



FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)
JUNE 2020

SGS

TEST TO CONSIDER: FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

Author: Dan Xie, SGS Electrical & Electronic Consumer

December 20th, 2020 is a critical date for ITE manufacturers as from this date the legacy safety standard IEC60950-1 and its national versions will be replaced by the new standard IEC62368-1 or its national versions in following regions:

- **European Economic Area:** from this date all ITE products to be placed into market shall have EN62368-1:2014 evaluation completed.
- **United States and Canada:** from this date all new applications or major changes to existing reports of UL/CSA60950-1 will not be accepted, while only UL/CSA62368-1(edition 2.0 or 3.0) is acceptable.
- **United Arab Emirates** – from this date all ITE products to be placed on to the market shall have completed an IEC 62368-1:2014 or 2018 version evaluation. (From December 20, 2021, only IEC 62368-1:2018 is acceptable)
- **Other countries'** status to mandate IEC62368-1 is to be updated.

With this conversion date is coming closer, the most frequently asked question by ITE manufacturers is **what tests are required to upgrade my products from IEC60950-1 to IEC62368-1**. Technically speaking, it is not "upgrade" because IEC62368-1 is a totally new standard than IEC60950-1. Anyway, some tests are technically same between IEC60950-1 and IEC62368-1, and therefore these tests could be waived under certain situations.*

So, this question is better described as **under the conditions that IEC62368-1 report can adopt test data from IEC60950-1 for the same product, by considering the different technical requirements what test data can't be adopted from IEC60950-1 report and these tests have to be conducted in accordance with IEC62368-1 requirements**.

This article is to try to answer above question so that the concerned ITE manufacturers could have a quick and easy-to-understand view of what these tests are.

To let the answer be more convenient for different types of ITE products, this article summarizes these tests by 3 tables based on Class III, Class II and Class I product types which are in align with the definition in both IEC60950-1 and IEC62368-1.

Please find these 3 tables below, and wish they are helpful for your products' smooth transition from IEC60950-1 to IEC62368-1.

Also please be noted that:

- 1) This summary is only for IEC standard, for harmonized national standards such as UL and EN please also consider the national differences.
- 2) Internal and external components and subassemblies (typical example is power supply) that comply with IEC 60950-1 or IEC 60065 are acceptable as part of equipment covered by this document without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end-product.
- 3) This summary does not list the complete tests items in the standard, and it only lists out the regular test items. If you need full tests items for your specific product, please work with your partner testing laboratory to get it.

Note*: depends on what kind of application and which testing laboratory you are handling with, normally an EN62368-1 CE LVD report can adopt test data from the EN60950-1 report from the same product for same testing laboratory, and an IEC62368-1 CB report might adopt test data from a valid IEC60950-1 CB report per CB OD2020 clause 5.5.

CLASS III PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
When the test environment temperature was not within the range below: IEC62368-1(edition 2.0): 20-25Deg.C IEC62368-1(edition 3.0): 20-30Deg.C	Temperature test under Normal, Abnormal and Single fault conditions	9.2.5	9.3.2	IEC62368-1 has more strict range for environment temperature. Also pay attention to different limit values, especially for wearable products.
Wearable and hand-held products with plastic enclosure	Temperature test under Normal, Abnormal and Single fault conditions	9.2.5	9.3.2	May have tighter limits IEC62368-1(edition 2.0): 48Deg.C IEC62368-1(edition 3.0): 43~48Deg.C
Wireless Charge product	Heating of foreign objects	N/A	9.6	New test requirement
When product enclosure is evaluated as Fire Enclosure.	Stress Relief test [for thermoplastic enclosure]	4.4.4.7, T.8	4.4.3.8, T.8	-
	Steady Force test (30N)	4.4.4.2, T.3	4.4.3.2, T.3	-
	Drop test (350/500mm height) [for product types of hand-held, direct plug-in, transportable or other types defined in the standard clause]	4.4.4.3, T.7	4.4.3.3, T.7	-
	Impact test (410mm height) [for products types that are not the types specified in Drop test above]	4.4.4.4, T.6	4.4.3.4, T.6	-
When product contains <=32mm diameter coin cell battery and can't meet any of 3 conditions below: 1) The product is not for consumer use and sold through special sales channels 2) The product is for consumer use but not in locations where children are likely to be present (instruction content per F.4), 3) The coin cell battery is soldered in place	Stress Relief test [For thermoplastic enclosure or compartment]	4.8.4.2	4.8.4.2	New test requirement
	Battery replacement test [For product with a battery compartment door / cover]	4.8.4.3	4.8.4.3	
	4.8.4.4 Drop test [For product <= 7kg]	4.8.4.4	4.8.4.4	
	4.8.4.5 Impact test [All products]	4.8.4.5	4.8.4.5	
	4.8.4.6 Crush test [For remote controller]	4.8.4.6	4.8.4.6	
When product employs rechargeable lithium battery	Maximum specified charging current & voltage test	M.4.2	M.4.2	
	Highest & Lowest specified charging temperature test	M.4.2	M.4.2	
When product employs rechargeable lithium battery and the product is direct plug-in, hand-held or transportable	Drop test of equipment containing a secondary lithium battery	M.4.4.	M.4.4.	

CLASS III PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
Wall mounted product with specific mount instruction in user manual	Mounting Test 1	8.7.2	8.7.2	Besides downward force test, horizontal force test is also required
Wall or ceiling mounted product without specific mount instruction in user manual	Mounting Test 2	8.7.2	8.7.2	New test method
Wall or ceiling mounted product, and threaded parts such as screws are replied upon for the mounting	Mounting Test 3	8.7.2	8.7.2	New test requirement
The product is portable music player according to IEC62368-1 clause 10.6.1	Applicable Acoustic tests	10.6.3, 10.6.5	10.6.3, 10.6.4, 10.6.6	New requirement for IEC standard (EN has such requirement before)
Product with Controls or display and may be used in locations where children would be present	Horizontal Force test	8.6.5	8.6.5	IEC60950-1: >=25kg and floor standing IEC62368-1(edition 2): >7kg floor standing or non-floor standing IEC62368-1(edition 3): >25kg floor standing or non-floor standing
>7kg product with Controls or display and may be used in locations where children would present	Glass Slide test	8.6.4	8.6.4 only apply to non-floor standing products	New test requirement: 10-degree tilt test with glass surface
Product with handle or construction to lift or carry itself	Handle Strength test	8.8	8.8	Bigger test force
TV or monitor meets all conditions below: 1) having a surface area exceeding 0.1 m2 or a major dimension exceeding 450mm 2) is not CRT type 3) the glass is not laminated	Glass Impact test	4.4.4.6	4.4.3.6	Different test height, and need to judge the size or number of expel glass pieces



CLASS II PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
When the test environment temperature was not within the range below: IEC62368-1(edition 2.0): 20-25Deg.C IEC62368-1(edition 3.0): 20-30Deg.C	Temperature test under Normal, Abnormal and Single fault conditions	9.2.5	9.3.2	IEC62368-1 has more strict range for environment temperature. Also pay attention to different limit values, especially for wearable products.
When product employs X capacitor	Capacitor discharge after disconnection of a connector	5.5.5.2	5.5.5.2	Different test method, test is required even capacitance <0.1uF, single fault of bleeding resistor
Basic Insulation	Electric Strength test (remember Humidity and other needed tests before conducting Electric Strength test)	5.4.9	5.4.9	Higher test voltage: 2500Vac peak
For switching power supply and tape is used as safeguard insulation for the transformer	Working Voltage Measurement (Frequency)	5.4.1.8	5.4.1.8	There are additional solid insulation thickness requirements at 5.4.4.9, and the thickness of insulation tape may not be enough when the frequency of the working voltage is above 200kHz
Non-detachable power supply cord or Non-detachable interconnecting cable of ES2, ES3 or PS3	Strain Relief test	G.7.3.2	G.7.3.2	0.25Nm torque, all Non-detachable interconnecting cables are not required in IEC60950-1
When product contains <=32mm diameter coin cell battery and can't meet any of 3 conditions below: 1) The product is not for consumer use and sold through special sales channels 2) The product is for consumer use but not in locations where children are likely to be present (instruction content per F.4), 3) The coin cell battery is soldered in place	Stress Relief test [For thermoplastic enclosure or compartment]	4.8.4.2	4.8.4.2	New test requirement
	Battery replacement test [For product with a battery compartment door / cover]	4.8.4.3	4.8.4.3	
	4.8.4.4 Drop test [For product <= 7kg]	4.8.4.4	4.8.4.4	
	4.8.4.5 Impact test [All products]	4.8.4.5	4.8.4.5	
	4.8.4.6 Crush test [For remote controller]	4.8.4.6	4.8.4.6	
When product employs rechargeable lithium battery	Maximum specified charging current & voltage test	M.4.2	M.4.2	
	Highest & Lowest specified charging temperature test			
When product employs rechargeable lithium battery and the product is direct plug-in, hand-held or transportable	Drop test of equipment containing a secondary lithium battery	M.4.4.	M.4.4	

CLASS II PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
Wall or ceiling mounted product without specific mount instruction in user manual	Mounting Test 2	8.7.2	8.7.2	New test method
Wall or ceiling mounted product, and threaded parts such as screws are relied upon for the mounting	Mounting Test 3	8.7.2	8.7.2	New test requirement
Product with Controls or display and may be used in locations where children would present	Horizontal Force test	8.6.5	8.6.5	IEC60950-1: $\geq 25\text{kg}$ and floor standing IEC62368-1(edition 2): $>7\text{kg}$ floor standing or non-floor standing IEC62368-1(edition 3): $>25\text{kg}$ floor standing or non-floor standing
$>7\text{kg}$ product with Controls or display and may be used in locations where children would present	Glass Slide test	8.6.4	8.6.4 only apply to non-floor standing products	New test requirement: 10-degree tilt test with glass surface
Product with handle or construction to lift or carry itself	Handle Strength test	8.8	8.8	Bigger test force



SGS

CLASS I PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
When the test environment temperature was not within the range below: IEC62368-1(edition 2.0): 20-25Deg.C IEC62368-1(edition 3.0): 20-30Deg.C	Temperature test under Normal, Abnormal and Single fault conditions	9.2.5	9.3.2	IEC62368-1 has more strict range for environment temperature. Also pay attention to different limit values, especially for wearable products.
When product employs X capacitor	Capacitor discharge after disconnection of a connector	5.5.5.2	5.5.5.2	Different test method, test is required even capacitance <0.1uF, single fault of bleeding resistor
Basic Insulation	Electric Strength test (remember Humidity and other needed tests before conducting Electric Strength test)	5.4.9	5.4.9	Higher test voltage: 2500Vac peak
For switching power supply and tape is used as safeguard insulation for the transformer	Working Voltage Measurement (Frequency)	5.4.1.8	5.4.1.8	There are additional solid insulation thickness requirements at 5.4.4.9, and the thickness of insulation tape may not be enough when the frequency of the working voltage is above 200kHz.
Non-detachable power supply cord or Non-detachable interconnecting cable of ES2, ES3 or PS3	Strain Relief test	G.7.3.2	G.7.3.2	0.25Nm torque, all Non-detachable interconnecting cables are not required in IEC60950-1
All products	Touch Current test for earthing conductor	5.7.4	5.7.5	Use IEC60990 network figure 5 instead of figure 4
When PCB trace is used as protective bonding path	Limited Short Circuit test	Annex R	Annex R	New test requirement
When product contains <=32mm diameter coin cell battery and can't meet any of 3 conditions below: 1) The product is not for consumer use and sold through special sales channels 2) The product is for consumer use but not in locations where children are likely to be present (instruction content perF4), 3) The coin cell battery is soldered in place	Stress Relief test [For thermoplastic enclosure or compartment]	4.8.4.2	4.8.4.2	New test requirement
	Battery replacement test [For product with a battery compartment door / cover]	4.8.4.3	4.8.4.3	
	4.8.4.4 Drop test [For product <= 7kg]	4.8.4.4	4.8.4.4	
	4.8.4.5 Impact test [All products]	4.8.4.5	4.8.4.5	
	4.8.4.6 Crush test [For remote controller]	4.8.4.6	4.8.4.6	
When product employs rechargeable lithium battery	Maximum specified charging current & voltage test	M.4.2	M.4.2	
	Highest & Lowest specified charging temperature test	M.4.2	M.4.2	
When product employs rechargeable lithium battery and the product is direct plug-in, hand-held or transportable	Drop test of equipment containing a secondary lithium battery	M.4.4.	M.4.4	

CLASS I PRODUCTS: TESTS TO CONSIDER FROM IEC60950-1(EDITION 2.2) TO IEC62368-1 (EDITION 2.0 AND 3.0)

APPLICABLE SITUATION	TEST ITEM	IEC62368-1 (EDITION 2.0) CLAUSE NO.	IEC62368-1 (EDITION 3.0) CLAUSE NO.	TEST DIFFERENCE IEC62368-1 VS IEC60950-1
Wall mounted product with specific mount instruction in user manual	Mounting Test 1	8.7.2	8.7.2	Besides downward force test, horizontal force test is also required
Wall or ceiling mounted product without specific mount instruction in user manual	Mounting Test 2	8.7.2	8.7.2	New test method
Wall or ceiling mounted product, and threaded parts such as screws are replied upon for the mounting	Mounting Test 3	8.7.2	8.7.2	New test requirement
Product with Controls or display and may be used in locations where children would present	Horizontal Force test	8.6.5	8.6.5	IEC60950-1: >=25kg and floor standing IEC62368-1(edition 2): >7kg floor standing or non-floor standing IEC62368-1(edition 3): >25kg floor standing or non-floor standing
>7kg product with Controls or display and may be used in locations where children would present	Glass Slide test	8.6.4	8.6.4 only apply to non-floor standing products	New test requirement: 10-degree tilt test with glass surface
Product with handle or construction to lift or carry itself	Handle Strength test	8.8	8.8	Bigger test force
TV or monitor meets all conditions below: 1) having a surface area exceeding 0.1 m2 or a major dimension exceeding 450 mm 2) is not CRT type 3) the glass is not laminated	Glass Impact test	4.4.4.6	4.4.3.6	Different test height, and need to judge the size or number of expelled glass pieces

ABOUT SGS

SGS is the world's leading inspection, verification, testing and certification company. SGS is recognized as the global benchmark for quality and integrity. With more than 94,000 employees, SGS operates a network of over 2,600 offices and laboratories around the world.

WHY SGS

SGS offers a dedicated team of experts with experience in substance analysis, supply chain management and (eco-) toxicology. Further still, SGS has a global network of laboratories, and expertise and consultancy services in electrical and electronic product supply chains enabling a convenient one-stop solution.

For more information, visit www.sgs.com/ee.

WHEN YOU NEED TO BE SURE

SGS