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**Earth-moving machinery —
Machines utilizing electric
rechargeable energy storage
systems (RESS)**

*Engins de terrassement — Engins utilisant des systèmes de
stockage d'énergie électrique rechargeable (RESS)*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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This document covers electrification activity in earth-moving machinery (EMM) as defined in ISO 6165, that involves replacing or augmenting the internal combustion engine (ICE) powering earthmoving equipment with a battery (or batteries) and electrical components, e.g. traction motors, electric actuators, electric pumps, and how those activities impact standards that support the EMM industry.

Many EMM standards are written with the assumption that machines have an ICE (e.g. diesel engine) on board. Many of these standards can also be used for machines powered by an electric machine battery. However, some need to be revised to account for machines where the ICE is no longer present. Additionally, new standards can be required to address the unique aspects specific to battery-powered machines.

State of the art battery technology is limited in energy density when compared to ICEs and fuel cells (FCs) that rely on fuels and hydrogen respectively. This limitation is acknowledged in the field, and it is accepted that hybrid machines will be a common solution to this problem for the foreseeable future. This document does not focus on the complexities that FCs and ICEs bring to the design of battery electric machines because it adds little to the general knowledge base and the topic of how batteries and battery technology are integrated into earth-moving machinery. Hybrid systems are envisioned by this document but the discussions within this document are limited to the usable electrical energy and RESS aspects of hybrid electric machines.