

Secondary batteries for the propulsion of electric road vehicles —

Part 3: Performance and life testing (traffic compatible, urban use vehicles)

The European Standard EN 61982-3:2001 has the status of a
British Standard

ICS 29.220; 43.120

National foreword

This British Standard is the official English language version of EN 61982-3:2001. It is identical with IEC 61982-3:2001.

The UK participation in its preparation was entrusted to Technical Committee PEL/21, Secondary Cells and Batteries, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Secondary batteries for the propulsion of electric road vehicles
Part 3: Performance and life testing
(traffic compatible, urban use vehicles)
(IEC 61982-3:2001)

Accumulateurs pour la propulsion des
véhicules routiers électriques
Partie 3: Essais de performance et de
durée de vie (véhicules pour utilisation
urbaine, compatibles avec la circulation)
(CEI 61982-3:2001)

Sekundärbatterien für den Antrieb von
Straßenfahrzeugen
Teil 3: Anforderungen und Prüfung
der Lebensdauer (verkehrstypisch,
Stadtfahrzeuge)
(IEC 61982-3:2001)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 21/535/FDIS, future edition 1 of IEC 61982-3, prepared by IEC TC 21, Secondary cells and batteries, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61982-3 on 2001-09-01.

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- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2002-06-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-09-01

Endorsement notice

The text of the International Standard IEC 61982-3:2001 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

The test cycles used in existing IEC standards for traction battery testing have been developed to confirm that batteries of the same type reach an acceptable standard of performance. The power levels have been based on the ampere hour capacity of the battery (W/Ah). The test procedures normally allow the results to be derived from tests on a small number of cells, in a constant temperature environment. The tests have specifically excluded the comparison of different battery electrochemistries for the same duty. The tests are not designed to give information about power capability, charge acceptance and partial discharge effects as a function of age, temperature, state of charge, etc. As a result, the standards are of limited use for traction battery selection when different battery types, whose characteristics can vary widely, could be chosen to power the same electric vehicle.

The electric vehicle community has developed test cycles that reflect the actual operation of the battery in the vehicle more closely. The power levels have been based on the weight of the battery (W/kg), on the assumption that the proportion of battery weight to vehicle weight will be constant. The tests have given satisfactory results in the past since batteries have had similar characteristics and vehicles have had relatively modest performance. The situation is now quite different for a number of reasons:

- 1) Vehicle performances are increasing and the difference between the peak power and the average power is becoming greater. A modern traction battery will be subjected to high peak powers in relation to its nominal capacity.
- 2) The same electric vehicle may be offered in one of a number of optional specifications. These could include a low-range option with a standard battery; a long-range option with a premium, high-energy battery and a hybrid option for those who wish to satisfy all their transport needs with a single vehicle. In all these cases, the power taken from the battery will be identical but the battery "size" will be quite different. In the case of the hybrid, there may be a significant charging component superimposed on the discharge.
- 3) High power regenerative braking, similar in magnitude to the drive power, can be developed by the drive systems. In the past, the use of high regenerative torque has not been permissible since there was a risk of loss of control on slippery surfaces. Many modern electric vehicles use anti-lock braking systems, in conjunction with active drive system control, to prevent this possibility.
- 4) Sophisticated drive systems will maintain constant power by increasing the current to compensate for additional voltage drop at the end of discharge (and at other points in the discharge cycle, if appropriate).
- 5) Many batteries are now part of a system that includes an electronic battery management system (BMS) and temperature control. In such cases, the characteristics of the battery system may be determined by the BMS as it protects the battery against extremes of use, and not by the electrochemistry of the battery itself. It is therefore essential to assess the actual performance of the complete system including the effects of the BMS.
- 6) Vehicle manufacturers and customers are interested in the behaviour of the battery system at the extremes of operation and not just at the normal conditions of operation.
- 7) The ambient temperature may be in excess of 50 °C or below -30 °C. The battery system will be expected to operate for indefinite periods under these conditions.

The tests of this standard can be used to provide this information.