The European Association of the Electricity Transmission and Distribution Equipment and Services Industry

GUIDANCE PAPER ON EU CE MARKING LEGISLATION
(MV AND POWER TRANSFORMERS)

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COMPLIANCE WITH EU DIRECTIVES RELEVANT TO MV AND POWER TRANSFORMERS[1] ACCORDING TO EN 60076

Introduction

The present guidance paper analyses the below stated CE marking related legislation of the European Union and assesses their possible application to High and Medium Voltage Transformers[2] [3]

This guidance reflects the best knowledge of industry experts from all over Europe and the state of the art at the moment of its publication. The principles contained in this guide are however not legally binding. A binding interpretation of EU legislation is the exclusive competence of the Court of Justice of the EU and national Courts. T&D Europe also recommends to producers, when applying this Guide and its principles, to always refer to the national legislation of the Member States which they are dealing with.

Summary

Although most of the reviewed Directives and regulations do not require CE marking of MV and power transformers, the specific Eco-design Regulation on transformers (Regulation 548/2014) asks for CE marking.
Since this Regulation is a measure for implementing the Ecodesign Directive 2009/215/EC,

[1] "In common language, the following are used. MV and HV are based on IEC standard 62271 series
- Low Voltage - up to 1000V AC included
- Medium Voltage - above 1000V AC to 52kV AC included
- High Voltage - above 52kV AC"

[2] This paper does not include any comment on the WEEE Directive (2012/19/EU) as this is not a CE marking Directive.

[3] Nor does it include comments on the Marine Equipment Directive, which provides for a very specific regime for equipment placed or to be placed on board an EU ship and for which the approval of the flag State administration is required by the international instruments". The directive essentially aims at applying in the EU the relevant international instruments (listed in article 2) and creates a special regime according to which marine equipment should bear the "wheel mark" and not the CE marking. Equipment falling under the scope of this Directive do no longer fall under any other CE-marking Directives as soon as they become "marine equipment".

T&D Europe aisbl ▪ Diamant building ▪ Boulevard A Reyers 80 ▪ B 1030 Brussels ▪ Belgium
Tel : +32 (0)2 706 82 68 ▪ fax : +32 2 706 82 53 ▪ e-mail : secretariat@tdeurope.eu ▪ www.tdeurope.eu
VAT BE 0898.208.617

the CE marking is used as proof of compliance and a corresponding EU conformity certificate is issued.

1. The restriction of the use of certain hazardous substances in electrical and electronic equipment – RoHS (Directive 2011/65/EU)

As described in the European Commission ROHS FAQ of December 2012,

- Article 2.4 (e) of the RoHS Directive provides that large-scale fixed installations are excluded from the Directive.
- Article 3 (1) states that equipment rated above 1000 V AC or 1500 DC are excluded from the Directive, which includes MV & HV transformers
- Article 3 (4) indicates that MV & HV transformers can also be considered as large-scale fixed installations, another reason to be excluded from the Directive.

Among examples of large-scale fixed installations (benefiting from an exclusion):

- Electrical distribution systems such as generators.
- If an installation has a rated power greater than 375 kW, it can be considered as large-scale

It is confirmed that MV & HV transformers are excluded from the ROHS directive 2011/65/EU.

2. Ecodesign requirements for energy-related products (Directive 2009/125/EC)

in 2009 the Ecodesign Directive was extended to all energy-related products (the use of which has an impact on energy consumption), including:

- energy-using products (EUPs): products which use, generate, transfer or measure energy, including consumer goods and industrial products such as transformers, industrial furnaces, etc.
- other energy related products (ERPs): products which do not necessarily use energy, but have an impact on energy consumption and can therefore contribute to saving energy, such as windows, insulation material, etc.

The Ecodesign Directive does not create binding requirements on products by itself: only product-specific Regulations, directly applicable in all EU countries, can create such binding requirements.

3. Specific Ecodesign Regulation on transformers (Regulation 548/2014)

As a product-specific Regulation applicable to transformers, the European Commission adopted in May 2014 Regulation (EU) N° 548/2014 on Eco-design requirements for small,

medium and large power transformers. It entered into force on 11 June 2014, with two dates for the application: 1 July 2015 for TIER 1 and 1 July 2021 for TIER 2.
References to the following two harmonised standards in support of Regulation 548/2014 are:

- EN 50588-1:2015 on medium power transformers 50 Hz, with highest voltage for equipment not exceeding 36 kV - Part 1: General requirements
- EN 50629:2015 on the energy performance of large power transformers (Um > 36 kV or Sr ≥ 40 MVA)

Since the Regulation is a measure for implementing the Ecodesign Directive 2009/215/EC, the CE marking is used as proof of compliance and a corresponding EU conformity certificate is issued.

A specific guide is has been prepared by T&D Europe on this Regulation, available at: http://www.tdeurope.eu/data/T&D%20Europe%20Transformers%20Eco-design%20PP%2015052015.pdf

4. Simple pressure vessels (Directive 2014/29/EU)

As of 20 April 2016 this Directive supersedes the former Directive 2009/105/EC, dated 16 September 2009, since this has been substantially amended; the recast was also prepared in the interest of clarity.

Pressure vessels used for MV and HV transformers are not type of a "simple pressure vessel" with characteristics described under Art. 1.1 for which Directive 2014/29/EU shall apply.

5. Electrical equipment designed for use within certain voltage limits – LVD (Directive 2014/35/EU)

The Low Voltage Directive (LVD) 2014/35/EU of 26 February 2014 repeals the previous version (2006/95/EC) with effect from 20 April 2016. Member States had to adopt and publish measures implementing the Directive by 19 April 2016.

The LVD applies to low voltage equipment (between 50 and 1000 V AC and between 75 and 1500 V DC), so MV and HV transformers fall outside its scope.

According to the "guidelines on the application of directive 2006/95/EC", dated August 2007, and modified in January 2012, chapter III, point 9, the scope of the Directive includes both electrical equipment intended for incorporation into other equipment and equipment intended to be used directly without being incorporated.

However, some types of electrical devices, designed and manufactured for being used as basic components to be incorporated into other electrical equipment, are such that their

safety to a very large extent depends on how they are integrated into the final product and the overall characteristics of the final product. These components are not covered by the Directive, and may not be CE marked unless covered by other Union legislation that requires CE marking.

New EU guidelines will be published before end 2016, including an analysis of the new elements of Directive 2014/35/EU.

6. Machinery (Directive 2006/42/EC)

The Machinery Directive (MD) 2006/42/EC of 14 June 2006 applies to most types of machinery, except certain special types which are specifically excluded. The current Directive (superseding as of 29 December 2009 the previous version 98/37/EC of 22 June 1998) clearly states that MV and HV switchgear and controlgear are excluded from the Machine Directive. Article 1.2 is relevant: "*The following are excluded from the scope of this Directive*", which states in sub clause (l): "*the following types of high-voltage electrical equipment: - switchgear and controlgear, - transformers*".

7. Electromagnetic compatibility – EMC (Directive 2014/30/EU)

The EMC Directive (EMCD) 2014/30/EU, superseding EMC Directive 2004/108/EC as of 20 April 2016, is intended to apply to nearly all electrical equipment. Specifically, high-voltage electrical installations are fixed installations. Therefore, whilst high-voltage installations are subject to the essential requirements of the Directive, there is no need for CE-marking, or an EC declaration of conformity, or to involve a notified body.

As for the constituent parts of high-voltage electrical installations, such as transformers, these can be apparatus intended for incorporation into a given fixed installation. There is, therefore, no need for CE-marking, neither an EC declaration of conformity, nor to involve a notified body.

8. Measuring instruments (Directive 2014/35/EU)

The Directive 2004/22/EC has been revised by 2014/35/EU and is applicable as of 20 April 2016. The Directive's scope is as follows: it applies to measuring instruments defined in 10 instrument-specific annexes (Annex III to XII):

III. Water meters
IV. Gas meters and volume conversion devices
V. Active electrical energy meters
VI. Thermal energy meters

VII. Measuring systems for continuous and dynamic measurement of quantities of liquid other than water
VIII. Automatic weighing instruments
IX. Taximeters
X. Material measures
XI. Dimensional measuring instruments
XII. Exhaust gas analysers

Annex V applies to active electrical energy meters intended for residential, commercial and light industrial use. This Directive is applicable to new meters and smart meters for low voltage use – which are out of the scope of T&D HV and MV equipment.

9. Pressure equipment (Directive 2014/68/EU)

The Pressure Equipment Directive (PED) 2014/68/EU of 15 May 2014 (recast of Directive 97/23/EC) and applicable from 19 July 2016, applies to all equipment with an internal pressure higher than 0.5 bar.

The "enclosures" used for MV and HV transformers are explicitly excluded from the scope of this Pressure Equipment Directive. Reference is made to Art. 1.2 *"This Directive shall not apply to (…):* under sub clause (l): *"enclosures for high-voltage electrical equipment such as switchgear, control gear, transformers, and rotating machines"*.

10. Equipment and protective systems intended for use in potentially explosive atmospheres - ATEX (Directive 2014/34/EU)

Equipment that are used outside ignitable/inflammable atmospheres should not be covered by the revised Directive 2014/34/EU (former Directive was 94/9/EC), applicable as of 20 April 2016. As stated in chapter 1 / article 1.1(a) this directive applies to "equipment and protective systems **intended to use** in potentially explosive atmospheres". These have to be marked with an <Ex> Symbol and required CE-marking and a declaration of conformity.

Since HV and MV transformers are normally not intended to be used in such atmospheres, CE-marking is not required under Directive 2014/34/EU, as long as the equipment is not intended to use in potentially explosive atmospheres.

11. Noise emission in the environment by equipment for use outdoors (Directive 2000/14/EC)

The Directive is applicable for equipment used outdoors such as power generators with combustion engines or lawn mowers. No electrical equipment is listed in Articles 12 and 13 and therefore MV transformers do not fall under the scope of this Directive.

12. Energy labelling (Directive 2010/30/EU)

The Directive establishes a general framework on the indication by labelling and standard product information of the consumption of energy and other resources by energy - related products. As a framework directive, it does not directly apply to any product.

To make the Directive applicable, the Commission has to prepare a Delegated Act for each category of products based on a set of criteria

So far no Delegated Act was adopted or is under preparation regarding MV or HV transformers.

13. Construction Products Regulation (305/2011) (CPR)

HV or MV transformers are not within the scope of the CPR. The regulation clarifies the definition of a construction product as follows:

"Article 2
'construction product' means any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works."

In the FAQ covering the CPR, recital 39, the "construction works" are defined as buildings or any civil engineering works, and the "basic requirements for construction works" are detailed as follows:

1. Mechanical resistance and stability
2. Safety in case of fire
3. Hygiene, health and the environment
4. Safety and accessibility in use
5. Protection against noise
6. Energy economy and heat retention
7. Sustainable use of natural resources

In this sense, transformers do not have effect on the performance of construction works with respect to previous basic requirements, and hence they are outside of the scope.

Furthermore, and according to FAQ recital 1, after 30/06/2013, the CE marking is only compulsory if the product is covered by a harmonised European Standard or a European

Technical Assessment has been issued for the product, which is not the case for transformers.

14. Radio Equipment Directive (Directive 2014/53/EU)

The Radio Equipment Directive RTTE Directive 1999/5/EC has been replaced by Directive 2014/53/EU as of 13 June 2016. Per article 2.1 (1) of the Directive, radio equipment means "an electrical or electronic product, which intentionally emits and/or receives radio waves for the purpose of radio communication and/or radio determination, or an electrical or electronic product which must be completed with an accessory, such as antenna, so as to intentionally emit and/or receive radio waves for the purpose of radio communication and/or radio determination".

None of the T&D equipment falls under this definition and the Directive therefore does not apply to MV and HV transformers.

15. Other Directives

Presently MV or HV transformers are not falling under any other Directive requiring an EC Declaration of Conformity and subsequently CE Marking.

New developments are followed carefully, and initiatives will be developed when appropriate.

Annex 1: Transformers according to EN 60076 – Series

T&D EUROPE defines transformers as those having a voltage greater than 1000 Volts. These transformers are described in EN 60076-1. They are typically sold to operators of networks concerned with the transmission and distribution of electricity and also to industrial companies using large quantities of electricity.