



December 2021

Technical Bulletin - Painting Vehicles with High Voltage Battery Systems

OEM Recommendations

Safe Repair Process

Vehicles with high voltage battery systems should be repaired and painted by trained professionals with knowledge of vehicle and high voltage electricity repairs.

Vehicle repair and paint technicians should refer to the vehicle manufacturer's specific instructions and recommendations.

OEMs will assume no liability for injury or property damage due to failure to properly follow instructions or for repairs attempted by unqualified technicians.

Vehicle manufacturers' instructions may change or be updated from time to time, always refer to the most up-to-date guidelines.

Audi

Maximum Baking Temperature	Maximum Baking Time	Comments
<70°C / 160°F	<90 minutes	<ul style="list-style-type: none">• Vehicles must be identified in the paintshop• The high voltage system may only be checked or switched off by a high voltage technician

Source: Audi Paintwork Guideline, Issue 01/2020

Paint drying:

- This battery type is only fully functional up to 55°C and cell damage can occur at temperature > 70°C. So that the battery-critical temperature of 70°C is not exceeded, these vehicles must not spend more than 90 minutes in the paint drier or in a combination booth in the drying mode.
- Do not dry too fast or too hot to obtain a homogeneous brilliant surface. Pay attention to the permissible object temperature of the top coating when carrying out the booth settings. In general the permissible object temperature of max. 65 °C is never exceeded.
- If repair materials are used that have a forced drying time that exceeds the permitted 90 minutes or 65°C, they must be dried using alternative drying methods, e.g. infrared or gas dryer radiators.
- Must be assumed that long journeys may be undertaken after a longer paint drying process.

BMW

Maximum Baking Temperature	Maximum Baking Time	Comments
60°C / 140°F	120 minutes	No comments

Source: BMW

Attention

Risk of damage to the battery! Vehicle is allowed to bake for a maximum of 2 hours at 60°C.

Ford N.A.

Maximum Baking Temperature	Maximum Baking Time	Comments
<60°C / 140°F	<45 minutes	<ul style="list-style-type: none">Temperatures in excess of 60°C (140°F) or bake durations longer than 45 minutes will require the HVTB (High Voltage Traction Battery) be removed from the vehicle prior to placing in the paint booth.

Notice: The HVTB (High Voltage Traction Battery) in electric vehicles can be affected and damaged by excessively high temperatures. The temperature in some body shop paint booths can exceed 60°C (140°F). Therefore, during refinishing operations, the paint booth temperature must set at or below 60°C (140°F) with a bake time of 45 minutes or less. Temperatures in excess of 60°C (140°F) or bake durations longer than 45 minutes will require the HVTB (High Voltage Traction Battery) be removed from the vehicle prior to placing in the paint booth.

Honda

Maximum Baking Temperature	Maximum Baking Time	Comments
65°C / 150°F	60 minutes	No comments

Source: PPG Europe Technical Bulletin

Jaguar Land Rover

Maximum Baking Temperature	Maximum Baking Time	Comments
<80°C / 176°F Infra-red 18kW	<60 minutes 18 minutes	No comments

Warning: Any work undertaken on the hazardous voltage system MUST only be completed by a suitably qualified person. This will be the subject of a separate training course.

For Paintshop repairs, the high voltage battery pack will not sustain damage providing the following requirements are strictly adhered to:

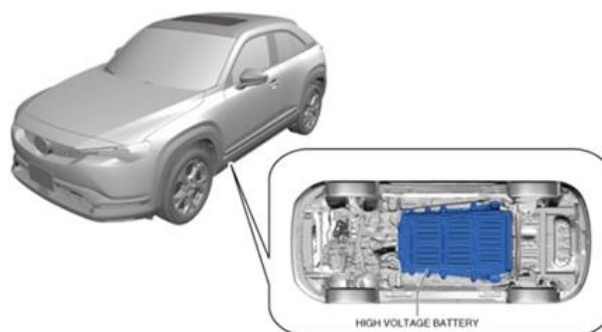
- Spot repairs to a vehicle may use infrared heaters (18kW for a max of 18 minutes) and be performed such that the infrared heater does not have line of sight to the battery pack to avoid excess heating.
- Paint over repairs to a vehicle may be performed such that the vehicle is not in the paint oven for more than one hour and the paint oven air temperature should not be allowed to exceed 80°C (176°F).

Mazda

Maximum Baking Temperature	Maximum Baking Time	Comments
<60°C / 140°F	None	No comments

Caution

- If the high voltage battery is heated to a temperature which exceeds 60°C (140 °F), the High Voltage battery life deteriorates and gas leakage occurs which may cause it to become unusable.
- Control the temperature around the High Voltage battery installation location and panel so that the temperature does not exceed 60°C (140 °F).



Mercedes-Benz (Daimler)

Maximum Baking Temperature	Maximum Baking Time	Comments
<80°C / 160°F	60 minutes	<ul style="list-style-type: none">The battery temperature must be lower than 30°C before the drying procedure is started

SI98.00-P-0020A, Service Information: Notes on paint drying, 11th July 2016

The following points must additionally be observed in the case of vehicles with high-voltage batteries:

It must be ensured that the drying time is not exceeded.

The battery temperature must be lower than 30 °C before the drying procedure is started. The maximum time that the vehicles remain in the drying facility must not exceed 60 min at 80 °C, otherwise the battery cells can be permanently damaged.

Remove the ignition key during the drying procedure and put it at a clearly visible location in the vehicle.

Opel

Maximum Baking Temperature	Maximum Baking Time	Comments
60°C / 140°F	60 minutes	<ul style="list-style-type: none">Make sure the vehicle is in "power off" modeHV battery should not be empty (0 charge) before you start the drying process

Source: PPG Europe Technical Bulletin

Porsche

Maximum Baking Temperature	Maximum Baking Time	Comments
60°C / 140°F 80°C / 175°F	120 minutes 60 minutes	<ul style="list-style-type: none">• Do not dry the vehicle directly while it is warm.• Before drying in the drying booth must have a standing time of 6 hours (not driven).• With infrared drying, protect all high-voltage components from direct infrared radiation.

Porsche Paintwork Manual, 2020/11

2.1.3.1 Electric (hybrid) vehicles

Danger!

- Possible ignition of explosive atmospheres through improper use or defective charging device.
 - Fire or explosion
- Do not charge vehicle and drive batteries in an explosive environment.
- Note! High temperatures can damage the battery or cause it to age prematurely.
- Only carry out the drying process in a drying cabin for as long as necessary.
- Max. 2h at 60 ° C, max. 1h at 80 ° C.
- Do not dry the vehicle directly while it is warm.
- Before drying in the drying booth must have a standing time of 6 hours.
- With infrared drying, protect all high-voltage components from direct infrared radiation.

Tesla

Maximum Baking Temperature	Maximum Baking Time	Comments
74°C / 165°F	45 minutes	<ul style="list-style-type: none">• Before baking, the vehicle must remain indoors at a temperature less than 95° F (35° C) for at least 6 hours.

Tesla BR-14-10-006 R1, September 12th, 2014

Body Repair Tech Notes provide information about Tesla-approved methods and practices for body repair. These instructions assume knowledge of motor vehicle and high voltage electricity repairs, and should only be executed by trained professionals. Tesla Motors assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This document supersedes BR-14-10-006, dated 29-Aug-14. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

After painting Model S, it is acceptable to “bake” (force dry) the vehicle in a paint booth with the HV battery installed.

CAUTION: Before baking, the vehicle must remain indoors at a temperature less than 95° F (35° C) for at least 6 hours.

- Maximum baking time: 45 minutes.
- Maximum baking temperature: 165° F (74 °C).

If these parameters must be exceeded for any reason, contact the Tesla Body Repair team before baking Model S.

Toyota

Maximum Baking Temperature	Maximum Baking Time	Comments
60°C / 140°F (Lithium-ion battery) 65°C / 150°F (Nickel metal hybrid battery)	None	No comments

Source: PPG Europe Technical Bulletin.