

This document was  
coordinated by:



**Tel.:** (+34) 911 294 440  
**E-mail:** [info@iacds.org](mailto:info@iacds.org)  
**Web:** [www.iacds.org](http://www.iacds.org)

In partnership with:



**Tel.:** (+1) 727 577 5004  
**Email:** [info@csda.org](mailto:info@csda.org)  
**Web:** [www.csda.org](http://www.csda.org)

# Tolerances and limits for concrete drilling and sawing



This report was produced and edited by:  
RABUSO, Association Management Company  
Tel.: (+32) 258 801 91  
E-mail: Brussels@rabuso.com  
Web: www.rabuso.com

Exclusively for the:  
International Association of Concrete Drillers, IACDS  
Tel.: (+34) 911 294 440  
Email: info@iacds.org  
Web: www.iacds.org

The original document was written by:  
Kaspar Disch

Jan Lemos

This is the second edition to be published in 2017.  
The document was updated by:

Philippe Wingeier

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# PRESENTATION

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Standard for tolerances and limits for concrete drilling and sawing of the International Association of Concrete Drillers, IACDS.

IACDS S-Tolerances-2 2017

# 1. Presentation

Tolerance evaluation of our specialized work can be viewed from a number of angles.

Matters that we presently do not control sufficiently may well stand out and become the primary target for future development. It is during planning that tolerances form the preconditions for accuracy or possible limitations and the requirement profile for the tradesman. They are intended to separate the amateur from the professional and should be available for advice or as reference work if there is a difference of opinion.

Among the various points of interest, the tolerance standard features limits that, for various reasons, can be different in the respective member countries. That is why these tolerances are mainly destined for national tolerances on the subjects proposed hereafter.

National or supra-national limits for noise, transfer sound, safety at work, safety of machines and tools, pollution of air and water exist in most countries and are valid for everyone. IACDS will observe very special cases in these fields which require special limits for the concrete drilling and sawing industry.

The document is constructed in such a way that national characteristics or information obtained from developments can be included at any time.

To adjust the professionalism in our industry, in 2016, the Board of IACDS decided to update the tolerances in this document. The tolerances in this document are based on current technologies and industry accepted practices. Now they are in line with the market and can be used worldwide as the guideline for core drilling and diamond cutting.

We hope that this tolerance standard, IACDS S-Tolerances-2 2017, will appeal to all associations and federations and thank you all for your contributions.



**Philippe Wingeier**

President of the Swiss concrete drilling and sawing Association, SVBS.

Vicepresident of International Association of Concrete Drillers, IACDS.



# GLOSSARY OF TERMS, SIGNS AND ABBREVIATIONS

- 
- Angle accuracy
  - Directional accuracy
  - Vertical level
  - Horizontal level
  - Surface roughing
  - Section width or drill-hole diameter
  - Target depth of pocket hole or joint
  - Pocket hole
  - Crushing
  - Bursting
  - Diving saws / plunge sawing

## 2. Glossary of terms, signs and abbreviations

Terms	Meaning
<b>Angle accuracy</b>	Measured from walls, floors or ceilings of the directly adjoining components, applicable in cases in which the angle of the cutting or coring direction is not at right angles to the plane of the fixing device. Unit of measurement for deviations: mm per m1/inch per ft1.
<b>Directional accuracy</b>	Maximum deviation from the given direction of the coring or the cut. Unit of measurement for deviations: mm per m1 / inch per ft1
<b>Vertical Level</b>	Maximum deviation in mm per m1 / inch per ft1
<b>Horizontal level</b>	Maximum deviation in mm per m1 / inch per ft1
<b>Surface roughing</b>	Flatness of the drilled hole or cut surface. Precondition: To a large extent uniform structure of the body to be worked. Maximum deviation in mm / inch
<b>Section width or drill-hole diameter</b>	Passage in: a. Hollow cylinder or hole diameter. Maximum deviation in mm / inch. b. Thickness of cut, width of joint. Maximum deviation in % from target value.
<b>Diving saws / plunge sawing</b>	Special cutting method: Diamond blades are lowered into an auxiliary core drill; usual method today: push cutting with wire saws (Chapter 7 of this document).



<b>Terms</b>	<b>Meaning</b>
<b>Target depth of pocket hole or joint</b>	Maximum deviation in mm / inch
<b>Pocket hole</b>	Blind hole
<b>Crushing</b>	Crushing a concrete part by means of hydraulically operated crusher jaws.
<b>Bursting</b>	Predetermined fracture lines created by perforating a body with hydraulically operated burster heads introduced into auxiliary core drills.

<b>Sign</b>	<b>Meaning</b>
>	Greater than
<	Smaller than
≥	Equal or greater than
d	Dimension of the structure to work on
t	Drilling depth, depth of cut
∅	Diameter
m	Meter. 39.37 in

<b>Abbreviation</b>	<b>Meaning</b>
Max.	Maximum
mm	Millimeter = 0.0394 in
in	Inch 25.4 mm (rounded from mm)
ft	Feet 304.8mm (rounded from mm)

**EXCEPTIONS:**

- These limits are not valid for work that has to be executed with hand-held machinery (for example chain saw, hand saw, etc.)
- According to the operation procedure enough space and load capacity must be ensured depending upon equipment specifications.
- Coring and drilling depths are not unlimited. They depend upon the diameter of the tools, the material to be worked on and the local conditions. They must therefore be pre-defined.



# WHAT IS THE PURPOSE OF THE STANDARD?

## 3. What is the purpose of the standard?

### 3.1. General principle

The Standard, IACDS S-Tolerances-2 2017, is intended to create trust, clarity and certainty between planners, contractors and building owners.

Planners should be able to rely on the fact that minimum tolerances are maintained in the concrete cutting industry at the quoted prices. The Standard, IACDS S-Tolerances-2 2017, represents the minimum. If planners require more accuracy this must be clearly stated in the tender specification documents. Tolerances tighter than those specified in the Standard will justify charging a higher price.

### 3.2. Each country

This Standard document is a proposal for those countries that don't have their own national standards. You can check these national standards in chapter 3 of this publication.

It is recommended that members should make the Standard a constituent part of their general conditions of business. Members are recommended at least to append this Standard to every quotation or tender, and by doing so make it an integral part of their offer.



# COUNTRIES WITH NATIONAL STANDARD

## 4. Countries with national standards

These are the countries that have their own Tolerances National Standards:

### **USA AND CANADA:**

Tolerances for sawing and core drilling - CSDA-TL\_001.

The document can be downloaded in: <https://csda.site-ym.com/?211> and in IACDS library:  
[www.iacds.org/library](http://www.iacds.org/library)

### **GERMANY:**

Regelwerk: 6. Toleranzen bei Betonbohr und sägearbeiten.

The document can be downloaded in:

[www.fachverband-bohren-saegen.de/xconfig/upload/files/download/regelwerk.pdf](http://www.fachverband-bohren-saegen.de/xconfig/upload/files/download/regelwerk.pdf)  
and in IACDS library: [www.iacds.org/library](http://www.iacds.org/library)



# MAXIMUM TOLERANCES

- 
- 4.1. Maximum tolerances for concrete core drilling with diamond tools in horizontal and vertical structures
  - 4.2. Maximum tolerances for diamond sawing with rail-mounted wall and plunge blade saws in horizontal and vertical concrete structures
  - 4.3. Maximum tolerances for diamond cutting with rail-mounted floor saws in horizontal concrete structures
  - 4.4. Maximum tolerances for diamond cutting with wheel driven floor saws in horizontal concrete structures
  - 4.5. Maximum tolerances for diamond wire saws in horizontal and vertical concrete structures

## 5. Maximum Tolerances

In this chapter, maximum tolerances are presented in tables organized by the particular type of work involved: which includes core drilling; diamond cutting of ceilings and walls; diamond cutting of floors, with one set of tolerances for rail-mounted equipment and a slightly different set for wheel-driven saws; wire sawing, in both horizontal and vertical structures.

Depending on their applicability, different measurements are addressed for those sawing and drilling activities. For example, core drilling and diamond cutting include tolerances for alignment accuracy and for hitting the target depth, whereas wire sawing do not. All include tolerances for some form of directional accuracy, for vertical and horizontal levelness, and for surface roughing.

Finally, a tolerance is given for hole diameter deviations in core drilling, and width of cut deviations for wire sawing and diamond cutting.

### 5.1. Maximum tolerances for concrete core drilling with diamond tools in horizontal and vertical structures

Alignment accuracy for all core drilling diameters and lengths: Center of circle to be drilled:  $\pm 5$  mm (0.2 in) plus 2,5% of the diameter.

Core drilling		$\varnothing < 300$ mm (11.8 in)	
		$d < 1000$ mm (39.4in)	$d \geq 1000$ mm (39.4in)
1	Angle accuracy	1%	2%
2	Directional accuracy in oblique drilling	2%	3%
3	Vertical	--	--
4	Horizontal	--	--
5	Surface roughing drilled wall (evenness)	$\pm 2$ mm	$\pm 3$ mm
6	Diameter of deviation from specified dimension	$\pm 2$ mm	$\pm 5$ mm
7	Specified depth for pocket hole	$\pm 10$ mm	$\pm 15$ mm



Core drilling (cont.)		Ø 301 mm – 1000 mm (11.8 in – 39.4 in)	
		d < 1000mm (39.4in)	d ≥ 1000 mm (39.4in) to max
1	Angle accuracy	1%	2%
2	Directional accuracy in oblique drilling	2%	3%
3	Vertical	--	--
4	Horizontal	--	--
5	Surface roughing drilled wall (evenness)	± 5 mm	± 10 mm
6	Diameter of deviation from specified dimension	± 5 mm	± 10 mm
7	Specified depth for pocket hole	± 10 mm	± 20 mm

## 5.2. Maximum tolerances for diamond sawing with rail-mounted wall and plunge blade saws in horizontal and vertical concrete structures

Alignment accuracy for all wall and diving blade saws:  $\pm 10$  mm (0.4 in) from target line.

Diamond cutting Ceilings + walls		Ceiling or wall thickness	
		d < 300mm (11.8 in)	d $\geq$ 300 - 600 mm (11.8-19.7 in)
Remark: Tolerances are only valid for ceiling cuts from above			
1	Angle accuracy	2%	4%
2	Directional accuracy in relation to specified dimension in longitudinal direction	$\pm 10$ mm/m1	$\pm 20$ mm/m1
3	Vertical	2 %	4 %
4	Horizontal	2 %	4 %
5	Surface roughing of cut surface (evenness)	$\pm 2$ mm	$\pm 5$ mm
6	Cut width, deviation from specified dimension	$\pm 10$ % from target value	$\pm 10$ % from target value
7	Specified depth	$\pm 10$ mm	$\pm 15$ mm

### 5.3. Maximum tolerances for diamond cutting with rail-mounted (track-mounted) floor saws in horizontal concrete structures

Alignment accuracy for all rail-mounted floor saws:  $\pm 10$  mm (0.4 in) from target line.

Diamond cutting of floors		Thickness, cutting depth	
		d < 100 mm (3.9 in)	d $\geq$ 100 - 500 mm (3.9-19.7 in)
Remark: Unevenness of the floor can't be compensated			
1	Angle accuracy	2%	4%
2	Directional accuracy in relation to specified dimension in longitudinal direction	$\pm 10$ mm/m1	$\pm 20$ mm/m1
3	Vertical	2 %	4 %
4	Horizontal	--	--
5	Surface roughing drilled wall (evenness)	$\pm 2$ mm	$\pm 5$ mm
6	Cut width, deviation from specified dimension	$\pm 10$ % from target value	$\pm 10$ % from target value
7	Specified depth at joint depth	$\pm 10$ mm	$\pm 15$ mm

## 5.4. Maximum tolerances for diamond cutting with wheel driven floor saws in horizontal concrete structures

Alignment accuracy for all wheel driven floor saws:  $\pm 10$  mm (0.4 in) from target line.

Diamond cutting of floors		Thickness, cutting depth	
		d <100mm (3.9 in)	d $\geq$ 100 - 500 mm (3.9-19.7 in)
Precondition: a level track next to the cut to cater for the width of the equipment to be used (max. 1.3m, 51.2 in) is necessary to ensure that the scheduled requirement figures can be achieved.			
Remark: Manually driven machines can be more accurate than motor driven machines.			
1	Angle accuracy	2%	4%
2	Directional accuracy in relation to specified dimension in longitudinal direction, cut 4 meters long	$\pm 10$ mm	$\pm 20$ mm
3	Vertical	2 %	5 %
4	Horizontal	--	--
5	Surface roughing of cut surface (evenness)	$\pm 2$ mm	$\pm 5$ mm
6	Cut width, deviation from specified dimension	$\pm 10$ % from target value	$\pm 10$ % from target value
7	Specified depth at joint depth	$\pm 10$ mm	$\pm 15$ mm



### 5.5. Maximum tolerances for diamond wire saws in horizontal and vertical concrete structures

Wire sawing	Body thickness			
	d < 150 cm (59 in)	d ≥ 150 cm – 300 cm (59-118.1 in)	d ≥ 300 cm (118.1 in)	
Remark: work carried out in stone quarries or under water is not included				
1	Angle accuracy	5 %	10%	15%
2	Directional accuracy in relation to specified dimension in longitudinal direction	5 %	10%	15%
3	Vertical	± 50 mm/m1	± 50 mm/m1	± 50 mm/m1
4	Horizontal	± 50 mm/m1	± 50 mm/m1	± 50 mm/m1
5	Surface roughing of cut surface (evenness)	± 10 mm	± 15 mm	± 20 mm
6	Width of cut	± 5 mm	± 10 mm	± 15 mm



# MORE INFORMATION

- 
- 6.1 About IACDS**
  - 6.2. IACDS members**
  - 6.3. Get involved**

## 6. More information

### 6.1. About IACDS

The International Association of Concrete Drillers & Sawers, IACDS, is the organization representing the associations, companies and professionals of the concrete drilling and sawing industry around the globe.

The IACDS has a strong focus on providing an international union with the cooperation of trade Associations.

IACDS has amongst others the following objectives:

- To look after, promote and protect the interests of industry;
- To set and promote international standards on the development of professional drilling and sawing contractors and their methods;
- To be involved in and have an impact on drilling & sawing legislation;
- To exchange information on techniques, working methods and training;
- To maintain contacts with similar organizations in other parts of the world.

The General Assembly is the supreme governing body of the association, in which all the members are represented. The Board is the governing body that manages and represents the interests of the association in accordance with the directives of the General Assembly. The current composition of the IACDS Board of Directors can be checked at: [www.iacds.org/association/organization](http://www.iacds.org/association/organization)

### 6.2. IACDS members

The complete list of IACDS members, can be checked on the following link: [www.iacds.org/members](http://www.iacds.org/members)

### 6.3. Get involved

IACDS offers different options to get involved:

Membership: National Concrete drilling and sawing Associations or Federations from European countries, concrete drilling and sawing contractors, concrete drilling and sawing suppliers (manufacturers, dealers,...).

Partnership: Associations and other groups related with the concrete drilling and sawing industry, specialized press related with the industry, universities and educational centers related with the activity of the association.

For more information, please contact IACDS secretariat:

Email: [info@iacds.org](mailto:info@iacds.org)

Web: [www.iacds.org](http://www.iacds.org)