



TEST REPORT IEC 62368-1

Audio/video, information and communication technology equipment Part 1: Safety requirements

Report Number: 50283317 001

Date of issue 2019-09-26

Total number of pages 139 (excluding attachments, refer to page 3)

Applicant's name.....: WUXI TDK-LAMBDA ELECTRONICS CO LTD

Address Lot 115 High-Tech Zone Wuxi Jiangsu, P. R. China

Test specification:

Standard.....: IEC 62368-1:2014 (Second Edition)

Test procedure CB Scheme

Non-standard test method.....: N/A

Test Report Form No.....: IEC62368_1B

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General disclaimer:

The test results presented in this report relate only to the object tested.

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Test Item description:	Switching Power Supply
Trade Mark:	TDK-Lambda
Manufacturer:	Same as applicant
Model/Type reference:	CUS600My-zxxxxxxx, CME600Ay-zxxxxxxx (y = blank; z = 12, 19, 24, 28, 32, 36 or 48; xxxxxxx =/ADJ, /T, /J, /M, /C, /C2, /SF, /G, /EF, other alphanumeric character, symbol or blank) Refer to page 12 for definition of variables
Ratings:	AC input: 100-240V, 50-60Hz, 4.5A or 7.0A DC output: See the model list on pages 9-11 for details

Testing procedure and testing location:	
	TÜV Rheinland Shanghai Co., Ltd.
Testing location/ address:	No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China
Associated CB Testing Laboratory:	
Testing location/ address	
Tested by (name + signature):	Johnson Ma/
	Technical Expert
Approved by (name + signature):	Sunny Sun/
	Technical Reviewer
☐ Testing procedure: TMP/CTF Stage 1	N/A
Testing location/ address:	
Tested by (name + signature):	
Approved by (name + signature):	
☐ Testing procedure: WMT/CTF Stage 2	N/A
Testing location/ address:	
Tested by (name + signature):	
Witnessed by (name + signature):	
Approved by (name + signature):	
☐ Testing procedure: SMT/CTF Stage 3 or 4	N/A
Testing location/ address:	
Tested by (name + signature):	
Approved by (name + signature):	
Supervised by (name + signature):	

List of Attachments (including a total number of pages in each attachment):

- ATTACHMENT National Differences (31 pages)
- ATTACHMENT Technical documentation (35 pages)
- ATTACHMENT Photo documentation (12 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

Summary of testing:

Tests performed (name of test and test clause):

All applicable tests as described in Test Case and Measurement Sections were performed on models CUS600M-12, CUS600M-19, CUS600M-28, CUS600M-32 and CUS600M-48 to represent others.

The maximum specified operation ambient temperature is 70°C.

Specified ambient temperature for operation is according to manufacturer's specification. (see chart of convection cooling and Forced air cooling on following).

The load conditions used during testing: Maximum normal load according to clause B.2.5 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

The equipment is operated up to 5000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.48 throughout this report.

The test samples are pre-production without serial numbers.

Uncertainty:

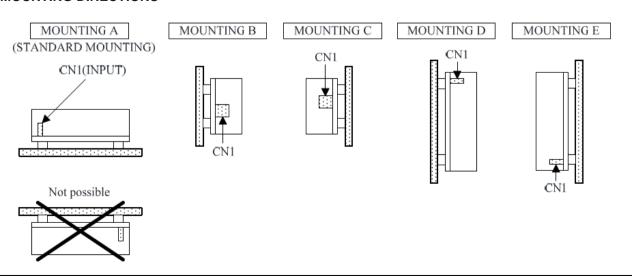
When determining for test conclusion, measurement uncertainty of tests has been considered.

The determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

Testing location:

TÜV Rheinland Shanghai Co. Ltd. No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

MOUNTING DIRECTIONS

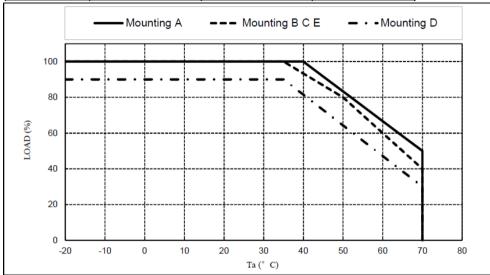


Derating Curve:

Convection cooling condition:

Condition A: Main output is derating according the following, standby mode power is no load.

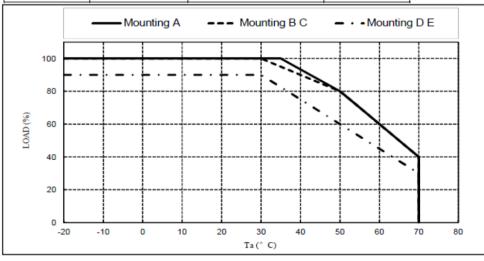
Ta (°C)	Mounting A	Mounting B C E	Mounting D
Ta (C)	LOAD (%)	LOAD (%)	LOAD (%)
-20 - +35	100	100	90
40	100	93.3	81.4
50	83.3	80	64.3
60	66.7	60	47.1
70	50	40	30



Condition B: Main output and standby mode power is derating according the following.

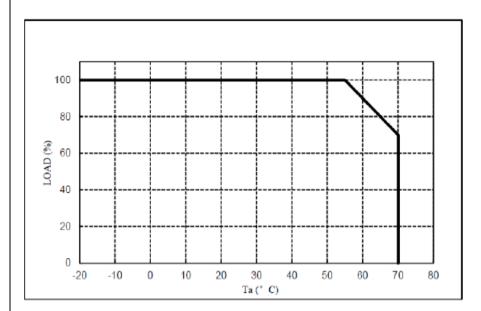
MODEL: ALL MODELS

Ta (°C)	Mounting A	Mounting B C	Mounting D E
1a (°C)	LOAD (%)	LOAD (%)	LOAD (%)
-20 - +30	100	100	90
35	100	95	82.5
40	93.3	90	75
50	80	80	60
60	60	60	45
70	40	40	30



Forced air cooling condition:

Ta (°C)	LOAD (%)
-20 - +55	100
60	93.4
70	70



Summary of compliance with National Differences:

List of countries addressed

EU Group Differences, EU Special National Conditions, AU, CA, DK, JP, NZ, US

Explanation of used codes:

AU = Australia; CA = Canada; DK = Denmark; JP = Japan; NZ = New Zealand; US = United States of America

Note(s):

Countries outside the CB Scheme membership may also accept this report.

☐ The product fulfils the requirements of

IEC 62368-1:2014 (Second Edition),

EN 62368-1:2014+A11:2017 and

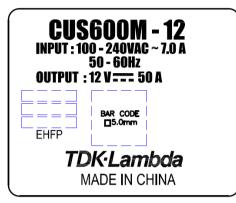
CSA/UL 62368-1:2014

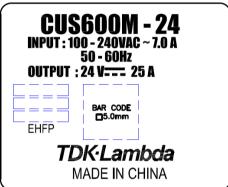
Copy of marking plate:

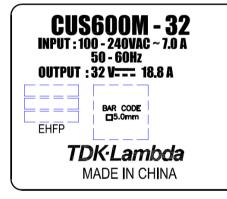
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

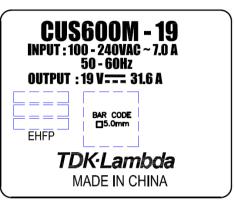
<Representative>

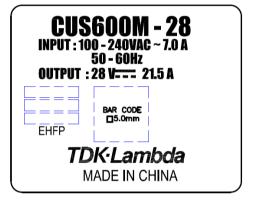
Marking for CUS600M series

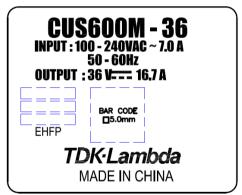


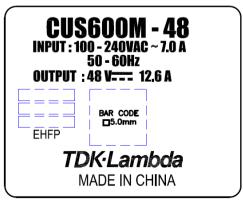






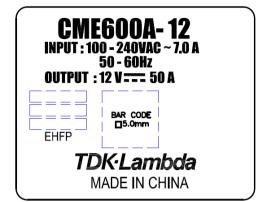


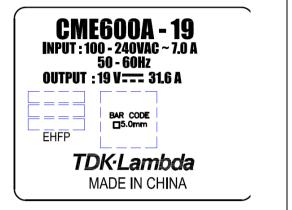


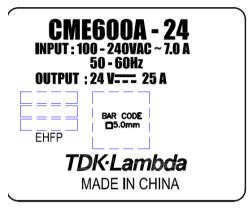


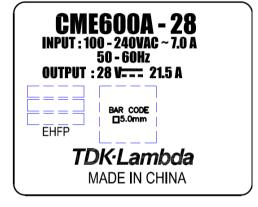
Cont.

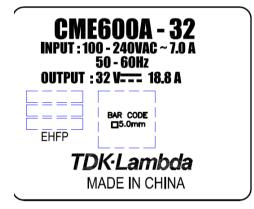
Marking for CME600A series

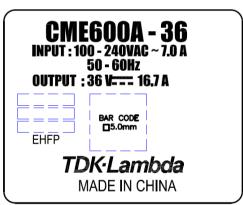


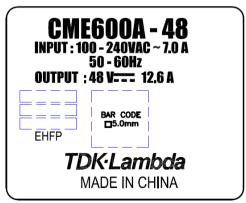












Remark: The rating labels of all models have the same design except for the model designation.

TEST ITEM PARTICULARS:	
Classification of use by:	 ☐ Ordinary person ☑ Instructed person ☐ Skilled person ☐ Children likely to be present
Supply Connection:	 AC Mains □ DC Mains □ External Circuit - not Mains connected - □ ES1 □ ES2 □ ES3
Supply % Tolerance:	
Supply Connection – Type:	 □ pluggable equipment type A - □ non-detachable supply cord □ appliance coupler □ direct plug-in □ mating connector □ pluggable equipment type B - □ non-detachable supply cord □ appliance coupler ☑ permanent connection □ mating connector ☑ other:Terminal block
Considered current rating of protective device as part of building or equipment installation	16 A or 20 A (for US/CSA) Installation location: ⊠ building; □ equipment
Equipment mobility:	 ☐ movable ☐ hand-held ☐ transportable ☐ stationary ☐ for building-in ☐ direct plug-in ☐ rack-mounting ☐ wall-mounted
Over voltage category (OVC):	□ OVC I □ OVC II □ OVC III □ OVC IV □ other:
Class of equipment:	☐ Class I ☐ Class II ☐ Class III ☐ Not classified
Access location:	
Pollution degree (PD)	□ PD 1 □ PD 3
Manufacturer's specified maxium operating ambient	Up to 70 °C
IP protection class:	☐ IP
Power Systems:	
Altitude during operation (m):	☐ 2000 m or less ☐ up to 5000 m
Altitude of test laboratory (m):	
Mass of equipment (kg):	<7

POSSIBLE TES	ST CASE V	ERDICT	S:					
- test case does	not apply to	o the tes	t object	:	N/A			
- test object doe	es meet the	requiren	nent	:	P (P	ass)		
- test object doe	s not meet	the requ	irement	:	F (Fa	ail)		
TESTING:								
Date of receipt	of test item			:	2019	0-06-01		
Date (s) of perfo	ormance of	tests		:	2019-06-01 to 2019-08-19			
GENERAL REI	MARKS:							
"(See ATTACH "(See appende	IMENT #)" ed table)" re	refers to	o additiona a table app	al infor ended	matic to the	pended to the repon appended to the report. as the decimal se	e report.	
Manufacturer's	Declaration	on per si	ub-clause 4	4.2.5 of	f IECE	EE 02:		
			⊠ Y □ N	es ot applicable				
When differences exist; they shall be identified in the General product information section.								
Name and address of factory (ies)								
	2. Zhangjiagang Hua Yang Electronics Co., Ltd. Zhao Feng Industrial Zone, Leyu Town, Zhangjiagang, Jiangsu 215622, P. R. China					own,		
GENERAL PRODUCT INFORMATION:								
 General product information: The PSU is a component type switching mode power supplies intended for the earthed construction or non-earthed construction of medical equipment. For earthed construction (Class I), the PSU need to be reliably earthed and professionally installed and fixed with metal screws. For non-earthed construction (Class II), no earthing connection is required. The PSU need to be fixed so, that it is insulated from any unearthed accessible conductive part by reinforced insulation. Model CME600Ay-zxxxxxxxx is identical to model CUS600My-zxxxxxxxx except for model name. All models are identical, except for the optional chassis, cover, turns of Transformer and the rating of some components which results in different output ratings. See Model List below for details. 								
For rating diffe	erences be	tween th	ne models	see be	olow t	ables:	I	
Series Model	I/p voltage (Vac)	Freq (Hz)	I/p current (A)	Out _l Char	nnel	Minimal output	Rated output (typical)	Maximum output
Convection cooling condition								

					10.8Vdc	12Vdc	12.9Vdc					
CUS600My-				Main	10.	8Vdc – 12.9Vdc						
12 xxxxxxx		50-		output	Normal Rating: 33.4A, 400.8W Max.							
CME600Ay-	100-240	60	4.5		Peak Rating: 5	50A, 600W Max.	(Dynamic)					
12 xxxxxx				Standby	:	5Vdc (Rated)						
				power (Optional)		2A (Rated)						
					17.1Vdc	19Vdc	20.5Vdc					
CUS600M y -				Main	17.	1Vdc - 20.5Vdc						
19 xxxxxx		50-		output	Normal Rat	ing: 21.1A, 400.9	9W Max.					
CME600A y -	100-240	60	4.5		Peak Rating: 31	.6A, 600.4W Ma	x. (Dynamic)					
19xxxxxxx				Standby		5Vdc (Rated)						
				power (Optional)		2A (Rated)						
					21.6Vdc	24Vdc	25.9Vdc					
CUS600M y -				Main	21.	6Vdc – 25.9Vdc,						
24 xxxxx x		50-		output	Normal Rat	ing: 16.7A, 400.8	BW Max.					
CME600A y -	100-240	60	4.5		Peak Rating: 2	25A, 600W Max.	(Dynamic)					
24xxxxxxx				Standby		5Vdc (Rated)						
			power (Optional)		2A (Rated)							
				25.2Vdc	28Vdc	30.2Vdc						
CUS600M y -				Main	Main	25.:	2Vdc – 30.2Vdc,					
28 xxxxx x		50-		4.5 Standby	Normal Rat	ing: 14.3A, 400.4	4W Max.					
CME600A y -	100-240	60	4.5		Peak Rating: 2	1.5A, 602W Max	(Dynamic)					
28xxxxxxx						5Vdc (Rated)						
				power (Optional)		2A (Rated)						
					28.8Vdc	32Vdc	34.5Vdc					
CUS600My-				Main	28.	8Vdc – 34.5Vdc,						
32 xxxxxx		50-		output	Normal Rating: 12.5A, 400W Max.							
CME600Ay-	100-240	60	4.5		Peak Rating: 18.8A, 601.6W Max. (Dynamic)		x. (Dynamic)					
32xxxxxxx				Standby	-	5Vdc (Rated)						
				power (Optional)		2A (Rated)						
					32.4Vdc	36Vdc	38.8Vdc					
			Main	32.	4Vdc – 38.8Vdc,	,						
CUS600My-			output	Normal Rat	ing: 11.1A, 399.6	SW Max.						
36 xxxxxx	100-240	50-	4.5		Peak Rating: 16	.7A, 601.2W Ma	x. (Dynamic)					
CME600Ay- 36xxxxxxx		60		Standby		5 Vdc (Rated)						
COAAAAAA			power		2 A (Rated)							
									(Optional)		. ,	
	100-240		4.5		43.2 Vdc	48 Vdc	51.8 Vdc					

CUS600My-19xxxxxxx	Peak Rating: 12.6A, 604.8W Max. (Dynamics of Vdc (Rated) 2A (Rated) ccity 2.7m/s & air volume 28.6CFM) 10.8Vdc 12Vdc 12.9Vdc 50A 50A 46.6A		
Power (Optional) Forced air cooling condition (airflow: air vertical force)	2A (Rated) ocity 2.7m/s & air volume 28.6CFM) 10.8Vdc 12Vdc 12.9Vdc		
CUS600My-12xxxxxx 100-240 50-60 7.0 Main output CUS600My-12xxxxxx 100-240 50-60 7.0 Main output CUS600My-19xxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-24xxxxxx 100-240 50-60 7.0 Main output CUS600My-24xxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-28xxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-32xxxxxxx 100-240 50-60 7.0 Main output CUS600My-32xxxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-36xxxxxxx 100-240 50-60 7.0 Main output CUS600My-36xxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-36xxxxxxx 100-240 50-60 7.0 Standby Stand	10.8Vdc 12Vdc 12.9Vdc		
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CUS600My- 32xxxxxxx 100-240 50- 60 7.0 Standby power (Optional) CUS600My- 36xxxxxxx 100-240 50- 60 7.0 Main output CME600Ay- CME600Ay- 100-240 50- 60 7.0 Standby	2A (Rated)		
32xxxxxxx 100-240 50-60 7.0 Standby power (Optional) CUS600My-36xxxxxxx 100-240 50-60 7.0 Main output CME600Ay-CME600Ay- 100-240 60 7.0 Standby	28.8Vdc 32Vdc 34.5Vdc		
CME600Ay- 32xxxxxx 100-240 60 7.0 Standby power (Optional) CUS600My- 36xxxxxxx Main output CME600Ay- 50- 60 7.0 Standby	18.8A 18.8A 17.5A		
CUS600My- 36xxxxxxx CME600Ay- 100-240 50- 60 7.0 Standby	5Vdc (Rated)		
CUS600My- 36xxxxxxx CME600Ay- 100-240 50- 60 7.0 Standby	2A (Rated)		
36 xxxxxx CME600A y - 100-240 50- 60 7.0 Standby	32.4Vdc 36Vdc 38.8Vdc		
CME600A y - 100-240 60 7.0 Standby	16.7A 16.7A 15.5A		
26vvvvvv nower	5Vdc (Rated)		
(Optional)	2A (Rated)		
CLICCOOM: Main	43.2Vdc 48Vdc 51.8Vdc		
CUS600My- 48xxxxxxx output	12.6A 12.6A 11.7A		
CME600A y - 100-240 60 7.0 Standby	5Vdc (Rated)		
48xxxxxxx power (Optional)			
Remark:	2A (Rated)		

Operating temp.: up to +70°C (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual). / EF the standby current (2A) is including the fan current (0.3A).

Additional Information:

- The product is a component type switching power supply, the overall compliance shall be investigated in the complete end system/equipment, in particular as:
 - Fire enclosure
 - Mechanical enclosure
 - Electrical enclosure
- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 62368-1, are employed in this product. Their suitability of use has been checked according to clauses 4.1.1 and 4.1.2.
- The product is to be operated up to <u>5000</u> m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.
- The label is draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.
- The input circuit includes one fuse (F1A) in the Line conductor and the other fuse (F1B) is optional in neutral conductor. Consideration shall be given in the end-use product regarding addition of the second fuse having the same or better characteristics in order to comply with fusing requirements of Clause 8.11.5 of the standard.
- The metal enclosure of Class II equipment should be evaluated by end system.
- Recommend by manufacturer as below:

The components listed in the following table must not exceed the temperatures given. To determine the component temperatures the heating test must be conducted in accordance with the requirements of the standard in question. Consideration should also be given to the requirements of other safety standards. Test requirements include: PSU to be fitted in its end-use equipment and operated under the most adverse conditions permitted in the end-use equipment handbook/specification and which will result in the highest temperatures in the PSU. To determine the most adverse conditions consideration should be given to the end use equipment maximum operating ambient, the PSU loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers etc. Temperatures should be monitored using type K fine wire thermocouples (secured with cyanoacrylate adhesive or similar) placed on the hottest part of the component (out of any direct airflow) and the equipment should be run until all temperatures have stabilized.

Circuit Ref.	Description	Max. Temperature (°C)
CN1	Input Connector	105
C1	X Capacitor	100
L2	Common Mode Choke Winding	130
C5,C52	Y Capacitor	125
BD1	Bridge Diode	150
L4	Boost Choke Winding	155
C6	Boost Capacitor	105
Q1	Boost FET	150
T1	Main Transformer Winding	130
T2	Standby Transformer Winding	130
PC103,PC106	Opto-Coupler	110
C51A,C51B,51C, C51D,C51E,C51F	Electrolytic Capacitors	105 (12V,32V,36V,48V) 125 (19V,24V,28V)
C61	Electrolytic Capacitor	105

Note:

PSU = Power Supply Unit

Markings and Instructions

- The installation instruction is provided in English, information regarding:
 - Electrical specification
 - Maximum operating temperature
- Fuse Identification (See subclause F.3.5.3): F1A/F1B: T1.6A 250Vac

Definition of variable(s):

(**y** = blank; **z** = 12, 19, 24, 28, 32, 36 or 48; **xxxxxxx** =/ADJ, /T, /J, /M, /C, /C2, /SF, /G, /EF, other alphanumeric character, symbol or blank)

Variable:	Range of variable:	Content:
у	blank	-
z	12, 19, 24, 28, 32, 36 or 48	Denoting output voltage from 12 Vdc to 48 Vdc.
xxxxxx	blank	Denoting for Standard model
	/ADJ	Denoting output adjustable
	/T	Denoting terminal block connector
	/J	Denoting JST connector
	/M	Denoting molex connector
	/C	Denoting single side PWB coating
	/C2	Denoting double side PWB coating
	/SF	Denoting single fuse
	/G	Denoting low earth leakage current
	/EF	Denoting end fan
	other alphanumeric character, symbol	Used for market purposes, no construction differences and no safety impact.

Additional application considerations – (Considerations used to test a component or sub-assembly) –

The equipment is a component intended for incorporation in audio/video, information and communication technology equipment, the overall compliance shall be investigated in the complete audio/video, information and communication technology equipment.

The power supply cord set was not evaluated together with the equipment. The suitable certified power supply cord set has to be provided in the country where the equipment is sold.

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:

(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.)

(Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.

Electrically-caused injury (Clause 5):

(Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification)

Example: +5 V dc input ES1

Source of electrical energy	Corresponding classification (ES)
Primary circuits (before transformer T1/T2)	ES3
Secondary circuits (After transformer T1, before Q201/Q202)	ES2
Secondary circuits (After Q201/Q202)	ES1
Secondary circuits (After T2)	ES1

Electrically-caused fire (Clause 6):

(Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts):

PS2

Source of power or PIS Corresponding classification (PS)

All primary and secondary circuits except CN61 output PS3

Injury caused by hazardous substances (Clause 7)

(Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.)

Example: Liquid in filled component Glycol

Source of hazardous substances	Corresponding chemical
N/A	N/A

Mechanically-caused injury (Clause 8)

(Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.)

Example: Wall mount unit MS2

Source of kinetic/mechanical energy	Corresponding classification (MS)
N/A	N/A

Thermal burn injury (Clause 9)

(Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.)

Example: Hand-held scanner – thermoplastic enclosure TS1

Source of thermal energy	Corresponding classification (TS)
To be determinied by end-product use	To be determinied by end-product use

Radiation (Clause 10)

(Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product RS1

Type of radiation	Corresponding classification (RS)
N/A	N/A