C.3 Elaboration of the specific safety requirements for prescribed products

3.1 Plugs

(1) Any plug which is designed for household use at a voltage of not less than 200 volts alternating current single phase is classified as a prescribed product. In addition to the essential safety requirements, the plug is required to meet the following specific safety requirements and conform to one of the designs listed below:

	Design of Plug	Safety Standards
(A)	3-rectangular-pin fused plugs rated at 13A	BS 1363 Part 1 or BS 5733
(B)	3-round-pin plugs rated at 5A or 15A	BS 546 or BS 5733
(C)	2-pin reversible plugs which are designed for connecting to a shaver supply unit conforming to BS 3535 Part 1	BS 4573 or EN 50075

(2) Examples of electrical products that use 2-pin reversible plugs to BS 4573 or EN 50075 are those electric shavers and toothbrushes that are designed for connecting to a shaver supply unit to BS 3535 : Part 1.

(3) The following type of plugs [(a) to (e) under Item 1, Schedule 2 of the Regulation refer] are not classified in the Regulation as prescribed products and yet they have to comply with the essential safety requirements of the Regulation :

(A) a plug which incorporates any other electrical equipment (other than a fuse-link, switch or indicator light);

(B) a plug forming part of a ceiling rose connector (that is to say, a connector designed to hold up overhead electric lighting fittings);

(C) a plug forming part of a luminaire comprising a track system for electric lights and their fittings;

(D) a plug forming part of an audio-visual assembly (that is to say, a plug designed to be connected to the socket installed within the audio-visual assembly and not suitable for connection to a mains socket in Hong Kong); and

(E) a plug inside or forming an integral part of an electrical product which is not capable of being engaged with or disengaged from the socket without first dismantling the electrical product with the use of a tool.

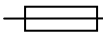
(4) Specific safety requirements

(A) 3-rectangular-pin fused plug rated at 13A

(I) Marking

(a) The standard to which the plug is complying with should be marked on the plug, i.e. BS 1363 Part 1 or BS 5733;

(b) The rated current in amperes (A), identities of plug pins (line (L), neutral (N) and earth (E or )) and availability of fuse should also be marked in accordance with BS 1363 Part 1;

(c) The word " FUSED " or " FUSE " or equivalent symbol () together with the standard to which the fuse-link conforms (BS 1362) and the rated current of the fuse-link in amperes (A) should be marked in accordance with BS 1363 Part 1.

(d) In addition to the marking requirements stipulated in the Regulation, the following markings and labelling should be used where appropriate :

- For rough use plug to BS 1363, BS 1363/A should be marked on the plug (rough use plug means a plug designed to withstand severe mechanical handling).

- All rewirable plugs should be marked with the rated current on the engagement surface. All non-rewirable plugs should be marked with the rated current of the fuse-link fitted (rewirable plug means a plug so constructed that a flexible cord can be fitted or replaced using general purpose tools, non-rewirable plug means a plug so constructed that it forms a complete unit with the flexible cord after connection and assembly by the manufacturer of the plug).

- Rewirable plug should have a removable tag or label indicating the rating of the fuse-link fitted, e.g. 'Fitted with X Ampere fuse', where X denotes the rating of the fuse-link.

(II) Instructions

(a) Clear instructions for the safe connection of the appropriate type and size of flexible cords should be provided in the form of a label attached to the plug showing the colour code of the flexible cores, except for a non-rewirable plug or a plug fitted to an electrical product:

brown, blue & green/yellow for line, neutral, & earth respectively; or
red, black & green for line, neutral & earth respectively.

(III) Construction and dimensions of plugs

(a) The dimensions of plugs which conform to BS 1363 Part 1 is shown in Figure 8.

(b) No part of a line or neutral pin should be less than 9.5 mm from the periphery of the plug measured along the engagement face.

(c) The base and cover of non-rewirable plugs should be permanently attached to each other, such that the flexible cord cannot be separated without making the plug permanently useless, and the plug cannot be opened by hand or by using a general purpose tool, for example a screwdriver used as such. A plug should be considered to be permanently useless when, for reassembling, the plug parts or materials other than the original have to be used.

(d) The base and cover of rewirable plugs should be firmly secured to each other. It should not be possible to remove the cover unless the plug is completely withdrawn from the socket-outlet. Any fixing screw should be captive.

(e) Plugs should be so designed and constructed that they cannot readily be deformed to allow access to live parts.

(f) For non-rewirable plugs, means should be provided to prevent loose strands of a conductor or current-carrying parts from reducing the minimum insulation thickness requirements between such parts and all accessible external surfaces of the plug.

(g) Plug pins should be constructed of brass. Materials other than brass should not be used in the construction of plug pins except for sleeves of pin. All exposed surfaces of plug pins should be smooth and free from burrs or sharp edges and other irregularities which could cause damage or excessive wear to corresponding socket contacts or shutters. For plugs fitted with non-solid pins, those surfaces of the non-solid plug pins which are visible when the plug is correctly assembled should be free of apertures.

(h) All seams and joints of non-solid pins should be closed over their entire length.

(i) Plug pins should have adequate strength to withstand the stresses of normal use.

(j) Plugs with non-solid pins should not cause excessive wear to socket contacts or shutters of socket-outlets.

(k) Plug pins should have adequate mechanical strength to ensure that they cannot be distorted by twisting.

(l) The terminals of earthing and neutral plug pins should be formed as one piece or should be permanently connected to the pin in such a way that efficient electrical connection is made that cannot work loose in use. This connection should not be made by means of a screw.

(m) The contact for the fuse-link connected to the line terminal or termination should be formed in one piece with the fixed part of the terminal or termination, or be permanently connected to it in such way that it cannot work loose in normal use, and the other contact for the fuse-link should be similarly connected to the corresponding plug pin. These connections should not be made by means of screws.

(n) The line terminal or termination should provide for effectively clamping and securing conductors connected to it so that efficient electrical connection is made with the fuse-link.

(o) Plugs should be so designed that when fully assembled the pins are adequately retained in position such that there is no likelihood of them becoming detached from the plug during normal use.

(p) The degree of flexibility of mounting of the plug pins and the angular movement of the pins in the base should not be excessive.

(q) Suitable means should be provided for withdrawing the plug without subjecting the flexible cord to stress.

(r) Conductive component parts of plugs should be so located and separated that, in normal use, they cannot be displaced so as to affect adversely the safety or proper operation of the plug.

(IV) Insulating sleeves

(a) Line and neutral plug pins should be provided with insulating sleeves. The dimensions of the pin and sleeve combination should fall within those given in Figure 8.

(b) Sleeves should not be fitted to any earthing plug pin.

(c) Plug pin sleeves should have adequate electric strength, resistance to abrasion and resistance to deformation due to overheating of pins.

(V) Fuse-link

(a) A fuse-link complying with BS 1362 should be provided within the body of the plug and the fuse-link should be mounted in appropriate contacts only between the line terminal or termination and the corresponding plug pin in such a way that it cannot be displaced when the plug is in use. The design should be such that the fuse-link cannot be left in inadequate contact when the plug cover, fuse cover or the fuse carrier is replaced and firmly secured in position. It should be impossible to replace the fuse-link in a plug unless the plug is completely withdrawn from the socket-outlet.

(b) For rewirable plugs, the preferred ratings of fuse-links are 3A and 13A.

(c) Fuse-link barrel should be marked in red for 3A and brown for 13A; for all other ratings the marking should be black.

(d) In non-rewirable plugs, where the fuse-link is retained by means of a fuse carrier, this device should be either :

- non-detachable during normal replacement of the fuse-link; or
- readily identifiable in relation to its plug by means of marking.

(B) 3-round-pin plug rated at 5A or 15A

(I) Marking

(a) The standard to which the plug is complying with should be marked on the plug, i.e. BS 546 or BS 5733.

(b) The rated current in amperes (A), identities of plug pins (line (L), neutral (N) and earth (E or ⏚)) should also be marked in accordance with BS 546.

(II) Instructions

(a) Clear instructions for the safe connection of the appropriate type and size of flexible cords should be provided in the form of a label attached to the plug showing the colour code of the flexible cores except for non-rewirable plug or a plug fitted to an electrical product:

brown, blue & green/yellow for line, neutral, & earth respectively; or
red, black & green for line, neutral & earth respectively.

(III) Construction and dimensions of plugs

(a) The dimensions of plugs which conform to BS 546 is shown in Figure 9.

(b) Unless the external portions of the current-carrying parts of pins adjacent to a plug base are insulated with sleeves of minimum length specified in Table 1, no part of them should be less than the minimum distance given in Table 1 from the periphery of the plug base.

TABLE 1 LENGTHS AND DISTANCES

Current rating	Minimum length of sleeves	Minimum distance of pins from periphery of plug base
amp.	mm	mm
5	6.35	7.93
15	7.93	9.52

(c) Plugs should be so constructed as to prevent an earthing pin from making contact with a current-carrying contact in any circumstances.

(d) Plugs should be so constructed as to prevent a current-carrying pin from making contact with a current-carrying contact while either or both of the other pins are completely exposed.

(e) An earthing pin should make and break contact with the corresponding earthing contact respectively before and after the associated current-carrying pins make and break contact with the corresponding current-carrying contacts.

(f) The nominal distance between centres of pins should be as given in table 2.

TABLE 2 PIN SPACING

Current rating	Nominal distance between centres of current-carrying pins	Nominal distance between centres of each current-carrying pin and the earthing pin
amp.	mm	mm
5	19.05	22.22
15	25.40	28.58

(g) The plug cover and the plug base should be firmly secured to one another. It should be impossible to remove the plug cover unless the plug is completely withdrawn from the socket-outlet. The minimum thickness of a plug base where the plug pins pass through it should be as given in Table 3, and unless the plug pins are rigidly fixed in the plug base the diameter of the holes in the plug base through which they pass should be such that they have a total lateral movement of not more than 0.152 mm.

TABLE 3 MINIMUM THICKNESS OF PLUG BASE

Current rating	Minimum thickness
amp.	mm
5	3.18
15	4.75

(h) Plug pins should be substantially cylindrical in form and should have radiused ends. Their dimensions should be as given in Table 4.

TABLE 4 DIMENSIONS OF PLUG PINS

Current rating	Plug pins	Diameter	Length of radiused end portion	Total projection from plug base
amp.		mm	mm	mm
5	Current-carrying	5.08	1.58	14.86
	Earthing	7.06	1.98	20.63
15	Current-carrying	7.06	1.98	18.62
	Earthing	8.71	2.36	28.58

(i) Each plug pin of a non-fused plug, each earthing plug pin, and each neutral plug pin of a fused plug, should be formed in one piece with the fixed part of its terminal.

(j) Each terminal should be of substantial construction, and the terminals of a non-fused plug, and the earthing terminal and the neutral terminal of a fused plug, should each provide for clamping and securing its flexible conductor so that efficient electrical connection is made direct with an integral part of the plug pin. The connection of the flexible conductor to the earthing plug pin should be visible when the cover of the plug is in position.

(k) The contact for the fuse-link which is connected to the line terminal of a fused plug should be formed in one piece with the fixed part of the terminal or connected to it in such a way that it cannot work loose under normal service conditions, and the other contact should be similarly connected to the corresponding plug pin. The line terminal should also provide for clamping and securing the conductor so that efficient electrical connection is made with the contact for the fuse-link.

(l) If the plug pins are removable from the plug base, the pins and/or the plug base should be so designed that it is impossible to assemble them in such a way that the fuse is connected to the neutral terminal.

(m) When pillar terminals are used they should be of the dimensions given in Table 5, and should have clamping screws long enough under the head to extend to the far side of the conductor holes and with slightly rounded ends to minimize damage to conductors.

TABLE 5 DIMENSIONS OF PILLAR TERMINALS

Current rating	Nominal diameter of hole for conductor	Minimum thickness of wall where clamping screw passes through	Size of clamping screw
amp.	mm	mm	British Association (B.A.) thread
5	3.05	1.58	No. 6
15	3.96	3.18	No. 4

(n) Insulating barriers forming an integral part of the plug should be provided so as to separate metal at different potentials, including bared flexible conductors. The barriers should be such that when the plug has been correctly wired and assembled there is negligible risk that a wire or strand that may become loose should touch other parts with which contact may be dangerous.

(o) A finger grip or other suitable means should be provided for inserting and withdrawing the plug without subjecting the flexible cord or cable to any stress, and such grip should be so designed as to discourage gripping the plug by the fingers at the point of entry of the flexible cord or cable.

(C) 2-pin reversible plug (which is designed for connecting to a shaver supply unit conforming to BS 3535 Part 1)

(I) Marking

(a) For plugs to BS 4573, the plugs should be clearly and indelibly marked with the following:

- The standard to which the plugs conform.
- The rated current of plugs in amperes (A).

(b) For plugs to EN 50075, the marking for rated current, rated voltage and nature of supply should be made in one of the following ways :

2,5A 250V ~ or 2,5/250 ~

or $\frac{2,5A}{250V}$ ~ or $\frac{2,5}{250}$ ~

Lines formed by the construction of the tool are not considered as part of the marking.

(II) Design of plug

Plugs to BS 4573

(a) The dimensions of plugs which conform to BS 4573 is shown in Figure 10.

(b) Unless the plug pins are provided with suitable fixed insulating sleeves, no part of either pin should be less than 8 mm from the periphery of the face of the plug.

(c) If fixed insulating sleeves are provided on the plug pins, they should extend outwards along the pin for a distance of not less than 8 mm and not more than 9 mm from the engagement face of the plug and should be sufficiently strong and rigid not to become displaced in normal service. The outside diameter of such fixed sleeves should not exceed 5.1 mm and the minimum thickness should be 0.5 mm.

(d) The design of the plug should be such as to prevent a plug pin from making contact with either socket-contact whilst the other pin is completely exposed.

(e) The diameter of the plug pins should be 5 mm ± 0.02 mm. The length of projection of the plug pin should be 15.8 mm, + 1.02 mm - 0 mm. The length of the radiused portion at the end of the plug pins should be 1.5 mm, + 0.25 mm - 0 mm. The nominal distance between the centres of plug pins should be 16.6 mm.

(f) The plug cover and the plug base of a rewirable plug should be secured firmly to one another. It should be impossible to remove the cover unless the plug is completely withdrawn from the socket-outlet.

(g) Each plug pin of a rewirable plug should be formed in one piece with, or reliably attached to, the fixed part of its terminal.

(h) For rewirable plugs, the flexible cord should enter the plug through one hole, groove or gland and there should be provision for gripping the flexible cord and preventing acute bending at the point of entry. Where the cord enters the plug, a flexible lead-in portion should be provided.

(i) A finger grip or other suitable means should be provided for inserting and withdrawing the plug without subjecting the flexible cord to any stress.

(j) Insulating barriers forming an integral part of the plug should be provided to separate metal at different potentials, including bared flexible conductors. The barriers should be such that when the plug has been correctly wired and assembled, there is negligible risk that a wire or strand should touch other parts and with which contact may be dangerous.

Plug to EN 50075

(k) The dimensions of plugs which conform to EN 50075 is shown in Figure 11.

(l) Live parts of plugs, with the exception of the bare metal parts of the pins, should not be accessible.

(m) It should not be possible to make connection between a pin of a plug and a live socket contact of a socket-outlet while the other pin is accessible.

(n) External parts of plugs, with the exception of the pins, should be of insulating material.

(o) Plugs according to this standard are non-rewirable.

(p) Switches, fuses or lampholders should not be incorporated in plugs.

(q) Pins of plugs should be solid and should have adequate mechanical strength.

(r) Pins of plugs should be locked against rotation and adequately fixed into the body of the plug.

(s) Plugs should be provided with soldered, welded, crimped or equally effective permanent connections; screwed or snap-on connections should not be used. Connections made by crimping a pre-soldered flexible conductor are not permitted, unless the soldered area is outside the crimping area.

(t) Plugs should be shaped in such a way and made of such a material that they can easily be withdrawn by hand from a socket-outlet. In addition, the gripping surfaces should be so designed that the plug can be withdrawn without having to pull the cord.