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Spotlight on Safety & Compliance
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Power Supply Standards: Which Ones Apply In Your Application?

by Kevin Parmenter, Chair, and James Spangler, Co-chair, PSMA Safety and Compliance Committee

The Power Sources Manufacturers Association (PSMA) developed a database to help its members keep current with the latest ongoing changes in the rules and regulations for the power supply industry. While these requirements apply directly to engineers working in the power supply industry, they also apply more broadly to all engineers who design power systems for products that will be offered in the global marketplace. Also, you don't have to be a PSMA member to use the database and there is no cost for doing so.

When an engineer begins a program, one confronting issue emerges—which standards or regulations must the product meet before going into production? The number of potentially applicable standards is quite large as suggested graphically in Fig. 1 and they cover a range of issues including safety, energy efficiency, electromagnetic compatibility, material toxicity and environmental considerations. In many instances, multiple standards apply and are sometime conflicting with each other. Meanwhile, standards are often evolving and changing. So determining what standards apply for a particular application and what they require can be daunting.

These challenges provided the motivation for creating the PSMA's Safety and Compliance database (SCDB). As co-chairs, we oversaw the development of this database and we coordinate the efforts to maintain up-to-date information on the standards. In writing this monthly column, we aim to help inform power supply and power system designers of changes to the standards that may affect their designs, as well as information that may help designers overcome compliance challenges. Here in this first Spotlight on Safety & Compliance Column, we'll take readers on a tour of the database so that they'll be able to take advantage of its resources more quickly and easily.

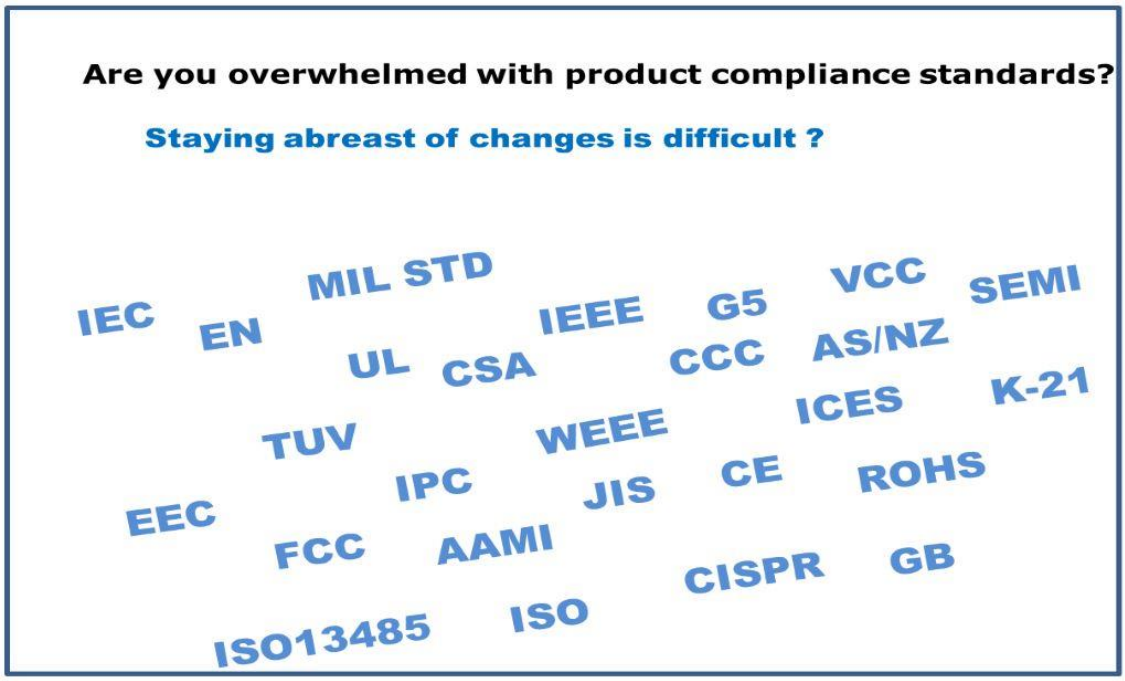

Fig. 1. Standards and product compliance issues.

Among the updates to the database, the SCDB continues to expand to include other product segments in the industry beside power supplies. This database also covers other regions of the world; and is broken down as follows: Americas, Asia/Pacific, Europe, Japan, and Global. The database is further classified by Agencies by Country/State. The homepage for the SCDB is shown in Fig. 2.

Fig. 2. Safety and Compliance Database homepage screen.

In Fig. 2, there are really six different tabs that can be used to select standards from the PSMA site. Below in Fig. 3, we show the 10 Agencies as they are listed by Country/State. These include Australia, Canada, China, EU-European Union, Germany, Global, Japan, New Zealand, United Kingdom and the U.S. Each of these has an extensive list of standards.

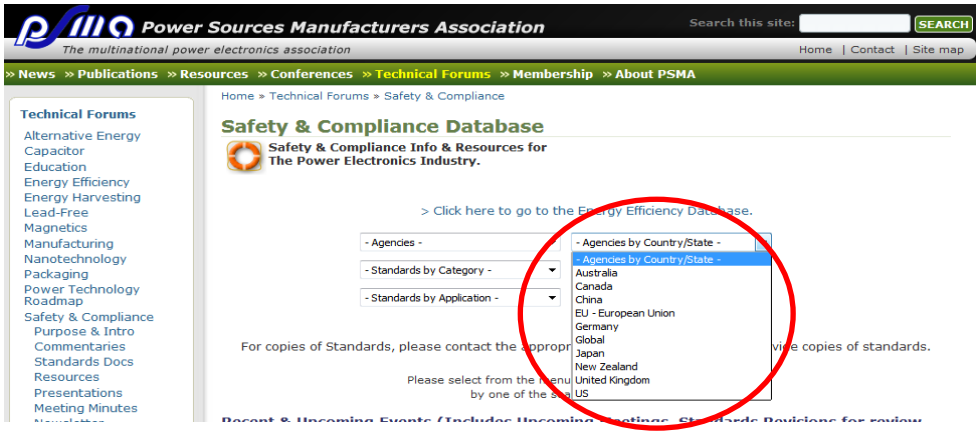

Fig. 3. Agencies by Country/State from the database.

As of August 2017, the SCDB has been divided into the following categories as shown in Table 1.

Table 1

Number of Regions	**5**
Number of Agencies	**38**
Number of Standards	**302**
Number of Standard Categories	**7**
Number of Applications	**100**
Safety & Compliance Database size	

The PSMA is a non-profit organization for the betterment of its members and the industry. The PSMA has agreed to allow anyone to access the database after registration. After entering your ID, email, and a password, an email will be sent that acknowledging acceptance to sign-in to review the database for standards and regulations.

Registration For The Database

To register to view the Safety and Compliance database first type the following: www.psma.com. This will take you to the PSMA homepage as shown in Fig. 4. Assuming you are not a member, click on the link "Not a Member?" and follow the instructions. Enter user ID or email, and a password.

Fig. 4. PSMA home page for signing into the Safety & Compliance database.

Standards By Application

There are 100 Standards by Application listed on a pull-down menu. One example standard that is applied to products is power factor correction. This is shown in Fig. 5. The standard, IEC 61000-3-2, is a current standard that is being applied to all products.

Products are classified by their use and their power draw from the ac line. As a reference, lighting products are classified as Class C. See the yellow box in Fig. 6. This class requires the power factor to be above 90% when the product uses energy greater than 25 W. The standard is concerned with harmonic line current; and when the distortion factor is combined with phase displacement factor they form the power factor.

The description of the standard is shown in Fig. 6 with notes. Below the notes, is the following link, which can be used to purchase the standard: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).

The PSMA and the SCDB cannot provide free copies of standards. These must be purchased from the agency listed on the bottom link. However, if you are an IEEE member, you can purchase many of the standards at a reduced rate through the IEEE.

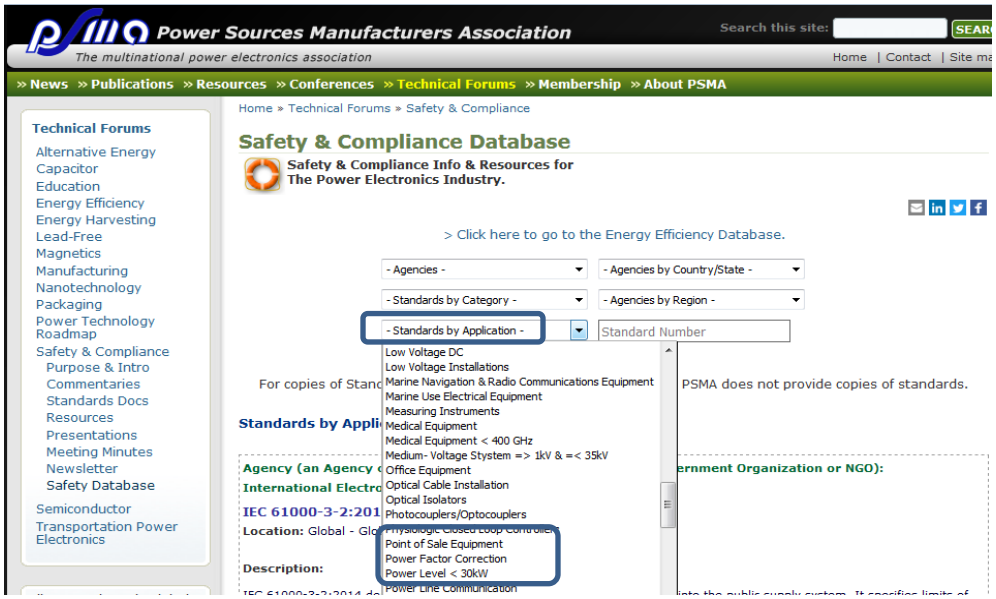

Fig. 5. A small list of Standards by Application where Power Factor Correction was selected.

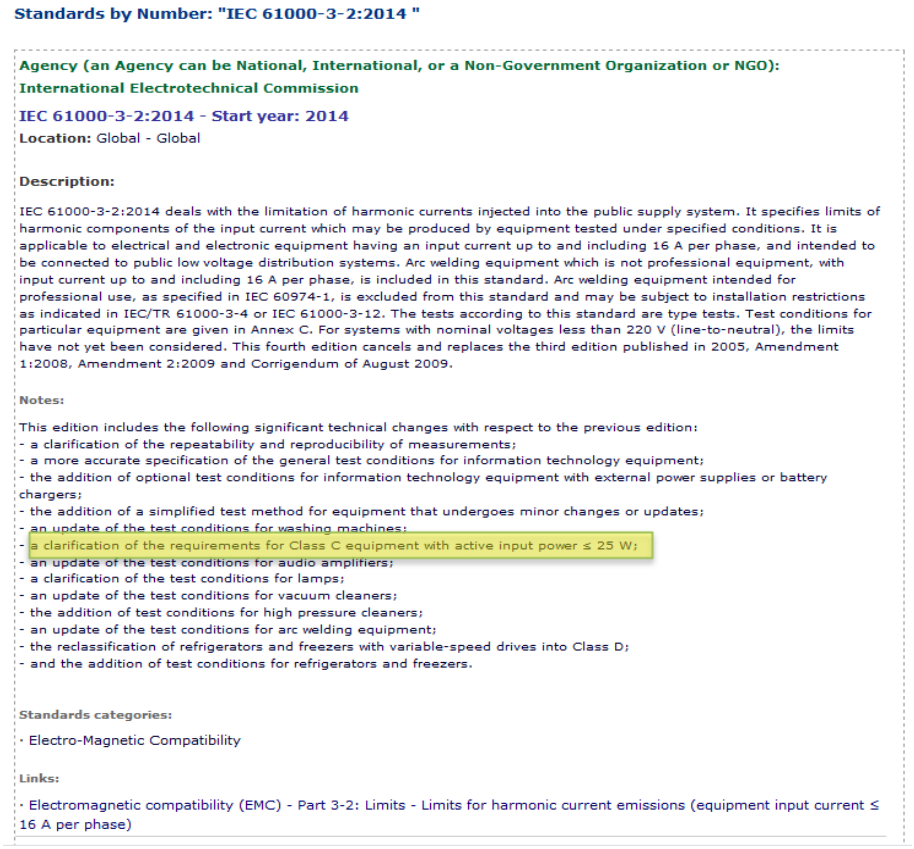

Fig. 6. PFC Harmonic Standard: IEC 61000-3-2 used by the industry.

New Presentations On The SCDB

Once you are signed into the database, click on the "Safety&Compliance database" link in the upper right corner of the screen. Next, click on the "Presentations" link on the left side of the screen. A new screen is shown in Fig. 7.

As shown, this page provides a link to a presentation stored on the PSMA website. This particular presentation was given by UL on a new standard, IEC 623681-1. This is not a copy of the standard but an overview. Also there are copies of the slides of the presentations given in the Industry Session at APEC 2017 in Tampa, Florida.

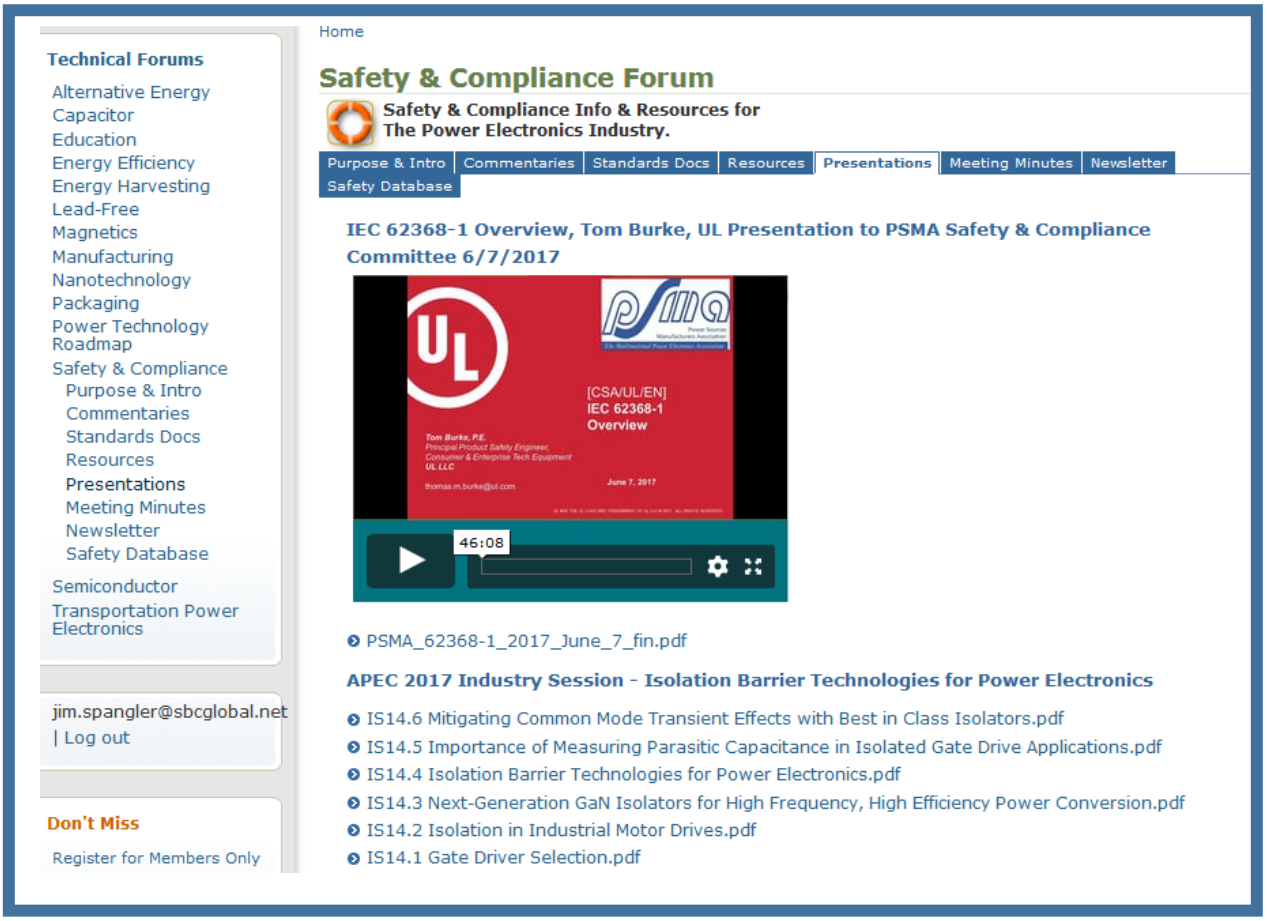

Fig. 7. IEC 62368-1 Overview presentation and copy of the slides.

In addition to what the database offers, there are other sites that have information. Below are just a few places that are useful resources. These will discussed in a future Spotlight on Safety & Compliance column.

- http://www.complianceandrisks.com
- http://incompliancemag.com/
- http://www.emcs.org/
- www.fcc.gov
- http://ewh.ieee.org/soc/pses
- www.cenelec.eu
- www.iec.ch
- www.ansi.org
- http://ulstandards.ul.com/standards-catalog/

Keeping Up With Standards News

This column will present information on new topics as they are added to the SCDB database. In addition, you can also learn about some of these updates by visiting the United States Standards Strategy (USSS), which is part of the continuing update of the Safety and Compliance database. Another database that you may want to follow is called the "Energy Efficiency database". This database will be discussed in a future edition of this column.

About The Authors

Kevin Parmenter has over 20 years of experience in the electronics and semiconductor industry. Kevin is currently vice president of applications engineering in the U.S.A. for Excelsys, an Advanced Energy company. Previously, Kevin has served as director of Advanced Technical Marketing for Digital Power Products at Exar, and led global product applications engineering and new product definition for Freescale Semiconductors AMPD - Analog, Mixed Signal and Power Division based in Tempe, Arizona.

Prior to that, he worked for Fairchild Semiconductor in the Americas as senior director of field applications engineering and held various technical and management positions with increasing responsibility at ON Semiconductor and in the Motorola Semiconductor Products Sector. Kevin also led an applications engineering team for the start-up Primarion where he worked on high-speed electro-optical communications and digital power supply semiconductors.

Kevin serves on the board of directors of the PSMA (Power Sources Manufacturers Association) and was the general chair of APEC 2009 (the IEEE Applied Power Electronics Conference.) Kevin has also had design engineering experience in the medical electronics and military electronics fields. He holds a BSEE and BS in Business Administration, is a member of the IEEE, and holds an Amateur Extra class FCC license (call sign KG5Q) as well as an FCC Commercial Radiotelephone License.

Jim Spangler is a Life Member of the IEEE with over 40 years of electronics design experience and is president of Spangler Prototype Inc. (SPI). His power electronics engineering consulting firm's priority is helping companies to place products into production, assisting them to pass government regulations and agency standards such as UL, FCC, ANSI, IES, and the IEC.

For many years, he worked as a field applications engineer (FAE) for Motorola Semiconductor, On Semiconductor, Cirrus Logic, and Active Semiconductor, assisting customers in using semiconductors. He published numerous application notes and conference papers at a variety of conferences: APEC, ECCE, IAS, and PCIM. Topics included power factor correction, lighting, and automotive applications. As an FAE, he traveled internationally giving switch-mode power supply seminars in Australia, Hong Kong, Taiwan, Korea, Japan, Mexico, and Canada.

Jim has a Master's Degree from Northern Illinois University (NIU), and was a PhD candidate at Illinois Institute of Technology (IIT). He taught senior and first-level graduate student classes: Survey of Power Electronics, Fields and Waves, and Electronic Engineering at IIT and Midwest College of Engineering.

Jim is a member of the IEEE: IAS, PELS, PES; the Illuminating Engineering Society (IES), and the Power Sources Manufacturers Association (PSMA) where he is co-chair of the Safety and Compliance Committee.