INTERNATIONAL STANDARD

ISO 7711-1

First edition
1997-02-15

Dental rotary instruments — Diamond instruments —

Part 1:
Dimensions, requirements, marking and packaging

Instruments rotatifs dentaires — Instruments diamantés —

Partie 1: Dimensions, exigences, marquage et emballage

Reference number
ISO 7711-1:1997(E)

Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7711-1 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 4, *Dental instruments*.

This first edition of ISO 7711-1 cancels and replaces the first edition of ISO 7711:1984, which has been technically revised.

ISO 7711 consists of the following parts, under the general title *Dental rotary instruments — Diamond instruments:*

— *Part 1: Dimensions, requirements, marking and packaging*

— *Part 2: Discs*

— *Part 3: Grit sizes, designation and colour code*

Introduction

This part of ISO 7711 is one of a series of standards relating to dental rotary instruments.

This first edition of ISO 7711-1 contains the updated specifications for diamond instruments given in ISO 7711:1984. It was also aligned in several details with the other International Standards on dental rotary instruments.

The various dimensional and other requirements specified for diamond instruments are those considered important to ensure the interchangeability and safe usage of these instruments in the practice of dentistry.

The nominal diameters of the working part listed in tables 1 to 48 comply with the diameters specified in ISO 2157. The diameters listed in the first column (preferred diameters) should be used in preference.

Attention is drawn to ISO 6360, which specifies a 15-digit number coding system for the identification of dental rotary instruments of all types.

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Dental rotary instruments — Diamond instruments —

Part 1:
Dimensions, requirements, marking and packaging

1 Scope

This part of ISO 7711 specifies dimensional and other relevant requirements for the 14 most commonly used shapes of dental diamond instruments, including a quality control for these instruments.

It is envisaged to update this part of ISO 7711 at each periodical revision to cover at that time the commonly used shapes and other specifications.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7711. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7711 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1797-1:1992, *Dental rotary instruments — Shanks — Part 1: Shanks made of metals.*

ISO 2157:1992, *Dental rotary instruments — Nominal diameters and designation code number.*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods.*

ISO 6360-1:1985, *Dental rotary instruments — Number coding system — Part 1: General characteristics.*

ISO 6360-2:1986, *Dental rotary instruments — Number coding system — Part 2: Shape and specific characteristics.*

ISO 7711-3:1992, *Dental rotary instruments — Diamond instruments — Part 3: Grit sizes, designation and colour code.*

ISO 8325:1985, *Dental rotary instruments — Test methods.*

3 Symbols

For the purposes of this part of ISO 7711, the following symbols apply:

d_1 diameter of working part; head diameter

d_2 neck diameter, measured directly behind the diamond coating

d_3 diameter of the coated neck, measured at the smallest diameter

l_1 length of the working part; head length

l_2 overall length

α angle of the working part

4 Requirements

4.1 Materials

4.1.1 Shank

The material of the shank shall comply with ISO 1797-1.

4.1.2 Working part

The working part shall be made of diamond grit, bound in either metal, plastics or other suitable material at the discretion of the manufacturer.

Grit sizes shall comply with ISO 7711-3.

4.2 Shapes

The shape of the working part shall be as specified in the appropriate figures 1 to 48. Variations of shape within the limited dimensions and the descriptions in the subclause titles are permitted.

Testing shall be carried out in accordance with 5.1.

4.3 Dimensions

4.3.1 Overall length

The overall length of the instrument, l_2, is the sum of the fitting length of the shank and the length of the working part. In tables 1 to 48, "Standard" refers to instruments with standard fitting lengths of shank. For instruments with longer or shorter shank lengths, the overall length, l_2, will vary accordingly. See ISO 1797-1:1992, table 1, for fitting lengths of shanks.

4.3.2 Shank

The shank shall be Type 1, 2 or 3 of ISO 1797-1.

4.3.3 Working part

The dimensions of the working part shall be as specified in the appropriate tables 1 to 48.

Testing shall be carried out in accordance with 5.1.

4.3.3.1 Round head (spherical)

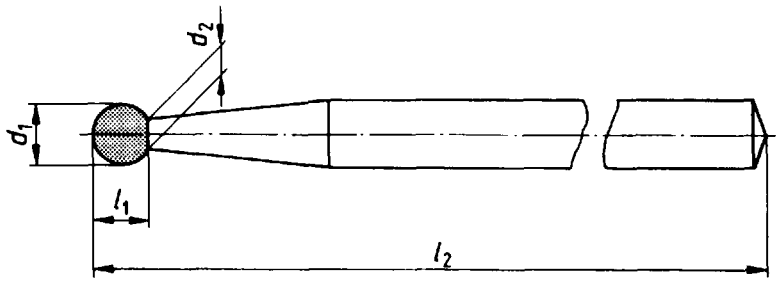

Figure 1

Table 1 — Dimensions (see figure 1)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	min.	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	007	0,7	± 0,08	0,50	0,50	22,0	44,5	19,0	16,5
008	—	0,8		0,53	0,55				
009	—	0,9		0,60	0,60				
010	—	1,0		0,70	0,65				
012	—	1,2	± 0,10	0,73	0,85				
014	—	1,4		0,83	1,05				
016	—	1,6		0,93	1,30				
018	—	1,8		1,03	1,50				
021	—	2,1		1,05	1,80				
023	—	2,3		1,23	2,00				
—	025	2,5		1,25	2,15				
—	027	2,7		1,33	2,35				
—	029	2,9		1,53	2,55				
—	033	3,3		1,63	2,90				
—	035	3,5		1,73	3,10				
—	042	4,2		2,01	3,80				
—	050	5,0		2,35	4,80				

4.3.3.2 Round head (with collar)

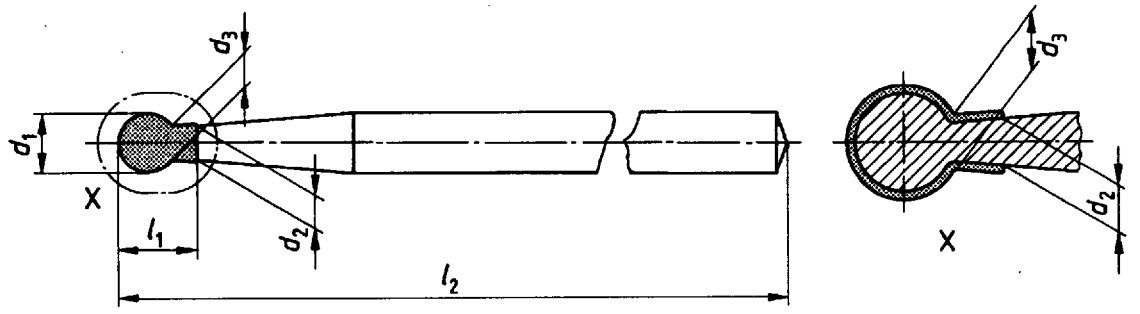

Figure 2

Table 2 — Dimensions (see figure 2)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	d_3 ± 0,1	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		min.	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009		0,9	± 0,08	0,75	0,68	2,2	22,0	44,5	19,0	16,5
010	—	1,0		0,96	0,78					
012	—	1,2	± 0,10	1,00	0,88					
014	—	1,4		1,04	0,98					
016	—	1,6		1,10	1,04					
018	—	1,8		1,18	1,12					
021	—	2,1		1,26	1,20					
023	—	2,3		1,32	1,28	2,5				
—	025	2,5		1,44	1,40					
—	033	3,3		1,60	1,52	3,5				

4.3.3.3 Inverted cone head (inverted, truncated conical)

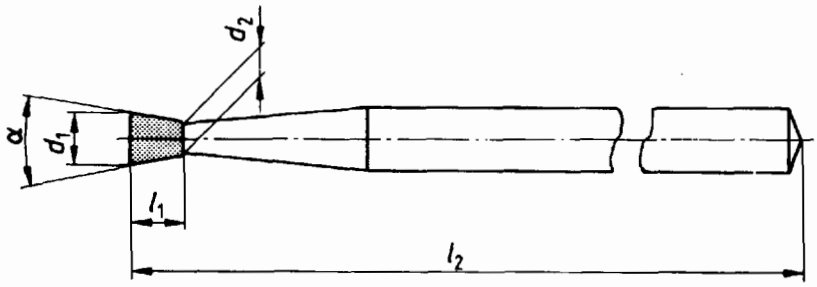

Figure 3

Table 3 — Dimensions (see figure 3)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		min.	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	007	0,7	± 0,08	0,50	8° to 14°	0,50	22,0	44,5	19,0	16,5
008	—	0,8		0,50		0,55				
009	—	0,9		0,53		0,60				
010	—	1,0		0,63		0,65				
012	—	1,2	± 0,10	0,73	10° to 18°	0,85				
014	—	1,4		0,83	10° to 22°	1,05				
016	—	1,6		0,89		1,30				
018	—	1,8		1,07		1,50				
021	—	2,1		1,15		1,80				
023	—	2,3		1,40		2,00				
—	0,25	2,5		1,60		2,15				
—	027	2,7		1,70		2,35				
—	042	4,2		2,00	40° to 60°	2,35				

4.3.3.4 Inverted cone head (with collar)

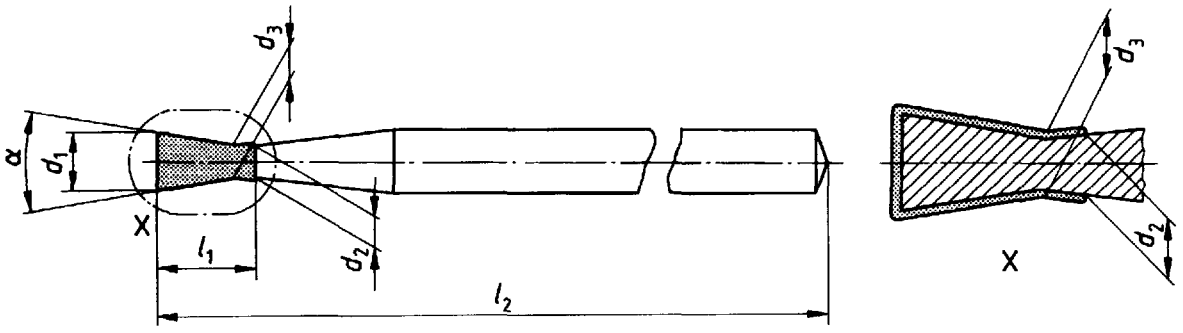

Figure 4

Table 4 — Dimensions (see figure 4)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	d_3	l_1	α	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,1	min.		Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	007	0,7	± 0,08	0,68	0,60	2,0	8° to 14°	22,0	44,5	19,0	16,5
008	—	0,8		0,78	0,68						
009	—	0,9		0,84	0,74						
010	—	1,0		0,96	0,78						
012	—	1,2	± 0,10	1,00	0,88	2,2	10° to 18°				
014	—	1,4		1,04	0,98		10° to 22°				
016	—	1,6		1,10	1,04						
018	—	1,8		1,18	1,35						
021	—	2,1		1,26	1,40	2,5					
023	—	2,3		1,32	1,70						
—	025	2,5		1,44	1,90						

4.3.3.5 Wheel

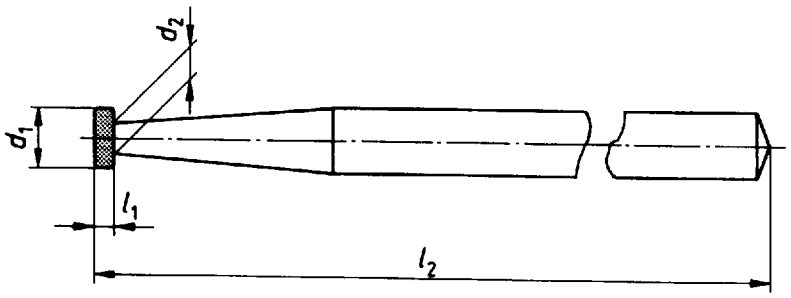

Figure 5

Table 5 — Dimensions (see figure 5)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	min.	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
012	—	1,2	0,73	0,3	22,0	44,5	19,0	16,5
014	—	1,4	0,83					
016	—	1,6	0,93	0,4				
018	—	1,8	1,03					
021	—	2,1	1,05	0,5				
023	—	2,3	1,23	0,6				
—	025	2,5	1,25					
—	027	2,7	1,43					
—	029	2,9	1,45					
—	031	3,1	1,53					
—	033	3,3	1,63					
—	035	3,5	1,67					
—	037	3,7	1,77					
—	040	4,0	1,91					
—	042	4,2	2,01					
—	045	4,5	2,01					
—	047	4,7	2,09					
—	050	5,0	2,17					

4.3.3.6 Wheel with collar

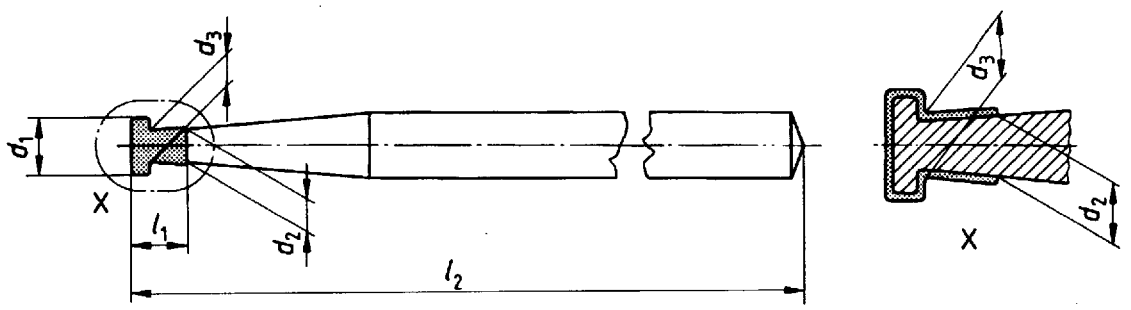

Figure 6

Table 6 — Dimensions (see figure 6)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	d_3	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,1	min.	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	012	1,2	1,00	0,88	2,2	22,0	44,5	19,0	16,5
—	016	1,6	1,10	1,04					
—	018	1,8	1,18	1,12					
—	023	2,3	1,32	1,23	2,5				

4.3.3.7 Cylindrical working part

4.3.3.7.1 Head length 3,0 mm

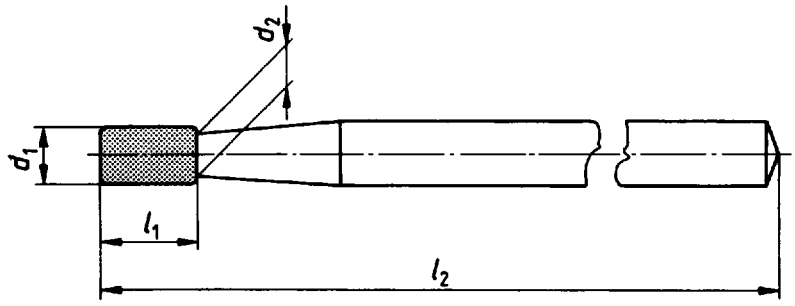

Figure 7

Table 7 — Dimensions (see figure 7)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	± 0,08	0,80	3,0	22,0	44,5	19,0	16,5
009	—	0,9		0,90					
010	—	1,0		1,00					
012	—	1,2	± 0,10	1,20					

4.3.3.7.2 Head length 4,0 mm

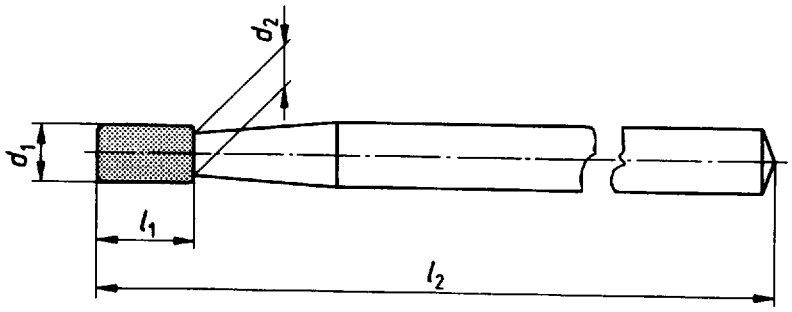

Figure 8

Table 8 — Dimensions (see figure 8)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009	—	0,9	± 0,08	0,90	4,0	22,0	44,5	19,0	16,5
010	—	1,0		1,00					
012	—	1,2	± 0,10	1,20					
014	—	1,4		1,35					
016	—	1,6		1,50					
018	—	1,8		1,60					

4.3.3.7.3 Head length 5,0 mm

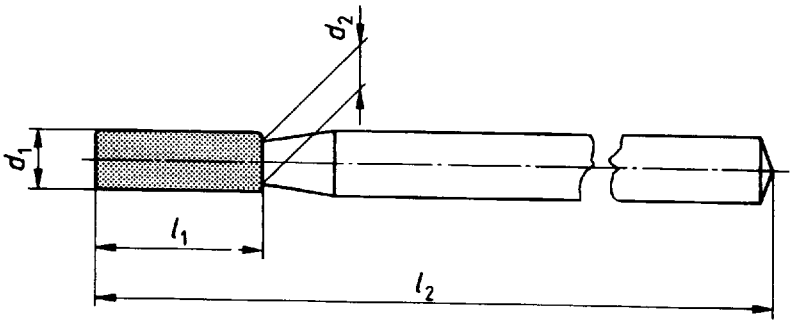

Figure 9

Table 9 — Dimensions (see figure 9)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	021	2,1	1,90	5,0	22,0	44,5	19,0	16,5

4.3.3.7.4 Head length 6,0 mm

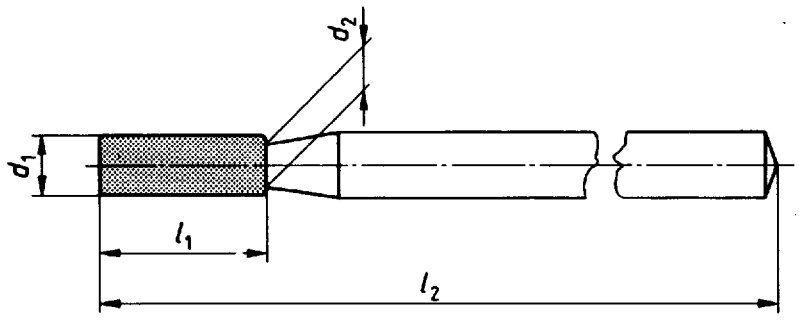

Figure 10

Table 10 — Dimensions (see figure 10)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	± 0,08	0,80	6,0	22,0	44,5	21,0	18,5
010	—	1,0		1,00					
012	—	1,2	± 0,10	1,20					
014	—	1,4		1,35					
016	—	1,6		1,50					
018	—	1,8		1,60					
—	027	2,7		2,35					

4.3.3.7.5 Head length 8,0 mm

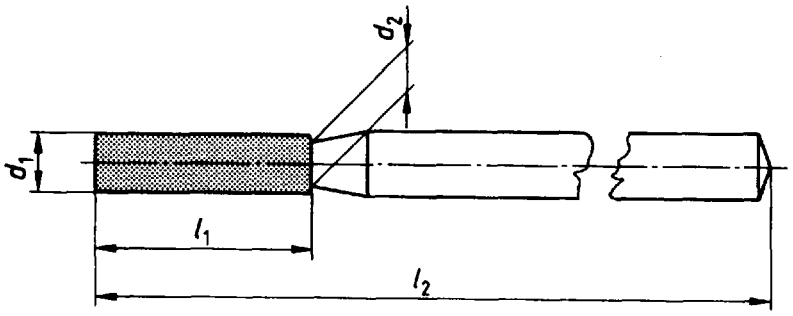

Figure 11

Table 11 — Dimensions (see figure 11)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,10	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	8,0	24,0	44,5	22,0	19,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					
—	025	2,5	1,85					

4.3.3.7.6 Head length 10,0 mm

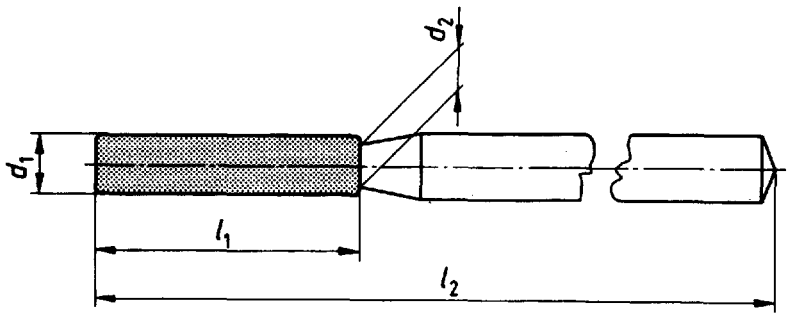

Figure 12

Table 12 — Dimensions (see figure 12)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,10	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	10,0	26,0	44,5	24,0	21,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					
—	025	2,5	1,85					

4.3.3.8 Truncated conical working part

4.3.3.8.1 Head length 3,0 mm

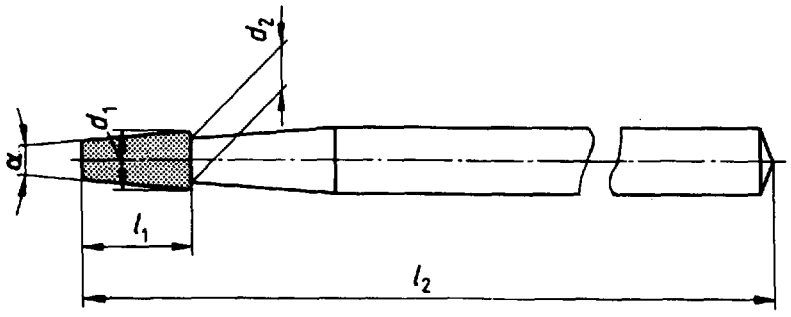

Figure 13

Table 13 — Dimensions (see figure 13)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,08	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	0,80	3° to 6°	3,0	22,0	44,5	19,0	16,5
009	—	0,9	0,90						
010	—	1,0	1,00						

4.3.3.8.2 Head length 4,0 mm

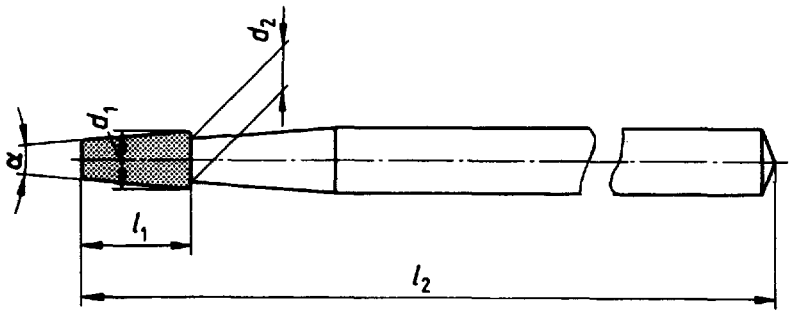

Figure 14

Table 14 — Dimensions (see figure 14)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	3° to 7°	4,0	22,0	44,5	19,0	16,5
012	—	1,2	1,20	4° to 8°					
014	—	1,4	1,35						
016	—	1,6	1,50						
018	—	1,8	1,60						
—	025	2,5	1,85	8° to 12°					
—	035	3,5	2,00	14° to 18°					

4.3.3.8.3 Head length 6,0 mm

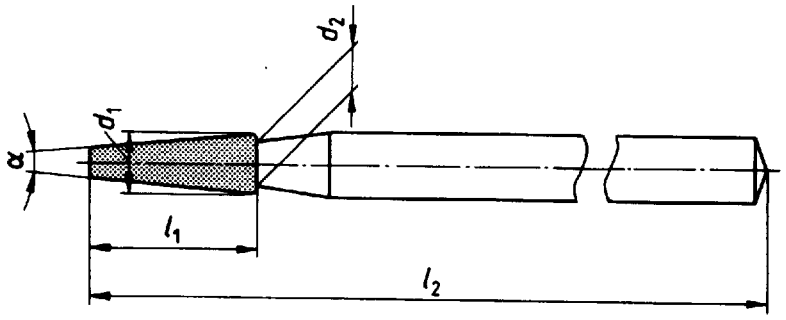

Figure 15

Table 15 — Dimensions (see figure 15)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 6°	6,0	22,0	44,5	21,0	18,5
012	—	1,2	1,20	3° to 7°					
014	—	1,4	1,35						
016	—	1,6	1,50						
018	—	1,8	1,60						
—	040	4,0	2,35	7° to 12°					

4.3.3.8.4 Head length 7,0 mm

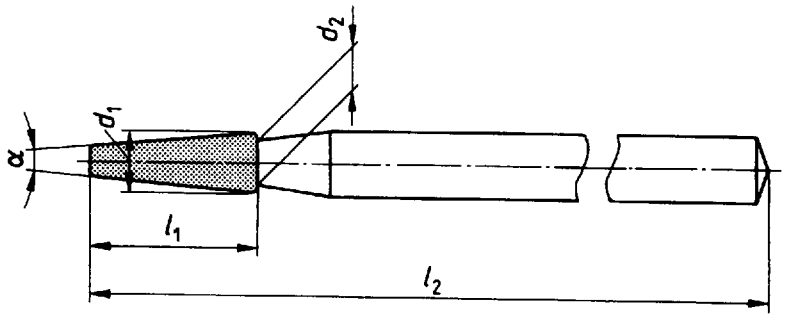

Figure 16

Table 16 — Dimensions (see figure 16)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	035	3,5	1,85	5° to 9°	7,0	23,0	44,5	21,0	18,5

4.3.3.8.5 Head length 8,0 mm

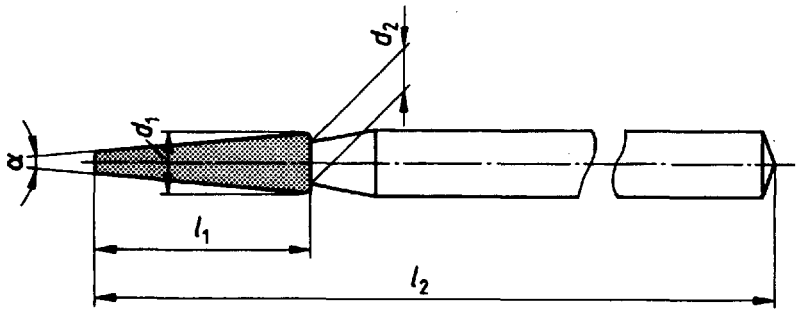

Figure 17

Table 17 — Dimensions (see figure 17)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 5°	8,0	24,0	44,5	22,0	19,5
012	—	1,2	1,20						
014	—	1,4	1,35	3° to 6°					
016	—	1,6	1,50						
018	—	1,8	1,60						
021	—	2,1	1,80						
023	—	2,3	1,80	4° to 8°					
—	025	2,5	1,85						

4.3.3.8.6 Head length 9,0 mm

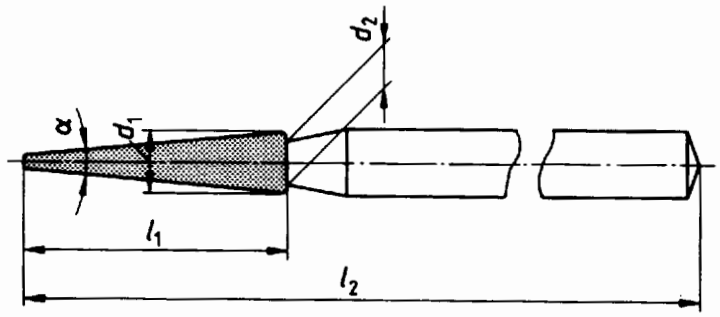

Figure 18

Table 18 — Dimensions (see figure 18)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	023	2,3	1,80	4° to 8°	9,0	25,0	44,5	24,0	21,5
—	031	3,1	2,35						
—	033	3,3	2,35						
—	040	4,0	2,35						
—	050	5,0	2,35						

4.3.3.8.7 Head length 10,0 mm

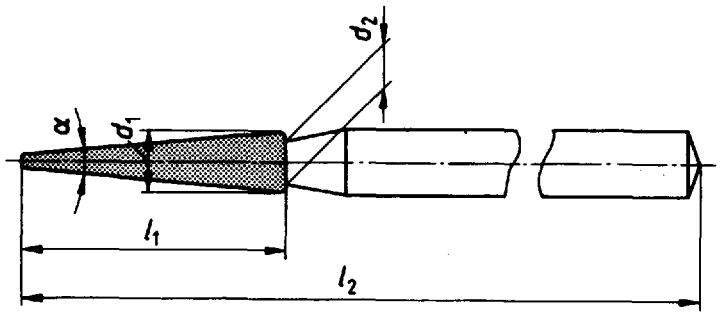

Figure 19

Table 19 — Dimensions (see figure 19)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 5°	10,0	26,0	44,5	24,0	21,5
012	—	1,2	1,20						
014	—	1,4	1,35	3° to 6°					
016	—	1,6	1,50						
018	—	1,8	1,60						
021	—	2,1	1,70	4° to 8°					
023	—	2,3	1,80						
—	025	2,5	1,85						
—	031	3,1	2,35						

4.3.3.9 Hemispherical cylindrical working part

4.3.3.9.1 Head length 3,0 mm

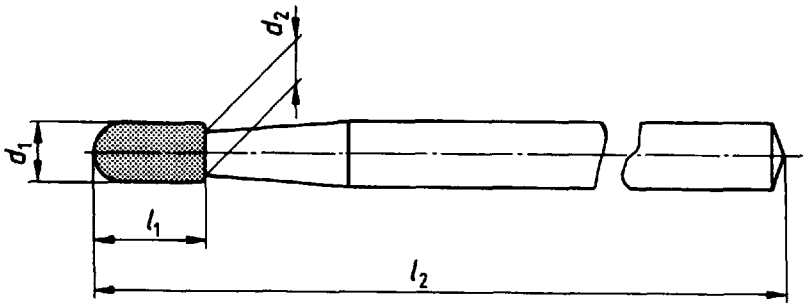

Figure 20

Table 20 — Dimensions (see figure 20)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,08	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	0,80	3,0	22,0	44,5	19,0	16,5
009	—	0,9	0,90					
010	—	1,0	1,00					

4.3.3.9.2 Head length 4,0 mm

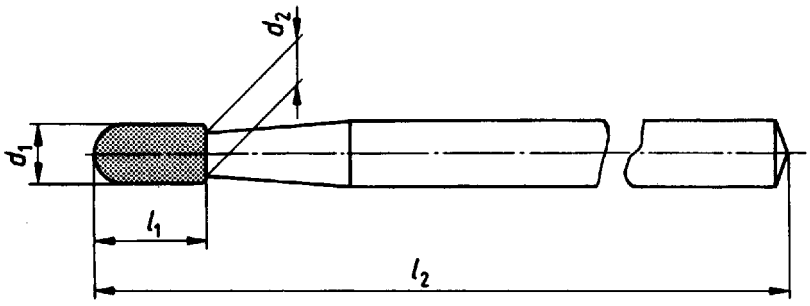

Figure 21

Table 21 — Dimensions (see figure 21)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009	—	0,9	± 0,08	0,90	4,0	22,0	44,5	19,0	16,5
010	—	1,0		1,00					
012	—	1,2	± 0,10	1,20					
014	—	1,4		1,35					

4.3.3.9.3 Head length 6,0 mm

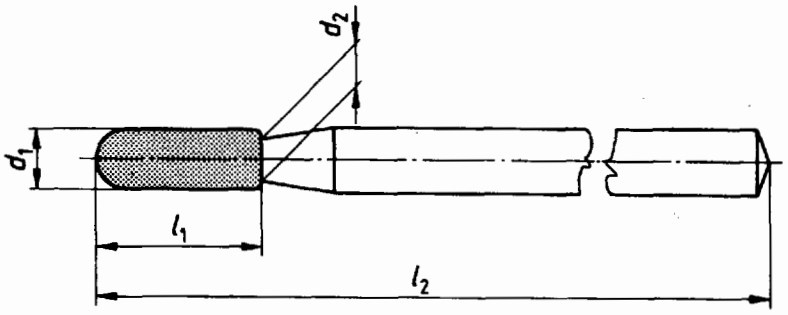

Figure 22

Table 22 — Dimensions (see figure 22)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	6,0	22,0	44,5	21,0	18,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					
023	—	2,3	2,00					
—	027	2,7	2,35					

4.3.3.9.4 Head length 8,0 mm

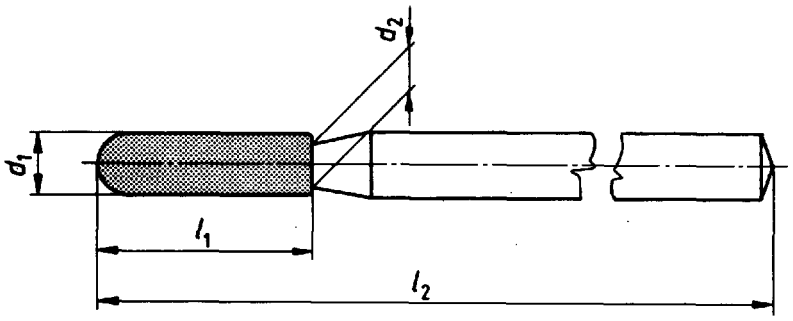

Figure 23

Table 23 — Dimensions (see figure 23)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,10	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	8,0	24,0	44,5	22,0	19,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					
—	025	2,5	1,85					

4.3.3.9.5 Head length 9,0 mm

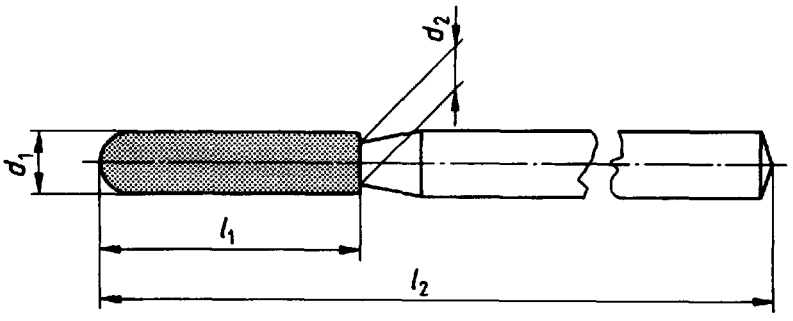

Figure 24

Table 24 — Dimensions (see figure 24)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	040	4,0	2,35	9,0	25,0	44,5	24,0	21,5

4.3.3.9.6 Head length 10,0 mm

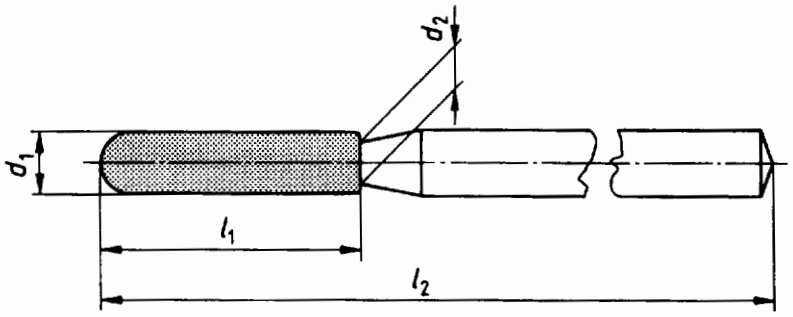

Figure 25

Table 25 — Dimensions (see figure 25)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
012	—	1,2	1,20	10,0	26,0	44,5	24,0	21,5
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					

4.3.3.10 Truncated conical, domed working part

4.3.3.10.1 Head length 4,0 mm

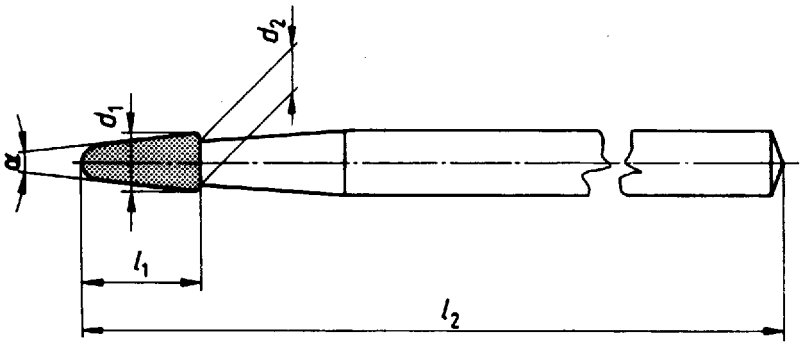

Figure 26

Table 26 — Dimensions (see figure 26)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009	—	0,9	± 0,08	0,90	3° to 7°	4,0	22,0	44,5	19,0	16,5
010	—	1,0		1,00	4° to 8°					
012	—	1,2	± 0,10	1,20						
014	—	1,4		1,35						
016	—	1,6		1,50						

4.3.3.10.2 Head length 6,0 mm

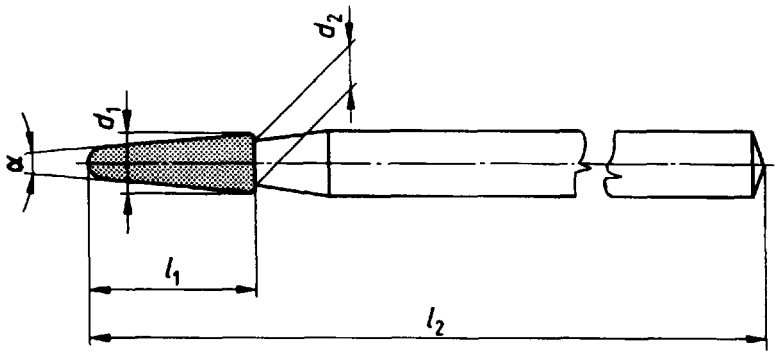

Figure 27

Table 27 — Dimensions (see figure 27)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 6°	6,0	22,0	44,5	21,0	18,5
012	—	1,2	1,20	3° to 7°					
014	—	1,4	1,35						
016	—	1,6	1,50						

4.3.3.10.3 Head length 7,0 mm

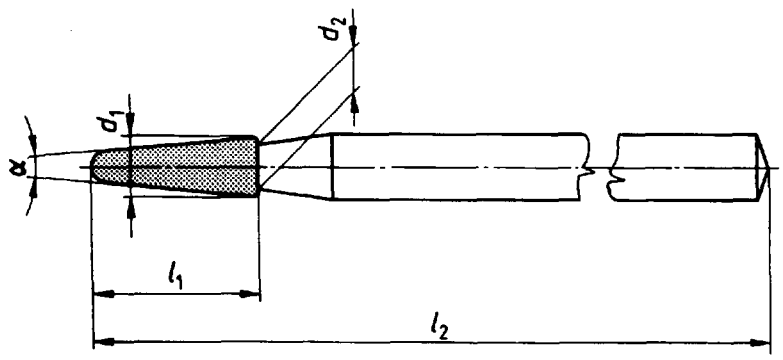

Figure 28

Table 28 — Dimensions (see figure 28)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	025	2,5	1,85	5° to 9°	7,0	23,0	44,5	21,0	18,5

4.3.3.10.4 Head length 8,0 mm

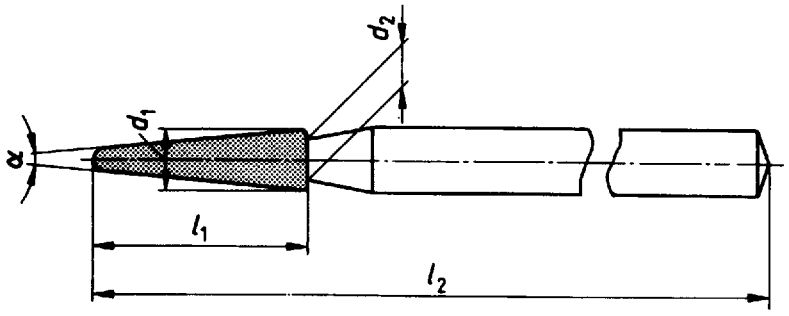

Figure 29

Table 29 — Dimensions (see figure 29)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 5°	8,0	24,0	44,5	22,0	19,5
012	—	1,2	1,20						
014	—	1,4	1,35	3° to 6°					
016	—	1,6	1,50						
018	—	1,8	1,60						
021	—	2,1	1,80	4° to 8°					
023	—	2,3	1,80						
—	025	2,5	1,85						

4.3.3.10.5 Head length 9,0 mm

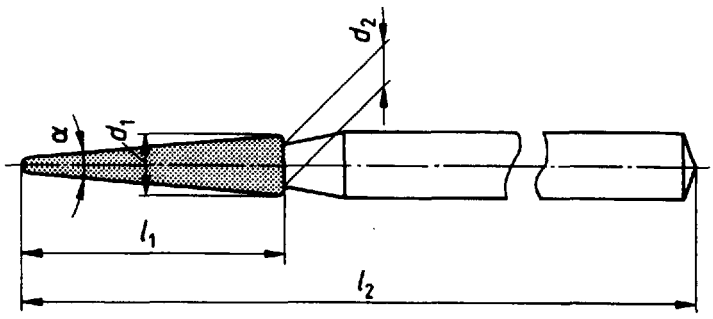

Figure 30

Table 30 — Dimensions (see figure 30)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	033	3,3	2,35	4° to 8°	9,0	25,0	44,5	24,0	21,5
—	040	4,0	2,35						
—	050	5,0	2,35						

4.3.3.10.6 Head length 10,0 mm

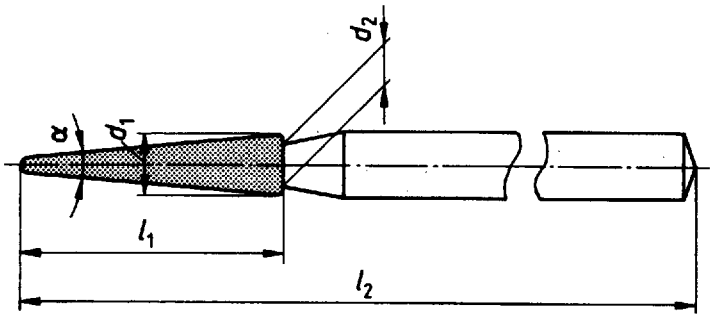

Figure 31

Table 31 — Dimensions (see figure 31)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	2° to 5°	10,0	26,0	44,5	24,0	21,5
012	—	1,2	1,20						
014	—	1,4	1,35	3° to 6°					
016	—	1,6	1,50						
018	—	1,8	1,60						
021	—	2,1	1,70	4° to 8°					
023	—	2,3	1,80						
—	025	2,5	1,85						
—	031	3,1	2,35						

4.3.3.11 Cylindrical working part with ogival end

4.3.3.11.1 Head length 4,0 mm

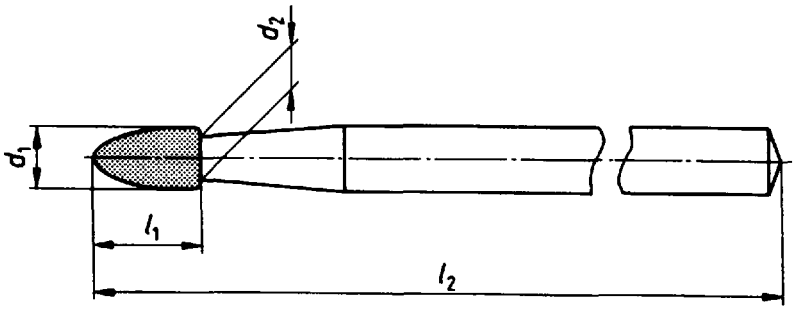

Figure 32

Table 32 — Dimensions (see figure 32)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	1,00	4,0	22,0	44,5	19,5	16,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					

4.3.3.11.2 Head length 5,0 mm

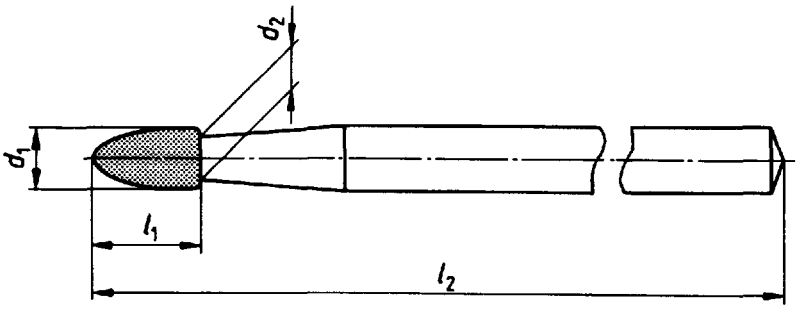

Figure 33

Table 33 — Dimensions (see figure 33)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	012	1,2	1,20	5,0	22,0	44,5	19,0	16,5
—	014	1,4	1,35					
—	016	1,6	1,50					

4.3.3.11.3 Head length 6,0 mm

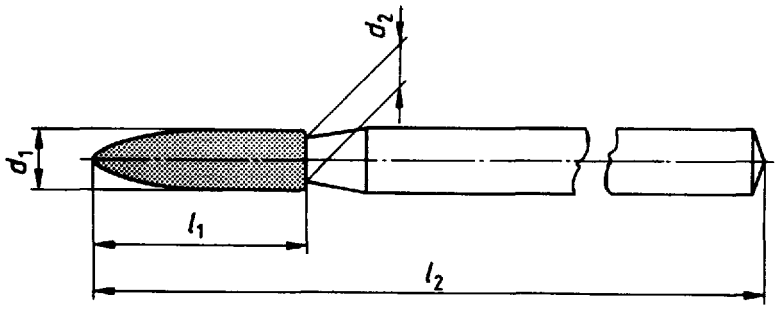

Figure 34

Table 34 — Dimensions (see figure 34)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
012	—	1,2	1,20	6,0	22,0	44,5	21,0	18,5
014	—	1,4	1,35					
016	—	1,6	1,50					

4.3.3.11.4 Head length 8,0 mm

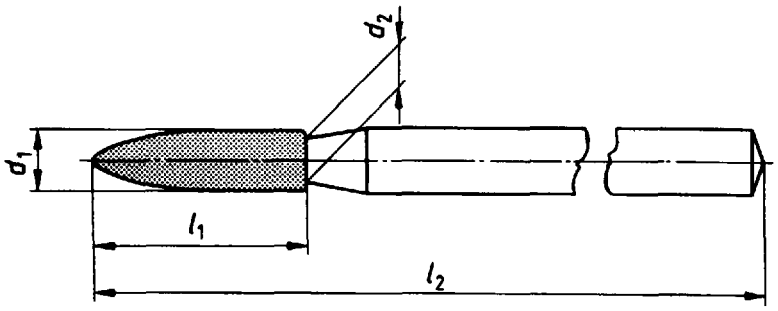

Figure 35

Table 35 — Dimensions (see figure 35)

Dimensions in millimetres

Designation of nominal diameter		d_1		d_2	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009	—	0,9	± 0,08	0,90	8,0	24,0	44,5	22,0	19,5
010	—	1,0		1,00					
012	—	1,2	± 0,10	1,20					
014	—	1,4		1,35					
016	—	1,6		1,50					
018	—	1,8		1,60					
021	—	2,1		1,70					

4.3.3.11.5 Head length 10,0 mm

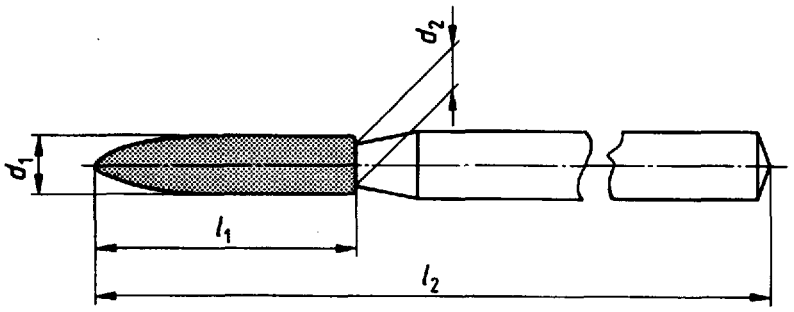

Figure 36

Table 36 — Dimensions (see figure 36)

Dimensions in millimetres

Designation of nominal diameter		d_1	d_2	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.	± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	010	1,0	1,00	10,0	26,0	44,5	24,0	21,5
012	—	1,2	1,20					
014	—	1,4	1,35					
016	—	1,6	1,50					
018	—	1,8	1,60					

4.3.3.12 Inverted, truncated conical working part

4.3.3.12.1 Head length 2,0 mm

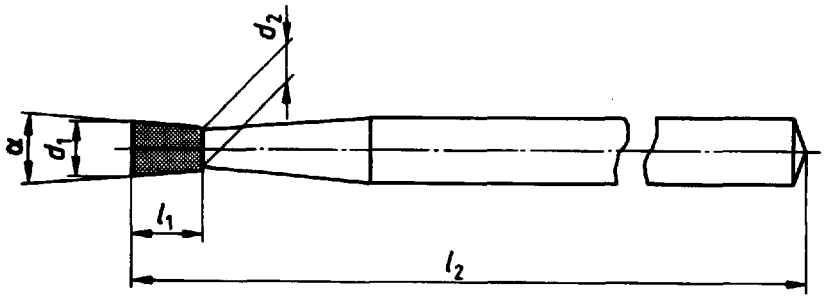

Figure 37

Table 37 — Dimensions (see figure 37)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,08	max.		± 0,15	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	009	0,9	0,80	2° to 6°	2,0	22,0	44,5	19,0	16,5
—	010	1,0	0,90						

4.3.3.12.2 Head length 3,5 mm

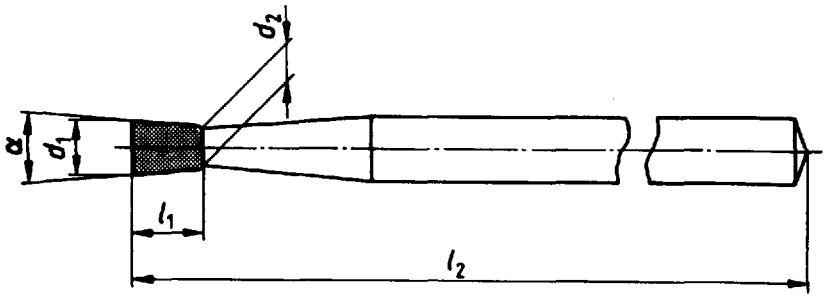

Figure 38

Table 38 — Dimensions (see figure 38)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	012	1,2	1,00	3° to 7°	3,5	22,0	44,5	19,0	16,5
—	014	1,4	1,10						
—	016	1,6	1,30						

4.3.3.12.3 Head length 4,0 mm

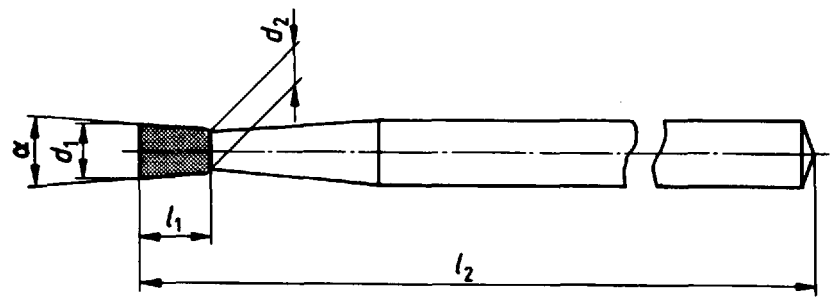

Figure 39

Table 39 — Dimensions (see figure 39)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
012	—	1,2	1,00	4° to 8°	4,0	22,0	44,5	19,0	16,5
014	—	1,4	1,10						
016	—	1,6	1,30						
018	—	1,8	1,40						
021	—	2,1	1,80						

4.3.3.12.4 Head length 5,0 mm

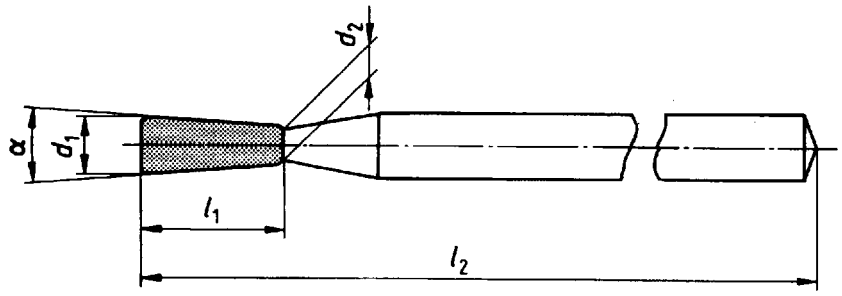

Figure 40

Table 40 — Dimensions (see figure 40)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	018	1,8	1,40	4° to 8°	5,0	22,0	44,5	19,0	16,5

4.3.3.12.5 Head length 6,0 mm

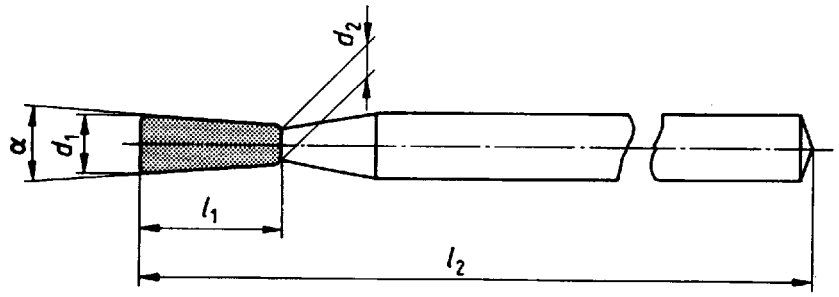

Figure 41

Table 41 — Dimensions (see figure 41)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	021	2,1	1,60	4° to 8°	6,0	22,0	44,5	21,0	18,5
023	—	2,3	1,70						
—	025	2,5	1,80						

4.3.3.13 Hemispherical, inverted, truncated conical working part

4.3.3.13.1 Head length 3,0 mm

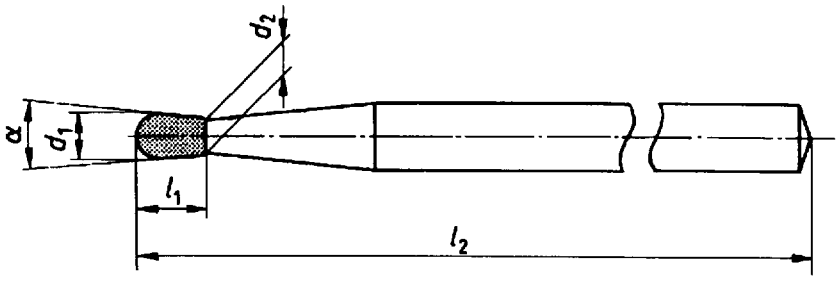

Figure 42

Table 42 — Dimensions (see figure 42)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	± 0,08	0,70	3° to 7°	3,0	22,0	44,5	19,0	16,5
009	—	0,9		0,75						
010	—	1,0		0,80						
012	—	1,2	± 0,10	1,00						
014	—	1,4		1,20						
016	—	1,6		1,30						

4.3.3.13.2 Head length 4,0 mm

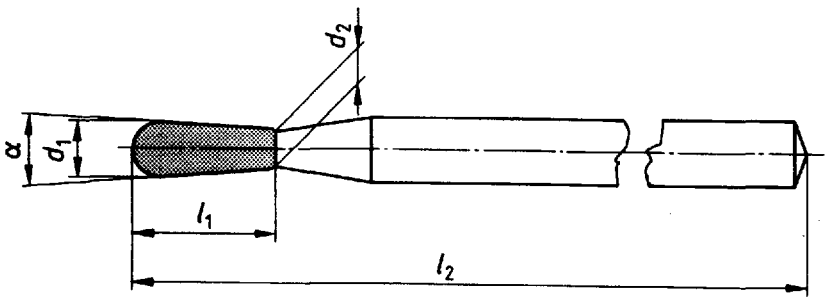

Figure 43

Table 43 — Dimensions (see figure 43)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	0,80	3° to 7°	4,0	22,0	44,5	19,0	16,5
012	—	1,2	1,00						
014	—	1,4	1,20						
016	—	1,6	1,40						
018	—	1,8	1,60						

4.3.3.14 Inverted conical working part with convex end and rounded edge

4.3.3.14.1 Head length 1,6 mm

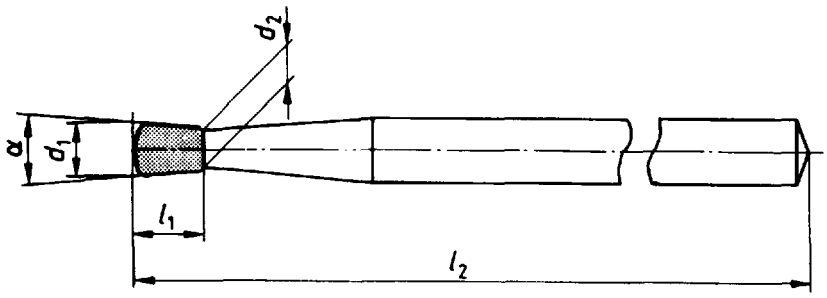

Figure 44

Table 44 — Dimensions (see figure 44)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		± 0,15	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
—	009	0,9	± 0,08	0,80	4° to 8°	1,6	22,0	44,5	19,0	16,5
—	010	1,0		0,90	5° to 16°					
—	012	1,2	± 0,10	1,00						
—	014	1,4		1,20						
—	016	1,6		1,30						

4.3.3.14.2 Head length 2,0 mm

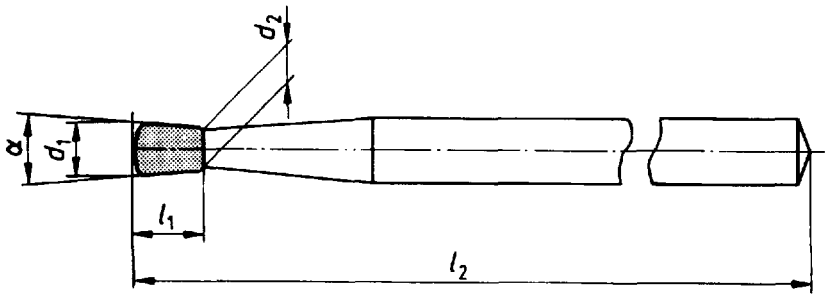

Figure 45

Table 45 — Dimensions (see figure 45)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,08	max.		± 0,15	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
008	—	0,8	0,70	3° to 7°	2,0	22,0	44,5	19,0	16,5
009	—	0,9	0,80						

4.3.3.14.3 Head length 2,7 mm

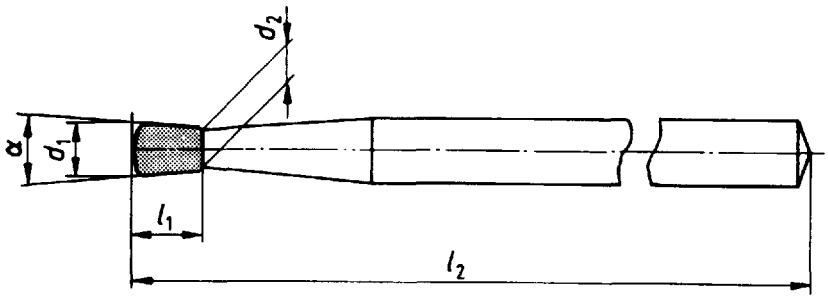

Figure 46

Table 46 — Dimensions (see figure 46)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1		d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		nom.	tol.	max.		± 0,15	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
009	—	0,9	± 0,08	0,75	3° to 7°	2,7	22,0	44,5	19,0	16,5
010	—	1,0		0,85						
012	—	1,2	± 0,10	1,05	4° to 8°					
014	—	1,4		1,20	6° to 10°					
016	—	1,6		1,25	8° to 15°					

4.3.3.14.4 Head length 4,0 mm

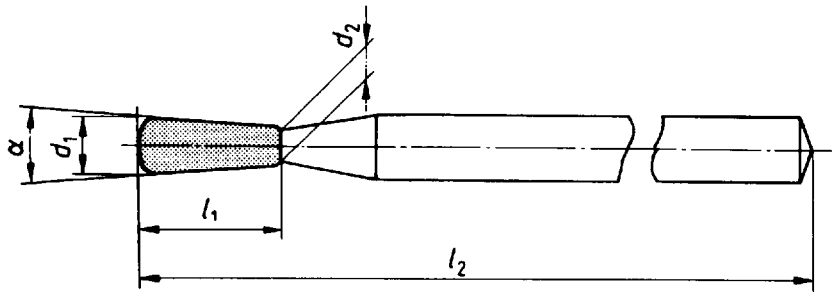

Figure 47

Table 47 — Dimensions (see figure 47)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
010	—	1,0	0,80	2° to 6°	4,0	22,0	44,5	19,0	16,5
012	—	1,2	1,00						
014	—	1,4	1,20	4° to 8°					
016	—	1,6	1,40	7° to 10°					
018	—	1,8	1,60						

4.3.3.14.5 Head length 5,0 mm

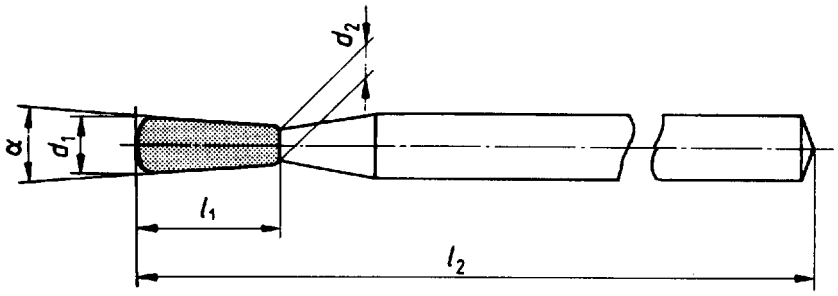

Figure 48

Table 48 — Dimensions (see figure 48)

Dimensions in millimetres, angles in degrees

Designation of nominal diameter		d_1	d_2	α	l_1	l_2 ± 0,5			
Preferred diameters		± 0,1	max.		± 0,3	Shank Type 1 Standard	Shank Type 2 Standard	Shank Type 3 Standard	Shank Type 3 Short
012	—	1,2	0,95	2° to 6°	5,0	22,0	44,5	19,0	16,5
014	—	1,4	1,15						
016	—	1,6	1,20	4° to 8°					
018	—	1,8	1,40	7° to 10°					
021	—	2,1	1,60						

4.4 Run-out

The total indicated run-out shall be as given in table 49.

Table 49 — Run-out

Grit	Maximum particle size µm	Maximum run-out mm
Ultra-fine	14	0,07
Extra-fine	22	0,07
Very fine	54	0,07
Fine	74	0,08
Standard	125	0,10
Coarse	177	0,12
Super-coarse	250	0,14

Testing shall be carried out in accordance with 5.2.

4.5 Corrosion resistance

Diamond instruments, if declared corrosion-resistant (or any similar term), shall show no signs of corrosion or functional deterioration after testing. A slight galvanic corrosion is permitted at the junction of the neck to the diamond-coated working part.

Testing shall be carried out in accordance with 5.3.

4.6 Neck strength

The instrument shall not fracture or take a permanent set in excess of 0,05 mm.

Testing shall be carried out in accordance with 5.4.

5 Testing

5.1 Dimensions

Measure and/or determine the shapes and dimensions according to ISO 8325:1985, 3.1 to 3.5, as appropriate.

5.2 Run-out

Determine the run-out in accordance with ISO 8325:1985, 3.6.

The measurement location shall be as given in table 50.

Table 50 — Measurement location

Shape of working part	Figure reference	Measurement location
Round head, spherical with collar	1 2	at the largest diameter
Inverted truncated, conical with collar	3 4	
Wheel with collar	5 6	
Hemispherical, inverted conical, truncated	42 and 43	
Inverted conical, with convex end and rounded edge	44 to 48	
Cylindrical	7 to 12	1 mm from tip
Truncated conical	13 to 19	
Inverted conical	37 to 41	
Hemispherical cylindrical	20 to 25	2 mm from tip
Truncated conical, domed	26 to 31	
Cylindrical, with ogival end	32 to 36	

5.3 Corrosion resistance

5.3.1 Equipment

Autoclave, operating in the nonvacuum mode, capable of being operated at temperatures of 134 °C to 138 °C and a pressure of 0,22 $MN \cdot m^{-2}$ (2,2 bar).

5.3.2 Reagent

Distilled or deionized water of grade 3 in accordance with ISO 3696.

5.3.3 Preparation of the test piece

Scrub the test piece using soap and warm water. Rinse thoroughly in water (5.3.2) and dry.

5.3.4 Procedure

Place the unwrapped test piece in the autoclave. Using the water (5.3.2), subject the test piece to an autoclaving cycle of $\left(3^{+0,5}_{0}\right)$ min at 134 °C to 138 °C and 0,22 MN · m^{-2}. After the cycle, open the door, remove the test piece and allow it to cool to room temperature.

5.3.5 Evaluation

5.3.5.1 Visually inspect the test piece at normal visual acuity for any signs of corrosion.

5.3.5.2 Determine any functional deterioration after testing the neck strength, see 5.4.

5.4 Neck strength

Determine the neck strength in accordance with ISO 8325:1985, 3.7 and after the test for corrosion resistance.

The test load, F, depends on the shape of the working part. Use the appropriate test load as specified in tables 51 to 61.

Table 51 — Round head

Values in newtons

Nominal diameter	Test load, F	
	Standard	With collar
007	7,21	—
008	7,77	—
009	10,09	10,75
010	14,32	20,86
012	13,73	22,30
014	17,10	23,78
016	20,60	26,65
018	24,76	31,12
021	22,94	35,29
023	33,01	36,87
025	32,47	45,49
027	36,17	—
029	50,34	—
033	54,26	47,84
035	60,98	—
042	79,58	—
050	104,78	—

Table 52 — Inverted, truncated, conical

Values in newtons

Nominal diameter	Test load, F	
	Standard	With collar
007	7,21	9,13
008	6,63	13,00
009	7,19	15,55
010	10,76	21,92
012	13,73	22,95
014	17,10	23,78
016	18,25	26,65
018	27,50	31,12
021	29,54	33,49
023	47,23	36,87
025	64,29	45,49
027	71,40	—
042	91,79	—

Table 53 — Wheel

Values in newtons

Nominal diameter	Test load, F	
	Standard	With collar
012	17,11	22,30
014	22,17	—
016	26,93	26,65
018	33,19	31,12
021	31,11	—
023	44,20	36,87
025	44,05	—
027	60,65	—
029	60,42	—
031	67,18	—
033	76,83	—
035	79,18	—
037	89,62	—
040	105,00	—
042	116,98	—
045	112,04	—
047	121,19	—
050	129,01	—

Table 54 — Cylindrical

Values in newtons

Nominal diameter	Test load, F					
	Head length, l_1					
	3 mm	4 mm	5 mm	6 mm	8 mm	10 mm
008	10,92	—	—	6,61	—	—
009	14,90	12,33	—	—	—	—
010	19,62	16,35	—	12,26	9,81	8,18
012	31,39	26,49	—	20,18	16,30	13,67
014	—	35,76	—	27,58	22,45	18,93
016	—	46,63	—	36,38	29,83	25,27
018	—	54,30	—	42,75	32,25	29,99
021	—	—	74,76	—	—	—
025	—	—	—	—	50,29	43,28
027	—	—	—	115,22	—	—

Table 55 — Truncated conical

Values in newtons

Nominal diameter	Test load, F						
	Head length, l_1						
	3 mm	4 mm	6 mm	7 mm	8 mm	9 mm	10 mm
008	10,92	—	—	—	—	—	—
009	14,90	—	—	—	—	—	—
010	19,62	16,35	12,26	—	9,81	—	8,18
012	—	26,49	20,18	—	16,30	—	13,67
014	—	35,76	27,58	—	22,45	—	18,93
016	—	46,63	36,38	—	29,83	—	25,27
018	—	54,30	42,75	—	35,25	—	29,99
021	—	—	—	—	48,08	—	34,93
023	—	—	—	—	47,28	43,67	40,58
025	—	74,39	—	—	50,29	—	43,28
031	—	—	—	—	—	88,11	82,40
033	—	—	—	—	—	86,90	—
035	—	82,61	—	50,29	—	—	—
040	—	—	103,09	—	—	82,94	—
050	—	—	—	—	—	77,87	—

Table 56 — Hemispherical cylindrical

Values in newtons

Nominal diameter	Test load, F					
	Head length, l_1					
	3 mm	4 mm	6 mm	8 mm	9 mm	10 mm
008	10,92	—	—	—	—	—
009	14,90	12,33	—	—	—	—
010	19,62	16,35	12,26	9,81		—
012	—	26,49	20,18	16,30	—	13,67
014	—	35,76	27,58	22,45	—	18,93
016	—	—	36,38	29,83	—	25,27
018	—	—	42,75	35,25	—	29,99
023	—	—	76,19	—	—	—
025	—	—	—	50,29	—	—
027	—	—	115,22	—	—	—
040	—	—	—	—	82,94	—

Table 57 — Truncated conical, domed

Values in newtons

Nominal diameter	Test load, F					
	Head length, l_1					
	4 mm	6 mm	7 mm	8 mm	9 mm	10 mm
009	12,33	—	—	—	—	—
010	16,35	12,26	—	9,81	—	8,18
012	26,49	20,18	—	16,30	—	13,67
014	35,76	27,58	—	22,45	—	18,93
016	46,63	36,38	—	29,83	—	25,27
018	—	—	—	35,25	—	29,99
021	—	—	—	48,08	—	34,93
023	—	—	—	47,28	—	40,58
025	—	—	54,73	50,29	—	43,28
031	—	—	—	—	—	82,40
033	—	—	—	—	86,90	—
040	—	—	—	—	82,94	—
050	—	—	—	—	77,87	—

Table 58 — Cylindrical, with ogival end

Values in newtons

Nominal diameter	Test load, F				
	Head length, l_1				
	4 mm	5 mm	6 mm	8 mm	10 mm
009	—	—	—	7,30	—
010	16,35	—	—	9,81	8,18
012	26,49	22,91	20,18	16,30	13,67
014	35,76	31,14	27,58	22,45	18,93
016	46,63	40,88	36,38	29,83	25,27
018	—	—	—	35,25	29,99
021	—	—	—	40,84	—

Table 59 — Inverted conical

Values in newtons

Nominal diameter	Test load, F				
	Head length, l_1				
	2 mm	3,5 mm	4 mm	5 mm	6 mm
009	13,57	—	—	—	—
010	18,34	—	—	—	—
012	—	17,21	15,82	—	—
014	—	21,76	21,06	—	—
016	—	33,68	31,24	—	—
018	—	—	37,39	32,83	—
021	—	—	72,42	—	41,42
023	—	—	—	—	48,20
025	—	—	—	—	55,55

Table 60 — Hemispherical, inverted conical, truncated

Values in newtons

Nominal diameter	Test load, F	
	Head length, l_1	
	3 mm	4 mm
008	7,48	—
009	8,90	—
010	10,46	8,66
012	18,87	15,82
014	30,27	25,68
016	36,53	38,46
018	—	54,30

Table 61 — Inverted conical, with convex end and rounded edge

Values in newtons

Nominal diameter	Test load, F				
	Head length, l_1				
	1,6 mm	2 mm	2,7 mm	4 mm	5 mm
008	—	9,61	—	—	—
009	15,22	13,57	9,51	—	—
010	20,43	—	13,24	8,66	—
012	25,82	—	22,94	15,82	11,76
014	40,36	—	31,98	25,68	19,76
016	47,89	—	34,52	38,46	21,73
018	—	—	—	54,30	32,83
021	—	—	—	—	46,19

6 Quality control

6.1 Sampling

Test only one size of each design. Use a sample consisting of 20 instruments of the same size for testing.

6.2 Compliance

6.2.1 Dimensions

A minimum of 16 of the 20 instruments of each shape tested shall comply with the requirements given in tables 1 to 48.

6.2.2 Run-out

A minimum of three out of five instruments of each shape tested shall comply with requirements given in 4.4.

7 Marking

7.1 Marking on diamond instruments

Marking on diamond instruments may contain information on the diamond grit size. The identification of the diamond grit size shall be in accordance with ISO 7711-3.

7.2 Labelling on the package

The labelling on the package of the diamond instrument shall contain at least the following information:

a) name and/or trademark of manufacturer or distributor;

b) material of working part;

c) type of shank, in accordance with ISO 1797-1;

d) shape number of working part, in accordance with ISO 6360-2;

e) the word "Sterile", if appropriate;

f) specific characteristics;

g) nominal diameter;

h) fineness of diamond grit, in accordance with ISO 7711-3, as appropriate;

i) lot number.

All information shall be given in accordance with the appropriate part of ISO 6360.

8 Packaging

Dental rotary diamond instruments are packaged at the discretion of the manufacturer as single pieces or in unit sets of several instruments.

ICS 11.060.20

Descriptors: dentistry, dental equipment, dental rotary-cutting instruments, diamond tools, specifications, shape, dimensions, marking, packaging, quality control.

Price based on 48 pages