

Product Fact Sheet – Transformers: Distribution transformers

Table 36. Overview of Distribution transformers

Country	MEPS	High Label	S&L metric	Test procedure	Reference test procedure & metric	Test Procedure (*)	Energy Performance Metric (*)	Notes
Australia and NZ	Power efficiency at 50% load, based on power input and 50Hz. Varies with transformer type (oil-immersed or dry), single or three phase, and rating.	Power efficiency at 50% load, based on power input and 50Hz. Varies with transformer type (oil-immersed or dry), single or three phase, and rating.		AS2374.1 .2-2003	IEC 60076-1 Ed 2.1	1.1	1	
EU	N/A			IEC 60076-1 Ed 2.1	IEC 60076-1 Ed 2.1	1.1	1	
Mexico	N/A	N/A		NMX-J-169-ANCE	IEC 60076-1 Ed 2.1	1	1	
US	<p>Power efficiency at 35% name-plate rated load for LV dry-type transformers</p> <p>Power efficiency at 50% name-plate rated load for MV dry-type and liquid immersed transformer</p> <p>For all types, MEP level varies with single or three phase and by rating.</p>	EPA suspended the ENERGY STAR spec. in 2007 due to MEPS reaching that level		Appendix A to Subpart K of Part 431	IEC 60076	1	N/A	
China	N/A	N/A		GB 1094.1-1996 and GB 6450	IEC 60076	1.1	N/A	
India		A star rating is given according to a maximum measured total losses (i.e.		IS 2026 (part II), IS 2026 (part III),	IEC 60076-1 Ed 2.1	1.1	N/A	

		combined iron and copper losses) at 50% and at 100% load	IS 1180 (part I), IS 2026 (part I), IS 2500 (part I).				
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(*) Conversion factors

Overview of international situation with regards to S&L for this product category

1. While the efficiencies of transmission and distribution transformers are the highest of any energy using product, their constant use and place in the electrical supply of all appliances means that even small increases in efficiency are worthwhile. All countries surveyed use the same IEC60076 standard as the basis of the standard.
2. The energy performance metrics used in different countries are very similar, but subtle differences mean that there is still the need for harmonization. For example the load point at which efficiency is measured (100%, 50%, 40% or a combination), and the normalized operating temperature used in tests. Achievable efficiency levels are also impacted by factors such as the frequency of operation, where 60Hz has c.10% higher losses compared to 50Hz transformers.
3. Short circuit current requirements, which are defined by network requirements, will also impact transformer design.

General description of conversion for test procedures and metrics/ efficiency metrics and standards

1. In summary, efficiency levels can be considered broadly comparable. Adding 10% to the allowable losses of a 60Hz transformer gives an acceptable technical equivalent to the same 50Hz transformer, allowing comparison of both 50 and 60Hz transformers.
2. However, further work still needs to be done to harmonize the test load points, although to a first approximation this is not a large impact. Similarly, careful checks also need to be made on the normalized operating temperature, as this will have a modest impact.

Notes and assumptions

None other than as described above.

List of sources

Test procedures, regulations and standards from each country, as listed in CLASP's Global S&L Database http://www.clasponline.org/en/Tools/Tools/SL_Search.aspx
 Electrical Energy Efficiency - Technologies and Applications. Sumper and Baggini, Wiley, 2012.
 EUP Preparatory study on Power Transformers