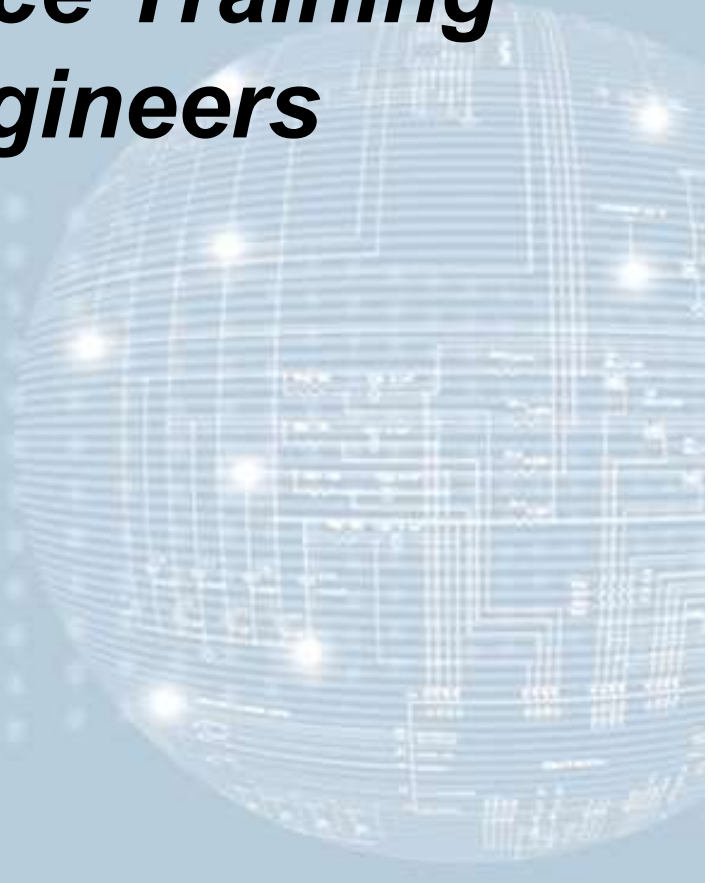
Regulatory Compliance Training for Non-Safety Engineers



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Product Safety Basic Concept

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Product Safety Definition:

- **Product safety** is a term used to describe policies designed to protect people from risks/hazards associated with thousands of consumer products they buy and use every day.

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Product Safety Basic Concept

Why Product Safety?

1. Reduce risk of injury & loss of life
2. Reduce risk of property damage.
3. Certification for worldwide market

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Protection

- Electric Shock
- Energy
- Fire
- Mechanical
- Heat
- Radiation
- Chemical

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Prevention

Hazard: Electric Shock

Preventive Requirements:

- Voltage limitation to SELV limits (42.4V or 60Vdc) for user accessible outputs under normal and abnormal operation conditions.

- Limit leakage current / touch current to user accessible parts.
  - 3.5mA for parts connected to protective earth;
  - 0.25mA for parts NOT connected to protective earth.

- Maintain creepage and clearance distance between hazardous live parts and user accessible parts

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Prevention

Hazard: Energy

Preventive Requirements:

- Energy limitation to 240VA to user accessible parts/outputs

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Prevention

Hazard: Fire

Preventive Requirements:

- Use of plastic material having appropriate flammability rating

- Provide fire enclosure

- Provide thermal controls to avoid occurrence of overheating and fire.

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Hazard: Mechanical

Preventive Requirements:

- No sharp edges, corners or burrs
- Guard all movable parts
- Provide good mechanical stability
- Strong enclosure to withstand abuses like drop, deflections and impacts.

Hazard: Heat

Preventive Requirements:

- Parts which attain high temperature during normal operation must be prevented from being touched by the user either by guarding or warning labels.

Prevention

Hazard: Radiation

Preventive Requirements:

- Avoid user being exposed to radiation like x-rays, laser, etc.

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Prevention

Hazard: Chemical

Preventive Requirements:

- Provide controls and warning label to limit contact with toxic vapors, fumes or dust.

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Applicable Safety Standards

UL 60950-1, CSA C22.2 No.60950-1 and EN 60950-1
Standard for Safety for
Information Technology Equipment

INSULATION TYPES

1. Operational Insulation/ Functional Insulation
2. Basic Insulation
3. Supplementary Insulation
4. Double Insulation (Basic + Supplementary)
5. Reinforced Insulation

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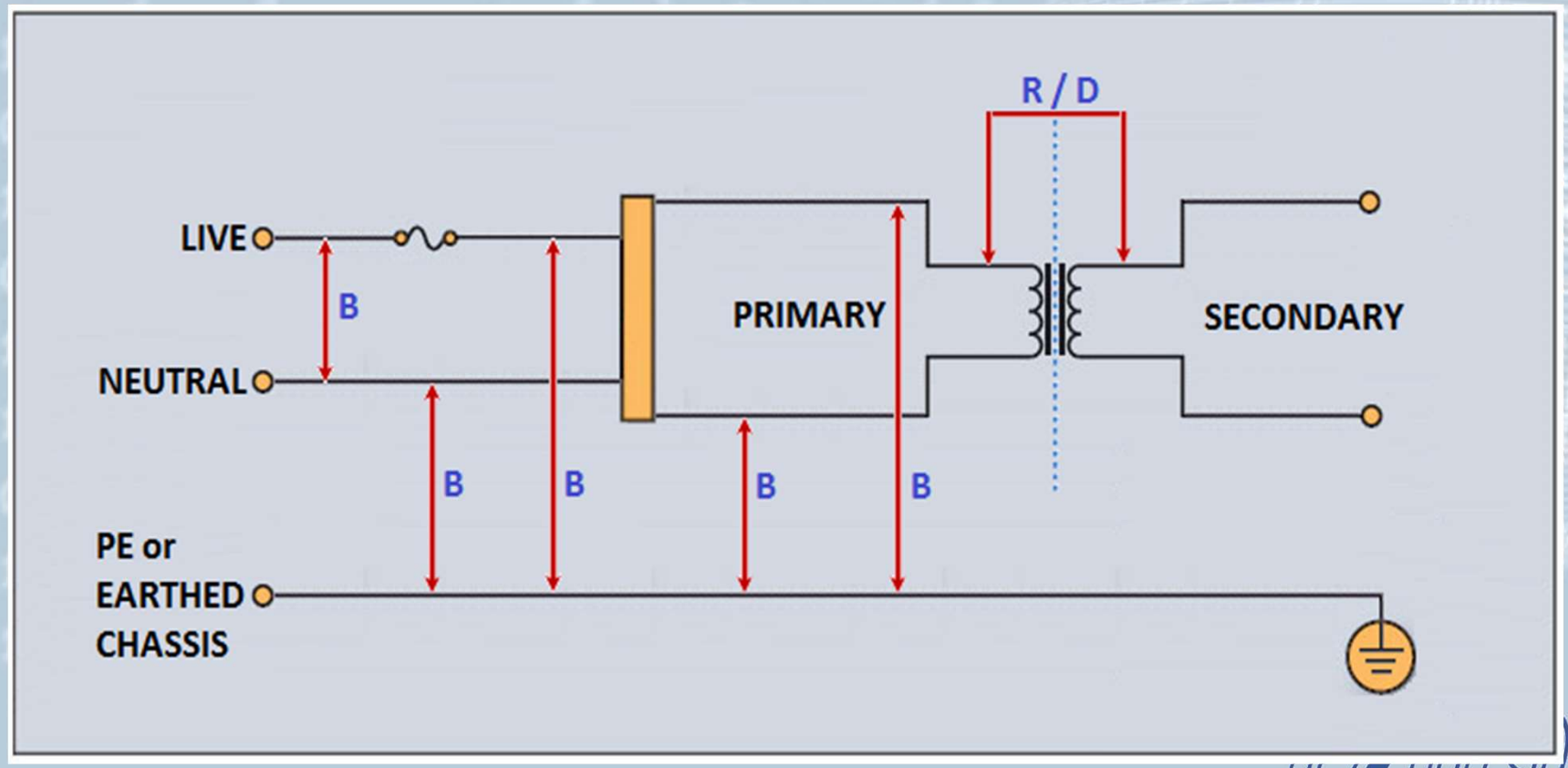
Insulation Requirements in a Power Supply

Class I Product
(Product with Protective Earth)



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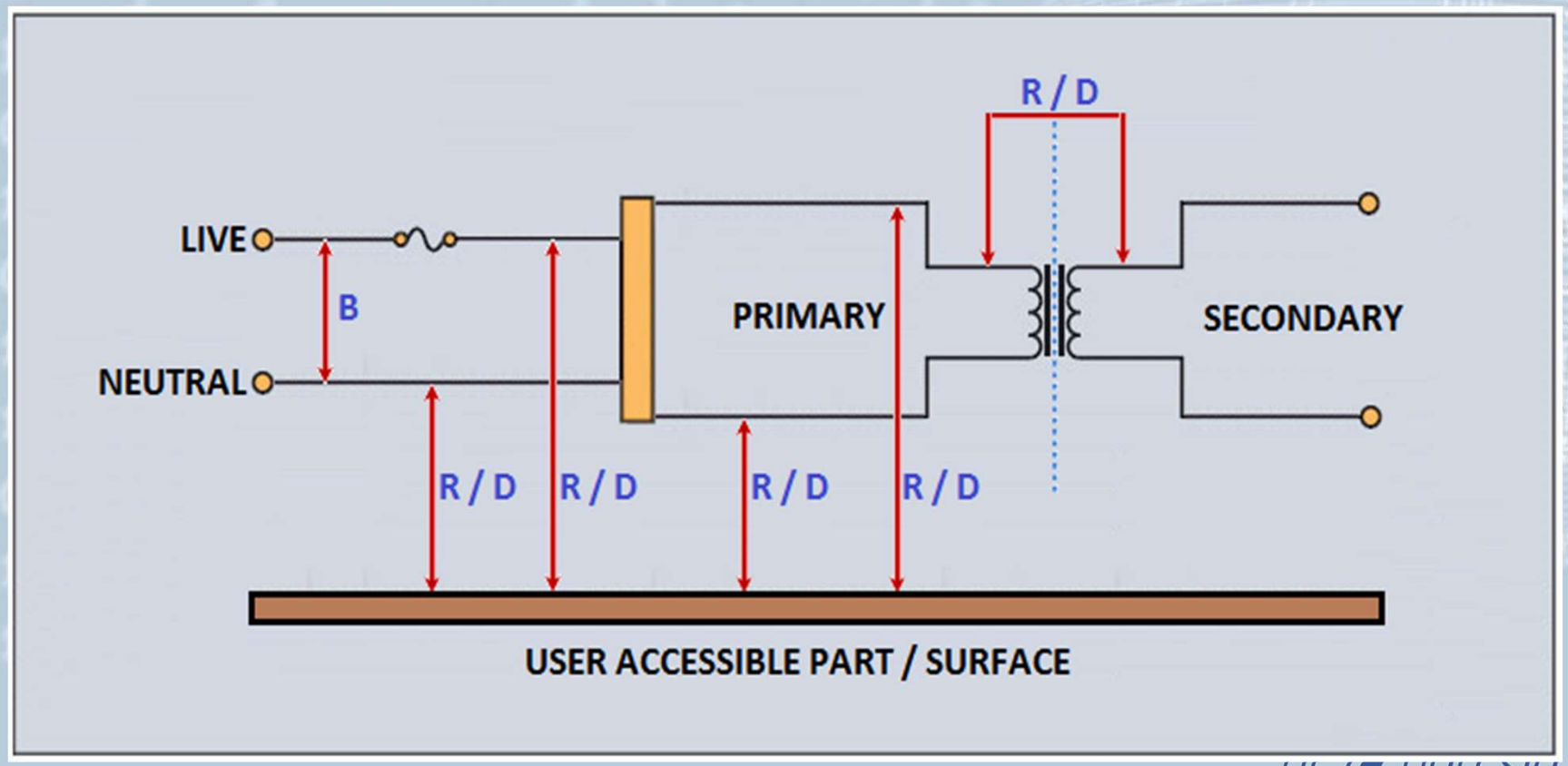
Insulation Requirements in a Power Supply

Class II Product
(Product without Protective Earth)



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Protective Earthing

Accessible conductive parts of Class I equipment which might assume a hazardous voltage in the event of a single insulation fault shall be reliably connected to a protective earthing terminal within the equipment.

Protective Earthing Considerations

- Mechanical
- Electrical
- Material

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Protective Earthing

Mechanical Requirement

- It shall not be possible to loosen the connection without the aid to tools.

- Protective earth connection at the input receptacle shall have two independent means of mechanical securing.

  1. To hook the protective earth wire on the earthing terminal.
  2. To solder connections.

- The first connections from earthing terminal of input receptacle must be to the chassis.

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Protective Earthing

Electrical Requirement

- Ground Continuity Test is performed in which a test current of 40A from a low voltage source of 12V AC/DC is passed between first protective earth connection at input receptacle and other parts considered as protective earth.

- Voltage drop is measured between these points and resistance is calculated taking the current as 40A.

- The resistance of the connection between earthing terminal and other parts required to be earthed shall not exceed 0.1 ohm

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Protective Earthing

Material Requirement

-Protective earth terminal shall be resistant to corrosion.

- The size of earthing conductor shall meet the min wire gauge. Wire gauge must not be smaller than L & N wires.

- The insulation of earthing conductor shall be green/yellow.

- Protective earth connection to the chassis should have teeth washer for better continuity and spring washer to compensate any resiliency in the earthing connection using different material

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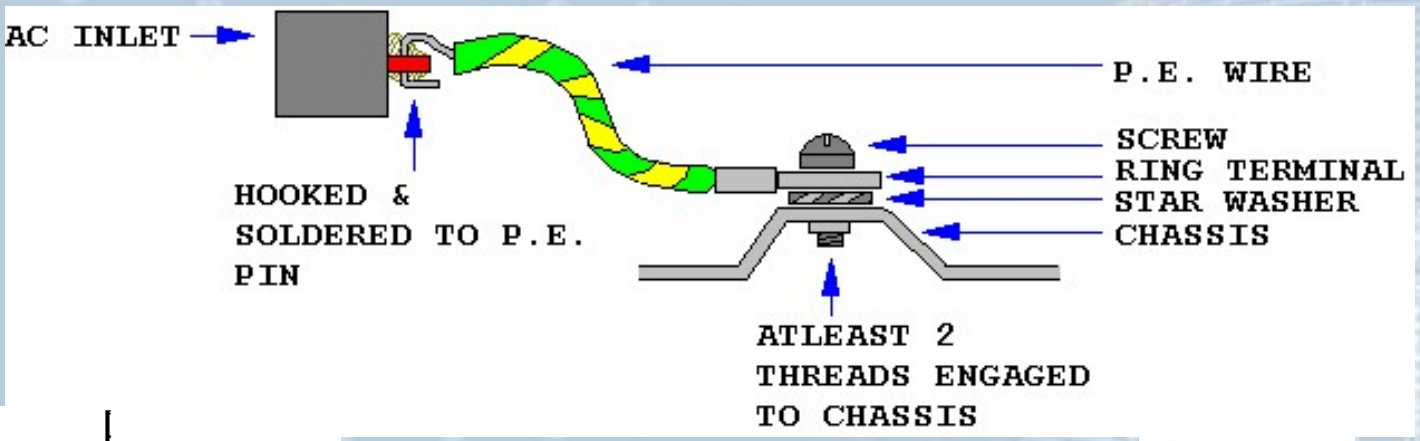
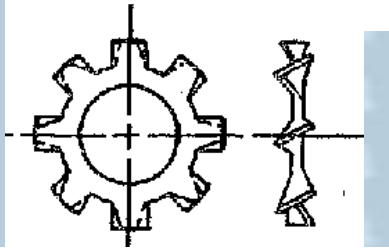
Protective Earthing

The most common bonding means is through the use of PE wire and screw connection as shown in the standard construction below:





Star Washer is preferably double-sided to ensure proper locking and bonding to PE pad on PCB or chassis.

If Star Washer is single-sided as shown above, the side with sharper teeth must be the one in contact with the PE pad on PCB or chassis.

Reference: Clause 2.6 of UL60950-1

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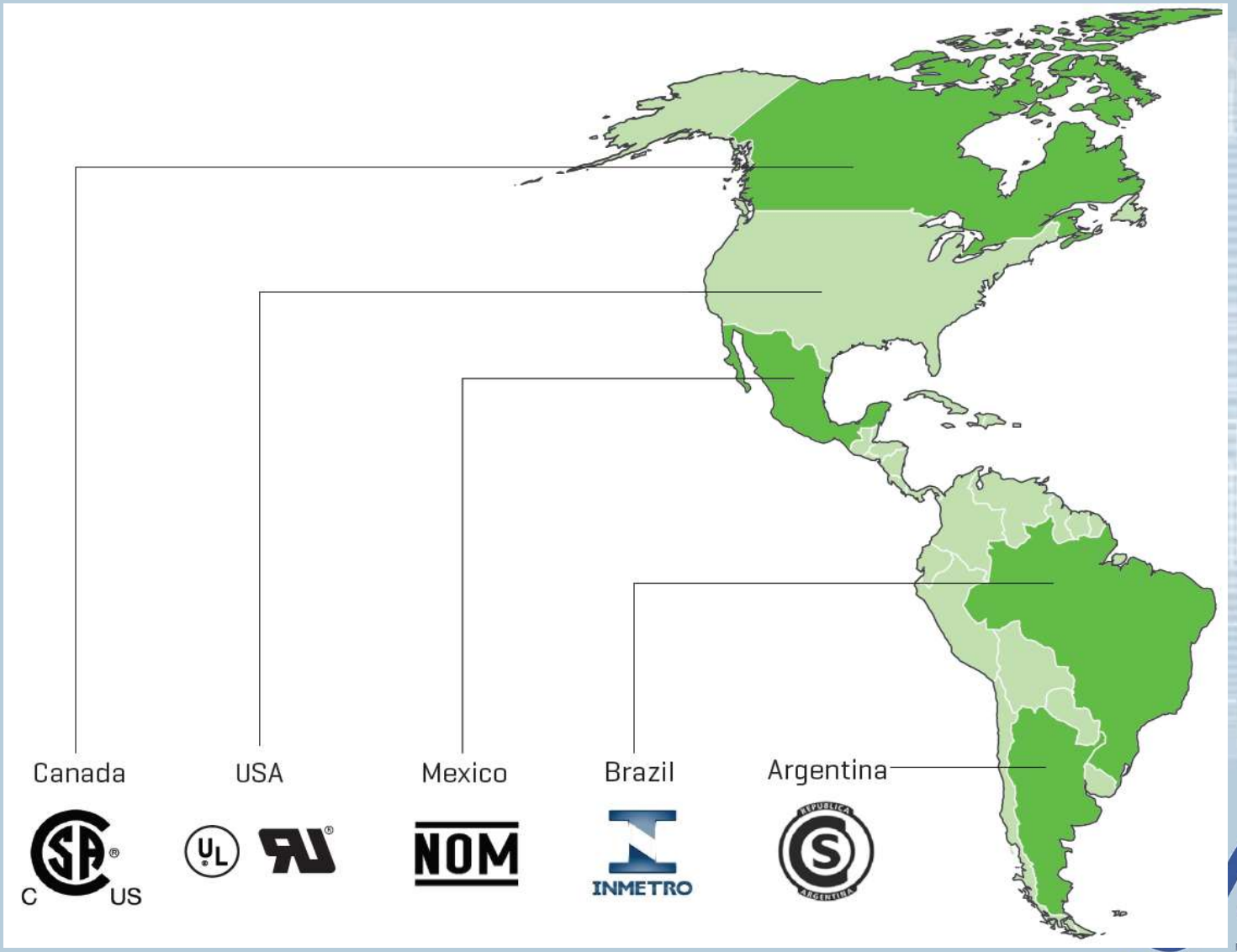
WW Product Safety Certification

Americas



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WW Product Safety Certification

Americas

Country	Certification	Mark	Certification Agency	Handler	(a) For component PSU? (b)For external PSU?	Local Rep or Local Supplier Needed?	CB Based?	With EMC Testing?	Typical Leadtime
Mexico	NOM	NOM	NYCE	Nemko, TUV, Huatsing	b)	Yes	Yes	No	6-8 Weeks after CB
Argentina	IRAM, Argentina S-mark		IRAM, UL	Nemko, TUV, Huatsing, UL	(a), (b)	Yes	Yes	No	
US / Can	UL+cUL cCSAus cETLus	XXXX c UL US LISTED EXXXXXX c US EXXXXXX	UL , CSA, ETL, TUV	UL , CSA, ETL, TUV	(a),(b)	No	No	No	2-3 weeks

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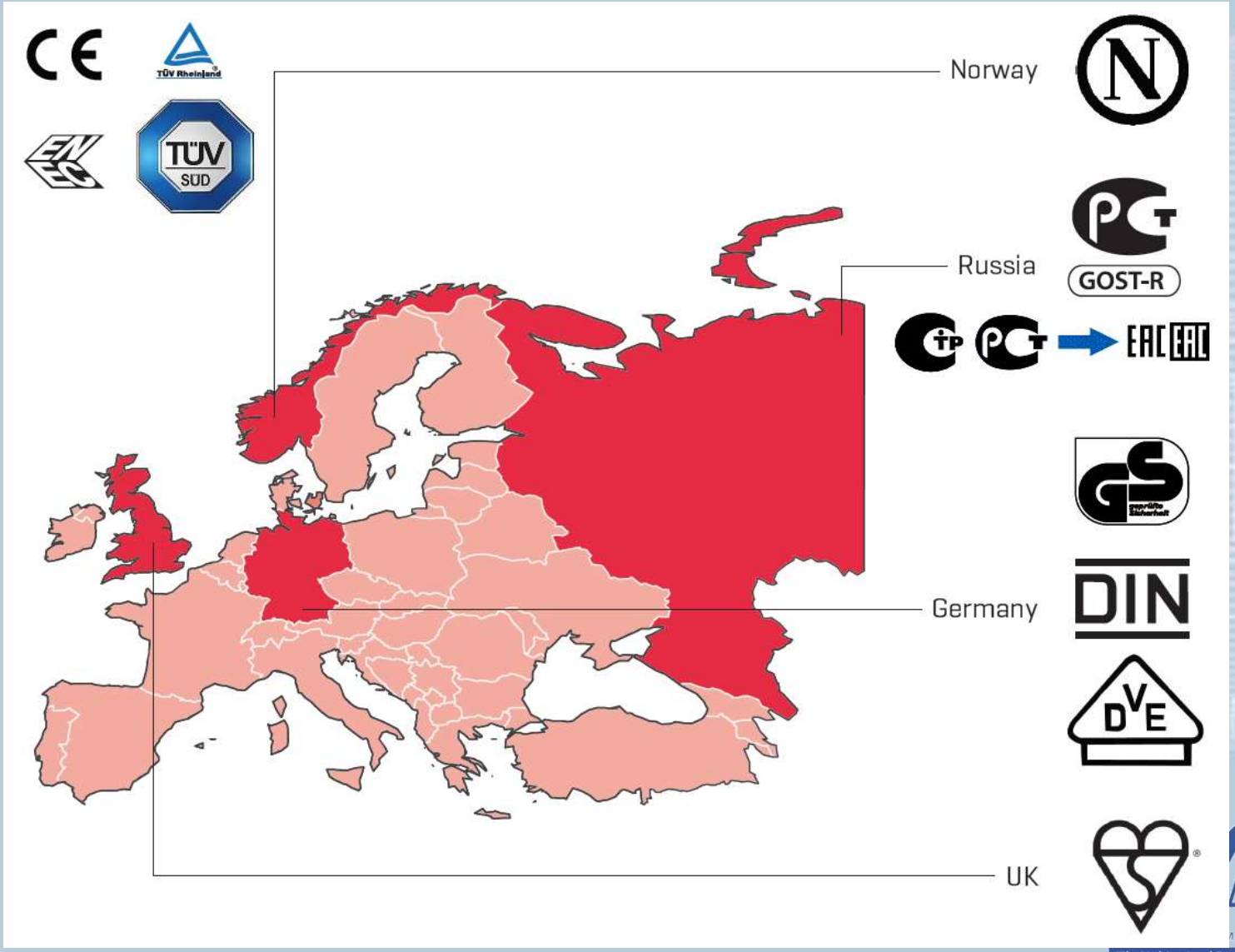
WW Product Safety Certification

Europe



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Europe

Country	Certification	Mark	Certification Agency	Handler	(a) For component PSU? (b)For external PSU?	Local Rep or Local Supplier Needed?	CB Based?	With EMC Testing?	Typical Leadtime
Poland	PCBC		PCBC	Nemko or TUV or UL or Huatsing	(b)	No	Yes	Yes	3-4 weeks after CB
Croatia	KONCAR		KONCAR	Nemko or TUV or UL or Huatsing	(b)	Yes	Yes	Yes	3-4 weeks after CB
Serbia	KVALITET			Nemko or TUV or Huatsing	(a),(b)	No	Yes	Yes	3-4 weeks after CB
Russia			CU Bodies		(a), (b)	No	Yes	Yes	4-6 weeks after CB and EMC Test report
Kazakhstan	EAC	EAC		Nemko or TUV or Huatsing					
Belarus									
Armenia									
Ukraine	Ukraine		Ukraine Bodies	Nemko, TUV, Huatsing	(b)	No	Yes	Yes	4 weeks after CB and EMC Test report

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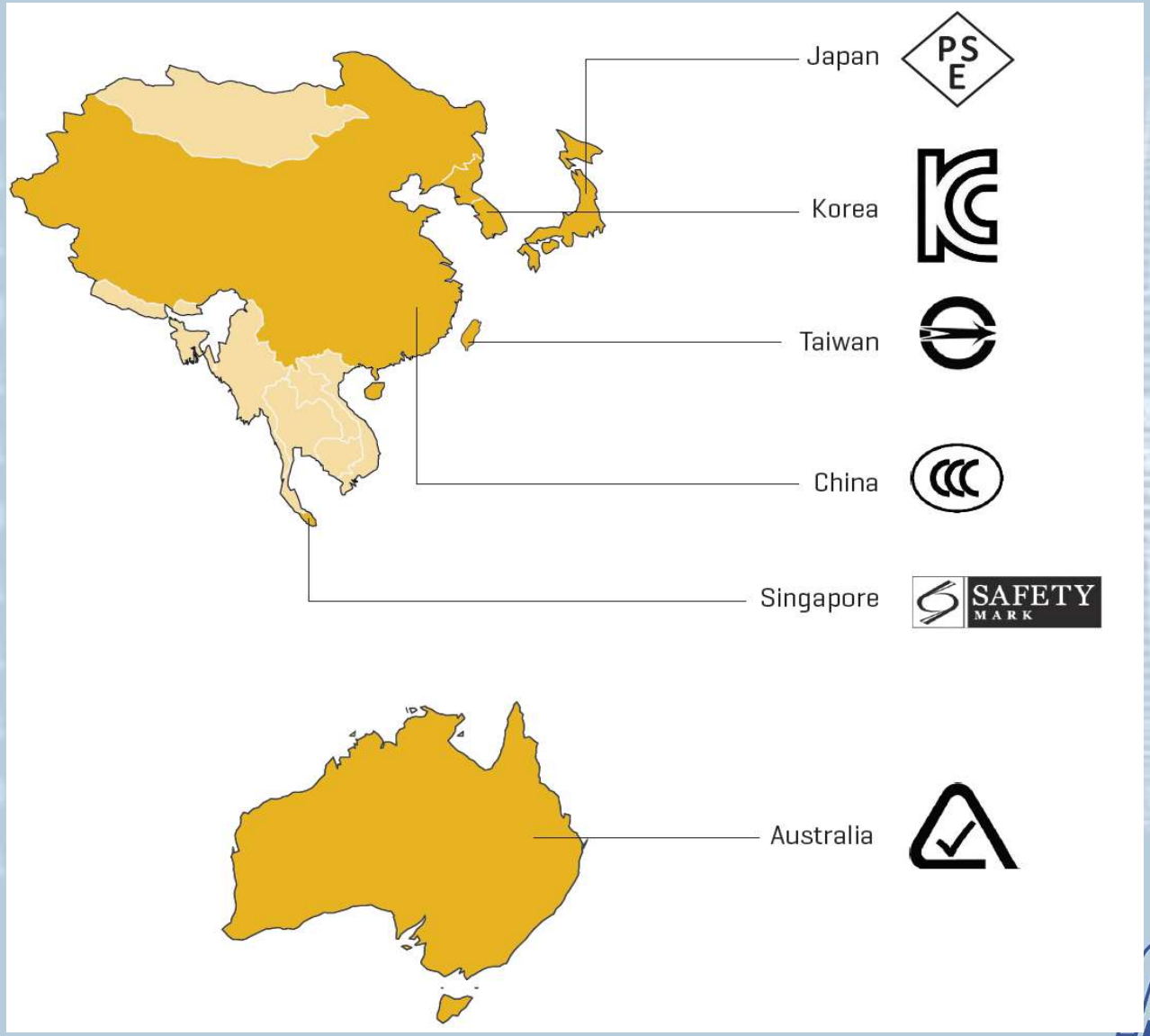
WW Product Safety Certification

Asia Pacific



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WW Product Safety Certification

Asia Pacific

Country`	Certification	Mark	Certification Agency	Handler	(a) For component PSU? (b)For external PSU?	Local Rep or Local Supplier Needed?	CB Based?	With EMC Testing?	Typical Leadtime
India	BIS	Registration No.	BIS	Nemko, TUV, Huatsing	(b)	Yes	No	No	12 weeks
Japan	DENAN		JET, TUV-SUD	JET, TUV-SUD	(b)	Yes	Yes	Yes	4-6 weeks after CB
Korea	KC		KTL	KTL	(a),(b)	Yes	Yes	Yes	4-6 weeks after CB
China	CCC or CQC		CQC	UL or CCC	(a),(b)	No	Yes	Yes for CCC	4-6 weeks after CB
Taiwan	BSMI		BSMI	Gestek, ADT, UL	(a),(b)	Yes	Yes	Yes	4-6 weeks after CB
Cambodia	ICS		ICS	Nemko, TUV, Huatsing	(b)	No	Yes	No	4-6 weeks after CB
Singapore	SPRING		SPRING	SPRING, TUV-SuD	(b)	Yes	Yes	No	3 weeks after CB
Malaysia	SIRIM		SIRIM	Huatsing	(b)	Yes	Yes	No	6 to 8 weeks after CB

WW Product Safety Certification

Middle East

Country	Certification	Mark	Certification Agency	Handler	(a) For component PSU? (b)For external PSU?	Local Rep or Local Supplier Needed?	CB Based?	With EMC Testing?	Typical Leadtime
Kuwait	PAI	N/A (registration only)	PAI	Nemko or TUV or Huatsing	(b)	No	Yes	No	4-6 weeks after CB
Israel	SII	N/A (registration only)	SII	Nemko or TUV or Huatsing	(b)	No	Yes	Yes	6-8 weeks after CB and EMC Test report
Saudi Arabia	SASO	N/A (registration only)	SASO	Nemko or TUV or Huatsing	(b)	No	Yes	No	4-6 weeks after CB and EMC Test report

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Types of Agency Submissions

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Types of Agency Submissions

New Submission:

Agency submission related to a new power supply where the design, ratings and construction were not derived from previously certified model

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Types of Agency Submissions

Modified:

Agency submission where the power supply design, ratings and construction were derived from previously certified model. Some tests may be waived due to similarity from the base model.

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Types of Agency Submissions

Renewal

Agency re-submission needed to extended the certification validity of the expiring certifications. The duration of certificate validity depends per agency. It is a must that certification of all active models remain valid for continued authorization of the use of agency approval marks.

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Types of Agency Submissions

Upgrade

Agency re-submission needed to consider compliance to the latest revisions / amendments of the standard used in certification. Upgrade must be completed before mandatory implementation date for continued authorization of the use of agency approval marks.

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2015 Regulatory Compliance Engineering News

Highlights:

1. Implementation date for BIS (India) certification covering adaptors/chargers was moved from 7May2015 to 1December 2015.

2. By March 2016, C-tick is to be replaced by RCM. Labeling with the C-tick mark is allowed prior to this date, and internal PSU labeled with the C-tick before the deadline will NOT need to be re-labeled. However, Australia-bound external power supplies manufactured starting 1 March 2016 shall use the RCM on the label.

3. EN62368-1 becomes mandatory by June 20, 2019. This will replace EN60950 and EN60065. The major design changes were highlighted like capacitor discharge test with single fault condition and use of Y1-caps for primary to earth.

Implementation

EUROPEAN STANDARD **EN 62368-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM August 2014

ICS 33.160.01; 35.020

English Version

Audio/video, information and communication technology equipment - Part 1: Safety requirements
(IEC 62368-1:2014 , modified)

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-06-20
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2019-06-20

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