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**SAFETY REQUIREMENTS FOR CORD EXTENSION
SETS 230 V/13 A**

ICS: 29.120.30

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FOREWORD

Saudi Standards, Metrology and Quality Organization (SASO) has prepared the Saudi Standard SASO 2815:2021 “Safety requirements for Cord Extension Sets- 230 V/13 A” based on BS 1363-2:2016+A1:2018 “13 A plugs, socket-outlets, adaptors and connection units- Part 2: Specification for 13 A switched and unswitched socket-outlets” and IEC 60884-2-7:2011 “Plugs and socket-outlets for household and similar purposes - Part 2-7: Particular requirements for cord extension sets” .

This standard after approval will replace and supersede SASO 2815:2010 “Safety requirements for Cord Extension Sets”.

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SAFETY REQUIREMENTS FOR CORD EXTENSION SETS 230 V/13 A

1.0 SCOPE AND OBJECT

This Saudi standard applies to cord extension sets (fused plug, 3 core flexible cables and portable socket-outlets with supplementary over current protection) for household, commercial and light industrial purposes, with particular reference to safety in normal use. Cord extension sets are suitable for the connection of appliances, sound-vision equipment, luminaires, etc. in a.c. circuits only, operating at rated voltage of 230 V r.m.s. at 60 Hz having rated current of 13A, using plug accordance with SASO 2203.

13A Fused plugs of cord extension sets having insulating sleeves on line and neutral pins. The plug may be rewirable or non-rewirable complete with 3 core flexible cable with nominal cross-sectional area of 1.5 mm² and 2.5 mm². The plugs shall incorporate a fuse complying with BS 1362.

This standard does not applies to 13 A plugs which have the metallic earth pin replaced with a similarly dimensioned protrusion made of insulating material designated as an insulated shutter opening device (ISOD) designed to operate the shutter mechanism of a socket-outlet.

Plugs containing switches and devices other than indicator lamps are outside the scope of this standard.

13 A shuttered portable socket-outlets of cord extension sets may be in single or multiple arrangements with or without switches which can be powered from 13A fixed socket outlet system complies SASO 2203.

Portable socket-outlets containing devices other than supplementary over current protection, switches, USB charging outlets, surge protective devices and indicator lamps are outside the scope of this standard.

Fixed socket-outlets are outside the scope of this standard.

This standard supersedes SASO 2815:2010 with respect to its specific rating and test requirements according to the Kingdom of Saudi Arabia requirements. Reference standard tests are performed with this standard specified value e.g. rated voltage is 230V r.m.s. at 60Hz.

Manufacturers shall produce the cord extension sets consists at least with fused plug, flexible cable and portable socket-outlet with supplementary over current protection. Supplying of rewirable portable socket-outlet alone to end-user is not allowed.

1.1 CONDITIONS FOR USE AND TESTING

1.1.1 Conditions of use

Cord extension sets shall be suitable for use under the following conditions:

- a) An ambient temperature in the range -5°C to $+40^{\circ}\text{C}$, the average value over 24 h not exceeding 25°C ;
- b) a situation not subject to exposure to direct radiation from the sun or other source of heat likely to raise temperatures above the limits specified in a);
- c) An altitude not exceeding 2 000 m above sea level;
- d) An atmosphere not subject to abnormal pollution by smoke, chemical fumes or other abnormal conditions as described in clause 2 of BS 1363-2.

1.1.2 Conditions for testing

Cord extension sets used for the tests shall be representative of normal production items in respect of all details which may affect the test results.

Unless otherwise specified in this standard, the portable socket outlets of cord extension set shall be tested as per clause 5 in BS 1363-2.

No extra requirements for components (plug, supplementary over current protection and cables) to be applied and relevant tests shall not be repeated if they comply with their relevant SASO standard.

All inspections and tests, of any one classification, shall be carried out as specified in the relevant clauses listed in this standard and the relevant schedule of tests given in clause 5.1 Table 1 in the reference standard BS 1363-2 on the number of samples in the sample column and in the order given.

2.0 REFERENCES

The following referenced documents are indispensable for the application of this SASO Standard. The latest edition of the referenced document (including any amendments) applies.

- 2.1 BS 1362, General purpose fuse links for domestic and similar purposes (primarily for use in plugs).
- 2.2 BS 1363-1, 13A plugs socket-outlets, adaptors and connection units - Part 1: Specification for rewirable and non-rewirable 13 A fused plugs.
- 2.3 BS 1363-2, 13 A plugs, socket-outlets, adaptors and connection units - Part 2: Specification for 13 A switched and unswitched socket-outlets.
- 2.4 IEC 60227 (all parts), Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V
- 2.5 IEC 60245 (all parts), Rubber insulated cables – Rated voltages up to and including 450/750 V
- 2.6 IEC 60884-2-7, Plugs and socket-outlets for household and similar purposes - Part 2-7: Particular requirements for cord extension sets
- 2.7 SASO IEC 60934, Circuit-breakers for Equipment (CBE).
- 2.8 SASO 2203, Plugs and socket-outlets for household and similar purpose-safety requirements and test methods 250V /13A.

3.0 DEFINITIONS

Throughout this standard the definitions of the BS 1363-2 applies.

4.0 MATERIALS, DESIGN AND CONSTRUCTION

The following requirements shall be met for the cord extension sets:

4.1 Materials and construction

4.1.1 Cord extension sets shall be so designed and constructed that, in normal use, their performance is reliable and without danger to the user or the surroundings within the meaning of this standard.

Components (plug, portable socket-outlets with supplementary over current protection, flexible cable) of the cord extension sets shall be fully compliant with, and have been verified against, the relevant SASO standards for those components.

4.1.2 The materials used in the component parts shall be in accordance with Table (1).

Table (1) – Materials and components parts

PART	MATERIAL
Non-resilient base and cover of a plug, portable socket-outlet (non-metallic).	Moulded, tough, non-ignitable insulating material.
Resilient base or resilient covers of a plug and portable socket-outlet.	Rubber or other insulating materials free from blisters, cracks, embedded impurities and defects likely to affect insulating and mechanical protecting properties.
Portable socket-outlet base.	An insulating material with rigid mechanical characteristics and no flame propagating characteristics like suitable grade of Poly Carbonates (PC) and/or suitable equivalent material.
Current carrying parts.	Brass, phosphor-bronze, and/or suitable equivalent material.
Shutter.	Moulded, tough, non-ignitable insulating material.
3 core flexible cable.	Conductor: Circular flexible copper. Insulation and outer sheath: PVC or Rubber.

4.1.3 Moulded insulating material shall be non-hygroscopic and shall be resistant to the formation of carbonized paths.

4.1.4 Parts made of ferrous material shall be treated to resist rusting.

4.1.5 Conformity shall be checked by inspection and/or relevant tests in this standard and the reference standards.

4.2 Terminals and terminations

- 4.2.1 Terminals and terminations shall provide for effective clamping and securing of conductors connected to them, so that efficient electrical connection is made. Supply input terminal or termination shall be provided for rewirable portable socket-outlet with screw type terminals and for non-rewirable socket-outlets with welded or similar permanent joints. All other joints inside of portable socket-outlet shall be welded, crimped or similar permanent joints.
- 4.2.2 Conformity shall be checked by inspection and/or relevant tests in this standard and clause 11 in the reference standard BS1363-2

4.3 Plugs

- 4.3.1 Plugs shall comply with the relevant dimensional standard figures in the reference standard BS 1363-1.
- 4.3.2 Conformity shall be checked by inspection, measurement, by the use of the gauges and/or relevant tests as described in this standard and the reference standard BS 1363-1.

4.3.3 Fuses

The plug shall be provided with a fuse inside it. This fuse shall fulfill the following:

- 4.3.3.1 Fuses shall have rating not exceeding 13A.
- 4.3.3.2 Conformity shall be checked by inspection and/or relevant tests in this standard and the reference standard BS 1362.

4.4 Portable socket-outlets of cord extension set

- 4.4.1 Portable socket-outlets shall comply with the relevant dimensional standard figures in the reference standard BS 1363-2.
- 4.4.2 The portable socket-outlet shall be either of the following.
- a) Single or multiple
 - b) Rewirable or non-rewirable
 - c) With or without a switch
 - d) With or without an indication lamp
 - e) With or without USB charging outlet
 - f) With or without surge protector
 - g) IP rated or not, and for IP rated portable socket-outlets there are two categories:
 - portable socket-outlets having an IP rating with the plug inserted.
 - portable socket-outlets having an IP rating only when no plug is inserted.
- 4.4.3 Spacing between two adjacent socket outlets of multiple portable socket outlets shall be provided with sufficient distance to insert adjacent plugs without any overlap each other. The minimum distance between two adjacent socket outlets, i.e. right side edge of line pin aperture of one socket-outlet to left side edge of neutral pin aperture of next socket-outlet shall be 22 mm.

Conformity shall be checked by inspection, measurement, by the use of the gauges and/or relevant tests as described in this standard and the reference standard BS 1363-2.

4.4.4 Switches

4.4.4.1 If the cord extension set is provided with a switch, it shall be a double pole.

4.4.4.2 Conformity shall be checked by inspection, by relevant tests as described in this standard and the reference standard BS 1363-2.

4.4.5 USB charging outlet and Surge protective devices

4.4.5.1 If the cord extension set is provided with a USB charging outlet, the outlet shall be of the characteristics of the USB outlet specified in annex I from reference standard BS 1363-2.

4.4.5.2 If the cord extension set is provided with a surge protective device, it shall have characteristics as specified in annex I from reference standard BS 1363-2.

4.4.5.3 Conformity shall be checked by inspection, measurement, by relevant tests as described in this standard and annex I from reference standard BS 1363-2.

4.4.6 Shutters

4.4.6.1 Portable socket-outlets shall be provided with shutters.

4.4.6.2 Conformity shall be checked by inspection, measurement, by the use of the gauges and/or relevant tests as described in this standard and the reference standard BS 1363-2.

4.4.7 Supplementary over current protection

4.4.7.1 Cord extension sets shall be provided with supplementary over current protection having same rating of the cord extension set irrespective of single or multiple portable socket-outlets.

The over current protective device shall be automatic trip-free, manual-reset type and shall be connected between the power supply cord and the socket-out.

Over current protective device incorporated with cord extension set is not intended to be a substitute for branch circuit protection.

4.4.7.2 Conformity shall be checked by inspection and relevant tests as described in this standard and the reference standard SASO IEC 60934.

Three previously untested cord extension sets are to be subjected to “over current test” each one shall be tested once.

4.5 Flexible cable

- 4.5.1 Type, length of the flexible cable and nominal cross sectional area of the conductors of cord extension sets shall comply with Table (2):

Table (2) –Type, length of the flexible cable and nominal cross-sectional area of the conductors of cord extension sets

Lightest type of flexible cable	Minimum nominal cross sectional area of the conductors	Maximum length of the flexible cable
60227 IEC 53 or 60245 IEC 53	1.5 mm ²	5m
	2.5 mm ²	30m
NOTE Cord extension sets for outdoor use shall be provided with cable type 60245 IEC 53 or equivalent.		

The length of the cable is measured between the operating faces of the plug and the portable socket-outlet. In the case of multiple socket-outlets the measurement is taken to the socket-outlet closest to the plug.

- 4.5.2 Conformity shall be checked by inspection and measurement.

4.6 Connection of flexible cables and cable anchorage

- 4.6.1 Cord extension sets shall be provided with proper connections of flexible cables and cable anchorages to ensure the safety during normal usage.
- 4.6.2 Conformity shall be checked by inspection and relevant tests as described in clause 19 in the reference standard BS 1363-2.

4.7 Clearance and creepage distances

- 4.7.1 Clearance and creepage distances shall comply with the relevant clause/sub clauses in the reference standard.
- 4.7.2 Conformity shall be checked by inspection, measurement, and/or relevant tests as described in this standard and clause 8 in the reference standard BS 1363-2.

5.0 RATING AND CHARACTERISTICS**5.1 Rating, shape and dimensions**

The rating of cord extension sets, shape and dimensions of portable socket-outlets of cord extension sets shall be as follows:

- 5.1.1 13A earth pin operated or any two or more pin operated shuttered portable socket-outlet with an earthing contact.
- 5.1.2 The rated current of the cord extension set shall be the lowest value from

- a) The rated current of the plug; or
- b) The rated current of the supplementary over current protective device.

5.1.3 Conformity shall be checked by inspection, measurement by the use of the gauges and/or relevant tests as described in this standard and clauses 5 and 6 of the reference standard BS 1363-2.

5.2 Protection against electric shock

5.2.1 Cord extensions sets shall be so constructed that when they are mounted and wired as in normal use, live parts are not accessible.

5.2.2 Conformity shall be checked by inspection, measurement, by the use of the gauges and/or relevant tests as described in this standard and clause 9 in the reference standard BS 1363-2.

5.3 Insulation resistance

5.3.1 The insulation resistance for the portable socket-outlets shall be not less than the relevant values specified in clause 15 of the reference standard BS 1363-2.

5.3.2 Conformity shall be checked by relevant tests as described in this standard and clause 15 of the reference standard BS 1363-2.

5.4 Electrical strength

5.4.1 Cord extension sets shall withstand a high voltage test and pass a temporary high voltage without any flash over or breakdown of insulation.

5.4.2 Conformity shall be checked by relevant tests as described in this standard and clause 15 of the reference standard BS 1363-2.

5.5 Temperature rise

5.5.1 The temperature rise measured for any part shall not exceed the relevant values specified in BS 1363-2 for portable socket-outlets of cord extension sets.

5.5.2 Conformity shall be checked by relevant tests as described in this standard and clause 16 of the reference standard BS 1363-2.

5.6 Contact resistance

5.6.1 The resistance between the earthing terminal or termination of portable socket-outlet and any other nominated metal part shall not exceed the relevant values specified in BS 1363-2.

5.6.2 Conformity shall be checked by relevant tests as described in this standard and clause 10 of the reference standard BS 1363-2.

5.7 Current breaking capacity

5.7.1 The breaking capacity of socket contacts and switches incorporated in portable socket-outlets shall be adequate.

5.7.2 Conformity shall be checked by the tests described in the clause 17 of the reference standard BS 1363-2 as applicable.

5.8 Normal operation

- 5.8.1 Portable socket-outlets and switches shall withstand, without excessive wear or other harmful effects, the electrical and mechanical stresses occurring in use.
- 5.8.2 Conformity shall be checked by the tests described in the clause 18 of the reference standard BS 1363-2.

5.9 Resistance to heat

- 5.9.1 Cord extension sets shall be resistant to heat.
- 5.9.2 Conformity shall be checked by the tests described in the clause 22 of the reference standard BS 1363-2.

5.10 Mechanical strength

- 5.10.1 Cord extension sets shall have adequate mechanical strength and be so constructed as to withstand such handling as may be expected in normal use.
- 5.10.2 Conformity shall be checked by the tests described in the clause 20 of the reference standard BS 1363-2.

5.11 Resistance to abnormal heat and fire

- 5.11.1 Cord extension sets shall be proof against abnormal heat, fire and tracking.
- 5.11.2 Conformity shall be checked by the glow wire test described in the clause 23 of the reference standard BS 1363-2.

5.12 Resistance to ageing, resistance to humidity and protection provided by enclosures**5.12.1 Resistance to ageing**

- 5.12.1.1 Cord extension sets shall be resistance to aging.
- 5.12.1.2 Conformity shall be checked by the test described in the clause 14 of the reference standard BS 1363-2.

5.12.2 Resistance to humidity

- 5.12.2.1 Cord extension sets shall be proof against humid conditions which may occur in normal use.
- 5.12.2.2 Conformity shall be checked by the test described in the clause 14 of the reference standard BS 1363-2.

5.12.3 Protection provided by enclosures

- 5.12.3.1 Cord extension sets shall provide protection against access to hazardous parts, against harmful effect due to ingress of solid foreign objects and against effects due to ingress of water in accordance with the IP classification of the cord extension set.
- 5.12.3.2 Conformity shall be checked by the test described in the clause 14 of the reference standard BS 1363-2.

5.13 Resistance to excessive residual stresses and to rusting

- 5.13.1 Press-formed or similar current-carrying parts of copper alloy containing less than 80% of copper shall be resistant to failure in use due to stress corrosion.
- 5.13.2 Ferrous parts, the rusting of which might cause the unit to become unsafe, shall be adequately protected against rusting.
- 5.13.3 Conformity shall be checked by the tests described in the clause 24 of the reference standard BS 1363-2.

6.0 TESTS

- 6.1 For all types of cord extension sets which are newly produced or delivered for the first time, a sample shall be selected at random for type approval.
- 6.2 Type tests of portable socket-outlets shall be carried out on the samples selected in accordance with clause 5 of the reference standard BS 1363-2.
- 6.3 Conformity shall be checked by the tests described in "Table 1 - schedule of tests" for portable socket-outlets from the reference standard BS 1363-2. One additional cord extension set shall submit to confirm the specific test requirements of this SASO standard which not covered in reference standard.
- 6.4 Routine tests are specified in annex A of this standard.

7.0 MARKING

- 7.1 Each cord extension set shall have the following information clearly and durably marked on it, in Arabic or English.
 - a. Country of origin
 - b. Manufacturer's or responsible vendor's name, trade mark or identification mark.




NOTE: This marking for cord extension set is necessary only if the manufacturer of the cord extension set is different to the manufacturer of the portable socket-outlet. The marking of the name, trade mark or identification mark of the manufacturer or responsible vendor may for example be applied on a sleeve or label provided around the cord.
 - c. Type reference which may be a catalogue number.

NOTE: For a cord extension set, the type reference, which may be a catalogue number, may be placed on the smallest packaging unit.
 - d. Rated current in amperes.
 - e. Rated voltage in volts.
 - f. Identification of each of the live, the neutral and the earthed pole.
 - g. For fused plugs, the word "Fuse" or "Fused" or symbol.
 - h. Power in watts.

The marking of power shall be completed by the word MAX. The power is calculated using nominal supply voltage in volts and a power factor $\cos \phi = 1$. (examples: MAX 2990 W or 2990 W MAX)

The maximum admissible power marking shall not be hidden by any inserted plug.
 - i. Cord extension sets with IP 20 or IP 41 shall be marked clearly as indoor use only.

j. If symbols are used they shall be as follows:

- Amperes : A
- Volts : V
- Fuse : 
- Neutral or live : N or L
- Earth : E or 
- Fused live : L
- Watt : W
- Indoor use only : 

Note 1: For rough use plugs and portable socket-outlets, the reference Standard's number (SASO or BS) shall be followed by "/A".

Note 2: where the declared IP classification is higher than IP20 then the IP classification shall be marked (IPXX). The IP of cord extension set is the same as lowest protection degree of the plug and the portable socket outlet.

7.3 Conformity shall be checked by the inspection and tests described in the clause 7 of the reference standard BS 1363-2.

Annex A :**Safety-related routine tests for factory-wired portable accessories
(protection against electric shock and correct polarity)****A.1 General Remarks**

All factory-wired plugs and portable socket-outlets shall be subjected to tests specified in clauses A.2, A.3 and A.4.

The test equipment or manufacturing systems shall be such that failed products are either made unfit for use or separated from satisfactory products in such a way that they cannot be released for sale.

NOTE: “Unfit for use” means that the accessory is treated in such a way that it cannot fulfil the intended function. It is, however, accepted that repairable products (by a reliable system) may be repaired and re-tested.

It shall be possible by process or manufacturing system to identify that accessories released for sale have been subjected to all the appropriate tests.

The manufacturers shall maintain records of the tests carried out which show

- the type of product;
- the date of test;
- the place of manufacture (if manufacture in more than one place)
- the quantity tested;
- the number of failures and actions taken, i.e. destroyed/repaired.

The test equipment shall be checked before and after each period of use and for periods of continuous use, at least once every 24 h. During these checks the equipment shall show that it indicates faults when known faulty products are inserted or simulated faults are applied.

Products manufactured prior to a check shall only be released for sale if the check is found satisfactory.

Test equipment shall be verified (calibrated) at least once a year. Records shall be kept of all checks and any adjustments found necessary.

A.2 Polarized systems, phase (L) and neutral (N) – correct connection

For polarized systems the test shall be made using SELV applied for a period of not less than 2 s:

NOTE 1: The period of 2 s may be reduced to not less than 1 s on test equipment with automatic timing.

- for plugs and portable socket-outlets, between the remote end of the L and N conductors of the flexible cable independently, and the corresponding L and N pin or contact of the accessory;
- for cord extension sets, between the L and N pin at one end of the flexible cable and the corresponding L and N contact at the other end of the flexible cable.

Polarity shall be correct.

A.3 Earth continuity

The test shall be made using SELV applied for a period of not less than 2 s:

NOTE 1: The period of 2 s may be reduced to not less than 1 s on test equipment with automatic timing.

- for plugs and portable socket-outlets, between the remote end of the earth conductor of the flexible cable, and the earth pin or contact of the accessory, as appropriate;
- for cord extension sets, between the corresponding earth pin or earth contact of the accessory at each end of the flexible cable.

Continuity shall be present.

A.4 Short-circuit/wrong connection and reduction of creepage distance and clearances between phase (L) or neutral (N) to earth (⊕)

The test shall be made by applying at the supply end, e.g. to a plug, for a period of not less than 2 s:

- 2000 V \pm 10 % for accessories having rated voltage of 230 V;

NOTE 1: The period of 2 s may be reduced to not less than 1 s on test equipment with automatic timing.

or

- applying an impulse voltage test using a 1.2/50 μ s waveform of 4 kV peak value and three impulses for each pole, with intervals of not less than 1 s:
 - between L and ⊕,
 - between N and ⊕.

NOTE 2: L and N may be connected together for this test.

No flashover shall occur.

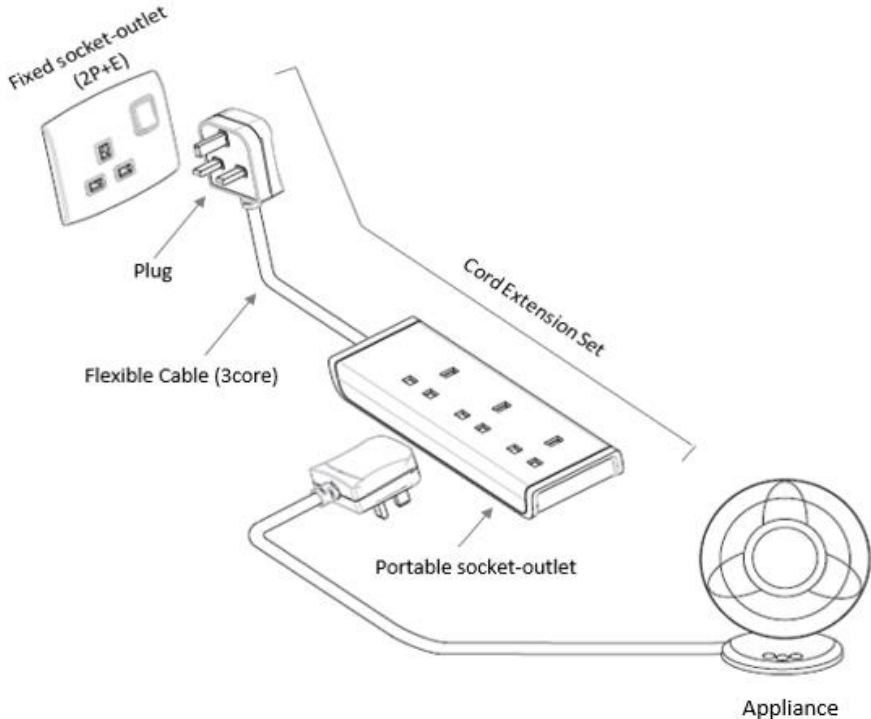


Figure 1a – Diagram showing various accessories and their use

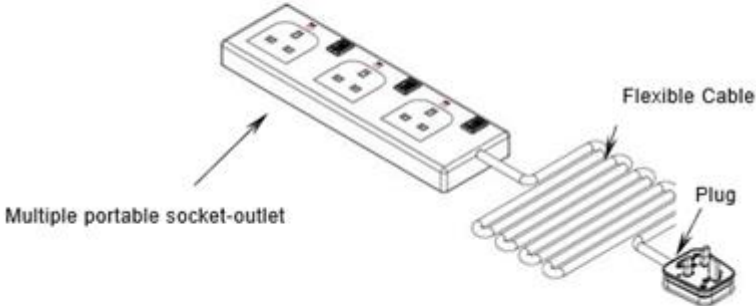


Figure 1b – Multiple portable socket-outlet (Cord extension set)

Figure 1 – Example of accessories