

UL 863

Time-Indicating and -Recording Appliances



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SUMMARY OF TOPICS

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UL 863

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INTRODUCTION

1 Scope

1.1 These requirements cover electrically-operated clocks that form parts of a master clock system, secondary, cost, pay-roll, and other clocks intended primarily for industrial installations; and also time stamps, job-card recorders, timers, and similar time-indicating and -recording appliances. These appliances are intended for use on circuits of 300 volts or less in accordance with the National Electrical Code.

1.2 These requirements do not cover clocks intended primarily for household installations nor do they cover illuminated clocks designed to serve as portable electrical lamps or for other illuminating purposes.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.2.2 Unless indicated otherwise all voltage and current values mentioned in this standard are root mean square (rms).

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

CONSTRUCTION

3 General

3.1 Throughout these requirements the term "thermoplastic" is used to designate a synthetic compound, the basic constituent of which is polyvinyl chloride or a copolymer of vinyl chloride and vinyl acetate.

4 Frame and Enclosure

4.1 General

4.1.1 An appliance shall be formed and assembled so that it has the strength and rigidity to resist the abuses to which it is likely to be subjected, without increasing the risk of fire, electric shock, or injury to persons due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious defects.

4.1.2 An edge, projection, or corner of an enclosure, opening, frame, guard, knob, handle, or similar part of an appliance shall be smooth and rounded and not sufficiently sharp to cause a cut type injury when contacted during normal use or user maintenance.

4.1.3 An electrical part of an appliance shall be located or enclosed so that persons will not unintentionally contact a live part, unless the voltage on the part is 30 volts or less or the available current measured through a 1500-ohm, noninductive resistor is 5 milliamperes or less.

4.1.4 Unless the appliance is marked in accordance with 33.1, a device such as a lampholder, fuseholder, circuit breaker, or a replaceable tape shall be designed and installed so that persons servicing the lamps, fuses, circuit breakers, or other devices will not unintentionally contact any uninsulated live part other than a screw shell or the clips of a fuseholder.

4.1.5 The enclosure of an appliance shall be complete. No dependence shall be placed on adjacent walls or equipment to complete an enclosure.

Exception: An elapsed time indicator may have an incomplete enclosure if the indicator has provision for panel mounting so that uninsulated live parts and internal wiring are completely enclosed after installation.

4.1.6 The enclosure of a stationary appliance shall be provided with means for support. Mounting holes shall be located or guarded so that nails or similar hangers will not come in contact with any bare, covered, or insulated live part.

4.1.7 For unreinforced, flat surfaces in general, cast metal shall be not less than 1/8 inch (3.2 mm) thick.

Exception No. 1: Malleable iron may be not less than 3/32 inch (2.4 mm) thick, and die-cast metal may be not less than 5/64 inch (2.0 mm) thick.

Exception No. 2: For a curved, ribbed, or otherwise reinforced surface, or if the shape and/or size of the surface is such that equivalent mechanical strength is provided, cast metal in general may be not less than 3/32 inch, malleable iron may be not less than 1/16 inch (1.6 mm), and die-cast metal may be not less than 3/64 inch (1.2 mm) thick.

4.1.8 If threads for the connection of metal conduit are tapped all the way through a hole in a box wall, or if an equivalent construction is used, there shall be not fewer than 3-1/2 and not more than 5 threads in the metal, and the construction of the device shall be such that a suitable conduit bushing can be properly attached. If threads for the connection of conduit are not tapped all the way through a hole in the box, wall, conduit hub, or the like, there shall be no fewer than 5 full threads in the metal, and there shall be a smooth, well-rounded inlet for the conductors that shall:

- a) Afford protection to the conductors equivalent to that provided by a standard conduit bushing and
- b) Have an internal diameter approximately the same as that of the corresponding trade size of rigid metal conduit.

4.1.9 An enclosure of sheet metal is to be judged with regard to its size, shape, thickness of metal, and its suitability for the particular application, considering the intended use of the complete appliance. The use of sheet steel having a thickness of less than 0.026 inch (0.66 mm) if uncoated or 0.029 inch (0.74 mm) if galvanized or of nonferrous sheet metal having an average thickness of less than 0.036 inch (0.91 mm) is not recommended.

Exception: Sheet metal thinner than that described may be used for relatively small areas or for surfaces that are covered or otherwise reinforced.

4.1.10 Among the factors taken into consideration when judging a nonmetallic enclosure or an enclosure of magnesium are:

- a) Mechanical strength,
- b) Resistance to impact,
- c) Moisture-absorptive properties,
- d) Combustibility, and
- e) Resistance to distortion at temperatures to which the material may be subjected under conditions of normal or abnormal usage.

4.1.11 If a flush plate facilitating mounting of a clock on an outlet box is provided as an integral part of the clock or is packaged or otherwise provided with the clock, the plate shall be made of one of the materials indicated in Table 4.1, and shall be at least as thick as indicated in that table.

Table 4.1
Thickness of flush plates

Acceptable material	Minimum acceptable thickness at any point of plate,	
	inch	(mm)
Ferrous metal	0.030	0.76
Nonferrous metal	0.040	1.02
Noncombustible electrical insulating material	0.100	2.54

4.2 Doors and covers

4.2.1 A door or cover that is accessible from outside the enclosure shall be hinged if it gives access to any kind of overload protective device that is required to be enclosed.

Exception: A cover, panel, door, or other part of the enclosure that, by its function, obviously must be in place if the appliance is to operate properly, need not be permanently attached.

4.2.2 Means shall be provided for holding the door or cover over a fuseholder in a closed position. The door or cover shall be tight-fitting.

5 Protection Against Corrosion

5.1 An iron or steel part shall be protected against corrosion by enameling, galvanizing plating, or other equivalent means, if the failure of such a part would be likely to result in the risk of fire, electric shock, or injury to persons.

Exception No. 1: If the oxidation of iron or steel from exposure of the metal to air and moisture is not likely to be appreciable (thickness of metal and the temperature also being factors), the surfaces of sheet steel and cast-iron parts within an enclosure need not be protected against corrosion.

Exception No. 2: The requirement in 5.1 does not apply to bearings or laminations or to minor parts of iron or steel (such as washers, screws, and the like).

6 Mechanical Assembly

6.1 An appliance shall be assembled so as not to be affected adversely by the vibration of normal operation.

6.2 A switch, fuseholder, lampholder, receptacle, plug connector, or other component that is handled by the user shall be mounted securely, and shall be prevented from turning.

Exception No. 1: The requirement that a switch be prevented from turning may be waived for a switch that is normally operated by mechanical means rather than by direct contact by persons if all three of the following conditions are met:

- a) The switch is a plunger or other type that does not tend to rotate when operated. A toggle switch is considered subject to forces that tend to turn the switch during normal operation.*
- b) The means of mounting makes it unlikely that operation can loosen the switch.*
- c) The spacings cannot be reduced below the minimum acceptable values if the switch does rotate.*

Exception No. 2: A lampholder of a type in which the lamp cannot be replaced (such as a neon pilot or indicator light in which the lamp is sealed in by a nonremovable jewel) need not be prevented from turning if rotation cannot reduce spacings below the minimum acceptable values.

6.3 The means for preventing the turning specified in 6.2 shall consist of more than friction between surfaces – for example, a lock washer, properly applied, is acceptable as a means to prevent turning of a small stem-mounted switch or other device having a single-hole mounting means.

7 Supply Connections – Cord-Connected Appliances

7.1 Cords and plugs

7.1.1 A cord-connected appliance shall be provided with a length of flexible cord and an attachment plug for connection to the branch-circuit supply.

7.1.2 A job-card recorder, elapsed-time indicator, or a time stamp shall be provided with a cord not less than 6.0 feet (1.8 meters) long, having a grounding conductor and a grounding-type attachment plug. The grounding conductor in a flexible cord shall be green with or without one or more yellow stripes, and shall be conductively connected to all exposed dead metal parts and to all dead metal parts inside the enclosure that are exposed to contact during any servicing operation (including maintenance and repair) and that are likely to become energized.

7.1.3 The attachment plug of the power supply cord of an appliance provided with a 15- or 20-ampere general-use convenience receptacle shall be of the 3-wire grounding type. The attachment plug of the power supply cord of all other appliances shall be polarized.

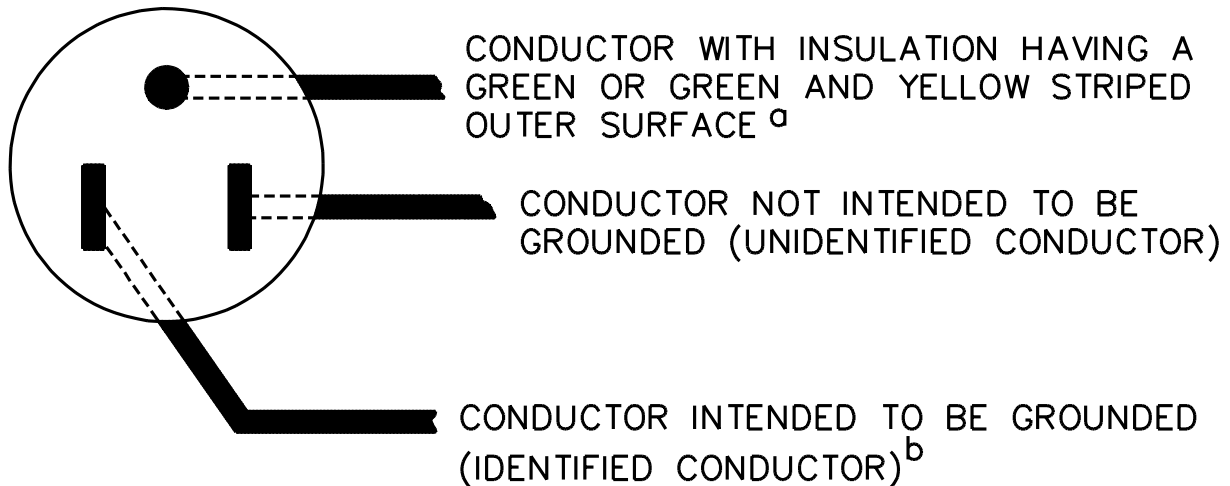
7.1.4 A 3-wire grounding-type attachment plug or a 2-wire polarized attachment plug shall be provided. The attachment plug connections shall comply with Figure 7.1, and the polarity identification of the flexible cord shall comply with Table 7.1.

Table 7.1
Polarity identification of flexible cords

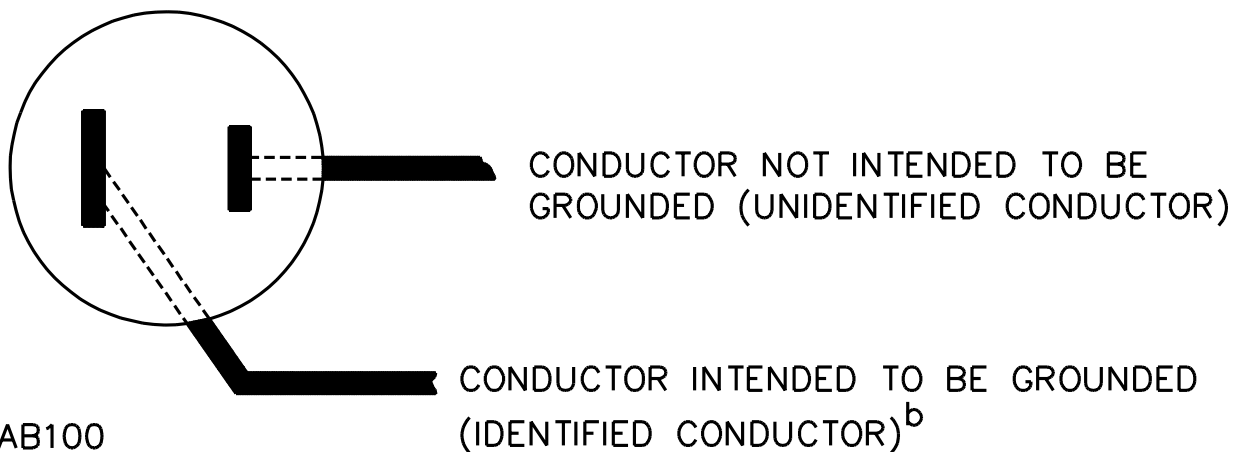
Method of investigation	Acceptable combinations	
	Wire intended to be grounded ^a	All other wires ^a
Color of braids on individual conductors	A Solid white or gray – without tracer	Solid color other than white or gray – without tracer
	B Color other than white or gray – with tracer in braid	Solid color other than white or gray – without tracer
Color of insulation on individual conductors	C ^b Solid white or gray	Solid color other than white or gray
	C1 ^c Light blue	Solid color other than light blue, white, or gray
Color of separators	D ^d White or gray	Color other than white or gray
Other means	E ^e Tin or other white metal on all strands of the conductor	No tin or other white metal on the strands of the conductor
	F ^d A stripe, ridge, or groove on the exterior surface of the cord	
^a A wire finished to show a green color with or without one or more yellow stripes or tracers is to be used as an equipment grounding conductor. See 7.2.1 and Figure 7.1. ^b Only for cords – other than Types SP-1, SP-2, and SPT-1 – having no braid on any individual conductor. ^c For jacketed cord. ^d Only for Types SP-1, SP-2, SPT-1, and SPT-2 cords. ^e Only for Types SPT-1 and SPT-2 cords.		

Figure 7.1
Connection to attachment plug

CONNECTIONS OF CORD CONDUCTORS TO GROUNDING – TYPE
ATTACHMENT PLUG (FACE OF PLUG REPRESENTED)



CONNECTIONS OF CORD CONDUCTORS TO POLARIZED
ATTACHMENT PLUG (FACE OF PLUG REPRESENTED)



^a In the above illustration, the blade to which the green conductor is connected may have a U-shaped or a circular cross section.

^b Signifies a conductor identified in accordance with Table 7.1.