

Docket Number 09-AAER-2

2010 Rulemaking Proceeding Phase II on Appliance Efficiency Regulations

**Codes and Standards Enhancement (CASE) Initiative for PY2010: Title 20 Standards Development –
Analysis of Standards Options for Battery Charger Systems Report**

Comments from Lester Electrical, Lincoln, NE, manufacturer of industrial/commercial battery chargers

Outlined below are our comments regarding the report and potential issues and consequences that we anticipate that will affect commercial/industrial electric vehicle/equipment purchasers and manufacturers, as well as to secondary component manufacturers such as those who produce batteries and battery chargers.

- 1) The proposed efficiency and power factor standards for both small and large battery charger systems go beyond economic and/or technical feasibility for transformer-based, line-frequency designs.
 - a. It is Lester Electrical's position that the product cost and design impact of the proposed standards is greatly underestimated for transformer-based, line-frequency designs (SCR, hybrid, and ferroresonant).
 - b. We also do not agree with the technical feasibility of the proposed standards for transformer-based, line-frequency designs.
 - c. We furthermore believe that the cost to produce commercial/industrial electric vehicles/equipment will likely rise as a result of the proposed regulations, resulting in increased costs passed along to purchasers (mostly businesses) and/or reduced margins for manufacturers.
 - d. We also believe that the proposed standards, because of their economic and technical infeasibility for transformer-base, line-frequency battery charger designs, will eliminate these options from the market, thus reducing the choices and features available to customers and increasing prices due to reduced competition in the market.

Recommendation: Product cost, product design, and technical feasibility data for implementation of the proposed regulations from transformer-based, line-frequency battery charger manufacturers should be reviewed and considered in determining the proposed standards. Lester Electrical would be willing to provide such data.

- 2) The proposed "small" and "large" battery charger system classifications are too broad and require clarification.
 - a. It is Lester Electrical's position that the "small" and "large" battery charger system classifications are too broad. Numerous exceptions similar to "emergency exit signs" and "inductive chargers" will need to exist because of unique application requirements if application-specific classifications are not created.
 - b. We also believe that the rules for determining the classification of a product require clarification because they are too vague and include contradictory information – for

example, golf car battery charger systems are identified in different classifications in the report and test procedure.

Recommendation: Application-specific battery charger system classifications should be developed in order to address unique application requirements.

- 3) As proposed, the timeline for implementation by companies involved in industrial/commercial electric vehicle/equipment manufacturing and the supply chain is far too aggressive.
 - a. It is Lester Electrical's position that the proposed timelines are not reasonable for large, integrated vehicle/equipment manufacturers. To properly design, test, and ramp up production of a key component such as the battery charger system commonly exceeds three (3) years.
 - b. We also believe that the insufficient timeline would force manufacturers to adopt components that may not have been properly design and/or tested for reliability, safety, and performance.
 - c. We furthermore believe that insufficient time to implement may result in product shortages, defects, and increased costs as it may force vehicle/equipment manufactures to go outside normal supply chains, shortcut transition processes, and adopt unproven components in order to comply.
 - d. We also believe that the short timeline would force manufacturers into unplanned capital expenditures in the near term (beginning as early as fiscal 2011), forcing them to either pass along higher costs to purchasers and/or reduce profits at a time of general economic weakness.
 - e. We furthermore believe that manufacturers and purchasers of electric vehicles/equipment are at risk if supply chains depend solely on non-U.S. component manufacturers. Switch-mode battery chargers, due to the relatively higher labor content are manufactured almost exclusively in low-cost countries (primarily in Asia). Disruptions are far more frequent in the supply of materials and/or logistical problems occur more often because of this. Traditional transformer-based, line-frequency battery chargers can be manufactured domestically and are cost competitive. Supply chain risk to vehicle/equipment manufacturers and businesses purchasing these products is, therefore, much lower.

Recommendation: Extend the implementation period to at least five (5) years to allow manufacturers to properly evaluate, design, test, and ramp up production of new components that cost effectively meet the proposed standards.

- 4) Implementation of the proposed regulations will limit effectiveness, quality, and business efficiency.
 - a. As identified in the proposal standards, transformer-based, line-frequency battery charger designs (SCR, hybrid, and ferroresonant) are moderately less efficient than switch-mode designs. However, it is Lester Electrical's position that in many industrial

and commercial applications, benefits inherent in these products outweigh efficiency disadvantage.

- i. Transformer-based, line-frequency battery chargers are inherently more reliable, durable, and deliver a much longer expected useful life than more efficient switch-mode charging products. For example, the typical life expectancy of consumer switch-mode battery chargers is around 2 years, while the typical life expectancy of industrial/commercial transformer-based, line-frequency battery chargers is around 10 years. In industrial and commercial applications, this results in a far lower lifetime cost of ownership for businesses that own electric vehicles/equipment.
 - ii. Because industrial/commercial products are typically used in widely variable environments and under more severe duty cycle conditions than consumer products, the more durable nature of transformer-based, line-frequency chargers is often the superior choice.
 - iii. Business managers understand the economic tradeoffs and are skilled in making the proper technical and economic choice of battery charging technologies based on cost, efficiency, and these other factors.
- b. We also believe that the increased costs that result from these proposed regulatory burdens will increase the cost of industrial/commercial electric vehicles/equipment relative to similar vehicles/equipment powered by gasoline engines. Therefore, there is a risk that this new cost structure may cause some purchasers to re-evaluate the cost vs. benefit of electric vs. gasoline power. Even a small number of customers converting to internal combustion vehicles/equipment would more than offset the efficiency gains intended by these proposals.
 - c. We furthermore believe that the estimated reduction in energy usage is overstated for industrial/commercial battery charger systems due to mistaken assumptions regarding the duty cycles for these applications (for example, three-phase material handling battery chargers).

Recommendation: Exclude industrial/commercial battery charger systems from the proposed standards since increased efficiency is not often the primary driver of choice for businesses that purchase industrial/commercial electric vehicles/equipment. Market forces are already at work to optimize vehicle/equipment battery and charging systems based on a wide range of criteria, including, but not limited to, energy efficiency.

- 5) Implementation of the proposed regulations will result in the loss of domestic manufacturing jobs to low-cost Asian countries.
 - a. It is Lester Electrical's position that because of the increased labor required to assemble switch-mode battery chargers as compared with transformer-based, line-frequency products, it is cost prohibitive to manufacture these products in the U.S. – this is demonstrated in the fact that nearly all global external power supply manufacturing takes place in Asia, as the Department of Energy (DOE) notes in similar battery charger

efficiency regulation proposal documentation. Therefore, following implementation of the proposed regulations, nearly all production of battery charging products will be performed in low-cost Asian countries. Correspondingly, manufacturing jobs will be lost as a direct result of these proposals, if implemented.

- b. We also believe that as the domestic capacity to produce battery charging products is lost, businesses that manufacture electric vehicles/equipment will be at higher risk of exposure to geopolitical, economic, and supply chain disruptions.

Recommendation: The impact to manufacturing in California, as well as other U.S. states, should be prioritized among other criteria. This is especially relevant in relatively high-power categories, as these higher power products tend to be used in industrial/commercial markets. In addition, these higher power requirements tend to correlate with requirements for longer life, greater durability, and higher reliability inherent in transformer-based, line-frequency battery charging products.

Recommendation: Evaluate, as an alternative to regulatory requirements, establishing incentive programs for U.S. manufacturers to develop products that are capable of increasing energy efficiency while maintaining domestic production capacity, U.S. jobs, and more stable supply chains for participants in this industry segment.

- 6) The proposed charge return factor requirements for large battery charger systems will be detrimental to battery life and performance.
 - a. It is Lester Electrical's position that the proposed Tier 1 and Tier 2 charge return factor requirements for large battery charger systems of 1.05 – 1.15 and 1.05 – 1.10, respectively, for 100 and 80 percent depth of discharge will be detrimental to lead-acid battery life because certain battery types, compositions, and constructions require charge return factors greater than 1.15.
 - b. We also do not believe that a single charge return factor is appropriate for all lead-acid battery types (wet/flooded, AGM, gel, etc.) and battery chemistries (lead-acid, nickel-cadmium, lithium-ion, etc.).
 - c. We furthermore believe that, in order to maximize lead-acid battery life, the charge return factor has to scale with battery cycles and total amp-hours discharged.

Recommendation: Proposed charge return factor requirements should be reviewed with leading battery manufacturers, both lead-acid and other chemistries.

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