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**Technical product documentation
(TPD) — Relief grooves — Types and
dimensioning**

*Documentation technique de produits (DPT) — Rainures en relief —
Types et dimensionnement*



Reference number
ISO 18388:2016(E)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 10, *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

Technical product documentation (TPD) — Relief grooves — Types and dimensioning

1 Scope

This International Standard specifies a series of relief grooves for shafts and holes, intended for general use in mechanical engineering.

It also intends to avoid unnecessary multiplicity of tools by a restricted selection of groove-types and dimensional versions.

NOTE The shape and the dimensions of the relief grooves type G and H correspond with the “Indexable hard material inserts” according to ISO 6987.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 128-22, *Technical drawings — General principles of presentation — Part 22: Basic conventions and applications for leader lines and reference lines*

ISO 128-24, *Technical drawings — General principles of presentation — Part 24: Lines on mechanical engineering drawings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

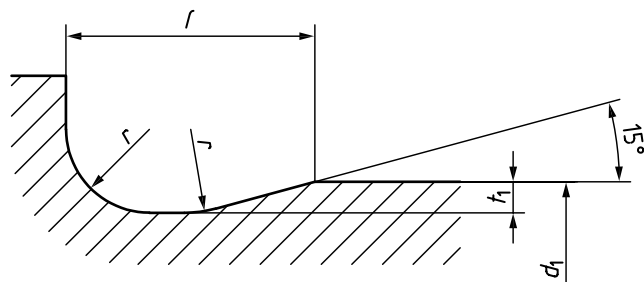
relief groove

clearance groove of specified form and dimensions created by removing material at an inner corner of a rotationally symmetric workpiece and which is necessary for subsequent machining and assembly with mating parts

4 Dimensions

4.1 Relief groove type E

The relief groove type E, see [Figure 1](#), shall be applied to workpieces where the planar surface is not subjected to high fatigue loads and where the cylindrical surface will be subsequently machined if necessary. They are also suitable where mating parts have a relatively large counterbore or will not be in contact with the planar surface.



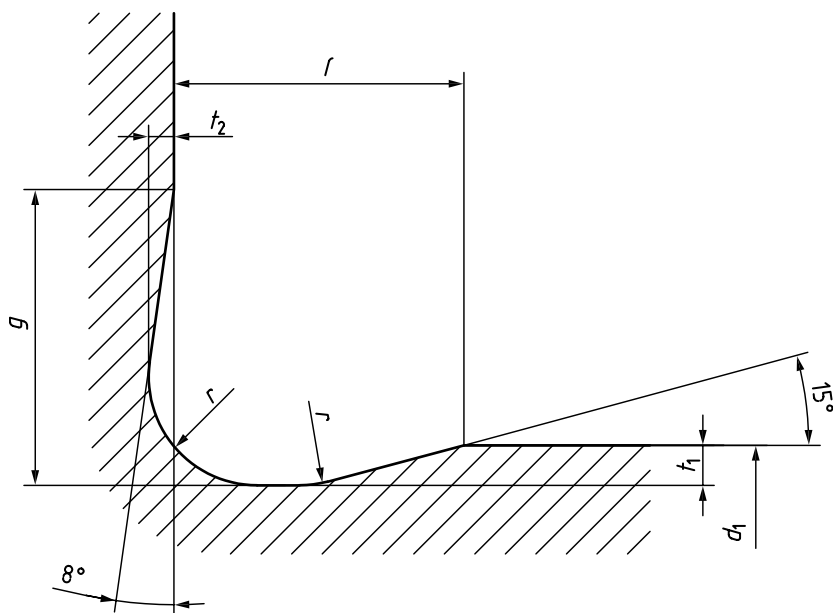
Key

- d_1 workpiece diameter
- f width of relief grooves
- r radius of relief grooves
- t_1 depth of recess

Figure 1 — Relief groove for cylindrical surfaces intended for subsequent machining

4.2 Relief groove type F

The relief groove type F, see [Figure 2](#), shall be applied to workpieces with surfaces that are perpendicular to each other and are intended for subsequent machining.



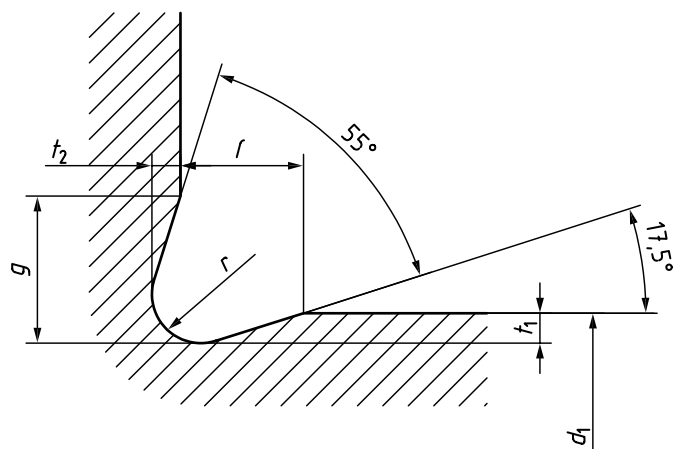
Key

- d_1 workpiece diameter
- f, g width of relief grooves
- r radius of relief grooves
- t_1, t_2 depth of recess

Figure 2 — Relief groove for cylindrical and planar surfaces intended for subsequent machining

4.3 Relief groove type G

The relief groove type G, see [Figure 3](#), shall be applied to workpieces which are not subjected to high fatigue loads and where a small included angle is required.

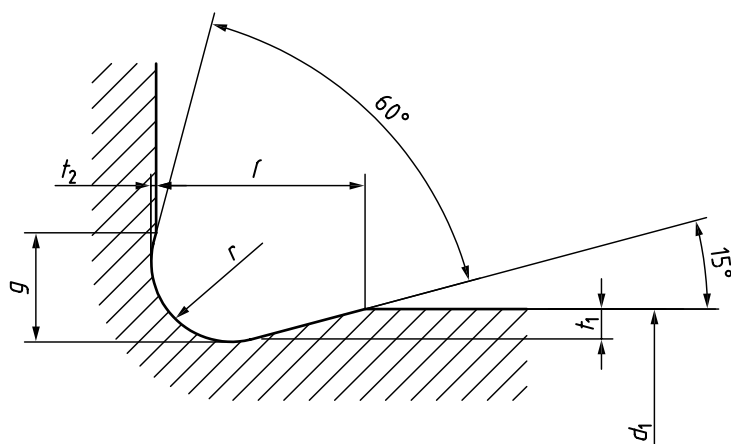
**Key**

- d_1 workpiece diameter
- f, g width of relief grooves
- r radius of relief grooves
- t_1, t_2 depth of recess

Figure 3 — Relief groove with smaller included angle

4.4 Relief groove type H

The relief groove type H, see [Figure 4](#), shall be applied to workpieces with surfaces that are perpendicular to each other and are intended for subsequent machining (but with a greater included angle).

**Key**

- d_1 workpiece diameter
- f, g width of relief grooves
- r radius of relief grooves
- t_1, t_2 depth of recess

Figure 4 — Relief groove with greater included angle

5 Dimensions of the relief grooves

5.1 Relief grooves

The dimensional values of the relief grooves shall be used for holes and shafts, see [Table 1](#).

Table 1 — Dimensions of the relief grooves

Dimensions in millimetres

Type	r^a		t_1	t_2	f	g	Corresponding diameter d_1^b for workpieces	
	Series 1	Series 2					subjected to normal loads ^c	subjected to higher alternating loads
E		R0,2	0,1	—	1	—	Over \varnothing 1,6 up to \varnothing 3	—
	R0,4		0,2	—	2	—	Over \varnothing 3 up to \varnothing 18	—
		R0,6	0,2	—	2	—	Over \varnothing 10 up to \varnothing 18	—
		R0,6	0,3	—	2,5	—	Over \varnothing 18 up to \varnothing 80	—
	R0,8		0,3	—	2,5	—	Over \varnothing 18 up to \varnothing 80	—
		R1	0,2	—	2,5	—	—	Over \varnothing 18 up to \varnothing 50
		R1	0,4	—	4	—	Over \varnothing 80	—
	R1,2		0,2	—	2,5	—	—	Over \varnothing 18 up to \varnothing 50
	R1,2		0,4	—	4	—	Over \varnothing 80	—
	R1,6		0,3	—	4	—	—	Over \varnothing 50 up to \varnothing 80
	R2,5		0,4	—	5	—	—	Over \varnothing 80 up to \varnothing 125
R4		0,5	—	7	—	—	Over \varnothing 125	
F		R0,2	0,1	0,1	1	(0,9)	Over \varnothing 1,6 up to \varnothing 3	—
	R0,4		0,2	0,1	2	(1,1)	Over \varnothing 3 up to \varnothing 18	—
		R0,6	0,2	0,1	2	(1,4)	Over \varnothing 10 up to \varnothing 18	—
		R0,6	0,3	0,2	2,5	(2,1)	Over \varnothing 18 up to \varnothing 80	—
	R0,8		0,3	0,2	2,5	(2,3)	Over \varnothing 18 up to \varnothing 80	—
		R1	0,2	0,1	2,5	(1,8)	—	Over \varnothing 18 up to \varnothing 50
		R1	0,4	0,3	4	(3,2)	Over \varnothing 80	—
	R1,2		0,2	0,1	2,5	(2)	—	Over \varnothing 18 up to \varnothing 50
	R1,2		0,4	0,3	4	(3,4)	Over \varnothing 80	—
	R1,6		0,3	0,2	4	(3,1)	—	Over \varnothing 50 up to \varnothing 80
	R2,5		0,4	0,3	5	(4,8)	—	Over \varnothing 80 up to \varnothing 125
R4		0,5	0,3	7	(6,4)	—	Over \varnothing 125	
G	R0,4		0,2	0,2	(0,9)	(1,1)	Over \varnothing 3 up to \varnothing 18	—
H	R0,8		0,3	0,05	(2,0)	(1,1)	Over \varnothing 18 up to \varnothing 80	—
	R1,2		0,3	0,05	(2,4)	(1,5)	—	Over \varnothing 18 up to \varnothing 50

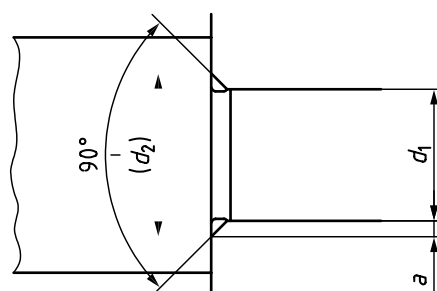
^a Relief grooves radii of the series 1 have to be preferred.

^b Does not apply to parts with a short shoulder and thin-walled parts. When a workpiece has different diameters, it may be expedient for manufacturing reasons to use several relief grooves having the same form and size.

^c Type G applies only to workpieces which are not subjected to high fatigue loads.

5.2 Countersink at the counterpart

The countersink at the counterpart by dimensions a , see [Figure 5](#) and [Table 2](#).



Key

a dimension of the countersink

d_1 nominal size of the workpiece

$d_2 = d_1 + 2a$

Figure 5 — Countersink at the counterpart

Table 2 — Dimension a

Dimensions in millimetres

Relief grooves size $r \times t_1$	Minimum dimension a for			
	Type E	Type F	Type G	Type H
0,2 × 0,1	0,2	0	—	—
0,4 × 0,2	0,3	0	0	—
0,6 × 0,2	0,5	0,15	—	—
0,6 × 0,3	0,4	0	—	—
0,8 × 0,3	0,6	0,05	—	0,35
1,0 × 0,2	0,9	0,45	—	—
1,0 × 0,4	0,7	0	—	—
1,2 × 0,2	1,1	0,6	—	—
1,2 × 0,3	—	—	—	0,65
1,2 × 0,4	0,9	0,1	—	—
1,6 × 0,3	1,4	0,6	—	—
2,5 × 0,4	2,2	1,0	—	—
4,0 × 0,5	3,6	2,1	—	—

6 Designation

The designation of relief grooves shall include the following elements:

- the term “Relief groove”;
- the number of this International Standard, i.e., ISO 18388;
- a hyphen;
- designation of the form by the relevant letter;
- the relief grooves size (radius r and depth t_1 separated by “×”).

EXAMPLE Designation of a type E relief groove, radius $r = 0,8$ mm, depth $t_1 = 0,3$ mm:

Relief groove ISO 18388 – E 0,8×0,3

7 Presentation on the drawing

7.1 General

Relief grooves can be shown in two presentation methods on technical drawings. The first method is to show the relief groove in a conventional representation and show how to present full details (see [Figure 6](#) and [Figure 7](#)). The second method is the simplified representation of relief grooves shown in technical drawings. This method shall preferably be drawn by using a continuous wide line, type 01.2 as in ISO 128-24. Designations shall be given in conjunction with a leader line and reference line as in ISO 128-22 (see [Figures 8](#) and [Figure 9](#)).

7.2 Conventional representation

Dimensions in millimetres

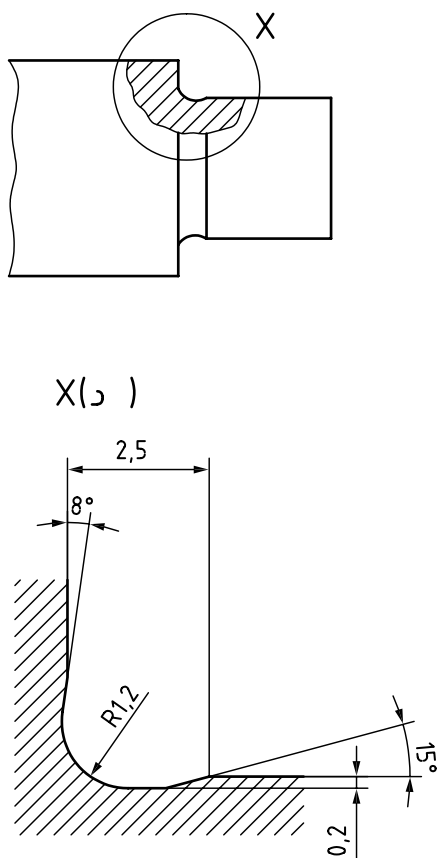


Figure 6 — Detailed representation of relief grooves
F 1,2×0,2

Dimensions in millimetres

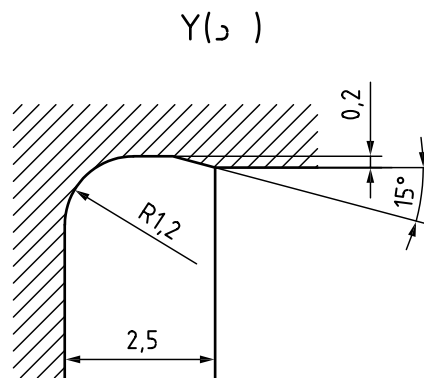
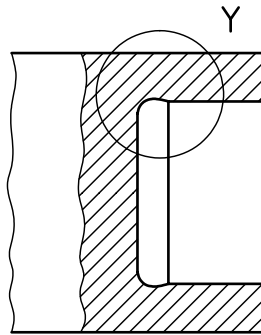


Figure 7 — Detailed representation of relief grooves
E 1,2×0,2

7.3 Simplified representation

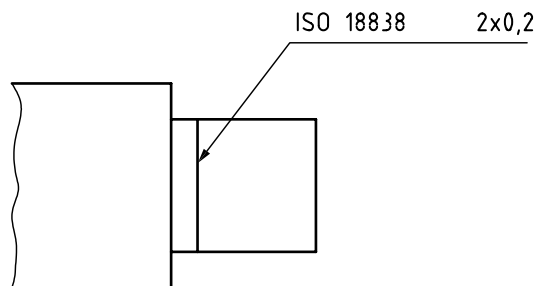


Figure 8 — Simplified representation of relief grooves
Relief groove ISO 18388 – F 1,2×0,2

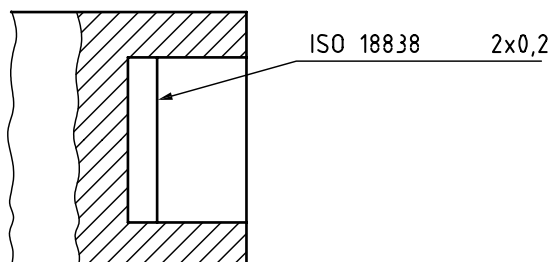


Figure 9 — Simplified representation of relief grooves
Relief groove ISO 18388 – E 1,2×0,2

Bibliography

- [1] ISO 6987, *Indexable hard material inserts with rounded corners, with partly cylindrical fixing hole — Dimensions*

