

# MGM



## TRANSFORMER COMPANY

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### SPECIALTY PRODUCT BROCHURE

#### **MGM Transformer Company Overview**

With over forty years of transformer experience and our long-standing commitment to quality and customer service, MGM Transformer will design and build the transformer that is right for your specific application.

MGM provides custom built dry type transformers for the Electric Vehicle (EV) charging industry, designed by industry leading, experienced, engineers for the unique requirements of EV charging stations. Our people, knowledge, and experience can provide a reliable, cost-effective transformer that will provide years of trouble-free service.



#### **Application**

There is no doubt that the trend towards EV is here to stay. Motorists who purchase such a vehicle also need a charging station. The total number of electrically powered cars worldwide reached some 3.2 Million in early 2018. That's a 55 % increase over the previous year. The figure includes all the vehicles charged with electricity, such as plug-in hybrids.

**ELECTRIC VEHICLE CHARGING**

EV's are still a small percentage of the overall number of vehicles used in North America (NA), but this is forecasted to change quickly in the next few years. The U.S. expects 1,000,000 EV's will be on the road by 2020, with about half used in California. While Canada expects an additional 80,000 vehicles by 2020. As a result, EV charging infrastructure must be developed rapidly. In fact, many NA building codes define a minimum level of EV charging support for new commercial and multi-tenant construction.

Currently, there are four levels of EV charging:

- **Level 1**
  - Uses onboard car charger at 120V
  - 2-5 miles per hour of charging
- **Level 2:**
  - Uses onboard car charger at 240V or 208V, up to 80A but typically at 30A
  - 10-11 miles per hour of charging
- **Level 3:**
  - Creates DC from 240V or 480V single or three phase sources
  - 50-100 miles per hour of charging
- **Level 4:**
  - Creates DC from 240V to 800V single or three phase sources
  - 170+ miles per hour of charging
  - 350 kW units can charge for 200 miles in 15 minutes

Level 1 and 2 are typically used for home, public and fleet charging, with level 2 being the most common. Eight hours of level 2 charging will cover over 95% of the average person's commuting distance. Levels 3 and 4 charging stations, often referred to as "Fast DC Chargers", are typically seen in public installations. Due to the high costs of installation, these may only be found in groupings of 1-2 charging units. Levels 3 and 4 charging provides a quick means to top off low battery levels – vehicles typically spend less than one hour charging. Currently only Tesla and a few other suppliers (ABB & Schneider Electric) offer Level 4 charging but this is expected to be widely common among vehicles in the early 2020s.

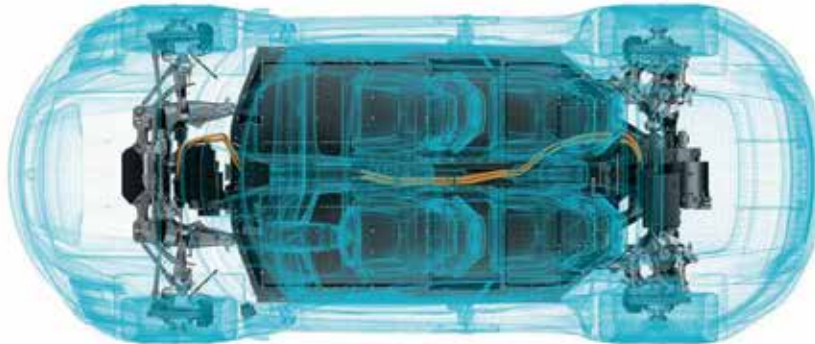
### **Advantages with MGM**

A highly experienced and trained engineering staff (ALL IN-HOUSE) for the design and manufacturing of standard and highly specialized products.

- Product offerings in both dry type and liquid filled to meet your specific demands.
- 220°C Nomex insulation for Dry-Type Transformers
- Self-Cooled or Forced Air Cooled
- Low Voltage and Medium Voltage solutions.
- All processes done in-house at our own UL, CUL, CSA and ISO 9001-2008 certified facilities.
- Shortest lead times in the industry.
- Every process is done under roof

## Our Capabilities

- 10 KVA – 5 MVA, single phase transformers
- Dry type or Liquid filled
- 10 KVA – 10 MVA, three-phase transformers
- 120 V – 34,500 V
- 10 KV – 250 KV Basic Impulse Level (BIL)



## Design Considerations

The following issues should be considered in specifying a transformer for EV charging:

- **High Harmonics:** Depending on charger architecture, a charger may present harmonic load currents to the transformer. For chargers that present a significant harmonic load we recommend that a K-factor rated transformer be considered. Depending on the harmonic spectrum, a K-factor in the range of K=4 to K=9 is usually required.
- **Power Quality:** National standards put limits on the amount of charger harmonics that may be transmitted through the transformer to the power line. This harmonic transmission can be reduced by transformers with multiple, phase shifted, secondary windings; electrostatic shields; and harmonic mitigating, zig-zag, windings.
- **Local Environmental Conditions:** If a transformer is installed in a non-temperature controlled area, 80°C or 115°C temperature rise units can contend with high ambient temperatures
  - Enhanced type NEMA 3R enclosures can be used if horizontally blowing rain or snow are a concern
- **Safety:** Units should be installed in areas that are not accessible to the general public. If that is not possible, additional options can be considered including tamper resistant hardware, hinged and lockable enclosures or non-ventilated enclosures
  - Local Electrical codes may require bollards or other features to protect transformers from vehicle damage. Transformers also should not be installed near water lines, water drains, etc., which could direct water onto the enclosure if broken
- **Low Site Voltage:** Use integral taps or buck-boost transformers to adjust the voltage input to the transformer
- **Aesthetics:** Custom enclosure colors or stainless steel are available. In some situations a smaller autotransformer can be used instead of an isolation transformer.

### Testing and Quality Control

MGM Transformer tests every transformer to satisfy the standards required by IEEE Standard C57.12.01 for Dry-Type Transformers and IEEE Standard C57.12.00 for liquid filled transformers. Our testing equipment ensures the highest quality transformers that meet all IEEE, and NEMA standards. We also offer customer witness testing on individual transformers. We also have the capability of providing a range of design tests and optional tests such as impulse, partial discharge, temperature rise, sound level, and others.

### THE BETTER CHOICE!

MGM is a leader in the transformer industry and a premiere manufacturer capable of fulfilling the most demanding applications. **No one can provide a wider range of products and solutions than MGM!**

