house data must be provided before the car goes through the full Euro NCAP tests and assessment.
- 7.2 The OEM must mention in the vehicle handbook that the vehicle is equipped with an MCB system and it should explain how it works.

### Definitions

- 7.3 Multi Collision Brake (MCB): System fitted to a vehicle that applies the brakes to prevent or mitigate a subsequent impact when a vehicle has been involved in a collision of sufficient severity. In response to a primary collision with or without airbag deployment, information is sent to the braking system to decelerate the vehicle with the intention to bring the vehicle to a standstill. It must not be possible to deactivate the MCB by the driver. After a crash and the vehicle coming to a standstill it is allowed for the MCB to release in order to help first responders move the vehicle.
- 7.4 MCB trigger signal: Signal sent from the crash detection function to the braking system during a primary collision.

### Overview

- 7.5 The test procedure for the Multi Collision Brake technology consists of two parts:
- Part A) a destruction-free demonstration of braking caused by the MCB trigger signal,
  - Part B) documentation showing that the MCB trigger signal is sent during a Frontal crash test as performed under Part A)

### Part A) Destruction-free MCB test

- 7.6 The vehicle under test drives in a straight line on a dry surface at a velocity of 15km/h  $\pm$ 1km/h.
- 7.7 The MCB trigger signal is simulated on the vehicle network using test and development equipment of the OEM.
- 7.8 If declared necessary by the OEM, the acceleration pedal shall be disengaged immediately prior to simulation of the MCB trigger signal.
- 7.9 The brake pedal must not be engaged by the driver or other means during the entirety of the test.
- 7.10 The MCB test is passed if the vehicle exceeds a minimum deceleration of 3m/s<sup>2</sup> with brakes lights on.



**Part B) Documentation to be provided by the OEM from in-house crash test data before official Euro NCAP testing**

- 7.11 The OEM can choose any full scale Frontal crash test where the MCB will be activated.
- 7.12 Video recording of the test at a ¾ angle from the rear on driver side to show the brakes lights are ON.
- 7.13 Data from this test that shows that the MCB trigger signal is sent on the vehicle network during the crash.

**Additional Requirements and Provisions**

- 7.14 The Multi Collision Brake must be described in the user manual of the tested vehicle.
- 7.15 An OEM-specific name for the MCB technology can be used in the manual.
- 7.16 The test procedure is organized and performed by the OEM.
- 7.17 The test procedure can be performed using a pre-series vehicle.

**8 POST-CRASH TECHNOLOGY – VEHICLE SUBMERGENCE**

- 8.1 In the event of a vehicle entering water during or after an impact certain vehicle systems can aid the occupants in exiting the vehicle. The functionality of the following will be examined:
  - Door opening possible with 12V vehicle battery disconnected - Euro NCAP test laboratory
  - Electric window opening functionality check – OEM dossier
- 8.2 Door opening from inside of vehicle with 12V disabled:  
Performance requirement: door opening from inside still possible  
Functionality of manual override shall be checked with following procedure with vehicle in static condition: 1. Vehicle occupant shall activate central lock to lock all the doors, with child safety lock system in disengaged mode. 2. Disconnect electrical supply either at system level (For example central locking, controller, etc.) or disconnect main battery supply. **Opening of the doors from inside shall be possible using internal controls within 2 minutes.**
- 8.3 Electric window opening check (*Front row only and only one window, left or right side*)
- 8.4 The OEM should provide proof in the form of a dossier to show that electric side windows still function for at least **2 minutes** (which would allow an occupant to operate the window to exit the vehicle) in the same condition as if the vehicle has entered the water. Dossier must be submitted prior to the Euro NCAP tests as part of the usual “Pre 121 meeting” OEM data. The data presented should represent a realistic case and include either submergence of the full vehicle or the window opening functionality under water including the power source and other elements such as body control module, motor, switches etc.

- 8.5 In the absence of proof that side windows are still functional the OEM must provide a method by which the occupant can open or break the side window to exit the vehicle together with instructions within the owner's manual (e.g. window breaking tool delivered with vehicle, pyrotechnic device, mechanical system, etc).