



## Tolerance for machining of outer contour and through holes

**DIN 7168** average tolerances apply

Accepted tolerance per dimension – without tolerance – in mm – extract DIN 7168							
	Range of nominal dimensions (mm) without tolerance						
Precision	from 0.5 to 3	from 3 to 6	from 6 to 30	from 30 to 120	from 120 to 315	from 315 to 1000	from 1000 to 2000
fine	± 0.05	± 0.05	± 0.1	± 0.15	± 0.2	± 0.3	± 0.5
Medium	± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2
rough	-	± 0.2	± 0.5	± 0.8	± 1.2	± 2.0	± 3.0
very rough	-	± 0.5	± 1.0	± 1.5	± 2.0	± 3.0	± 4.0

### Tolerance for diameters

#### Non plated through holes

Non-plated through holes refer to drilled holes required for positioning, for automated assembly of items and for testers, close-tolerance drilling and drilling to assemble the printed circuit and the items with normal tolerance.

Sizing of positioning holes is recorded in a particular way and these holes must be drilled at the same time as the plated through holes.

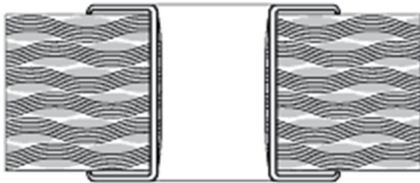
For all other non-plated through holes that are not specifically marked, average DIN 7168 tolerance applies.

## Plated through hole

Unless there is a special indication in the order, the following tolerances apply:

$D < 0,8 \text{ mm}$	Tolerance: $D -0,05 / +0,1 \text{ mm}$
$0,8 \leq D \leq 2,0 \text{ mm}$	Tolerance: $D -0,05 / +0,1 \text{ mm}$
$D < 2,0 \text{ mm}$	Tolerance: $D -0,05 / +0,1 \text{ mm}$

D: final diameter of the plated through hole



When selecting the diameter, special care must be brought in choosing the corresponding solder pad so that the remaining collar is large enough.

**Example:** Example: If you need a final diameter of 0.8 mm, we have to take account of the plating when drilling the through hole (see diagram). Generally, we calculate an additional 0.15 mm, meaning we will drill a 0.95 mm hole. Once the galvanized coating is in place, the final diameter is close to 0.85 mm.

An example not to follow: solder pad of 0.5 mm for a hole having a diameter of 0.4 mm. If we calculate as indicated above by including an additional 0.15 mm, on the drilled board, there is only a residual collar from the plating of the hole.

## Tolerance for grooves

If the contours of the printed circuits have grooves, the tolerances indicated below will apply.

1. Thickness of the printed circuit 1.0 mm (SMD boards)

Cut angle V	30° 45° 60° 90°
Thickness of the central blade K	$0,3 \pm 0,1 \text{ mm}$
Offset F* of each groove	$\pm 0.025 \text{ mm}$
Offset P* of the contour (after separation of the printed circuits)	$\pm 0.15 \text{ mm}$

\*with regard to the nominal median line

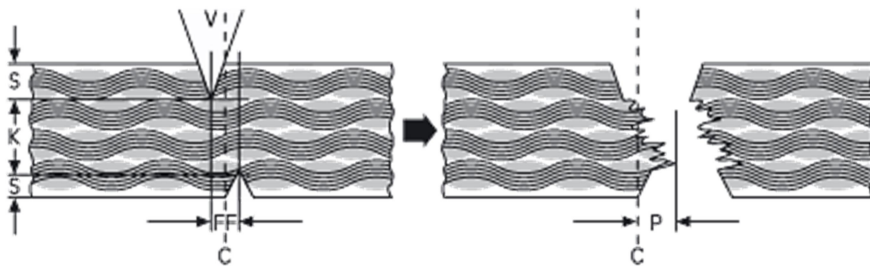
## Tolerance for grooves

>If the contours of the printed circuits have grooves, the tolerances indicated below will apply.

2. Thickness of the printed circuit 1.5 mm (combined SMD boards)

Cut angle V	30° 45° 60° 90°
Thickness of the central blade K	0,4 ± 0,1 mm
Offset F* of each groove	± 0.025 mm
Offset P* of the contour (after separation of the printed circuits)	± 0.15 mm

\*with regard to the nominal median line



### Distance between tracks and grooving line:

PCB thickness 0.80 mm : Xmin = 0.3 mm.

PCB thickness 1.00 mm : Xmin = 0.4 mm.

PCB thickness 1.50 mm : Xmin = 0.5 mm.