IS 3403 (1981): Dimensions for knurls [PGD 20: Engineering Standards]

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UDC 621·914·7 : 621·882·16 : 006·78

(Reaffirmed 2002)

Indian Standard

DIMENSIONS FOR KNURLS

(First Revision)

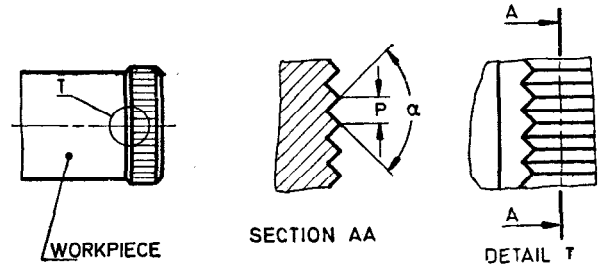
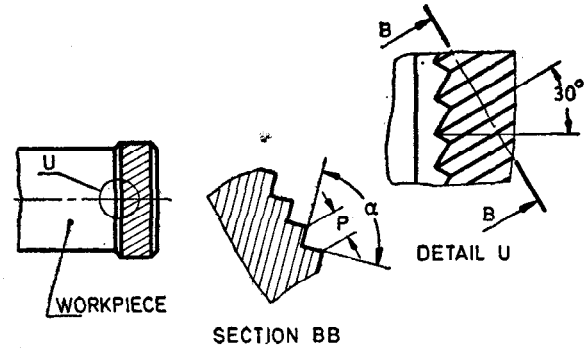
[Engineering Standards Sectional Committee, EDC 1; Basic Engineering Standards Subcommittee, EDC 1 : 2 [Ref : Doc : EDC 1 (3573)]]

1. Scope — Specifies the types and dimensions for knurls.

2. Types — Shall be of the following types:

Type RAA — Knurl with grooves paralled to axis
Type RBL — Left-hand knurl
Type RBR — Right-hand knurl
Type RGE — Left-hand/right-hand knurl, points raised
Type RGV — Left-hand/right-hand knurl, points indented
Type RKE — Cross-knurl, points raised
Type RKV — Cross-knurl, points indented.

2.1 *Representation of Types*

Type	Representation
RAA	Knurling with grooves parallel to axis 
RBL	Left-hand knurling 

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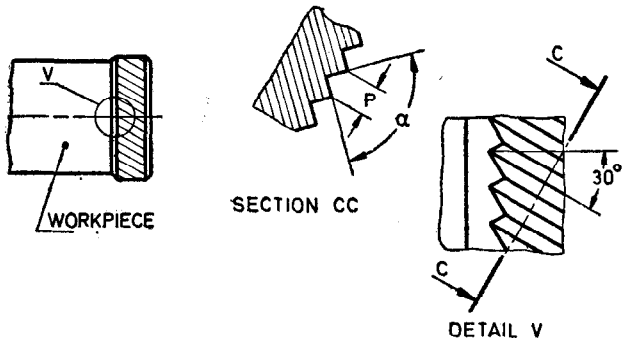
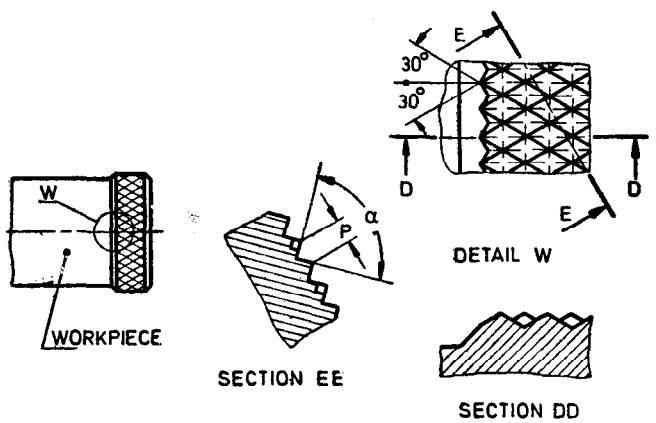
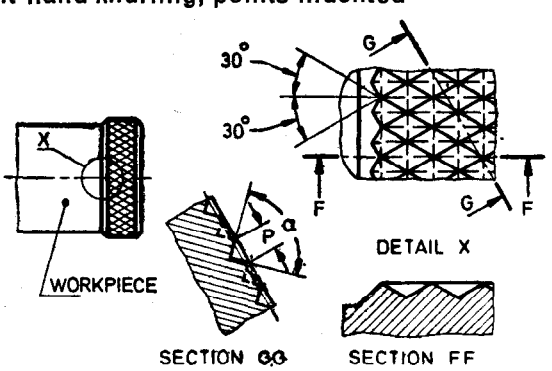
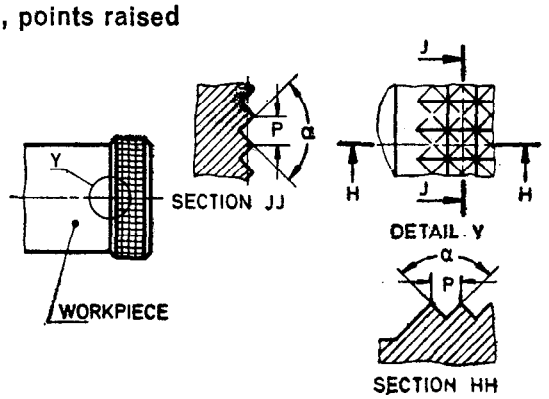
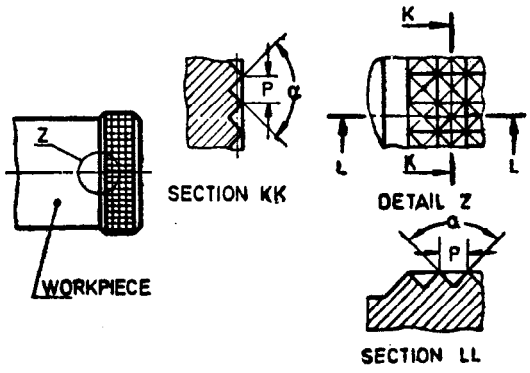
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Type	Representation
RBR	Right-hand knurling 
RGE	Left-hand/Right-hand knurling, points raised 
RGV	Left-hand/Right-hand knurling, points indented 
RKE	Cross-knurling, points raised 

Type	Representation
RKV	Cross-knurling, points indented 

3. Dimensions

3.1 *Profile Angle* — Profile angle $\alpha = 90°$.

3.2 *Pitch* — *P*.

0·5, 0·6, 0·8, 1·0, 1·2, 1·6 mm.

3.3 *Nominal Diameter* d_1 — The nominal diameter d_1 stated in the workshop drawing shall be the outside diameter of the finished knurl; this dimension is a function of the design.

3.4 *Initial Diameter* d_2 — The initial diameter d_2 of the workpiece prior to knurling shall be smaller than the nominal diameter d_1, because the initial diameter undergoes enlargement through displacement of the material during the knurling operation.

The initial diameter d_2 for knurls with profile angle $\alpha = 90°$ can be calculated from the formulae in the following table, depending on the type of knurl and the size of pitch:

Type of knurl		Initial diameter d_2
RAA	Knurl with grooves parallel to axis	$d_1 - 0{\cdot}5\,P$
RBL	Left-hand knurl	
RBR	Right-hand knurl	
RGE	Left-hand/right-hand knurl, points raised	$d_1 - 0{\cdot}67\,P$
RGV	Left-hand/right-hand knurl, points indented	$d_1 - 0{\cdot}33\,P$
RKE	Cross-knurl, points raised	$d_1 - 0{\cdot}67\,P$
RKV	Cross-knurl, points indented	$d_1 - 0{\cdot}33\,P$

The factors in the formulae, however, do not take into account the rounding of the grooves resulting from the knurling operation or the specific properties of the materials to be knurled.

4. Designation — A cross-knurl, points indented (Type RKV) with pitch $P = 0{\cdot}8$ mm and conforming to this standard shall be designated as:

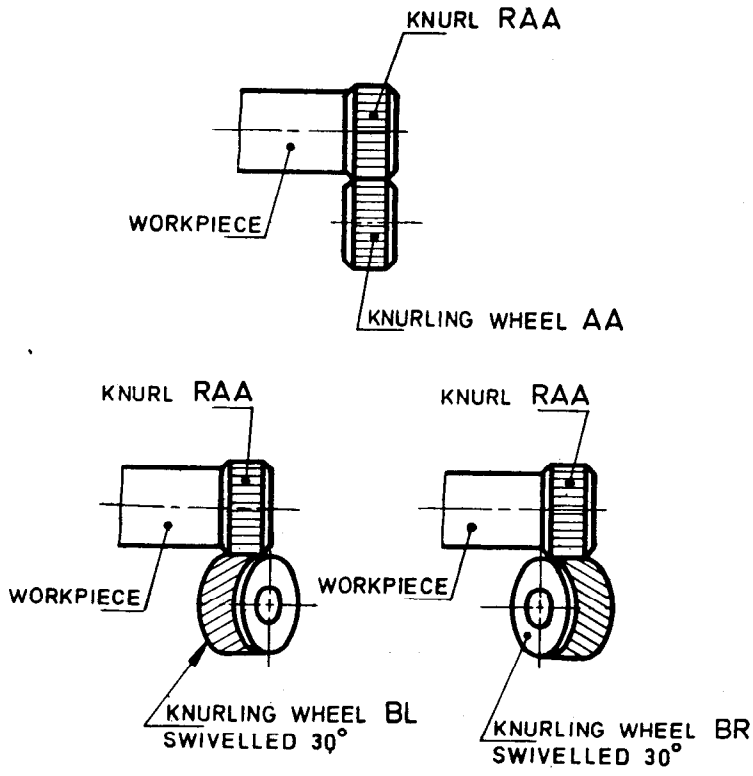
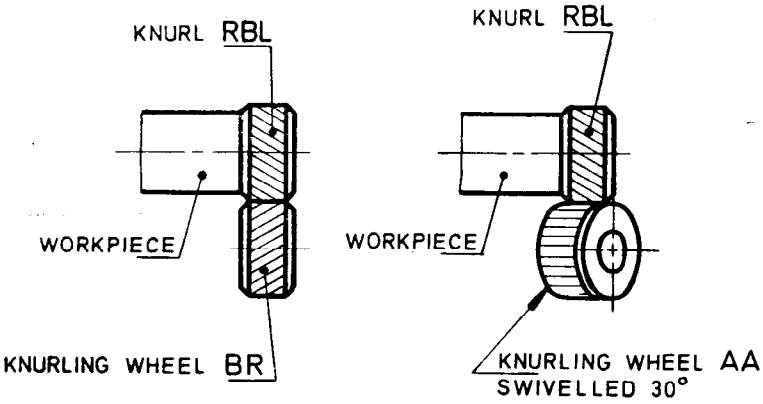
Knurl RKV 08 IS : 3403

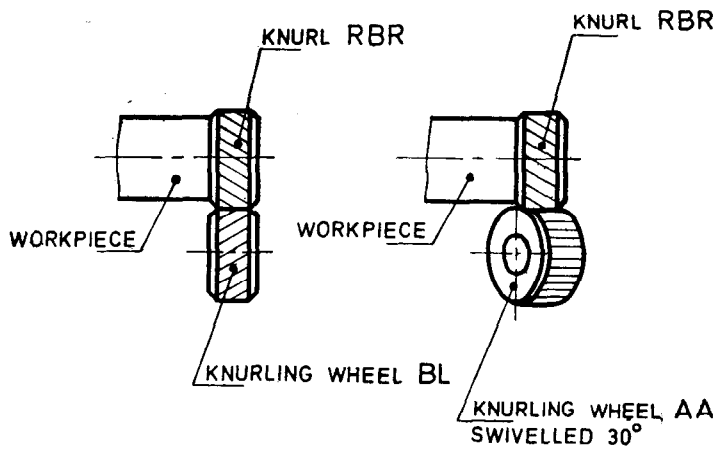
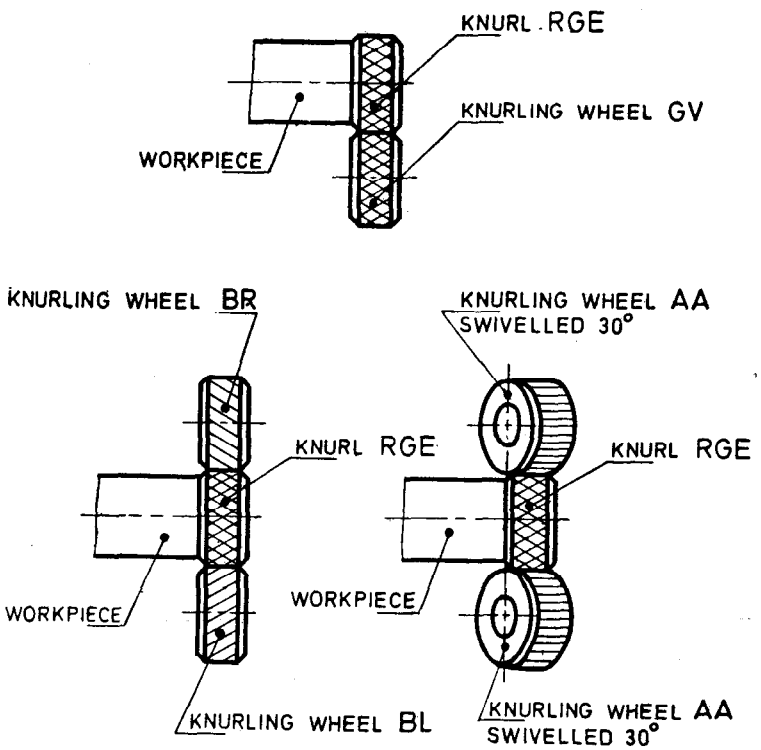
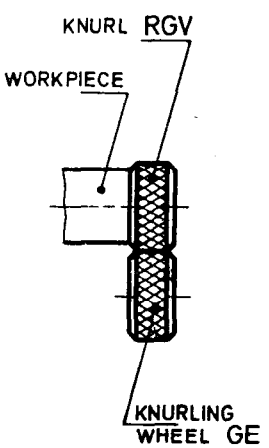
5. Manufacture — In order to facilitate the selection of knurling wheels according to IS : 6776-1980 'Specification for knurling wheels (*first revision*)', the manufacturing methods suitable for each type of knurl are indicated in Appendix A.

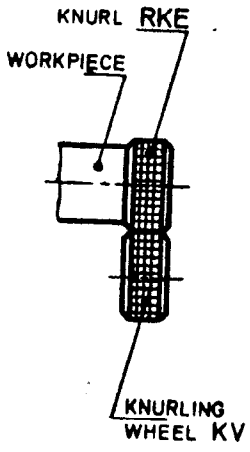
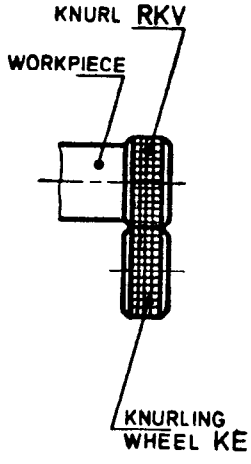
APPENDIX A

(*Clause* 5)

MANUFACTURING METHODS USING KNURLING WHEEL TO IS : 6776

Type	Manufacturing Method
RAA	Knurl with grooves parallel to axis 
RBL	Left-hand knurl 

Type	Manufacturing Method
RBR	Right-hand knurl 
RGE	Left-hand/right-hand knurl, points raised 
RGV	Left-hand/right-hand knurl, points indented 

Type	Manufacturing Method
RKE	Cross-knurl, points raised 
RKV	Cross-knurl, points indented 

EXPLANATORY NOTE

This standard was first issued in 1966. The present revision has been undertaken to take into consideration the latest changes in the corresponding foreign standards. In this revision, the standard nomenclature "knurl" has been adopted for all types, since the previous names "diamond knurling" and "negative diamond knurling" were not used consistently, and hence difficulties arose in the choice of tools. Some types of knurls have been given shorter names, such as left-hand knurl, right-hand knurl, left-hand/right-hand knurl.

The letter symbols assigned to the various types provide both for better differentiation and also yield a code designation for use in electronic data processing. The letter *R* differentiates the knurls from the knurling wheels (*see* IS : 6776-1980), the second letter *A*, *B*, *G* and *K* designates the basic type, whilst the third letter (*A* — Parallel to axis, L — left-hand, R — right-hand, E — raised, V — indented) marks the direction and form of the grooves.

The helix angle of Types BR, GE and GV is fixed at a standard value of 30°. The profile angle is normally $\alpha = 90°$.

The pitch $P = 2$ mm has been discontinued because it is scarcely used in practice. Similarly, no attempt has been made to correlate pitch with workpiece diameter, since recommendations made earlier have not proved suitable in all fields of application and hence their adoption in actual practice has been limited.

Formulae for calculating the initial diameter of the workpiece as a function of the type of knurl and of the outside diameter of the finished knurl, which counts as the nominal diameter, are given. The results obtained are only reference values, however, since the specific properties of the materials have not been taken into account.

In the preparation of this standard, assistance has been derived from 'DIN 82-1973 Knurls' issued by Deutsches Institut für Normung.

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