

## Contents

	Page
Notice .....	ii
Foreword .....	ii
Committee .....	iv
<b>1</b> Scope .....	1
<b>2</b> Normative references .....	1
<b>3</b> Definitions .....	1
<b>4</b> Requirements .....	1
<b>5</b> Modifications .....	2
Standard sheets 1 to 7 .....	3-13
<b>Annexes</b>	
<b>A</b> Gauges for checking distance from engagement face to points of first contact with current-carrying contact tubes (reference number 6 of standard sheets 1, 2, 3, 5 and 6) .....	14
<b>B</b> Gauges for proving that a single-pole insertion of a plug is not possible (reference numbers 1 and 2 of standard sheets 1, 2, 3, 5 and 6) .....	16
<b>C</b> Gauges for checking that earth pin makes contact before current-carrying pins (reference number 7 of standard sheets 1, 2 and 3) .....	17
<b>D</b> Gauges for checking resilience of socket contacts (reference number 8 of standard sheets 1, 2, 3, 5 and 6) .....	18
<b>E</b> Bibliography .....	19

## Committee

At the time of approval of this part of SABS 164 by National Committee SC 3350.7C: Electrical accessories, the composition of the committee was as follows:

SABS .....	AJ Claasen (Chairman) W Breed (Standards writer) V Matshaba (Committee clerk)
Ampco (Pty) Ltd .....	M Braun
Chamber of Mines of South Africa .....	DA Kruger
Circuit Breaker Industries (Pty) Ltd .....	V Cohen
Conpower (Pty) Ltd .....	R Patterson
Department of Labour .....	W Benjamin
Department of Public Works .....	HH Kuhles
Electrical Engineering and Allied Industries Association .....	JC Myers
Eskom Distribution .....	AL Gullan
Hycon Electrical Components (Pty) Ltd .....	C Coode
Kimbe Electric Company of South Africa (Pty) Ltd .....	D Francois
Kopp Electrical .....	A Kopp
Litemaster Industrial Group .....	AD Cawse
Lumex Clipsal (Pty) Ltd .....	G Campetti
Nu World Industries (Pty) Ltd .....	JH Botha
Rotek Engineering (Pty) Ltd .....	D Graeff
SABS .....	C Koen JS van Heerden
Solar and Electro-technology .....	KJ Koornhof
South African Housing Trust Limited .....	AJ van der Elst
Spoornet Infrastructure .....	JH Coetzee
Switch King Electrical Industries (Pty) Ltd .....	D Shapiro
Telkom SA Limited .....	F de Kock
Texel Electric (Pty) Ltd .....	BD Lavery
The Association of Municipal Electricity Undertakings (Southern Africa) .....	JJ Roos
The Electrical Contractors' Association (South Africa) .....	VAH McDonald
The South African Association of Consulting Engineers .....	GC Delpoit
TV & Electrical Distributors (Pty) Ltd .....	C D'Angel
Voltco (Pty) Ltd .....	NC Bronkhorst
Voltex (Pty) Ltd .....	MJ Freeman

## Plugs and socket-outlets for household and similar purposes

### Part 2:

National adaptation of IEC worldwide system (16 A 250 V)

### 1 Scope

This part of SABS 164 specifies the national limitations on, and additions to, the international standard for plugs and socket-outlets for household and similar purposes, as applicable to the IEC worldwide system.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of SABS 164. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this part of SABS 164 are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below. Information on currently valid national and international standards can be obtained from the South African Bureau of Standards.

IEC 417, *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.*

SABS 1085, *Wall outlet boxes for the enclosure of electrical accessories – Part 1: Standard boxes.*

SABS IEC 884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements.*

### 3 Definitions

For the purposes of this part of SABS 164, the definitions given in SABS IEC 884-1 apply.

### 4 Requirements

A plug and a socket-outlet shall comply with the relevant requirements of SABS IEC 884-1, as modified by clause 5 of this part of SABS 164.

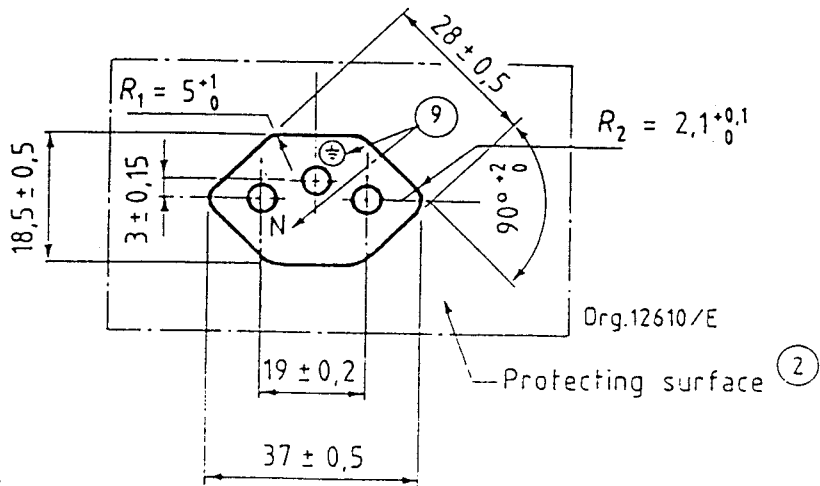
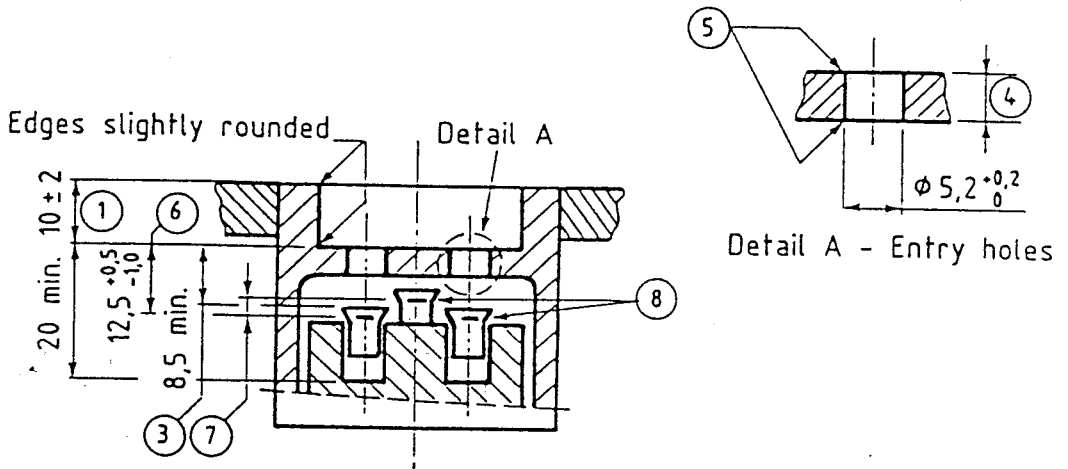
## **5 Modifications**

- 5.1** A plug and a socket-outlet shall be rated at 250 V and 16 A.
- 5.2** A socket-outlet shall comply with the requirements for increased protection.
- 5.3** Plugs for equipment of class O are not permitted.
- 5.4** A socket-outlet for fixed installation shall have an earthing contact.
- 5.5** The markings required by SABS IEC 884-1 shall be in accordance with the conventions given on the relevant standard sheets.
- 5.6** A plug and a socket-outlet shall comply with the dimensions given on the appropriate standard sheet 1 to 7.

NOTE – Drawings for gauges to check the distance from the engagement face to points of first contact with current-carrying socket contacts are given in annex A.

- 5.7** The means of mounting a fixed socket-outlet in a wall outlet box shall have oval holes of width  $4,9 \text{ mm} \pm 1,5 \text{ mm}$ , or other equally suitable means, to permit rotational adjustment of the socket-outlet, relative to the box. If a socket-outlet for a fixed installation is not supplied together with its own outlet box, the fixing hole centres shall comply with the requirements of SABS 1085.

Dimensions in millimetres



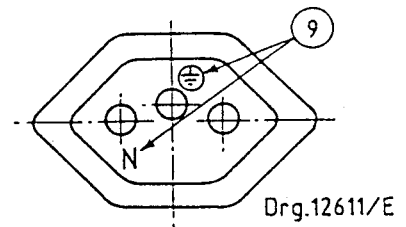
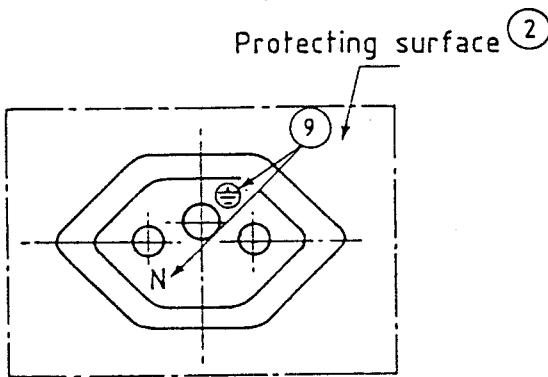
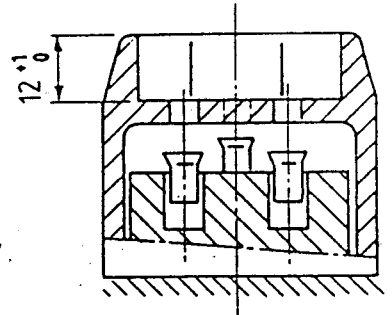
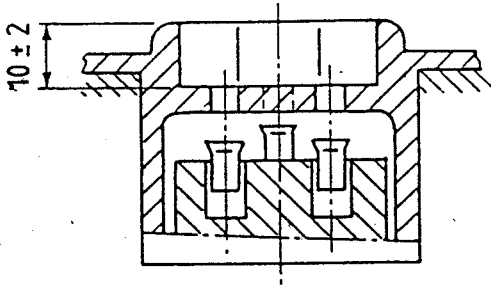
## NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given after standard sheet 3.
- 2 The sketches are not intended to govern design, except as regards the dimensions shown.
- 3 The socket-outlets may be used in various arrangements, such as multiple types.

Standard sheet 1 — 16 A 250 V Two-pole socket-outlet with earthing-contact flush-type socket-outlet

Semi-flush and surface-type socket-outlets **with** protecting surface

Semi-flush and surface type socket-outlets **without** protecting surface



NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given after standard sheet 3.
- 2 For dimensions not indicated, and for other details, see standard sheet 1.
- 3 The sketches are not intended to govern design, except as regards the dimensions shown.
- 4 The socket-outlets may be used in various arrangements, such as multiple types.

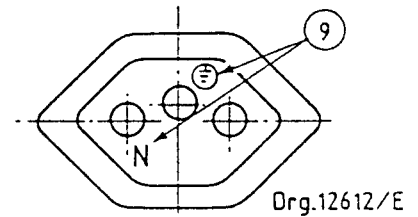
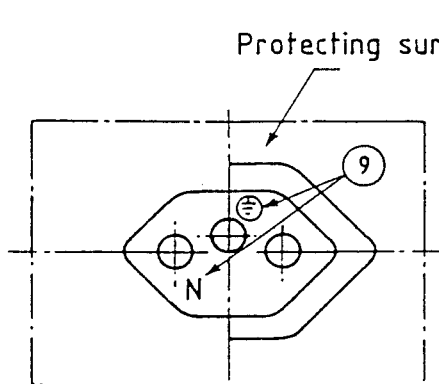
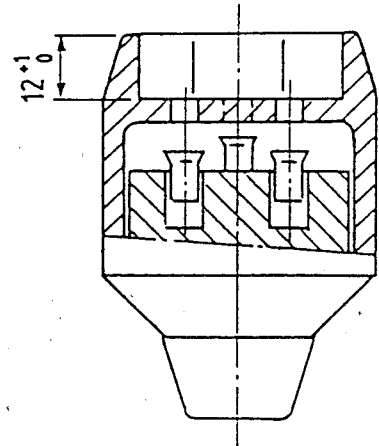
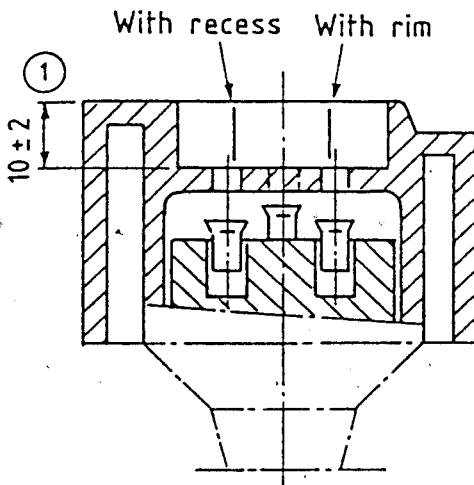
Standard sheet 2 — 16 A 250 V Two-pole socket-outlet with earthing-contact semi-flush and surface-type socket-outlets

Dimensions in millimetres

These socket-outlets may be rewirable or non-rewirable

With protecting surface

Without protecting surface



## NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given on the following page.
- 2 For dimensions not indicated, and for other details, see standard sheet 1.
- 3 The sketches are not intended to govern design, except as regards the dimensions shown.
- 4 The socket-outlets may be used in various arrangements, such as multiple types.

Standard sheet 3 — 16 A 250 V Two-pole portable socket-outlet with earthing contact

## Explanation of reference numbers on standard sheets 1, 2 and 3

**1** A recess for flush types, a rim for surface and portable types or a combination of the two for semi-flush types shall be provided. For all types, prevention of single-pole insertion of a plug is checked by means of a gauge (see annex B).

**2** The gauge in annex B shall be used to check that single-pole insertion is not possible.

NOTE – With regard to the possibility of using shutters as the only means of preventing single-pole insertion, see SABS IEC 884-1.

**3** This dimension is for the cover-plate, for the guidance of pins and, if any, for the shutter mechanism. Shutters are optional. There is no need to provide space for them in non-shuttered types.

**4** Within this thickness, the guidance for the pins shall be of length at least 1,5 mm at the specified diameter.

**5** Slight chamfer or radius.

**6** The points of first contact with current-carrying socket contacts are checked by means of the gauges referred to in annex A.

**7** The gauge referred to in annex C shall be used to ensure that:

- a) when the plug is inserted, the earth connection is made before the current-carrying pins of the plug become live; and
- b) when the plug is withdrawn, both current-carrying pins separate from their socket contacts before the earth connection is broken.

**8** Socket contacts shall be resilient between 3,5 mm and 4,8 mm. They may have a shape other than tubular.

A suitably shaped entry, such as a chamfer or a radius, is necessary to prevent damage to the socket contacts when the plug is introduced at its most unfavourable angle.

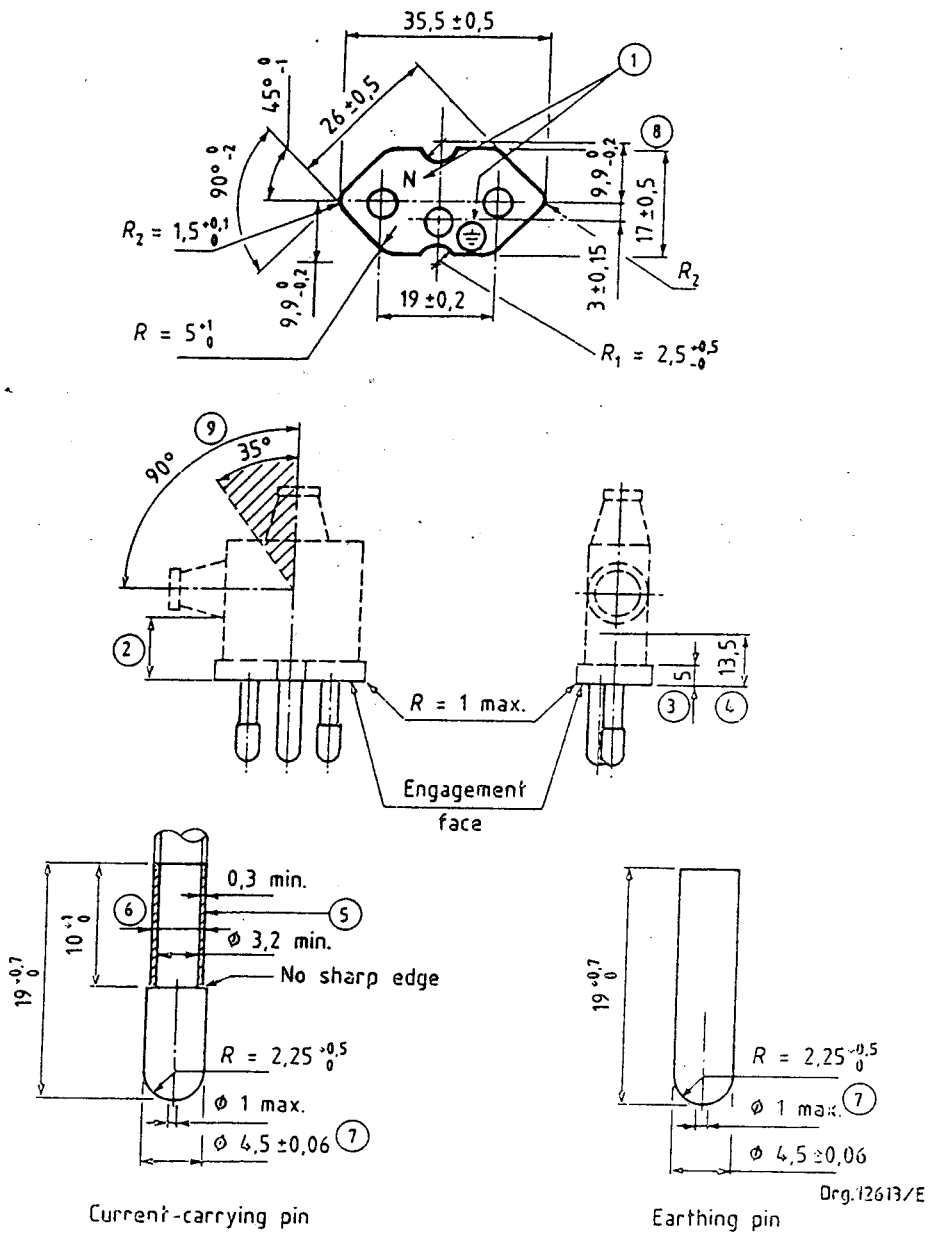
The suitability of the contacts is checked by carrying out all the tests specified and by means of the gauges referred to in annex D, while shutters, if any, are opened.

**9** The earthing terminal shall be indicated by symbol No. 5019 of IEC 417. Indication of the other terminals is optional. The indications shall be placed near the terminals. There is no need to mark the terminals of non-rewirable types.



This plug may be rewirable or non-rewirable

\*\* Dimensions in millimetres



NOTES

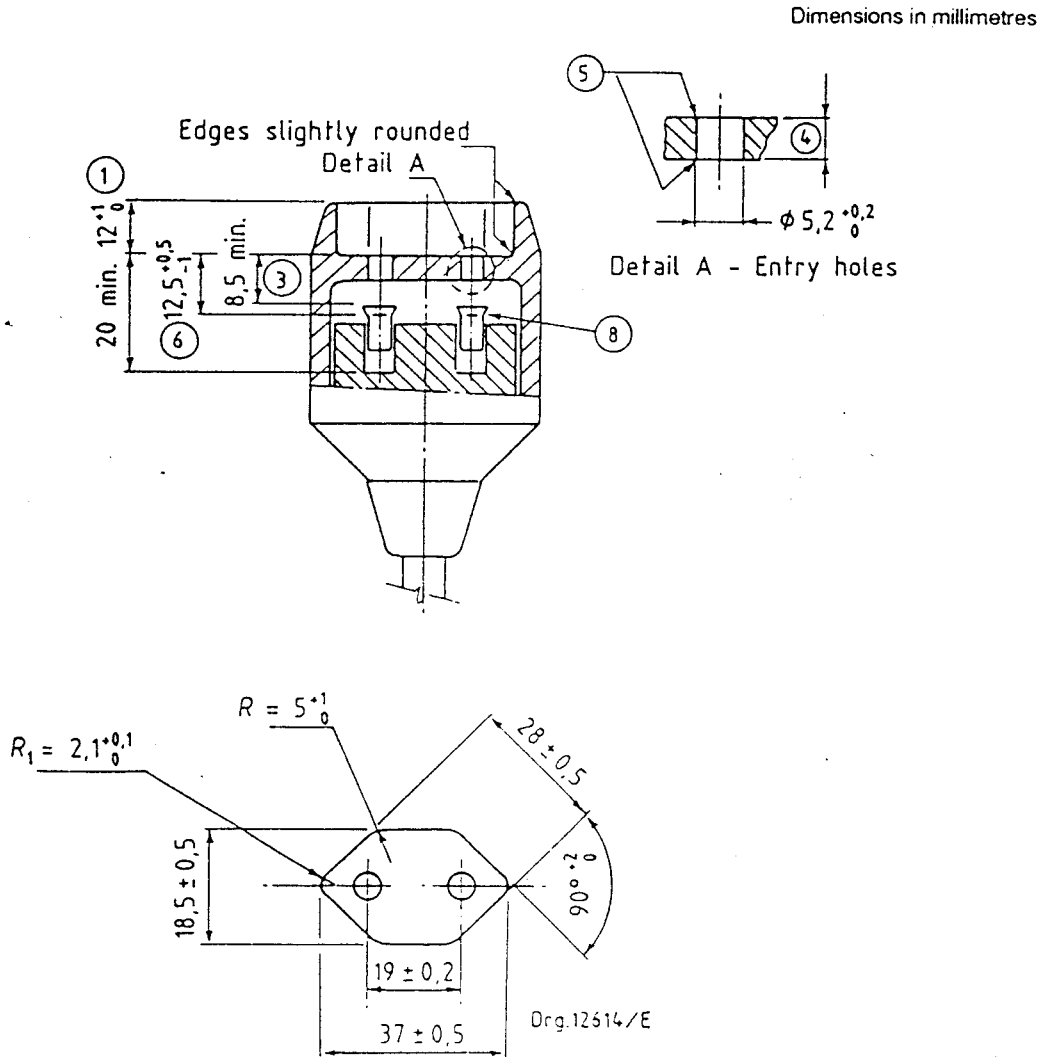
- 1 An explanation of the encircled reference numbers on this standard sheet is given on the following page.
- 2 The sketches are not intended to govern design, except as regards the dimensions shown.

Standard sheet 4 — 16 A 250 V Two-pole plug with earthing contact (for class 1 equipment)

## Explanation of reference numbers on standard sheet 4

- 1** The earthing terminal shall be indicated by symbol No. 5019 of IEC 417. Indication of the other terminals is optional. The indications shall be placed inside the body, near the terminals. There is no need to mark the terminals of non-rewirable types.
- 2** The distance between the engagement face and, if any, the cord or cord guard, shall be at least 14 mm.
- 3** Within the distance indicated, the outline shall be not smaller than the engagement face.
- 4** Within the distance indicated, the outline shall be not larger than the engagement face.
- 5** Insulating sleeves on the current-carrying pins are mandatory. If the insulating sleeves are separate parts, they shall penetrate the engagement face by at least 3 mm.
- 6** The external diameter of the insulating sleeves shall not exceed the diameter of the uninsulated part of the pins.
- 7** To avoid damage to shutters, the ends of the pins shall have neither sharp edges nor burrs. They shall be of rounded shape as shown.
- 8** The concept of indicating a maximum and a minimum outline is under consideration.
- 9** The angle of 90° represents the maximum permissible area for the orientation of the entry of the flexible cable or cord. The angle of 35° represents the recommended area.

These socket-outlets may be rewirable or non-rewirable



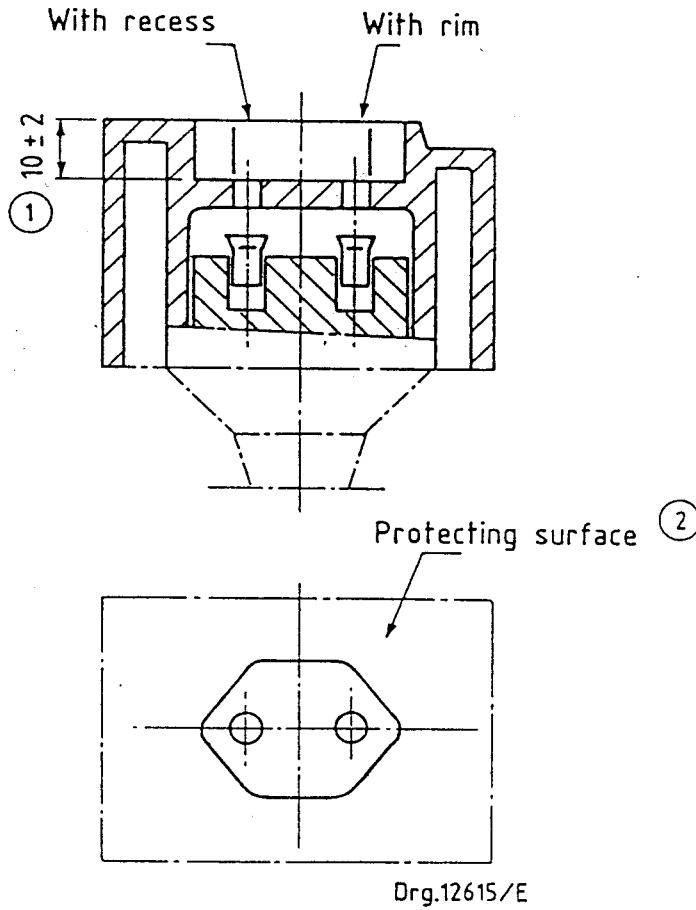
#### NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given after standard sheet 6.
- 2 The sketches are not intended to govern design, except as regards the dimensions shown.
- 3 The socket-outlets may be used in various arrangements, such as multiple types.

**Standard sheet 5 — 16 A 250 V Two-pole portable socket-outlet without earthing contact (for class 2 equipment)**

These socket-outlets may be rewirable or non-rewirable

Dimensions in millimetres



NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given on the following page.
- 2 For dimensions not indicated, and for other details, see standard sheet 5.
- 3 The sketches are not intended to govern design, except as regards the dimensions shown.
- 4 The socket-outlets may be used in various arrangements, such as multiple types.

**Standard sheet 6 — 16 A 250 V Two-pole portable socket-outlet without earthing contact but with protecting surface**

## Explanation of reference numbers on standard sheets 5 and 6

NOTE – These standard sheets are also intended to cover socket-outlets for incorporation into equipment.

**1** A rim for types without a protecting surface or a recess (or, for types with a protecting surface, a combination of a rim and recess) shall be provided. For all types, in all cases, prevention of single-pole insertion of a plug is checked by means of a gauge (see annex B).

**2** The gauge in annex B shall be used to check that single-pole insertion is not possible.

NOTE – With regard to the possibility of using shutters as the only means of preventing single-pole insertion, see SABS IEC 884-1.

**3** This dimension is for the cover-plate, for the guidance of pins and, if any, for the shutter mechanism. Shutters are optional. There is no need to provide space for them in non-shuttered types.

**4** Within this thickness, the guidance for the pins shall be of length at least 1,5 mm at the specified diameter.

**5** Slight chamfer or radius.

**6** The points of first contact with current-carrying socket contacts are checked by means of the gauges referred to in annex A.

**7** Non-used reference.

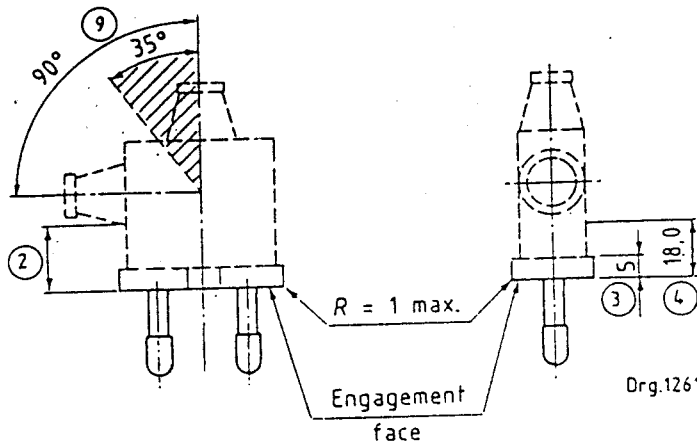
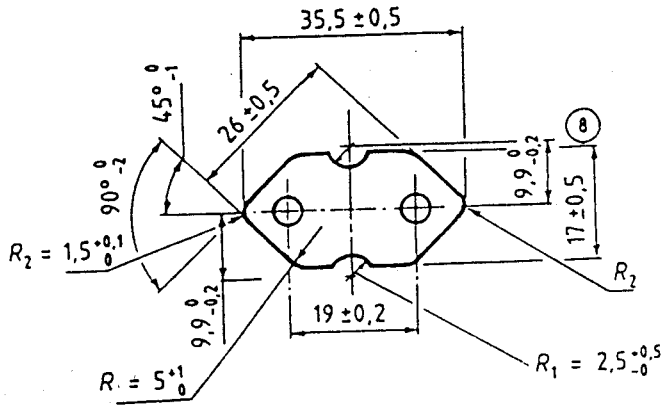
**8** Socket contacts shall be resilient between 3,5 mm and 4,8 mm. They may have a shape other than tubular.

A suitably shaped entry, such as a chamfer or a radius, is necessary to prevent damage to the socket contacts when the plug is introduced at its most unfavourable angle.

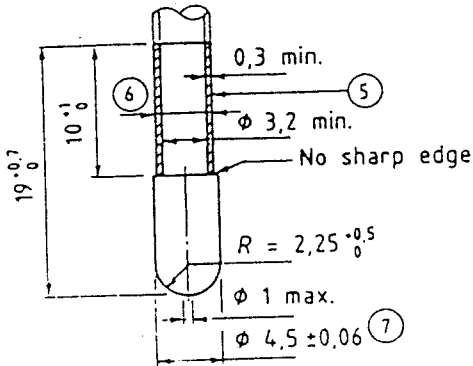
The suitability of the contacts is checked by carrying out all the tests specified and by means of the gauges referred to in annex D, while shutters, if any, are opened.

This plug shall be non-rewirable

Dimensions in millimetres



Drg.12616/E



Current-carrying pin

NOTES

- 1 An explanation of the encircled reference numbers on this standard sheet is given on the following page.
- 2 The sketches are not intended to govern design, except as regards the dimensions shown.

Standard sheet 7 — 16 A 250 V Two-pole plug without earthing contact (for class 2 equipment)

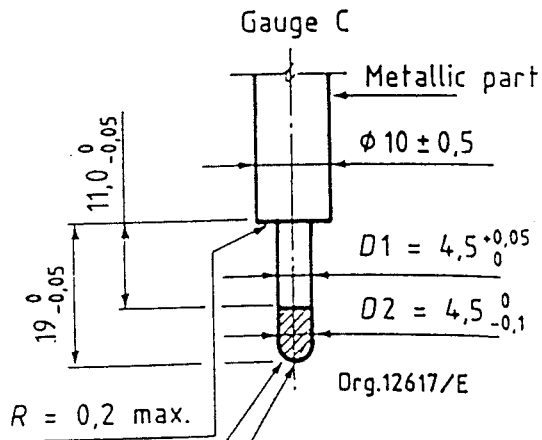
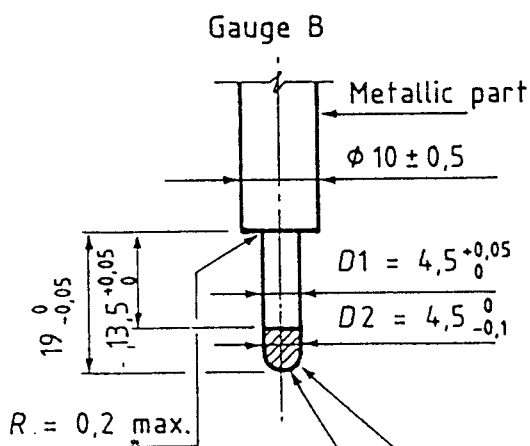
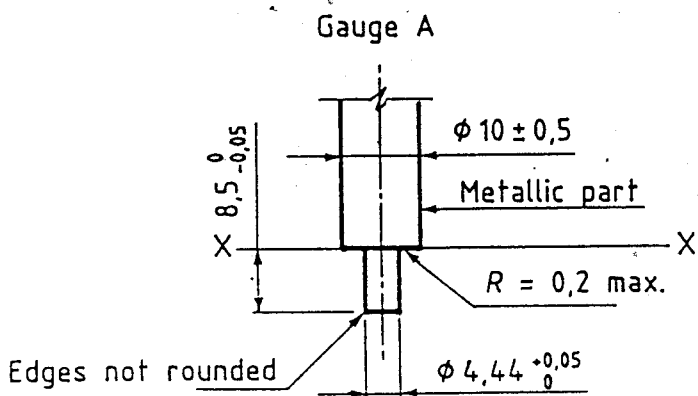
## Explanation of reference numbers on standard sheet 7

- 1** Non-used reference.
- 2** The distance between the engagement face and, if any, the cord or cord guard, shall be at least 19 mm.
- 3** Within the distance indicated, the outline shall be not smaller than the engagement face.
- 4** Within the distance indicated, the outline shall be not larger than the engagement face.
- 5** Insulating sleeves on the current-carrying pins are mandatory. If the insulating sleeves are separate parts, they shall penetrate the engagement face by at least 3 mm.
- 6** The external diameter of the insulating sleeves shall not exceed the diameter of the insulated part of the pins.
- 7** To avoid damage to shutters, the ends of the pins shall have neither sharp edges nor burrs. They shall be of rounded shape as shown.
- 8** The concept of indicating a maximum and a minimum outline is under consideration.
- 9** The angle of 90° represents the maximum permissible area for the orientation of the entry of the flexible cable or cord. The angle of 35° represents the recommended area.

**Annex A**  
(normative)

**Gauges for checking distance from engagement face to points of first contact with current-carrying contact tubes**  
(reference number 6 of standard sheets 1, 2, 3, 5 and 6)

Dimensions in millimetres



Suitable radius

Insulating material



The metallic parts of gauges A, B and C are made of a hard corrosion-resistant metal (for example, stainless steel). An electrical indicator with a voltage of not less than 40 V and not more than 50 V is used to show contact. Gauge A shall be introduced in every possible position through the entry holes of current-carrying contacts until the face XX is fully in contact with the engagement face.

The indicator shall not light.

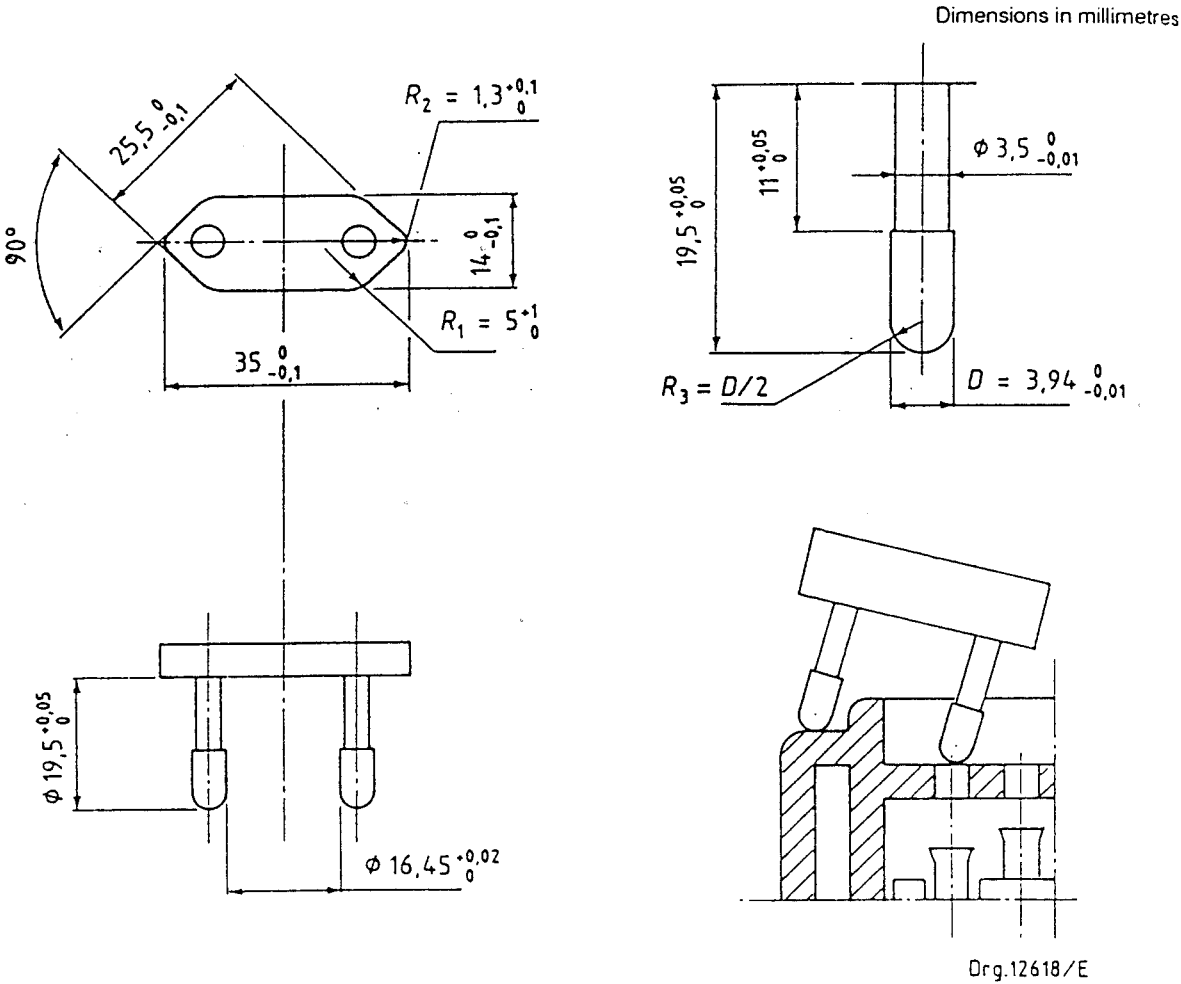
The pins of gauges B and C shall be completely inserted. In this situation,

- a) for gauge B, the indicator shall light, and
- b) for gauge C, the indicator shall not light.

During the test, shutters, if any, shall be opened.

**Annex B**  
(normative)

**Gauges for proving that a single-pole insertion of a plug is not possible**  
(reference numbers 1 and 2 of standard sheets 1, 2, 3, 5 and 6)



The test is carried out with the engagement face of the socket-outlet horizontal. The gauge is applied under its own weight in every possible position. It shall not be possible to touch current-carrying contact tubes with one gauge pin only; an electrical indicator with a voltage of not less than 40 V and not more than 50 V is used to show contact. The total mass of the gauge shall be  $200\text{ g} \pm 5\text{ g}$  and it shall be made of hard corrosion-resistant metal that provides sufficient rigidity (for example, stainless steel).

During the test, shutters, if any, of the socket-outlet shall be opened.

NOTES

1 Owing to the fact that the plug rated at 2,5 A 250 V in IEC 83, C5, alternative II, is compatible with the socket-outlet referred to on standard sheets 1, 2, 3, 5 and 6, the gauge is used to check single-pole insertion of the plug.

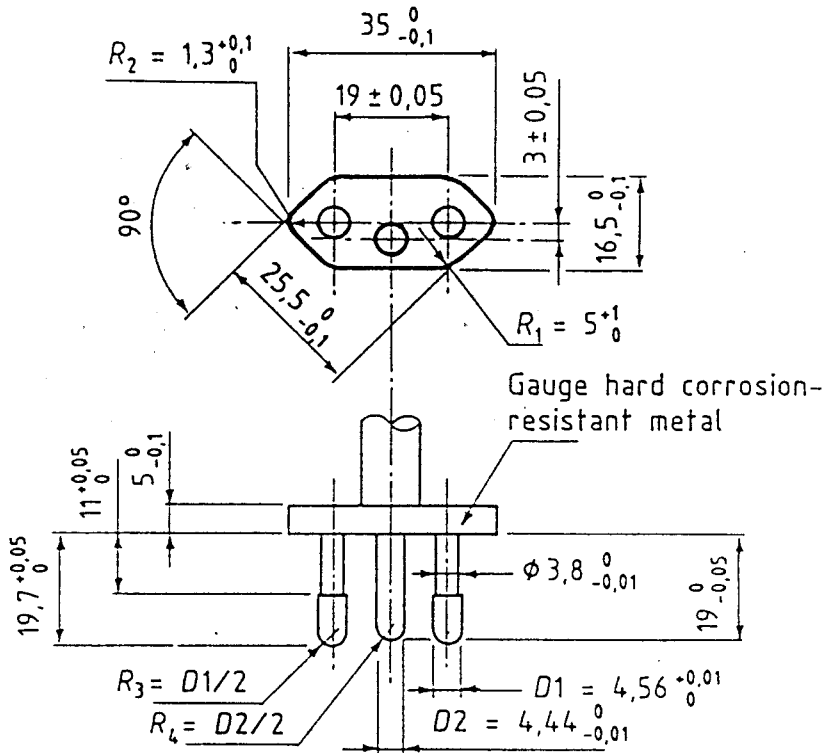
2 For a socket-outlet of material such as rubber or PVC, see 10.3 of SABS IEC 884-1.

## Annex C

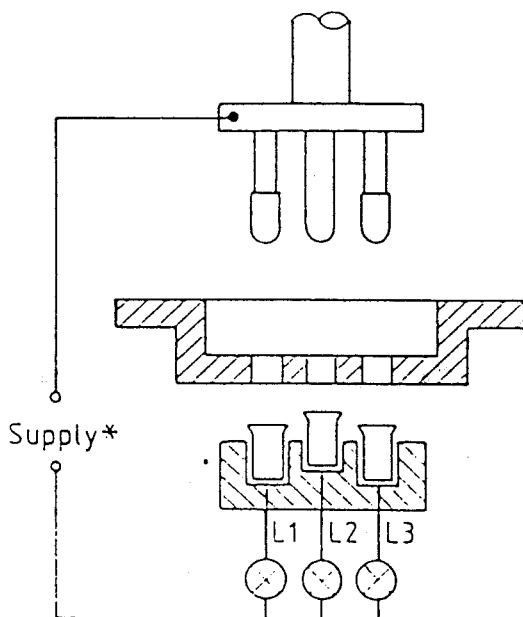
(normative)

### Gauges for checking that earth pin makes contact before current-carrying pins (reference number 7 of standard sheets 1, 2 and 3)

Dimensions in millimetres



Org.12619/E



The gauge, when inserted without undue force but at any possible angle into the socket-outlet, shall cause lamp L2 to light before lamps L1 and L3. The gauge, when withdrawn, shall cause the lamps L1 and L3 to go out before lamp L2.

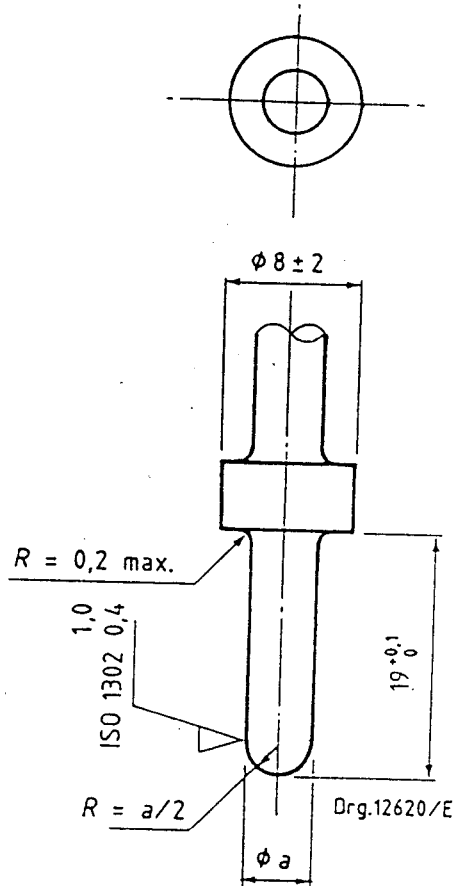
\* : 40 V min., 50 V max.

During the test, shutters, if any, shall be opened.

**Annex D**  
(normative)

**Gauges for checking resilience of socket contacts**  
(reference number 8 of standard sheets 1, 2, 3, 5 and 6)

Dimensions in millimetres



1	2	3
	Diam. "a"	Withdrawal force
	mm	N
Largest test pin	< 4,85	> 20,5
Smallest test pin	> 3,75	< 3,87

**Annex E**  
(informative)

**Bibliography**

IEC 83, *Plugs and socket-outlets for domestic and similar general use. Standards.*

sabs pta