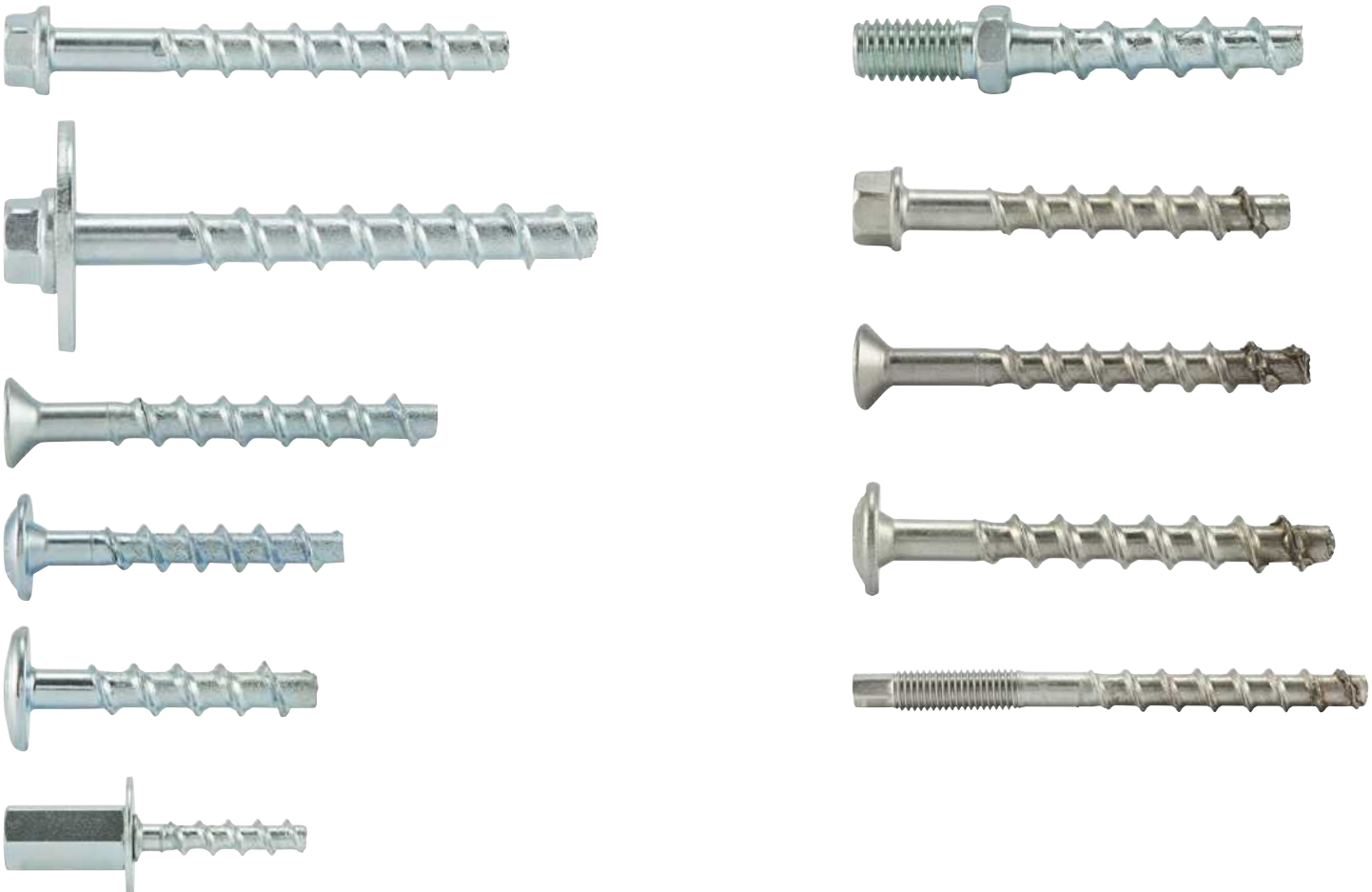
WÜRTH GULF SUBMITTAL
CONCRETE SCREW W-BS



WÜRTH

Supplier & Manufacturer Profile

Würth Gulf

is part of The Würth Group. We are the supplier of Fasteners, Automotive Chemicals, Hand Tools & Electrical Supplies also Construction Assembly Items, Sealants, Power Tools & Safety Solutions.
Established in 2000, Würth Gulf FZE is one of the leading suppliers in the Middle-East. Existing industrial companies and developing organizations alike can benefit from the uparalleled selection, quality and unbeatable service that is synonymous with the Würth brand.



OUR VISION

Becoming the number 1 in the eyes of our customers as the best and most qualified sales team.

OUR MISSION

We love selling.
We inspire our customers.

OUR PRINCIPLES

We request and promote achievements.
The greater the success, the more freedom and liberty.
We are optimistic, dynamic and have powers of self-assertion.
We passionately fight for success.
We consistently pursue everything that has proven to be successful, and we try out new things.
We strive for perfection in every area of our activities.
We assume responsibility for our actions, work in mutual respect and appreciation and are straightforward and predictable in everything we do.
The term we consider most important in dealing with each other is "Thank You".

WE SERVE THE FOLLOWING MARKET SECTOR:

- Auto Workshops
- Construction Companies
- Metal and Fabrication
- Oil and Gas Sector
- Maintenance and Repair Shops
- Industrial Companies
- And all other Manufacturing Sectors.

OUR PRODUCT RANGE :

More Than 100, 000 Products

We have all sizes and dimensions that are suited to the needs of our customers in industry and trade. Würth offers you as our client a comprehensive product package – all in one solution.

- Service and Systems
- Chemical Technical Products
- Fasteners / Fittings
- Concrete Anchors and Fixings
- Fire Protection Systems
- Material Processing
- General Tools/Equipment
- master ® Power Tools
- Workshop / Garage Equipment
- Orsy® Assortments and Workshop Equipment
- Personal Protective Equipment (PPE)
- Construction Accessories
- Electrical
- Sanitary
- Automotive / Cargo Accessories and Spare Parts
- Lubricants and Degreasers
- Hand and Power Tools
- Sealants and Adhesives



Over 3 million customers

Worldwide, there are over 400 Wurth companies in more than 80 countries and has 65,000 employees on its payroll. This guarantee our customers can rely on our high quality, excellent service and innovative products.

To each customer Würth allocates our Sales Consultant, who is strongly focused on the individual needs of the client. We have adopted this attitude to benefit you, the customer. Our daily commitment helps us to find new approaches so that we always improve. We aim to supply every customer with every article at any time in any place. We therefore have developed modular systems and logistics tailored to the individual needs of the customers. In October 2009, we won the German Logistics Award for this concept.

Our philosophy

We owe it to Reinhold Würth that the Würth Group has a clear business orientation: It is marked by a strong brand policy, future-oriented product strategy, closeness to the customer, clear quality offensive, thinking in terms of visions and not least by a strong corporate culture. Bettina Würth, Reinhold Würth's daughter and Chairwoman of the Advisory Board together with the members of the Central Managing Board see to it that these values are filled with life and developed further.

WÜRTH

Industrial / Trade License

رخصة تجارية عامة

General Trading License

Government of Dubai

CELEBRATING 40 YEARS

Jafza
المنطقة الحرة لجبل علي
Jebel Ali Free Zone

License Details / تفاصيل الرخصة

License Number	2421	٢٤٢١	رقم الرخصة
Licensee	Wurth Gulf FZE	وورث جلف م م ح	صاحب الرخصة
Trade Name	Wurth Gulf FZE	وورث جلف م م ح	الإسم التجاري
Legal Status	FZE (Limited Liability)	م م ح (ذات مسؤولية محدودة)	الشكل القانوني
Issue Date	01/01/2000	٢٠٠٠/٠١/٠١	تاريخ الإصدار
Expiry Date	30/11/2026	٢٠٢٦/١١/٣٠	تاريخ الإنتهاء
Business Unit	Jebel Ali Free Zone	المنطقة الحرة لجبل علي	قطاع العمل

Company Manager / مدير الشركة

Name of Manager	JEAN LUC MARCEL THESMAR	جيان لوس مارسيل ثيسمار	إسم مدير الشركة

Address / العنوان

Premises No.	Plot No: S61303 P. O. Box: 17036 Jebel Ali south 17036 Dubai United Arab Emirates	ارض رقم: اس ٦١٣٠٣ ص. ب: ١٧٠٣٦ جبل علي دبي الإمارات العربية المتحدة	المقر رقم
Floor Number			رقم الطابق
Building Name			إسم المبنى
Area Name			إسم المنطقة

Activities / النشاطات

General Trading	تجارة عامة
Occupational Hygiene & Safety Requisites Trading	تجارة لوازم السلامة والصحة والمهنية وأداوتها
Basic Steel Products Trading	تجارة منتجات الحديد الأساسية
Non Ferrous Metal Trading	تجارة المنتجات الأساسيه للمعادن غير الحديدية
Building Hardware & Tools Trading	تجارة عدد و أدوات البناء
Workshop Hardware & Tools Trading	تجارة عدد وأدوات الورش
Building & Construction Materials Trading	تجارة مواد البناء
Lubricants & Grease Trading	تجارة الشحوم وزيوت التزليق
Workshop Equipment, Machinery & Spare Parts Trading	تجارة معدات و مكائن الورش وقطع غيارها
Fire Fighting & Safety Equipment Trading	تجارة معدات وأجهزة السلامة وإطفاء الحريق
Construction Chemicals Trading	تجارة المواد الكيماوية لأغراض البناء
Building Metal Products Trading	تجارة الأشغال المعدنية للأبنية

License Remarks / ملاحظات الترخيص

001-00002421-010100

CN:1057 (GT)

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الإمارات
THE EMIRATES

وثيقة إلكترونية معتمدة و صادرة بدون توقيع من سلطة المنطقة الحرة لجبل علي
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حكومة دبي
GOVERNMENT OF DUBAI

دبي للاقتصاد والسياحة
Economy and Tourism

رخصة تجارية
Commercial License

License Details / تفاصيل الرخصة

License No.	572033	رقم الرخصة	
Company Name	WURTH GULF (L L C)	اسم الشركة	وورث جلف (شركة ذات مسئولية محدودة)
Business Name	WURTH GULF (L L C)	الاسم التجاري	وورث جلف (ش ذ م م)
License Category	Dep. of Economic Development	فئة الرخصة	دائرة التنمية الاقتصادية
Legal Type	Limited Liability Company - Single Owner(LLC - SO)	الشكل القانونى	شركة ذات مسؤولية محدودة - الشخص الواحد (ذ.م.م)
Issue Date 06/08/2005	Expiry Date 05/08/2026	تاريخ الإصدار	تاريخ الإنتهاء
Main License No. 572033	D&B D-U-N-S ® N 561529749	رقم الرخصة الام	الرقم العالمى
DCCI No. 99967	Register No. 1778252	عضوية الغرفة	رقم السجل التجارى

License Members / الاطراف

رقم الشخص/No.	الإسم / Name	الجنسية / Nationality	الصفة / Role	الحصص / Share
1162256	وورث جلف م م ح WURTH GULF FZE	United Arab Emirates / الامارات	Shares Owner / مالك حصص	100.00%
1070435	جيان لوس مارسيل تيسمار JEAN LUC MARCEL THESMAR	فرنسا / France	Manager / مدير	
1162255	موكانى توفيق احمد موكانى اقبال احمد MOOKANE THAUFEEQUE AHMED MOOKANE IQBAL AHMED	الهند / India	Manager / مدير	

License Activities / أنشطة الرخصة

النشاط	الحالة	Status	Activity
تجارة المواد المقاومة والمانعة لإنتشار الحريق	فعال	Active	Fire Resistant & Retardant Materials Trading
تجارة عامة	فعال	Active	General Trading

Print Date 07/08/2025 20:09 تاريخ الطباعة

Receipt No. رقم الإيصال

الإمـــارات
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العنوان / Address

صندوق بريد	17036	P.O. Box	
رقم القطعة	613-767	Parcel ID	
البريد الإلكتروني	mohamed.elsadig@wurth.ae	Email	

محل 02 ملك علي احمد خلفان - بردبي - راس الخور الصناعية الثانية

تليفون	971-4-8834229	Phone No	
فاكس	971-4-8834303	Fax No	
هاتف متحرك	971-50-7098917	Mobile No	

الملاحظات / Remarks

نقل الموقع بتاريخ 5/5/2015

رقم الإيصال Receipt No.

تاريخ الطباعة 07/08/2025 20:09 Print Date

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Economy and Tourism

شهادة شهر قيد شركة فى السجل التجارى
Commercial Register

تفاصيل القيد / Register Details

رقم القيد	1778252	Register No.	
الاسم التجاري	وورث جلف (شركة ذات مسئولية محدودة)		
الشكل القانونى	شركة ذات مسؤولية محدودة - الشخص الواحد (ذ.م.م.)		
تاريخ الإصدار	03/08/2005	Reg. Date	
الرقم العالمي	561529749		

Main Lice. Nr	572033	رقم الرخصة الأم	
Business Name	WURTH GULF (L L C)		
Legal Type	Limited Liability Company - Single Owner(LLC - SO)		
Expiry Date	05/08/2026	تاريخ الإنتهاء	
D&B D-U-N-S ® No.			

تفاصيل راس المال / Capital Details

الإسمى	300,000.00	Nominated	
المدفوع	300,000	Paid	
عدد الأسهم	300	No. of Shares	
العملة	درهم إماراتي	Currency	UAE Dirhams

عنوان الرخصة / License Address

عنوان السجل التجاري / Commerce Address

محل 02 ملك علي احمد خلفان - بردبي - راس الخور الصناعية الثانية

أنشطة السجل / Register Activities

تجارة المواد المقاومة والمانعة لإنتشار الحريق	Fire Resistant & Retardant Materials Trading
تجارة عامة	General Trading

Print Date	07/08/2025	20:09	تاريخ الطباعة	Receipt No.	رقم الإيصال

الإمـــارات
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الفروع / Branches

رقم الرخصة License No	الاسم التجارى Business Name
961444	وورث جلف (ش ذ م م) (فرع) WURTH GULF (L L C) (BRANCH)
1007865	وورث جلف (ش ذ م م) (فرع) WURTH GULF (L L C) (BRANCH)
1218999	وورث جلف (ش ذ م م) (فرع) WURTH GULF (L L C) (BRANCH)

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Receipt الرصيد

Receipt Date	**07/08/2025**	**تاريخ الإيصال**	**Receipt No**	**16705333**	**رقم الإيصال**
Business Name	WURTH GULF (L L C)			ورث جلف)ش ذ م م(	**اسم الشخص**
Procedure	Renew License,Modify Location			Renew License,Modify Location	**نوع الاجراء**
P.V.Nr.	**24404931**	**رقم إذن الدفع**	**License Nr.**	**572033**	**رقم الرخصه**
Payment Mode	eGovernment Online Payment			eGovernment Online Payment	**كيفية الدفع**
Amount in Words	Twenty One Thousand Eight Hundred and Fifteen Dirhams			واحد وعشرون الفا وثمانمئة وخمسة عشر درهما	**القيمة بالحروف**

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الإمارات
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GOVERNMENT OF DUBAI

دبي للاقتصاد والسياحة
Economy and Tourism

عزيزي التاجر،،

يرجى اخذ التعليمات التالية بعين الاعتبار:

1. عدم القيام بتغيير موقع الترخيص والانتقال الى موقع اخر دون الحصول على موافقة الدائرة.

2. ضرورة ان يكون الاسم التجاري المدون على اللافتة مطابق للاسم المدون بالرخصة مع ضرورة كتابته بحجم واحد.

الحرص على أن تكون اللافتة باللغتين العربية والانجليزية و بالشكل التالي:

- يكتب الاسم التجاري باللغة العربية في يمين اللافتة وباللغة الإنجليزية تجاه اليسار.

- يكتب الاسم التجاري باللغة العربية بنفس حجم الاسم المكتوب باللغة الانجليزية

- يكتب الاسم التجاري باللغة العربية أعلى الاسم المكتوب باللغة الانجليزية

3. الحرص على استخراج تصريح للافتات الاضافيه والعلامات التجارية على اللافتة.

4. عدم تظليل الواجهة أكثر من 50%

5. عدم العمل لساعات اضافية بعد الساعة 12:00 بعد منتصف الليل الا بعد استخراج تصريح.

6. عدم اجراء التنزيلات او التصفيات او العروض الخاصه بدون تصريح.

7. عدم اجراء اي تعديل او تغيير بيانات الترخيص الا بعد الرجوع للدائرة.

8. الالتزام بكتابة الاسعار على السلع والبضائع.

9. طباعة ووضع بطاقة حماية المستهلك (كن على حق واعرف حقوقك كمستهلك) في مكان بارز من موقع الدائرة www.consumerrights.ae

10. للمستهلك الحق في الحصول على فاتورة الشراء.

11. الاعلان عن سياسة البيع للمستهلك عبر وسيلة اعلان مناسبة شاملة (لعملية الاسترجاع او الاستبدال او الاصلاح للسلع)

12. عدم الترويج عن منتج عن طريق المندوبين، أو الاتصال أو غير ذلك وعدم البيع بطريقة المناداه

13. استخراج تصريح لمستودعات التخزين الخاصة بالمنشأة المرخصة أو تصريح للمكاتب الإضافية أو الاكشاك.

14. يجب على المطاعم وضع قائمه الطعام باللغتين العربيه والانجليزيه.

15. يجب وضع واعتماد قائمة الاسعار الخاصة بالصالونات الرجالية والنسائية ووضعها في مكان بارز.

16. يجب ان تكون الاسعار المعلنه مشمولة القيمة المضافه 5%

17. يجب عرض الفاتورة بشكل تفصيلي موضحا فيها القيمه الاجماليه للسلع والخدمات وقيمة الضريبه المضافه.

18. عدم القيام بالترويج او البيع او العرض لأية بضائع مقلدة أو مغشوشة.

Dear Merchants,

Kindly take the following instruction into high consideration:

1. It is not allowed to change the location registered in the license to move to another address unless DET approval is obtained.
2. The business name on the signboard must conform to the name mentioned in t license and typed in one size.

The business name must be in both Arabic and English as follows:

- The business name in Arabic must be placed on the right hand side of the signboard whereas the English text on the left hand side.
- The Arabic text must be in same size of the English equivalent
- The Arabic business name must be placed above the English equivalent.

3. A commercial permit must be issued for additional signboards and for placing trademarks on the signboard.
4. Text must not occupy more than 50% of the signboard.
5. Shops operating hours must not exceed 12:00 am unless a permit is issued.
6. Discounts, sales or special offers must not be announces unless a permit is issu
7. It is not allowed to apply any amendments or change the license details unless approved by DET.
8. Prices must be placed on products and goods.
9. The Consumer Protection Card (Be Right and Know Your Consumer Rights) mu be typed and placed visibly above the DET website www.consumerrights.ae
10. Consumers have the right to receive a purchase receipt.
11. Announce the sale policy to consumer through suitable applicable channels (t clarify procedures for goods replacement, repair and refund).
12. It is not allowed to promote products through agents, telephone calls, or othe ways or yelling.
13. Permits must be issued for warehouses of licensed business or additional offi or kiosks.
14. Restaurants must place a menu in both Arabic and English languages.
15. Place an approved price list for services provided by ladies and gentlemen salons at a visible area.
16. The displayed price list should be inclusive of 5% VAT
17. Invoices must clearly reflect the total amount of the purchased goods, service and VAT.
18. Avoid promoting or selling or displaying any counterfeited goods.
19. To protect trade marks, it must be registered by the Ministry of Economy.
20. The Department of Economy & Tourism in Dubai has the right to suspend or

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الإمارات
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شهادة تسجيل العضوية
Membership Certificate

License no.	572033	572033	**رقم الرخصة**
Membership no.	99967	99967	**رقم العضوية**
Registration no.	1778252	1778252	**رقم السجل التجاري**
Business Name	WURTH GULF (L L C)	وورث جلف (ش ذ م م)	**الاسم التجاري**
Legal Status	Limited Liability Company - Sing	شركة ذات مسؤولية محدودة - الشخص	**الشكل القانوني**
Activity	Fire Resistant & Retardant Materials Trading General Trading	تجارة المواد المقاومة والمانعة لإنتشار الحريق تجارة عامة	**نوع النشاط**
Member Since	06/08/2005	06/08/2005	**تاريخ الإنتساب**
Date of Issue	06/08/2005	06/08/2005	**تاريخ الإصدار**
Expiry Date	05/08/2026	05/08/2026	**تاريخ الإنتهاء**

Remarks

This certificate shall be invalid incase of any alteration without chamber's authorization

For online verification of this Certificate, please visit our website http://www.dubaichamber.ae/verify

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للتأكد من صحة بيانات الشهادة يرجى الرجوع إلى موقع الغرفة http://www.dubaichamber.ae/verify

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Dubai Chamber of Commerce & Industry

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ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

CERTIFICATE

Certificate Registration No.: **12 100 23791 TMS** / Order No.: **70020920**

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that the organization

WÜRTH

Adolf Würth GmbH & Co. KG

Reinhold-Würth-Str. 12-17 • 74653 Künzelsau
Germany

for the scope

Development and distribution of fasteners, hand tools and storage systems. Distribution of products (standard parts, special parts, systems) for industrial safety, construction, workshops, fire protection technology, chemical-technical applications, anchor technology, direct assembly, electrical installations, material processing, installation, measuring technology, soldering and welding technology, as well as of products such as electrical and pneumatic tools and machines, small and replacement parts for automotive vehicles, advertising media. Maintenance of electric power tools, pin driver technology and pneumatic tools as well as testing of fall arrest systems, length measuring tools (laser technology) and tools for torque measurement and vehicle conversion or installation of storage systems including load securing in vehicles as well

including the sites see enclosure

has established and applies a Quality Management System.

An audit was performed and has furnished proof
that the requirements according to

DIN EN ISO 9001:2015

are fulfilled.

The certificate is valid from **2024-04-10** until **2027-04-09**.

Fred Wenke
Head of Certification Body
Munich, 2024-03-13

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

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MS/01-07/2023

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

ENCLOSURE OF CERTIFICATE

Certificate Registration No.: **12 100 23791 TMS** / Order No.: **70020920**

certificate holder:

Adolf Würth GmbH & Co. KG
Reinhold-Würth-Str. 12-17
74653 Künzelsau
Germany

at the sites	scope
Adolf Würth GmbH & Co. KG Reinhold-Würth-Str. 12-17 74653 Künzelsau Germany	Development and distribution of fasteners, hand tools and storage systems. Distribution of products (standard parts, special parts, systems) for industrial safety, construction, workshops, fire protection technology, chemical-technical applications, anchor technology, direct assembly, electrical installations, material processing, installation, measuring technology, soldering and welding technology, as well as of products such as electrical and pneumatic tools and machines, small and replacement parts for automotive vehicles, advertising media. Maintenance of electric power tools, pin driver technology and pneumatic tools as well as testing of fall arrest systems, length measuring tools (laser technology) and tools for torque measurement.
Adolf Würth GmbH & Co. KG **Fahrzeugeinrichtungen** Am Seebach 2 74182 Obersulm-Willsbach Germany	Vehicle conversion or installation of storage systems including load securing in vehicles.

Fred Wenke
Head of Certification Body
Munich, 2024-03-13

DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

MS/01-07/2023

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

Adolf Würth GmbH & Co. KG

Reinhold-Würth-Str. 12-17 • 74653 Künzelsau
Germany

has established and applies
an Energy Management System for

Development and distribution of fasteners, hand tools and storage systems. Distribution of products (standard parts, special parts, systems) for industrial safety, construction, workshops, fire protection technology, chemical-technical applications, anchor technology, direct assembly, electrical installations, material processing, installation, measuring technology, soldering and welding technology, as well as of products such as electrical and pneumatic tools and machines, small and replacement parts for automotive vehicles, advertising media. Installation of storage systems including load securing in automotive vehicles. Maintenance of electric power tools, pin driver technology and pneumatic tools as well as testing of fall arrest systems, length measuring tools (laser technology) and tools for torque measurement.

An audit was performed, Order No. **70020920**.

Proof has been furnished that the requirements
according to

ISO 50001:2018

are fulfilled.

The certificate is valid in conjunction
with the main certificate from **2022-10-04** until **2025-10-03**.

Certificate Registration No.: **12 340 23791/01 TMS**.

Head of Certification Body
Munich, 2022-10-05

DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

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TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

WÜRTH | INDUSTRY

Würth Industrie Service GmbH & Co. KG

Industriepark Würth, Drillberg
97980 Bad Mergentheim
Germany

has established and applies
an Environmental Management System for

Sales of fastener and fixing material, DIN/ISO and standardized parts, dowels and anchors, chemical products, personal protective equipment, tools, operating equipment and special parts. Product development. C-Parts management. Logistical services. Automated supply concepts.

An audit was performed, Order No. **70005015**.

Proof has been furnished that the requirements
according to

DIN EN ISO 14001:2015

are fulfilled.

The certificate is valid from **2023-06-30** until **2026-06-29**.

Certificate Registration No.: **12 104 25349 TMS**.

Head of Certification Body
Munich, 2023-05-16

IAF MLA

DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

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WÜRTH

Technical Data Sheets

W-BS CONCRETE SCREW



Individual attachment
in cracked and uncracked concrete

Multiple attachment
in concrete and prestressed concrete hollow slab ceilings

Approved for adjustability after installation in order, for example, to align railings etc.

Proof of performance

Approvals			
European Technical Approval Option 1 for cracked and uncracked concrete	**European Technical Approval** Multiple attachment of non-load-bearing systems	**Fire resistance** **Technical Report TR 020** **R30 – R120**	**Size 6–14**
			

1. Areas of use:

- **Individual attachment, Size 6–14:** Normal concrete C20/25 to C50/60 (cracked and uncracked concrete)
- **Multiple attachment, Size 5 and 6:** Anchoring non-load-bearing systems in cracked and uncracked concrete
- **Attachment in prestressed concrete hollow slab ceilings, Size 6**
- Suitable for attachment of metal constructions, metal profiles, brackets, foot plates, supports, cable conduits, pipes, railings, machines etc.
- Can also be used in concrete < C20/25 and pressure-resistant natural stone (without approval)
- W-BS/S (galvanized steel) can be used in dry indoor rooms
- W-BS/A4 (A4 stainless steel) may be used in dry indoor rooms, outdoors (including industrial atmosphere and near the sea) or in humid rooms if no especially aggressive conditions exist

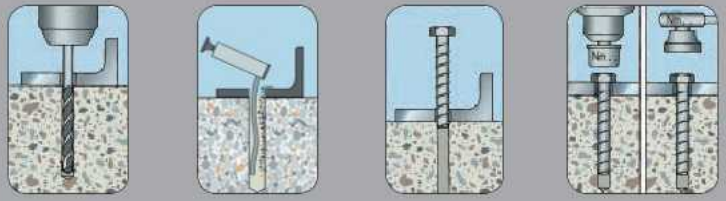
2. Advantages:

- High load-bearing capacities
- Small axial spacings and edge spacings thanks to very minor spreading effect
- Very quick and easy installation
- No mounting torque required
- Can be loaded immediately – no waiting times
- Enable extremely flexible use due to three anchoring depths (Size 6–14) and a broad range of types
- Same performance data for steel galvanized and stainless steel A4 version
- Adjustability of attachment possible up to twice following installation (Size 8–14) in order, for example, to align railing or anchor plate (observe installation instructions in approval or enclosed leaflet)

3. Properties:

- Approval
  ETA-16/0043 for individual attachment, Size 6–14
  Option 1, cracked and uncracked concrete
  ETA-16/0128 for multiple attachment in concrete (Size 5 and 6) and attachment in prestressed concrete hollow slab ceilings (Size 6)
- Fire resistance: R30, R60, R90, R120; Technical Report TR020 (contained in the approvals)

Setting instructions



Produce the drill hole | Clean the drill hole | Position the anchor | Screw in the anchor

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W-BS CONCRETE SCREW

01.3

W-BS/S concrete screw, galvanized steel with hexagon head and pressed-on washer, Type S



Washer diameter:

Size	Screw dia. [mm]
5	12.5
6	15
8	16
10	20
12	23
14	28

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\ 1}$	$t_{fix\ 2}$	$t_{fix\ 3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
5	5	–	–	40	35	–	–	5	40	–	–	SW10	**5929 125 005**	100
	15	–	–	50									**5929 125 015**	
	25	–	–	60									**5929 125 025**	
6	5	–	–	40	35	–	–	6	40	–	–	SW13	**5929 126 005**	
	15	10	–	50		40				45			**5929 126 015**	
	25	20	5	60			55				60		**5929 126 025**	
	45	40	25	80									**5929 126 045**	
	65	60	45	100									**5929 126 065**	
8	5	–	–	50	45	–	–	8	55	–	–	SW13	**5929 128 005**	50
	15	5	–	60		55				65			**5929 128 015**	
	25	15	5	70			65				75		**5929 128 025**	
	35	25	15	80									**5929 128 035**	
	45	35	25	90									**5929 128 045**	
	55	45	35	100									**5929 128 055**	
	75	65	55	120									**5929 128 075**	
	95	85	75	140									**5929 128 095**	
	115	105	95	160									**5929 128 115**	
10	5	–	–	60	55	–	–	10	65	–	–	SW15	**5929 121 005**	25
	25	5	–	80		75				85			**5929 121 025**	
	35	15	5	90			85				95		**5929 121 035**	
	45	25	15	100									**5929 121 045**	
	65	45	35	120									**5929 121 065**	
	85	65	55	140									**5929 121 085**	
	105	85	75	160									**5929 121 105**	
12	15	–	–	80	65	–	–	12	75	–	–	SW17	**5929 122 015**	
	45	25	10	110		85	100			95	110		**5929 122 045**	
14	5	–	–	80	75	–	–	14	85	–	–	SW21	**5929 124 005**	
	35	10	–	110		100				110			**5929 124 035**	
	55	30	15	130			115				125		**5929 124 055**	

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W-BS CONCRETE SCREW

W-BS/S concrete screw, galvanized steel with hexagon head and large washer as per DIN 440, Type S



Washer diameter:

Size	Screw dia. [mm]
10	44

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia. d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
10	125	105	95	180	55	75	85	10	65	85	95	SW15	**5929 121 125**	25
	145	125	115	200									**5929 121 145**	
	185	165	155	240									**5929 121 185**	15
	225	205	195	280									**5929 121 225**	
	265	245	235	320									**5929 121 265**	

Concrete screw W-BS/S, galvanized steel with countersunk head, Type SK



Head diameter: (90° countersunk head)

Size	Head dia. [mm]
5	12
6	13
8	20
10	22

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia. d_0 [mm]	Drill hole depth h_1 [mm]			Torx drive [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
5	5	–	–	40	35	–	–	5	40	–	–	TX25	**5929 135 005**	100
	15	–	–	50									**5929 135 015**	
	25	–	–	60									**5929 135 025**	
6	5	–	–	40	35	–	–	6	40	–	–	TX30	**5929 136 005**	100
	15	10	–	50		40				45			**5929 136 015**	
	25	20	5	60			55				60		**5929 136 025**	
	45	40	25	80									**5929 136 045**	
	65	60	45	100									**5929 136 065**	
	85	80	65	120									**5929 136 085**	50
	105	100	85	140									**5929 136 105**	
	125	120	105	160									**5929 136 125**	
8	35	25	15	80	45	55	65	8	55	65	75	TX40	**5929 138 035**	
10	35	15	5	90	55	75	85	10	65	85	95	TX50	**5929 131 035**	25

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W-BS CONCRETE SCREW

Concrete screw W-BS/S, galvanized steel with pan head, Type P



Head diameter:

Size	Head dia. [mm]
5	14
6	15

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Torx drive [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
5	5	–	–	40	35	–	–	5	40	–	–	TX30	**5929 145 005**	100
	15	–	–	50									**5929 145 015**	
	25	–	–	60									**5929 145 025**	
6	5	–	–	40	35	–	–	6	40	–	–	TX30	**5929 146 005**	
	15	10	–	50		40				45			**5929 146 015**	
	25	20	5	60			55				60		**5929 146 025**	
	45	40	25	80									**5929 146 045**	
	65	60	45	100									**5929 146 065**	

Concrete screw W-BS/S, galvanized steel with large pan head, Type P



Head diameter:

Size	Head dia. [mm]
6	18

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia. d_0 [mm]	Drill hole depth h_1 [mm]			Torx drive [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	5	–	–	40	35	–	–	6	40	–	–	TX30	**5929 156 005**	100
	25	20	5	60		40	55			45	60		**5929 156 025**	

Concrete screw W-BS/S, galvanized steel with inside thread, Type I



Stepped thread:

Size	Stepped thread
6	M8/M10

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia. d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	0	–	–	35	35	–	–	6	40	–	–	SW13	**5929 176 001**	50
	–	–	0	55	–	–	55		–	–	60		**5929 176 002**	

Concrete screw W-BS/S, galvanized steel with stud screw with countersunk head, Type ST



Connecting thread:

Size	Thread [mm]
6	M8 x 16

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia. d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	0	–	–	35	35	–	–	6	40	–	–	SW10	**5929 186 000**	100
	20	15	0	55		40	55			45	60		**5929 186 020**	
	40	35	20	75									**5929 186 040**	
	60	55	40	95									**5929 186 060**	

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W-BS CONCRETE SCREW

W-BS/A4 concrete screw, stainless steel A4 with hexagon head and pressed-on washer, Type S



Washer diameter:

Size	Screw dia. [mm]
6	17
8	16
10	20

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	15	10	–	50	35	40	–	6	40	45	–	SW13	**5929 226 015**	100
	25	20	5	60			55				60		**5929 226 025**	100
8	25	15	5	70	45	55	65	8	55	65	75	SW13	**5929 228 025**	50
	35	25	15	80									**5929 228 035**	50
10	35	15	5	90	55	75	85	10	65	85	95	SW15	**5929 221 035**	25
	45	25	15	100									**5929 221 045**	25
	65	45	35	120									**5929 221 065**	25

Concrete screw W-BS/A4, stainless steel A4 with countersunk head, Type SK



Head diameter:
(90° countersunk head)

Size	Head dia. [mm]
6	13
8	20
10	22

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Torx drive [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	15	10	–	50	35	40	–	6	40	45	–	TX30	**5929 236 015**	100
	30	25	10	65			55				60		**5929 236 030**	
	50	45	30	85									**5929 236 050**	
	70	65	50	105									**5929 236 070**	
8	35	25	15	80	45	55	65	8	55	65	75	TX40	**5929 238 035**	50
10	35	15	5	90	55	75	85	10	65	85	95	TX50	**5929 231 035**	25

Concrete screw W-BS/A4, stainless steel A4 with pan head, Type P



Head diameter:

Size	Head dia. [mm]
6	15

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Torx drive [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
6	15	10	–	50	35	40	–	6	40	45	–	TX30	**5929 246 015**	100
	25	20	5	60			55				60		**5929 246 025**	
	45	40	25	80									**5929 246 045**	
	65	60	45	100									**5929 246 065**	

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W-BS CONCRETE SCREW

01.3

Concrete screw W-BS/A4, stainless steel A4 with stud screw, Type ST



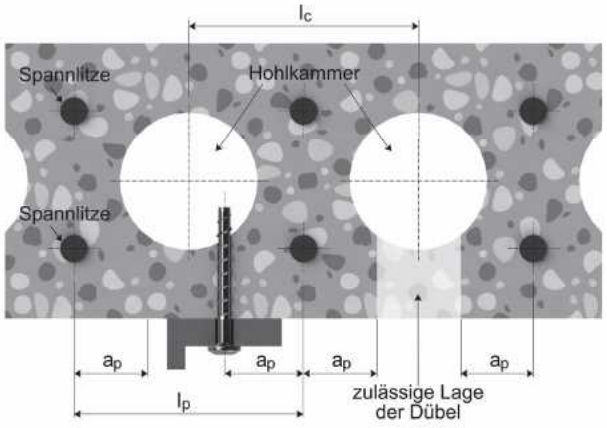
Connecting thread:

Size	Thread [mm]
8	M10 x 30
10 x 140	M12 x 20
10 x 160	M12 x 55

Anchor size	Attachment height t_{fix} [mm]			Total length L [mm]	Length of the anchor in the concrete h_{nom} [mm]			Drill bit nominal dia d_0 [mm]	Drill hole depth h_1 [mm]			Wrench size [mm]	Art. No.	P. Qty.
	$t_{fix\,1}$	$t_{fix\,2}$	$t_{fix\,3}$		h_{nom1}	h_{nom2}	h_{nom3}		$H_{1.1}$	$H_{1.2}$	$H_{1.3}$			
8	40	30	20	105	45	55	65	8	55	65	75	SW7	**5929 268 040**	50
10	60	40	30	140	55	75	85	10	65	85	95	SW9	**5929 261 060**	25
	80	60	50	160									**5929 261 080**	

Installation characteristics in concrete																		
Anchor size [mm]		**5**	**6**			**8**			**10**			**12**			**14**			
Length of the anchor in the drilled hole	h_{nom} [mm]	35	35	40	55	45	55	65	55	75	85	65	85	100	75	100	115	
Minimum axial spacing	s_{min} [mm]	35	35	40		40	50		50			50		70	50	70		
Axial spacing	$s_{cr,N}$ [mm]	81	81	93	132	105	129	156	129	180	204	150	201	240	174	237	276	
Minimum edge spacing	c_{min} [mm]	35	35	40		40	50		50			50		70	50	70		
Edge spacing	$c_{cr,N}$ [mm]	40.5	40.5	46.5	66	52.5	64.5	78	64.5	90	102	75	100.5	120	87	118.5	138	
Minimum component thickness	h_{min} [in mm]	80	80	100		100		120	100	130		120	130	150	130	150	170	
Drill nominal dia.	d_0 [mm]	5	6			8			10			12			14			
Drill cutting edge dia.	$d_{cut} \leq$ [mm]	5.40	6.40			8.45			10.45			12.50			14.50			
Drilled hole depth	h_1 [mm]	40	40	45	60	55	65	75	65	85	95	75	95	110	85	110	125	
Through-hole in the component being connected	$d_f \leq$ [mm]	7	8			12			14			16			18			
Max. torque for anchoring	T_{inst} = [Nm]	8	10			20			40			60			80			

Installation characteristics in prestressed concrete hollow slab ceiling		
Anchor size [mm]		**6**
Minimum axial spacing	s_{min} [mm]	100
Minimum edge spacing	c_{min} [mm]	100
Minimum distance between the anchor groups	a_{min} [mm]	100
Distance between the cavity axes	$l_c \geq$ [mm]	100
Distance between the pre-stressed strands	$l_p \geq$ [mm]	100
Distance between the pre-stressed strand and drilled hole	$a_p \geq$ [mm]	50
Drill nominal dia.	d_0 [mm]	6
Through-hole in the component being connected	$d_f \leq$ [mm]	8
Max. torque for anchoring	T_{inst} = [Nm]	10



MWF - 06/16 - 19777 - ©

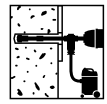
Concrete screw with hexagon head W-BS/S

Highest load capacities and efficient mounting. Ideal for mounting metal structures in concrete, zinc-plated steel

- Extremely flexible to use due to three anchorage depths (size 6-14)
- Fastening can be adjusted up to twice after installation (size 6-14), for example in order to align railings or anchor plates (please refer to the assembly guide)
- Very high loads
- Smallest spacing and edge distance thanks to very low expansion effect
- Very fast and easy assembly and immediately load-bearing



01.3



Material	Steel
Surface	Zinc plated

Anchor size	Anchor length (l)	Attachment height (t fix 1)	Attachment height (t fix 2)	Attachment height (t fix 3)	External drive	Art. no.	P. Qty.
5 mm	40 mm	5 mm			WS10	**5929 125 005**	100
5 mm	50 mm	15 mm			WS10	**5929 125 015**	100
5 mm	60 mm	25 mm			WS10	**5929 125 025**	100
6 mm	40 mm	5 mm			WS13	**5929 126 005**	100
6 mm	50 mm	15 mm	10 mm		WS13	**5929 126 015**	100
6 mm	60 mm	25 mm	20 mm	5 mm	WS13	**5929 126 025**	100
6 mm	80 mm	45 mm	40 mm	25 mm	WS13	**5929 126 045**	100
6 mm	100 mm	65 mm	60 mm	45 mm	WS13	**5929 126 065**	100
8 mm	50 mm	5 mm			WS13	**5929 128 005**	50
8 mm	60 mm	15 mm	5 mm		WS13	**5929 128 015**	50
8 mm	70 mm	25 mm	15 mm	5 mm	WS13	**5929 128 025**	50
8 mm	80 mm	35 mm	25 mm	15 mm	WS13	**5929 128 035**	50
8 mm	90 mm	45 mm	35 mm	25 mm	WS13	**5929 128 045**	50
8 mm	100 mm	55 mm	45 mm	35 mm	WS13	**5929 128 055**	50
8 mm	120 mm	75 mm	65 mm	55 mm	WS13	**5929 128 075**	50
8 mm	140 mm	95 mm	85 mm	75 mm	WS13	**5929 128 095**	50
8 mm	160 mm	115 mm	105 mm	95 mm	WS13	**5929 128 115**	50
10 mm	60 mm	5 mm			WS15	**5929 121 005**	25
10 mm	80 mm	25 mm	5 mm		WS15	**5929 121 025**	25
10 mm	90 mm	35 mm	15 mm	5 mm	WS15	**5929 121 035**	25
10 mm	100 mm	45 mm	25 mm	15 mm	WS15	**5929 121 045**	25
10 mm	120 mm	65 mm	45 mm	35 mm	WS15	**5929 121 065**	25
10 mm	140 mm	85 mm	65 mm	55 mm	WS15	**5929 121 085**	25
10 mm	160 mm	105 mm	85 mm	75 mm	WS15	**5929 121 105**	25
12 mm	80 mm	15 mm			WS17	**5929 122 015**	25
12 mm	110 mm	45 mm	25 mm	10 mm	WS17	**5929 122 045**	25
14 mm	80 mm	5 mm			WS21	**5929 124 005**	25
14 mm	110 mm	35 mm	10 mm		WS21	**5929 124 035**	25
14 mm	130 mm	55 mm	30 mm	15 mm	WS21	**5929 124 055**	25

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Performance data in concrete - individual fixing point according to ETA-16/0043

Anchor size [mm]			6		8			10			12			14		
Nominal length of thread engagement		**h_{nom} [mm]**	40	55	45	55	65	55	75	85	65	85	100	75	100	115
Admissible centric tension load[1] on an individual anchor without the influence of the edge distance	**Tensile zone** (cracked concrete C20/25[2], s ≥ 3 h_{ef} **c ≥ 1.5 h_{ef}**)	**N_{adm} [kN] = C20/25[2]**	1,0	1,9	2,4	4,3	5,7	4,3	8,0	9,6	5,7	9,4	12,3	7,6	12,0	15,1
	Compressive zone (uncracked concrete C20/25[2], s ≥ 3 h_{ef} **c ≥ 1.5 h_{ef}**)		1,9	4,3	3,6	5,7	7,6	5,7	9,5	11,9	7,6	13,2	17,2	10,6	16,9	21,2
Permissible shear load[1] on an individual anchor without the influence of the edge distance	**Tensile zone** (cracked concrete C20/25[2], **c ≥ 10 h_{ef}**)	**V_{adm} [kN] = C20/25[2]**	3,0	3,3	3,6	4,8	6,4	4,8	15,9	16,2	6,1	18,8	20,0	7,6	24,1	26,7
	Compressive zone (uncracked concrete C20/25[2], **c ≥ 10 h_{ef}**)		3,3	3,3	5,0	6,8	8,1	6,8	16,2	16,2	8,5	20,0	20,0	10,6	26,7	26,7
Permissible bending moment		**M_{adm} [Nm]**	4,8		12,4			26,7			53,8			88,1		
Admissible load under seismic activity performance categories C1 and C2 see European Technical Assessment ETA-16/0043		**C1**	x	x			x	x		x			x			x
		C2					x			x			x			x
Admissible load when exposed to fire (R30, R60, R90, R120), see European Technical Assessment ETA-16/0043																

Performance data in concrete - anchors in a redundant non-structural system according to ETA-16/0128

Anchor size [mm]			5	6	
Nominal length of thread engagement		**h_{nom} [mm]**	35	35	55
Anchors in concrete in a non-structural system based on a redundant design[3]		**N_{adm} [kN] ≥ C20/25**	0,6	0,6	3.6[4]
Permissible shear load[1] on an individual anchor without the influence of the edge distance	**Tensile zone** (cracked concrete C20/25[2], **c ≥ 10 h_{ef}**)	**V_{adm} [kN] = C20/25[2]**	2,0	2,0	3,3
	Compressive zone (uncracked concrete C20/25[2], **c ≥ 10 h_{ef}**)		2,1	2,8	3,3
Permissible bending moment		**M_{adm} [Nm]**	2,5	4,8	
Admissible load when exposed to fire (R30, R60, R90, R120), see European Technical Assessment ETA-16/0128					

Performance data in hollow-core prestressed concrete ceilings according to ETA-16/0128

Anchor size [mm]		6		
Mirror thickness [mm]		≥ 25	≥ 30	≥ 35
Anchors in a redundant non-structural system in hollow-core prestressed concrete ceilings[5]	**F_{adm} [kN]**	0,4	0,8	1,2

[1] The partial safety factors of the resistances γ_M regulated in the evaluation/approval and a partial safety factor of the effects of γ_F = 1.4 have been taken into account. For a combination of tensile and shear loads, for the influence of the edge distance and anchor groups please see the appropriate guidelines e.g. DIN EN 1992-4.
[2] The concrete has normal reinforcement. Higher values are possible for higher concrete compressive strengths.
[3] The permissible loads were determined without axial and edge distance influence.
[4] Number of attachment points ≥ 3 and at least one anchor per attachment point produces a load per attachment point of $F_{adm} \leq$ 1.4 kN or number of attachment points ≥ 4 and at least one anchor per attachment point produces a load per attachment point of $F_{adm} \leq$ 2.1 kN. The admissible loads can be increased if the design shows that the requirements governing the strength and rigidity of the component to be attached remain satisfied even after the failure of an anchor in terms of the limit state of serviceability and load-bearing capacity.
[5] The assembly data must be observed

Installation parameters in concrete

Anchor size [mm]		5	6			8			10			12			14		
Nominal length of thread engagement	**h_{nom} [mm]**	35[1]	35[1]	40	55	45	55	65	55	75	85	65	85	100	75	100	115

[1] For anchors in a redundant non-structural system according to ETA-16/0128

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Installation parameters in concrete

Anchor size [mm]		5	6			8			10			12			14		
Minimum axis distance	s_{min} [mm]	35	35	40		40	50		50			50		70	50	70	
Axis distance	$s_{cr,N}$ [mm]	81	81	93	132	105	129	156	129	180	204	150	201	240	174	237	276
Minimum edge distance	c_{min} [mm]	35	35	40		40	50		50			50		70	50	70	
Edge distance	$c_{cr,N}$ [mm]	40,5	40,5	46,5	66	52,5	64,5	78	64,5	90	102	75	100,5	120	87	118,5	138
Minimum member thickness	h_{min} [mm]	80	80			80			80	90	102	80	101	120	87	119	138
Nominal drill Ø	d_0 [mm]	5	6			8			10			12			14		
Ø of cutting edges	$d_{cut} \leq$ [mm]	5,40	6,40			8,45			10,45			12,50			14,50		
Drill hole depth	$h_1 \geq$ [mm]	40	40	45	60	55	65	75	65	85	95	75	95	110	85	110	125
Through hole in the component being connected	$d_f \leq$ [mm]	7	8			12			14			16			18		
Width across flats	[mm]		AF13			AF13			AF15			AF17			AF21		
Washer diameter	d_w [mm]	12,5	15			16			20			23			28		
Screw-head height	h_n [mm]	5	6			9			10			10			12,5		
Max. rated torque of tangential impact screwdriver	$T_{imp,max}$ [Nm]	110	160			300			400			650			650		

[1] For anchors in a redundant non-structural system according to ETA-16/0128

Installation parameters in pre-loaded hollow ceiling panels

Anchor size [mm]		6
Minimum axis distance	s_{min} [mm]	100
Minimum edge distance	c_{min} [mm]	100
Minimum spacing between the groups of anchors	a_{min} [mm]	100
Spacing between cavity axes	$l_c \geq$ [mm]	100
Spacing between tensioning strands	$l_p \geq$ [mm]	100
Spacing between tensioning strands and drilled hole	$a_p \geq$ [mm]	50
Nominal drill Ø	d_0 [mm]	6
Through hole in the component being connected	$d_f \leq$ [mm]	8

Details/Application

Individual fixing point with approval (Ø6 - Ø14):

In normal weight concrete C20/25 to C50/60 (cracked and uncracked concrete)

Multiple anchors in a redundant non-structural system, with approval:

- In normal weight concrete C20/25 to C50/60 (cracked and uncracked concrete), (Ø5 and Ø6)
- In hollow-core prestressed concrete ceilings C30/37 - C50/60, (Ø6)

Suitable for fastening medium to heavy loads in concrete:

- Fastening of e.g. metal structures, metal profiles, brackets, footboards, supports, cable trays, pipes, railings, construction site equipment, etc. in in-place installation
- Fastenings under seismic conditions in earthquake areas
- Fastenings under exposure to fire

W-BS/S (galvanised steel) may only be used in dry indoor room conditions

Temporary fastening of construction site equipment may be carried out indoors and outdoors

For use in concrete < C20/25 and pressure-resistant natural stone (without approval)



The optimized thread geometry enables quick and easy setting – even in higher-strength concrete.



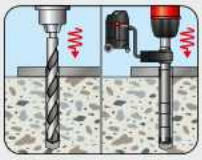
Steel supports

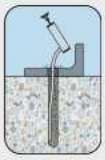


Consoles

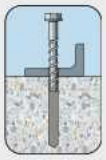


Adjustment - subsequent aligning possible

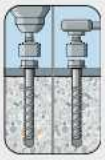




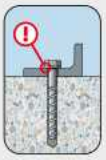
Clean the drill hole



Place screw



Screw in the screw







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Anchoring in prestressed concrete



Text Text Text Text Text Text Text

Proof of performance

European Technical Assessment ETA-16/0043 for individual fixing point, option 1, cracked and uncracked concrete:

- Static and quasi-static effects (Ø6 - Ø14)
- Seismic effect, performance category C1 (Ø6 - Ø14) and C2 (Ø8 - Ø14)
- Fire resistance R30, R60, R90, R120

European Technical Assessment ETA-16/0128 for multiple anchors in a redundant non-structural system:

- Cracked and uncracked concrete, (Ø5 and Ø6)
- Hollow-core prestressed concrete ceilings C30/37 - C50/60, (Ø6)
- Fire resistance R30, R60, R90, R120

DIBt National technical approval/general type approval Z-21.8-2090 for temporary anchoring in concrete (Ø10 - Ø14, type S hex-head)

- In reinforced and non-reinforced and cracked and uncracked concrete C20/25 to C50/60
- Attachment in fresh concrete
- Anchors in a non-structural redundant system

DIBt National technical approval/general type approval Z-21.1-2075 as bonded screw anchor for anchoring in concrete (Ø10 - Ø14, type S hex-head)

- Use in combination with injection mortar WIT-BS as bonded screw anchor WIT-BS
- In reinforced and non-reinforced and cracked and uncracked concrete C20/25 to C50/60

Tensile capacity in concrete hollow body ceilings, (Ø6 - Ø10) - expert report no. 21641 - 2016

Fire resistance rating when exposed to fire according to the uniform temperature time curve in masonry (Mz, KSL, KS), and reinforced concrete, (Ø5 and Ø6) - expert report no 2101/173/18 - 2018



Fire protection certified

Notice

From size 8, we recommend the use of a suitable tangential impact screwdriver for installation. The recommended maximum nominal torque must be observed.

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Related products for	Designation	Art. no.
5929 125 005	Blow-out bulb	**0903 990 003**
5929 125 015	Blow-out bulb	**0903 990 003**
5929 125 025	Blow-out bulb	**0903 990 003**
5929 126 005	Blow-out bulb	**0903 990 003**
5929 126 015	Blow-out bulb	**0903 990 003**
5929 126 025	Blow-out bulb	**0903 990 003**
5929 126 045	Blow-out bulb	**0903 990 003**
5929 126 065	Blow-out bulb	**0903 990 003**

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DECLARATION OF PERFORMANCE

Nr. LE_5929125005_02_M_W-BS

This is an English translation of the original German wording.
In cases of doubt, the German version applies

1. Unique identification code of the product type: Würth concrete screw W-BS 5 und W-BS 6
   Art.-No. 5929125*; 5929126*; 5929135*; 5929136*; 5929145*; 5929146*; 5929156*; 5929176*; 5929186*; 5929226*; 5929236*; 5929246*
2. Intended use(s): Concrete screw for multiple use for non-structural applications in concrete and in prestressed hollow core slabs
3. Manufactured by: Adolf Würth GmbH & Co. KG
   Reinhold-Würth-Str. 12 - 17
   D - 74653 Künzelsau
4. System(s) of assessment and verification of constancy of performance: System 2+
5. European Assessment Document: ETAG 001 Part 6 - August 2010
   European Technical Assessment: ETA-16/0128 - 06/04/2018
   Technical Assessment Body: Deutsches Institut für Bautechnik (DIBt), Berlin
   Notified Body or Bodies: 2873, Institut für Stahlbau und Werkstoffmechanik (IFSW), Darmstadt
6. Declared performance(s):

Essential Characteristics	Performance	Harmonised Technical Specification
Safety in case of fire (BWR 2)		ETA-16/0128 ETAG 001 Part 6 - August 2010
Reaction to fire	Class A1	
Resistance to fire	See Annex C3	
Safety in use (BWR 4)		
Characteristic resistance for tension and shear loads as well as bending moments in concrete and in pre-stressed hollow core slabs	See Annex C1 and C2	
Edge distance and spacing	See Annex C1	

The performance of the product identified above corresponds to the declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Frank Wolpert
Authorized Signatory, Head of Market Division

Dr. -Ing. Siegfried Beichter
Authorized Signatory, Head of Quality

Künzelsau, 01/03/2021

Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA

www.eota.eu

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-16/0043 of 7 July 2021

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Würth concrete screw W-BS/S, W-BS/A4, W-BS/HCR
Product family to which the construction product belongs	Mechanical fasteners for use in concrete
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold-Würth-Straße 12-17 74653 Künzelsau DEUTSCHLAND
Manufacturing plant	Herstellwerk W9
This European Technical Assessment contains	23 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330232-00-0601, Edition 10/2016
This version replaces	ETA-16/0043 issued on 29 July 2019

Electronic copy of the ETA by DIBt: ETA-16/0043

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de

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Specific Part

1 Technical description of the product

The Würth concrete screw W-BS is an anchor in size 6, 8, 10, 12 and 14 mm made of galvanised steel respectively steel with zinc flake coating, made of stainless or high corrosion resistant steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex C 1 and C 2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1 and C 2
Displacements (static and quasi-static loading)	See Annex C 7
Characteristic resistance and displacements for seismic performance categories C1 and C2	See Annex C 3, C 4, C 5 and C 8
Durability	See Annex B 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 6

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with European Assessment Document EAD No. 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

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5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 7 July 2021 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Tempel

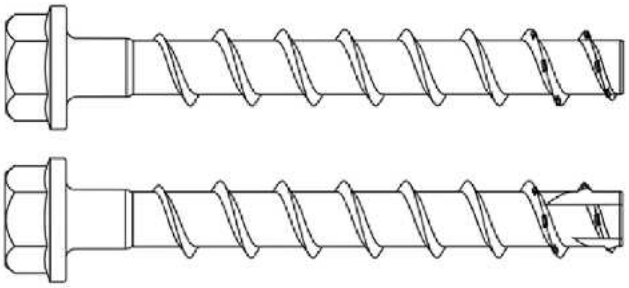
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Deutsches Institut für Bautechnik DIBt

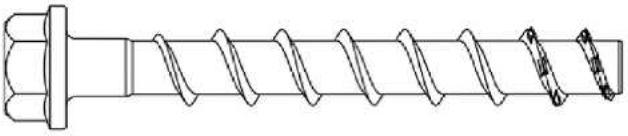
Product in installed condition

Würth concrete screw W-BS

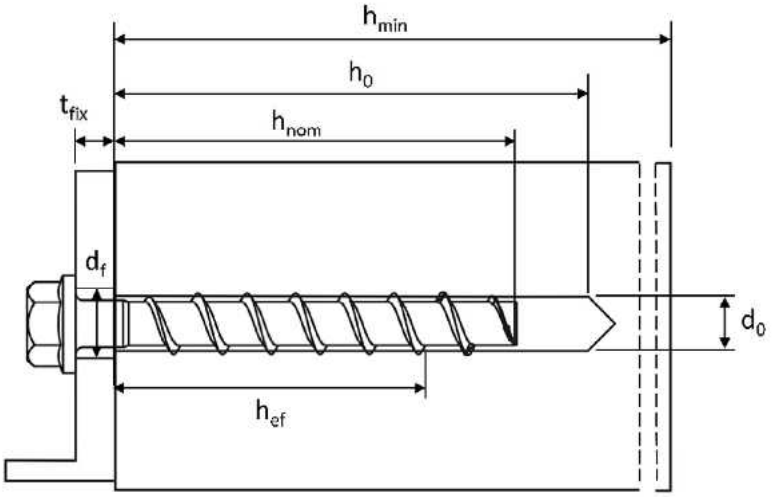
- Galvanized carbon steel
- Zinc flakes coated carbon steel



- Stainless steel A4
- Stainless steel HCR



e.g. Würth concrete screw, zinc flakes coated, with hexagon head and fixture



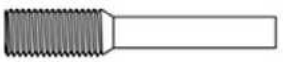
d_0 = nominal drill hole diameter
t_{fix} = thickness of fixture
d_f = clearance hole diameter

h_{min} = minimum thickness of member
h_{nom} = nominal embedment depth
h_0 = drill hole depth
h_{ef} = effective embedment depth

Würth concrete screw W-BS	
Product description Product in installed condition	**Annex A1**

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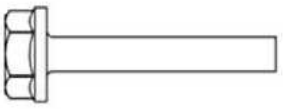
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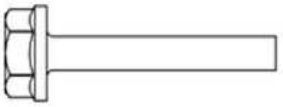

Configuration with threaded stud and hexagon socket e.g. W-BS 8x105 Typ ST M10 WS5



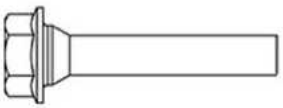

Configuration with threaded stud and hexagon drive e.g. W-BS 8x105 Typ ST M10 WS7




Configuration with washer and hexagon head e.g. W-BS 8x80 Typ S WS13




Configuration with washer, hexagon head and TX drive e.g. W-BS 8x80 Typ S WS13 und TX 40




Configuration with washer and bund e.g. W-BS-T BND 14x130 WS24



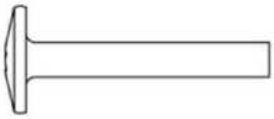

Configuration with hexagon head e.g. W-BS 8x80 Typ S WS



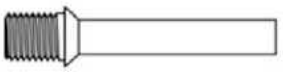

Configuration with countersunk head and TX drive e.g. W-BS 8x80 Typ SK TX 40



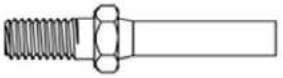

Configuration with pan head and TX drive e.g. W-BS 8x80 Typ P TX 40



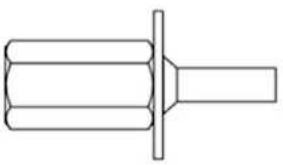

Configuration with large pan head and TX drive e.g. W-BS 8x80 Typ P TX 40




Configuration with countersunk head and threaded stud e.g. TSM W-BS 6x55 Typ ST-6 M8




Configuration with hexagon drive and threaded stud e.g. W-BS 6x55 Typ ST-6 M8 SW10




Configuration with internal thread and hexagon drive e.g. W-BS 6x55 TYP I M8/10

Würth concrete screw W-BS

Product description
Screw types

Annex A2

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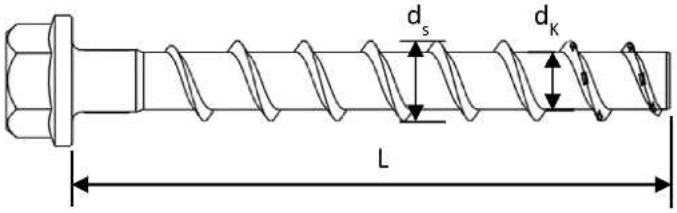
Table 1: Material

Part	Product name	Material
all types	W-BS/S	- Steel EN 10263-4:2017 galvanized acc. to EN ISO 4042:2018 - Zinc flake coating according to EN ISO 10683:2018 (≥5µm) - Zinc flake coating according to EN ISO 10683:2018 Special coating TKC (≥20µm)
	W-BS/A4	1.4401; 1.4404; 1.4571; 1.4578
	W-BS/HCR	1.4529

Part	Product name	Nominal characteristic steel		Rupture elongation
		Yield strength f_{yk} [N/mm²]	Ultimate strength f_{uk} [N/mm²]	A_5 [%]
all types	W-BS/S	560	700	≤ 8
	W-BS/A4			
	W-BS/HCR			

Table 2: Dimensions

Anchor size			6		8			10			12			14		
Nominal embedment depth		h_{nom}	1	2	1	2	3	1	2	3	1	2	3	1	2	3
		[mm]	40	55	45	55	65	55	75	85	65	85	100	75	100	115
Screw length	≤ L	[mm]	500													
Core diameter	d_K	[mm]	5,1		7,1			9,1			11,1			13,1		
Thread outer diameter	d_s	[mm]	7,5		10,6			12,6			14,6			16,6		
Thickness of filling washer	t	[mm]	-		5			5			5			5		



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Würth concrete screw W-BS

Product description
Material, Dimensions and markings

Annex A3

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..Marking

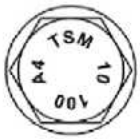
W-BS/S

Screw type:	W-BS or TSM
Screw size:	10
Screw length:	100



W-BS/A4

Screw type:	W-BS or TSM
Screw size:	10
Screw length:	100
Material:	A4



W-BS-T BND

Screw type:	TSM BC ST
Screw size:	10
Screw length:	100



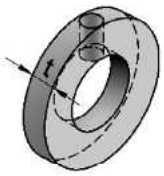
W-BS/HCR

Screw type:	W-BS or TSM
Screw size:	10
Screw length:	100
Material:	HCR



.Filling washer WIT-SHB

Filling washer WIT-SHB



Mixer reduction nozzle



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Würth concrete screw W-BS	
Product description Material, Dimensions and markings	**Annex A4**

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Specification of Intended use

Table 3: Anchorages subject to

W-BS concrete screw size		6		8			10			12			14		
Nominal embedment depth		h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
	[mm]	40	55	45	55	65	55	75	85	65	85	100	65	85	115
Static and quasi-static loads		All sizes and all embedment depths													
Fire exposure															
C1 category - seismic		ok	ok	-*)		ok	ok	-*)	ok	-*)		ok	-*)		ok
C2 category – seismic (A4 and HCR: no performance assessed)		-*)					-*)								

*) no performance assessed

Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exits: screw types made of stainless steel with marking A4.
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exits: screw types made of stainless steel with marking HCR.
  Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

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Würth concrete screw W-BS	Annex B1
Intended use Specification	

Deutsches Institut für Bautechnik DIBt

Specification of Intended use - continuation

Design:

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed according to EN 1992-4:2018 and EOTA Technical Report TR 055.

  The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters d_f of clearance hole in the fixture in Annex B3, Table 4.

Installation:

- Hammer drilling or hollow drilling
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer, if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The head of the anchor is supported in the fixture and is not damaged.
- The borehole may be filled with injection mortar Würth concrete screw mortar WIT-BS
- Adjustability according to Annex B6 for sizes 6-14, all embedment depths, but not for seismic application
- Cleaning of borehole is not necessary, if using a hollow drill

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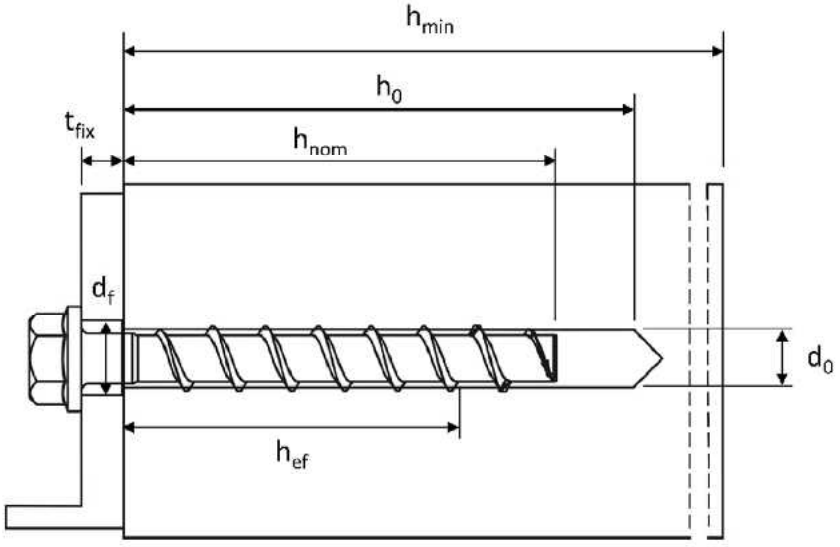
Würth concrete screw W-BS	
Intended use Specification continuation	**Annex B2**

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Table 4: Installation parameters

W-BS concrete screw size			6		8			10		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	40	55	45	55	65	55	75	85
Nominal drill hole diameter	d_0	[mm]	6		8			10		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40		8,45			10,45		
Drill hole depth	$h_0 \geq$	[mm]	45	60	55	65	75	65	85	95
Clearance hole diameter	$d_f \leq$	[mm]	8		12			14		
Installation torque (version with connection thread)	T_{inst}	[Nm]	10		20			40		
Torque impact screw driver		[Nm]	Max. torque according to manufacturer's instructions							
			160		300			400		

W-BS concrete screw size			12			14		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	65	85	100	75	100	115
Nominal drill hole diameter	d_0	[mm]	12			14		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	12,50			14,50		
Drill hole depth	$h_0 \geq$	[mm]	75	95	110	85	110	125
Clearance hole diameter	$d_f \leq$	[mm]	16			18		
Installation torque (version with connection thread)	T_{inst}	[Nm]	60			80		
Torque impact screw driver	$T_{imp,max}$	[Nm]	Max. torque according to manufacturer's instructions					
			650			650		



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Würth concrete screw W-BS

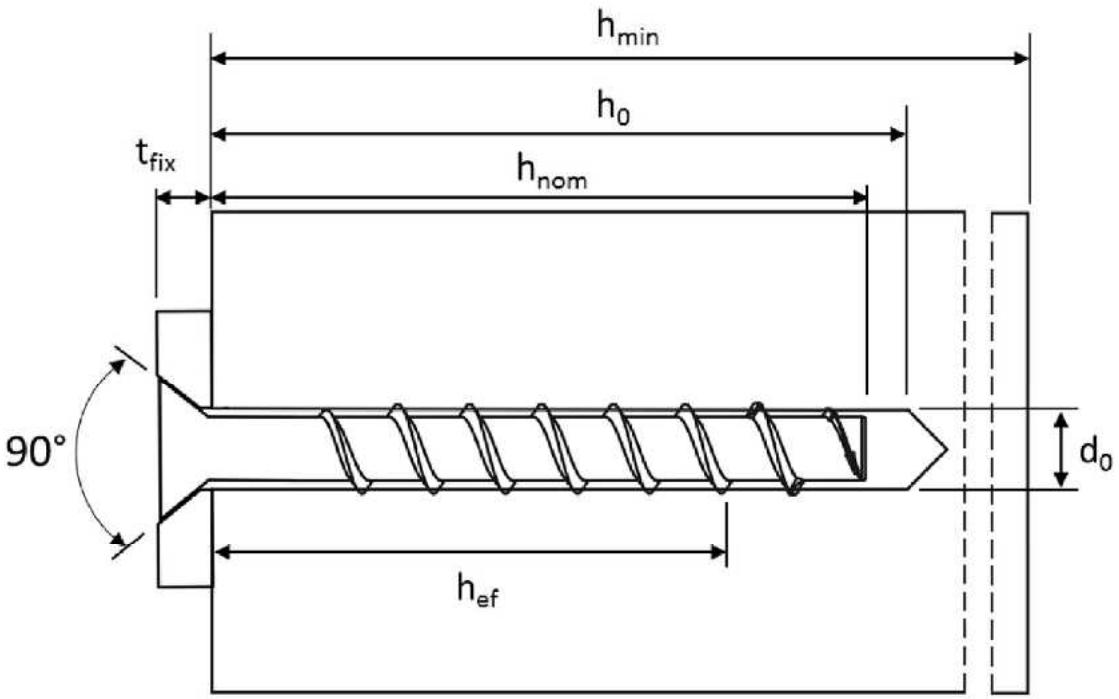
Intended use
Installation parameters

Annex B3

Table 5: Minimum thickness of member, minimum edge distance and minimum spacing

W-BS concrete screw size			6		8			10		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	40	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	80						90	102
Minimum edge distance	c_{min}	[mm]	40		40	50		50		
Minimum spacing	s_{min}	[mm]	40		40	50		50		

W-BS concrete screw size			12			14		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	65	85	100	75	100	115
Minimum thickness of member	h_{min}	[mm]	80	101	120	87	119	138
Minimum edge distance	c_{min}	[mm]	50		70	50	70	
Minimum spacing	s_{min}	[mm]	50		70	50	70	



Würth concrete screw W-BS

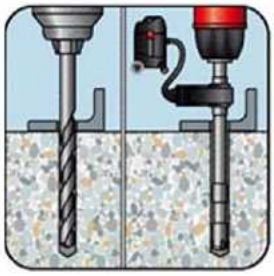
Intended use
Minimum thickness of member, minimum edge distance and minimum spacing

Annex B4

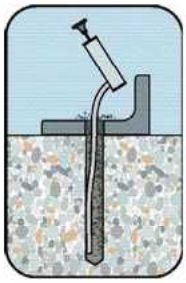
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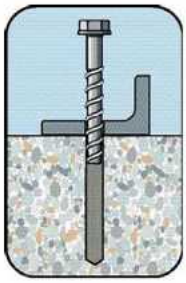
Installation instructions



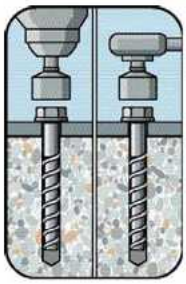
Create hammer drilled or hollow drilled borehole.



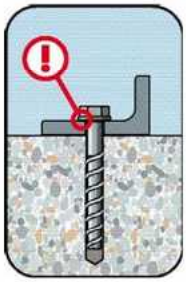
Clean the borehole. If using a hollow drill an additional cleaning of the borehole is not necessary.



Set the screw



Install the screw by hand or using a impact screw driver. Consider $T_{imp,max}$ und T_{inst}



Installation was successful when the head of the anchor is fully supported and in contact to the fixture without damaging it.

Würth concrete screw W-BS	
Intended use Installation instructions	**Annex B5**

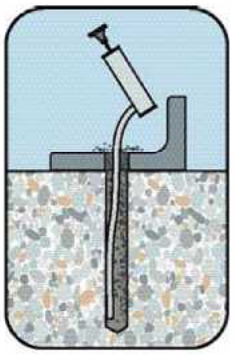
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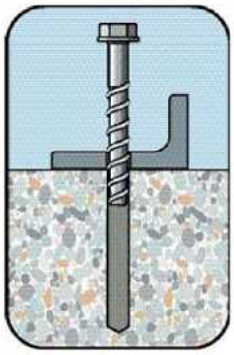
Installation instructions for adjustability for sizes 6 - 14



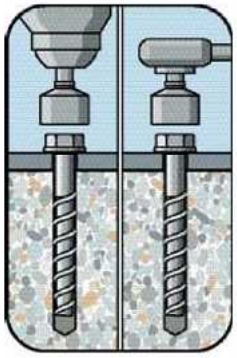
Create hammer drilled or hollow drilled borehole.



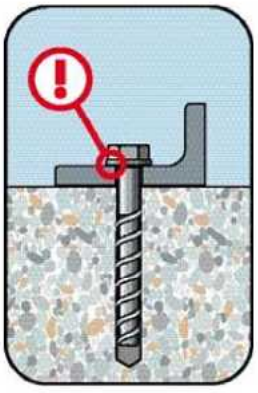
Clean the borehole. If using a hollow drill an additional cleaning of the borehole is not necessary.



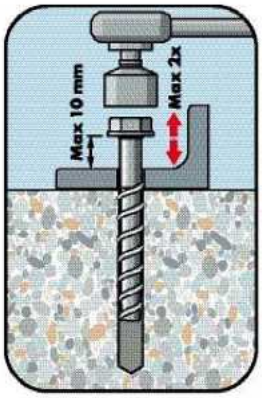
Set the screw



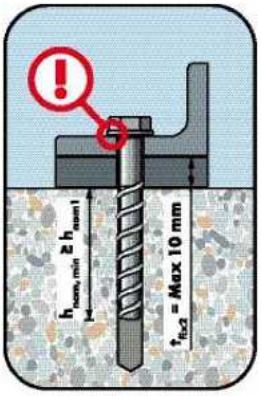
Install the screw by hand or using a impact screw driver. Consider $T_{imp,max}$ und T_{inst}



Installation was successful when the head of the anchor is fully supported and in contact to the fixture without damaging it.



The Anchor may be adjusted max. two times while the anchor may turn back at most 10 mm.



Install the screw again after the adjustment. The total allowed thickness of shims added during the adjustment process is 10mm. The final embedment depth after adjustment process must be equal or larger than h_{nom}.

Note: Adjustment for seismic loading is not allowed

Würth concrete screw W-BS

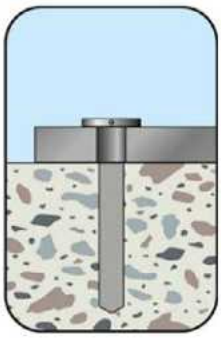
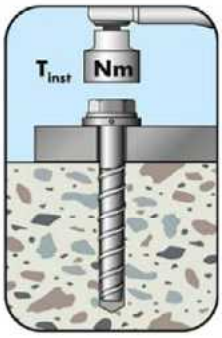
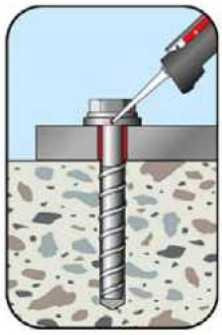
Intended use
Installation instructions - Adjustment

Annex B6

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Installation instruction – filling annular gap

	After preparing bore hole (Annex B5), position fixture first, than filling washer
	Install with impact screw driver or torque wrench. Consider $T_{imp,max}$ and T_{inst}
	Connect the mixer reduction nozzle to the tip of the mixer. Fill the annular gap with injection mortar. The annular gap is filled with mortar, when mortar oozes out of the washer. You can use Würth injection mortars with a compressive strength ≥ 40 N/mm2 like CONCRETE MULTI WIT-UH 300, ALLROUNDER WIT-VM 250, WIT-PE 1000, or WIT-BS Observe the processing/installation instructions for the injection mortar.

Notes:

1. For seismic loading the installation with filled and without filled annular gap is approved. Differences in performance can be found in Annex C5 – C7.
2. The thickness of fixture t_{fix} is reduced about 5 mm when using WÜRTH Filling Washer WIT-SHB.

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Würth concrete screw W-BS	
Intended use Installation instructions - Filling annular gap	**Annex B7**

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Table 6: Characteristic values for static and quasi-static loading, sizes 6-10

W-BS concrete screw size				6		8			10		
Nominal embedment depth		h_{nom}		h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]		40	55	45	55	65	55	75	85
Steel failure for tension and shear loading											
Characteristic tension load		$N_{Rk,s}$	[kN]	14,0		27,0			45,0		
Partial factor		$\gamma_{Ms,N}$	[-]	1,5							
Characteristic shear load		$V^0_{Rk,s}$	[kN]	7,0		13,5		17,0	22,5	34,0	
Partial factor		$\gamma_{Ms,V}$	[-]	1,25							
Ductility factor		k_7	[-]	0,8							
Characteristic bending load		$M^0_{Rk,s}$	[Nm]	10,9		26,0			56,0		
Pull-out failure											
Character-istic tension load C20/25	cracked	$N_{Rk,p}$	[kN]	2,0	4,0	5,0	9,0	12,0	9,0	≥ $N^0_{Rk,c}$ [1]	
	uncracked	$N_{Rk,p}$	[kN]	4,0	9,0	7,5	12,0	16,0	12,0	20,0	26,0
Increasing factor for $N_{Rk,p}$	C25/30	ψ_c	[-]	1,12							
	C30/37			1,22							
	C40/50			1,41							
	C50/60			1,58							
Concrete failure: Splitting failure, concrete cone failure and pry-out failure											
Effective embedment depth		h_{ef}	[mm]	31	44	35	43	52	43	60	68
k-factor	cracked	k_{cr}	[-]	7,7							
	uncracked	k_{ucr}	[-]	11,0							
Concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}							
	edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}							
Splitting failure	resistance	$N^0_{Rk,sp}$	[kN]	4,0	9,0	7,5	12,0	16,0	12,0	20,0	26,0
	spacing	$s_{cr,Sp}$	[mm]	120	160	120	140	150	140	180	210
	edge distance	$c_{cr,Sp}$	[mm]	60	80	60	70	75	70	90	105
Factor for pry-out failure		k_8	[-]	1,0						2,0	
Installation factor		γ_{inst}	[-]	1,0							
Concrete edge failure											
Effective length in concrete		$l_f = h_{ef}$	[mm]	31	44	35	43	52	43	60	68
Nominal outer diameter of screw		d_{nom}	[mm]	6		8			10		

[1] $N^0_{Rk,c}$ according to EN 1992-4:2018

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Würth concrete screw W-BS

Performances
Characteristic values for static and quasi-static loading, sizes 6-10

Annex C1

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Table 7: Characteristic values for static and quasi-static loading, sizes 12-14

W-BS concrete screw size				12			14		
Nominal embedment depth		h_{nom}		h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]		65	85	100	75	100	115
Steel failure for tension and shear loading									
Characteristic tension load		$N_{Rk,s}$	[kN]	67,0			94,0		
Partial factor		$\gamma_{Ms,N}$	[-]	1,5					
Characteristic shear load		$V^0_{Rk,s}$	[kN]	33,5	42,0		56,0		
Partial factor		$\gamma_{Ms,V}$	[-]	1,25					
Ductility factor		k_7	[-]	0,8					
Characteristic bending load		$M^0_{Rk,s}$	[Nm]	113,0			185,0		
Pull-out failure									
Characteristic tension load C20/25	cracked	$N_{Rk,p}$	[kN]	12,0	$\geq N^0_{Rk,c}$ [1]				
	uncracked	$N_{Rk,p}$	[kN]	16,0					
Increasing factor for $N_{Rk,p}$	C25/30	Ψ_c	[-]	1,12					
	C30/37			1,22					
	C40/50			1,41					
	C50/60			1,58					
Concrete failure: Splitting failure, concrete cone failure and pry-out failure									
Effective embedment depth		h_{ef}	[mm]	50	67	80	58	79	92
k-factor	cracked	$k_1 = k_{cr}$	[-]	7,7					
	uncracked	$k_1 = k_{ucr}$	[-]	11,0					
Concrete cone failure	spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$					
	edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$					
Splitting failure	resistance	$N^0_{Rk,sp}$	[kN]	16,0	27,0	35,0	21,5	34,5	43,5
	spacing	$s_{cr,Sp}$	[mm]	150	210	240	180	240	280
	edge distance	$c_{cr,Sp}$	[mm]	75	105	120	90	120	140
Factor for pry-out failure		k_8	[-]	1,0	2,0		1,0	2,0	
Installation factor		γ_{inst}	[-]	1,0					
Concrete edge failure									
Effective length in concrete		$l_f = h_{ef}$	[mm]	50	67	80	58	79	92
Nominal outer diameter of screw		d_{nom}	[mm]	12			14		

[1] $N^0_{Rk,c}$ according to EN 1992-4:2018

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Würth concrete screw W-BS

Performances
Characteristic values for static and quasi-static loading, sizes 12-14

Annex C2

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Table 8: Seismic category C1 – Characteristic load values (Typ S, Typ SK, Typ ST, Typ ST-6[3], Typ P and Typ I[3])

W-BS concrete screw size			6		8	10		12	14
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom3}	h_{nom3}	h_{nom3}
		[mm]	40	55	65	55	85	100	115
Steel failure for tension and shear load (configuration **Typ S, Typ SK, Typ ST, Typ ST-6[3], Typ P and Typ I[3]**)									
Characteristic load	$N_{Rk,s,eq}$	[kN]	14,0		27,0	45,0		67,0	94,0
Partial factor	$\gamma_{Ms,eq}$	[-]	1,5						
Characteristic load	$V_{Rk,s,eq}$	[kN]	4,7	5,5	8,5	13,5	15,3	21,0	22,4
Partial factor	$\gamma_{Ms,eq}$	[-]	1,25						
With filling of the annular gap [1]	α_{gap}	[-]	1,0						
Without filling of the annular gap	α_{gap}	[-]	0,5						
Pull-out failure									
Characteristic tension load in cracked concrete C20/25	$N_{Rk,p,eq}$	[kN]	2,0	4,0	12,0	9,0	$\geq N^0_{Rk,c}$ [2]		
Concrete cone failure									
Effective embedment depth	h_{ef}	[mm]	31	44	52	43	68	80	92
Edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$						
Spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$						
Installation safety factor	γ_{inst}	[-]	1,0						
Concrete pry-out failure									
Factor for pry-out failure	k_8	[-]	1,0				2,0		
Concrete edge failure									
Effective length in concrete	$l_f = h_{ef}$	[mm]	31	44	52	43	68	80	92
Nominal outer diameter of screw	d_{nom}	[mm]	6	6	8	10	10	12	14

[1] Filling of the annular gap according to annex B7, figure 5
[2] $N^0_{Rk,c}$ according to EN 1992-4:2018
[3] just for tension load

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Würth concrete screw W-BS

Performances
Seismic category C1 – Characteristic load values

Annex C3

Table 9: Seismic category C2 [1] – Characteristic load values **with filled annular gap according to annex B7, figure 5** (Typ S, Typ ST, Typ P)

W-BS concrete screw size			8	10	12	14
Nominal embedment depth	h_{nom}		h_{nom3}			
		[mm]	65	85	100	115
Steel failure for tension and shear load (configuration Typ S, Typ ST und Typ P)						
Characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0	67,0	94,0
Partial factor	$\gamma_{Ms,eq}$	[-]	1,5			
Characteristic load	$V_{Rk,s,eq}$	[kN]	9,9	18,5	31,6	40,7
Partial factor	$\gamma_{Ms,eq}$	[-]	1,25			
With filling of the annular gap	α_{gap}	[-]	1,0			
Pull-out failure						
Characteristic load in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,4	5,4	7,1	10,5
Concrete cone failure						
Effective embedment depth	h_{ef}	[mm]	52	68	80	92
Edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$			
Spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$			
Installation safety factor	γ_{inst}	[-]	1,0			
Concrete pry-out failure						
Factor for pry-out failure	k_8	[-]	1,0	2,0		
Concrete edge failure						
Effective length in concrete	$l_f = h_{ef}$	[mm]	52	68	80	92
Nominal outer diameter of screw	d_{nom}	[mm]	8	10	12	14

[1] A4 and HCR not suitable

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Würth concrete screw W-BS

Performances
Seismic category C2 – Characteristic load values with filled annular gap

Annex C4

Table 10: Seismic category C2 [1] – Characteristic load values **without filled annular gap according to annex B7, figure 3** (Typ S, Typ SK, Typ ST, Typ P)

W-BS concrete screw size			8	10	12	14
Nominal embedment depth	h_{nom}		h_{nom3}			
		[mm]	65	85	100	115
Steel failure for tension and shear load (configuration Typ S, Typ ST und Typ P)						
Characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0	67,0	94,0
Partial factor	$\gamma_{Ms,eq}$	[-]	1,5			
Characteristic load	$V_{Rk,s,eq}$	[kN]	10,3	21,9	24,4	23,3
Partial factor	$\gamma_{Ms,eq}$	[-]	1,25			
Without filling of the annular gap	α_{gap}	[-]	0,5			
Pull-out failure (configuration Typ S, Typ ST und Typ P))						
Characteristic load in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,4	5,4	7,1	10,5
Steel failure for tension and shear load (configuration Typ SK)						
Characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0	no performance assessed	
Partial factor	$\gamma_{Ms,eq}$	[-]	1,5			
Characteristic load	$V_{Rk,s,eq}$	[kN]	3,6	13,7		
Partial factor	$\gamma_{Ms,eq}$	[-]	1,25			
Without filling of the annular gap	α_{gap}	[-]	0,5			
Pull-out failure (configuration Typ SK)						
Characteristic load in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,4	5,4	no performance assessed	
Concrete cone failure						
Effective embedment depth	h_{ef}	[mm]	52	68	80	92
Edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$			
Spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$			
Installation safety factor	γ_{inst}	[-]	1,0			
Concrete pry-out failure						
Factor for pry-out failure	k_8	[-]	1,0	2,0		
Concrete edge failure						
Effective length in concrete	$l_f = h_{ef}$	[mm]	52	68	80	92
Nominal outer diameter of screw	d_{nom}	[mm]	8	10	12	14

[1] A4 and HCR not suitable

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Würth concrete screw W-BS

Performances
Seismic category C2 – Characteristic load values without filled annular gap

Annex C5

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Table 11: Fire exposure – characteristic values of resistance

W-BS concrete screw size				6		8			10			12			14		
Nominal embedment depth			h_{nom}	1	2	1	2	3	1	2	3	1	2	3	1	2	3
			[mm]	40	55	45	55	65	55	75	85	65	85	100	75	100	115
Steel failure for tension and shear load																	
characteristic Resistance	R30	$N_{Rk,s,fi30}$	[kN]	0,9		2,4			4,4			7,3			10,3		
	R60	$N_{Rk,s,fi60}$	[kN]	0,8		1,7			3,3			5,8			8,2		
	R90	$N_{Rk,s,fi90}$	[kN]	0,6		1,1			2,3			4,2			5,9		
	R120	$N_{Rk,s,fi120}$	[kN]	0,4		0,7			1,7			3,4			4,8		
	R30	$V_{Rk,s,fi30}$	[kN]	0,9		2,4			4,4			7,3			10,3		
	R60	$V_{Rk,s,fi60}$	[kN]	0,8		1,7			3,3			5,8			8,2		
	R90	$V_{Rk,s,fi90}$	[kN]	0,6		1,1			2,3			4,2			5,9		
	R120	$V_{Rk,s,fi120}$	[kN]	0,4		0,7			1,7			3,4			4,8		
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,7		2,4			5,9			12,3			20,4		
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,6		1,8			4,5			9,7			15,9		
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,5		1,2			3,0			7,0			11,6		
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,3		0,9			2,3			5,7			9,4		
Pull-out failure																	
Characteristic Resistance	R30-R90	$N_{Rk,p,fi}$	[kN]	0,5	1,0	1,3	2,3	3,0	2,3	4,0	4,8	3,0	4,7	6,2	3,8	6,0	7,6
	R120	$N_{Rk,p,fi}$	[kN]	0,4	0,8	1,0	1,8	2,4	1,8	3,2	3,9	2,4	3,8	4,9	3,0	4,8	6,1
Concrete cone failure																	
Characteristic Resistance	R30-R90	$N^0_{Rk,c,fi}$	[kN]	0,9	2,2	1,2	2,1	3,4	2,1	4,8	6,6	3,0	6,3	9,9	4,4	9,6	14,0
	R120	$N^0_{Rk,c,fi}$	[kN]	0,7	1,8	1,0	1,7	2,7	1,7	3,8	5,3	2,4	5,1	7,9	3,5	7,6	11,2

Edge distance													
R30 bis R120	$c_{cr,fi}$	[mm]	$2 \times h_{ef}$										
In case of fire attack from more than one side, the minimum edge distance shall be ≥300mm.													
Spacing													
R30 bis R120	$s_{cr,fi}$	[mm]	$4 \times h_{ef}$										
Pry-out failure													
R30 bis R120	k_8	[-]	1,0				2,0		1,0		2,0		2,0
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.													

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Würth concrete screw W-BS

Performances
Fire exposure – characteristic values of resistance

Annex C6

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Table 12: Displacements under static and quasi-static tension load

W-BS concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	40	55	45	55	65	55	75	85
Cracked concrete	tension load	N	[kN]	0,95	1,9	2,4	4,3	5,7	4,3	7,9	9,6
	displacement	δ_{N0}	[mm]	0,3	0,6	0,6	0,7	0,8	0,6	0,5	0,9
		$\delta_{N\infty}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2
Uncracked concrete	tension load	N	[kN]	1,9	4,3	3,6	5,7	7,6	5,7	9,5	11,9
	displacement	δ_{N0}	[mm]	0,4	0,6	0,7	0,9	0,5	0,7	1,1	1,0
		$\delta_{N\infty}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2

W-BS concrete screw size				12			14		
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	65	85	100	75	100	115
Cracked concrete	tension load	N	[kN]	5,7	9,4	12,3	7,6	12,0	15,1
	displacement	δ_{N0}	[mm]	0,9	0,5	1,0	0,5	0,8	0,7
		$\delta_{N\infty}$	[mm]	1,0	1,2	1,2	0,9	1,2	1,0
Uncracked concrete	tension load	N	[kN]	7,6	13,2	17,2	10,6	16,9	21,2
	displacement	δ_{N0}	[mm]	1,0	1,1	1,2	0,9	1,2	0,8
		$\delta_{N\infty}$	[mm]	1,0	1,2	1,2	0,9	1,2	1,0

Table 13: Displacements under static and quasi-static shear load

W-BS concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	40	55	45	55	65	55	75	85
Cracked and uncracked concrete	shear load	V	[kN]	3,3		8,6			16,2		
	displacement	δ_{V0}	[mm]	1,55		2,7			2,7		
		$\delta_{V\infty}$	[mm]	3,1		4,1			4,3		

W-BS concrete screw size				12			14		
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	65	85	100	75	100	115
Cracked and uncracked concrete	shear load	V	[kN]	20,0			30,5		
	displacement	δ_{V0}	[mm]	4,0			3,1		
		$\delta_{V\infty}$	[mm]	6,0			4,7		

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Würth concrete screw W-BS

Performances
Displacements under static and quasi-static loads

Annex C7

Table 14: Seismic category C2 [1] – Displacements **with filled annular gap according to annex B7, figure 5** (Typ S, Typ ST, Typ P)

W-BS concrete screw size			8	10	12	14
Nominal embedment depth		h_{nom}	h_{nom3}			
		[mm]	65	85	100	115
Displacements under tension loads (configuration **Typ S, Typ ST, Typ P**)						
Displacement DLS	$\delta_{N,eq(DLS)}$	[mm]	0,66	0,32	0,57	1,16
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36	2,36	4,39
Displacements under shear loads (configuration **Typ S, Typ ST, Typ P,** with hole clearance)						
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	1,68	2,91	1,88	2,42
Displacement ULS	$\delta_{V,eq(ULS)}$	[mm]	5,19	6,72	5,37	9,27

Table 15: Seismic category C2 [1] – Displacements **without filled annular gap according to annex B7, figure 3** (Typ S, Typ SK, Typ ST, Typ)

W-BS concrete screw size			8	10	12	14
Nominal embedment depth		h_{nom}	h_{nom3}			
		[mm]	65	85	100	115
Displacements under tension loads (configuration **Typ S, Typ ST, Typ P**)						
Displacement DLS	$\delta_{N,eq(DLS)}$	[mm]	0,66	0,32	0,57	1,16
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36	2,36	4,39
Displacements under tension loads (configuration **Typ SK**)						
Displacement DLS	$\delta_{N,eq(DLS)}$	[mm]	0,66	0,32	no performance assessed	
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36		
Displacements under shear loads (configuration **Typ S, Typ ST, Typ P,** with hole clearance)						
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	4,21	4,71	4,42	5,60
Displacement ULS	$\delta_{V,eq(ULS)}$	[mm]	7,13	8,83	6,95	12,63
Displacements under shear loads (configuration **Typ SK** with hole clearance)						
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	2,51	2,98	no performance assessed	
Displacement ULS	$\delta_{V,eq(ULS)}$	[mm]	7,76	6,25		

[1] A4 and HCR not suitable

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Würth concrete screw W-BS

Performances
Displacements under seismic loads

Annex C8

Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-23/0196 of 2 August 2023

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	WÜRTH concrete screw W-BS/S
Product family to which the construction product belongs	Screw anchor for use in masonry
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold Würth Straße 12-17 74650 Künzelsau DEUTSCHLAND
Manufacturing plant	Werk 9
This European Technical Assessment contains	39 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	330460-00-0604, Edition 08/2022

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Specific Part

1 Technical description of the product

The WÜRTH concrete screw W-BS/S is an anchor in size 5,6, 8 and 10 mm made of galvanised steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterized by mechanical interlock in the special thread.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to steel failure of a single screw anchor under tension loading	$N_{Rk,s}$ see Annex C1
Characteristic resistance to steel failure of a single screw anchor under shear loading	$V_{Rk,s}$ [kN], $M^0_{Rk,s}$ see Annex C1
Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading	$N_{Rk,p}$, $N_{Rk,b}$, $N_{Rk,p,c}$, $N_{Rk,b,c}$ see Annex B7, C4, C9, C14, C19, C23 $\alpha_{j,N}$ see Annex C3, C8, C13, C18, C23
Characteristic resistance to local brick failure and brick edge failure of a single screw anchor under shear loading	$V_{Rk,b,II}$, $V_{Rk,b,\perp}$, $V_{Rk,c,II}$, $V_{Rk,c,\perp}$ see Annex B7, C4, C9, C14, C19, C23 $\alpha_{j,VII}$, $\alpha_{j,V\perp}$ see Annex C3, C8, C13, C18, C23
Characteristic resistance to brick breakout failure of a screw anchor group under tension loading	N^g_{Rk} see Annex B7 $\alpha_{g,N}$ see Annex B7, C2, C8, C13, C18, C22
Characteristic resistance to local brick failure and brick edge failure of a screw anchor group under shear loading	$V^g_{Rk,b,II}$, $V^g_{Rk,b,\perp}$, $V^g_{Rk,c,II}$, $V^g_{Rk,c,\perp}$ see Annex B7 $\alpha_{g,VII}$, $\alpha_{g,VII\perp}$ see Annex B7, C2, C8, C13, C18, C22

Essential characteristic	Performance
Edge distances, joint distances, spacing, member thickness	c_{cr}, s_{crII}, $s_{cr\perp}$ see Annex B7 c_{min}, c_{jII}, $c_{j\perp}$, s_{minII}, $s_{min\perp}$ see Annex B7, C2, C8, C13, C18, C22 h_{min} see Annex C2, C7, C12, C17, C22
Resistance to combined tension and shear loading (hollow and perforated bricks)	Limit value X for interaction see Annex C14
Displacements	δ_{N0}, $\delta_{N\infty}$, δ_{V0}, $\delta_{V\infty}$ see Annex C5, C10, C15, C 20, C 24

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A 1
Resistance to fire	$N_{Rk,s,fi}$, $N_{Rk,p,fi}$, $N_{Rk,b,fi}$, $V_{Rk,s,fi}$, $M^0_{Rk,s,fi}$, $c_{min,fi}$, $c_{j,fi}$ see Annex C6, C11, C16, C21 $N^g_{Rk,fi}$, $s_{min,fi}$, $c_{min,fi}$, $c_{j,fi}$ see Annex C5, C10, C15, C20

3.3 Aspects of durability

Essential characteristic	Performance
Durability	See Annex B1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330460-00-0604 the applicable European legal act is: 97/177/EC.

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

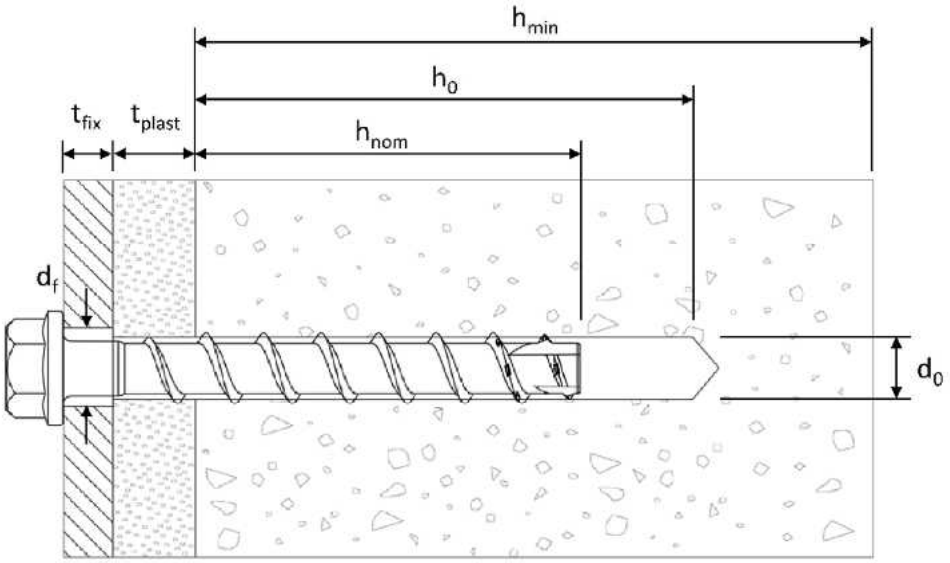
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Head of Section

beglaubigt:
Pascal Stiller

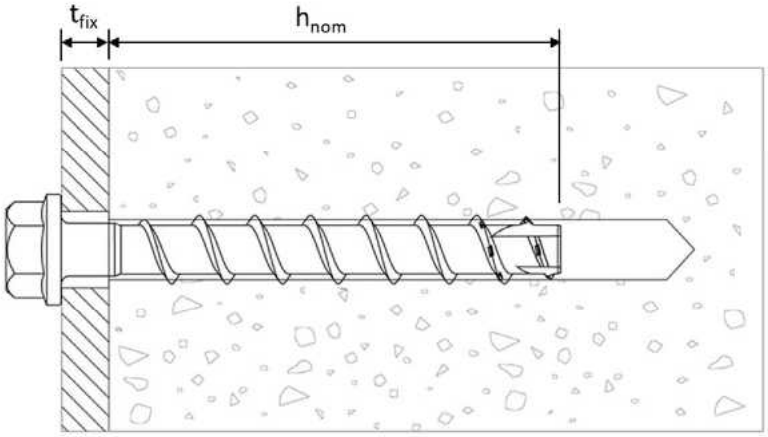
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Product in installed condition

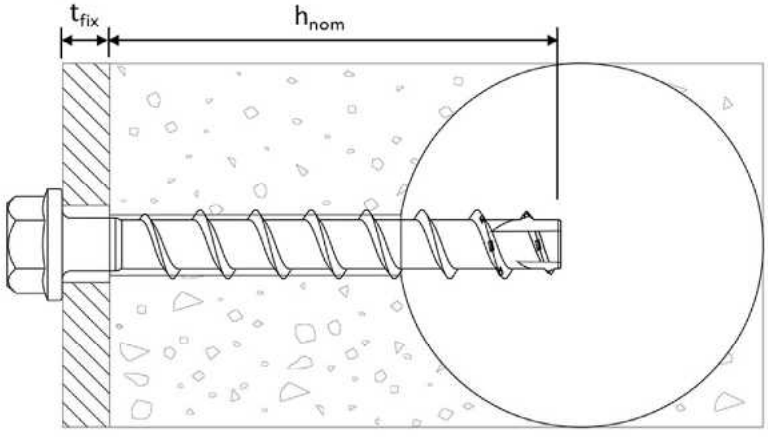


WÜRTH concrete screw
W-BS/S

in solid and perforated brick with non-load-bearing layer



WÜRTH concrete screw
W-BS/S
in solid brick



WÜRTH concrete screw
W-BS/S
in perforated brick

d_0 = nominal drill hole diameter
t_{fix} = thickness of fixture
d_f = clearance hole diameter
t_{plast} = thickness of non-load-bearing layer

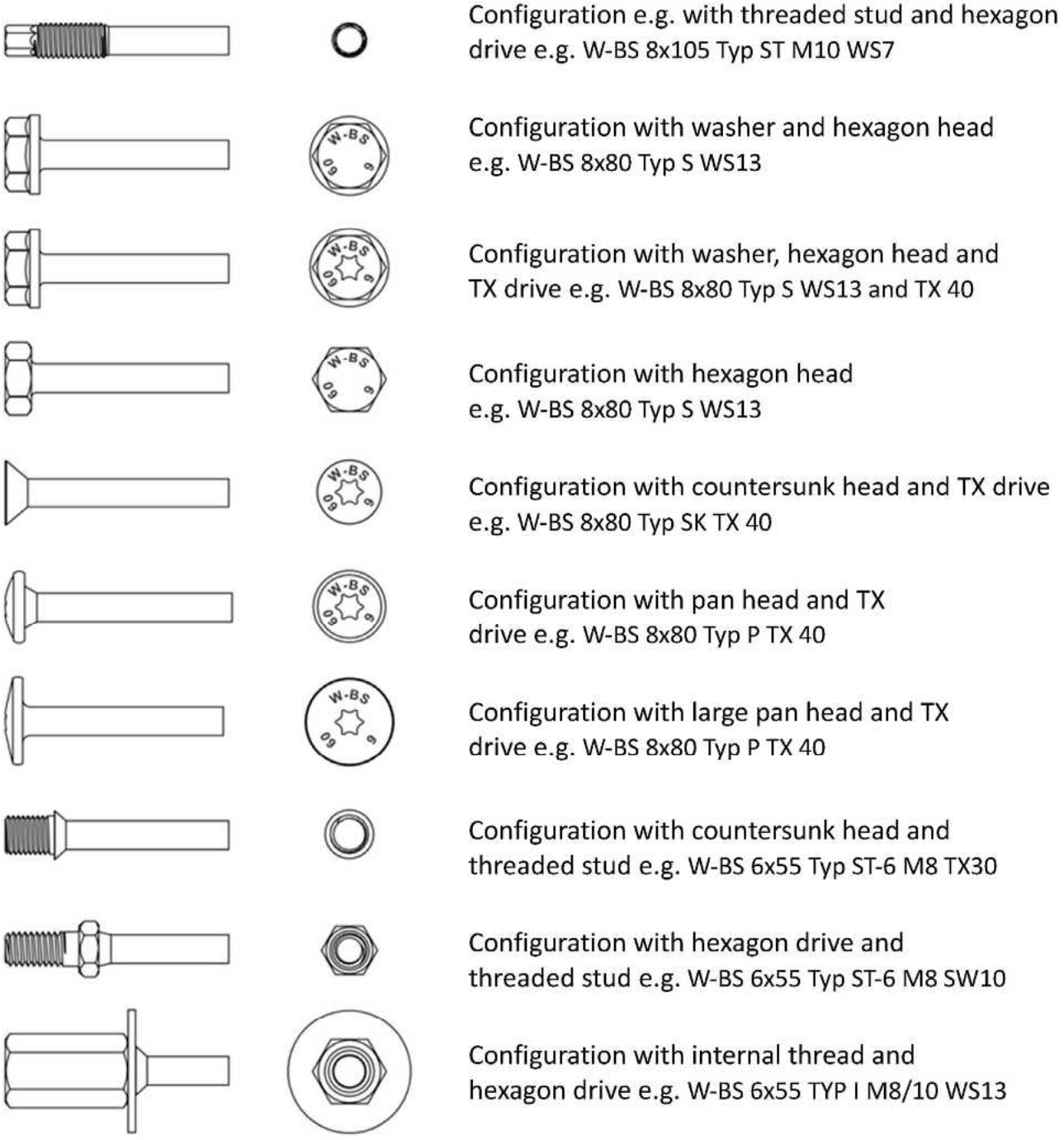
h_{min} = minimum thickness of member
h_{nom} = nominal embedment depth
h_0 = drill hole depth

WÜRTH concrete screw W-BS/S

Product description
Product in installed condition

Annex A1

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Configuration e.g. with threaded stud and hexagon drive e.g. W-BS 8x105 Typ ST M10 WS7

Configuration with washer and hexagon head e.g. W-BS 8x80 Typ S WS13

Configuration with washer, hexagon head and TX drive e.g. W-BS 8x80 Typ S WS13 and TX 40

Configuration with hexagon head e.g. W-BS 8x80 Typ S WS13

Configuration with countersunk head and TX drive e.g. W-BS 8x80 Typ SK TX 40

Configuration with pan head and TX drive e.g. W-BS 8x80 Typ P TX 40

Configuration with large pan head and TX drive e.g. W-BS 8x80 Typ P TX 40

Configuration with countersunk head and threaded stud e.g. W-BS 6x55 Typ ST-6 M8 TX30

Configuration with hexagon drive and threaded stud e.g. W-BS 6x55 Typ ST-6 M8 SW10

Configuration with internal thread and hexagon drive e.g. W-BS 6x55 TYP I M8/10 WS13

WÜRTH concrete screw W-BS/S

Product description
Screw types

Annex A2

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Table 1: Material

Part	Product name	Material
All types	W-BS/S	- Steel EN 10263-4:2017 galvanized acc. to EN ISO 4042:2018 - Zinc flake coating according to EN ISO 10683:2018 (≥5µm) - Zinc flake coating according to EN ISO 10683:2018 special coating Special coating TCC (≥20µm)

Part	Product name	Nominal characteristic steel		Elongation
		Yield strength f_{yk} [N/mm²]	Ultimate strength f_{uk} [N/mm²]	A_5 [%]
All types	W-BS/S	560	700	≤ 8

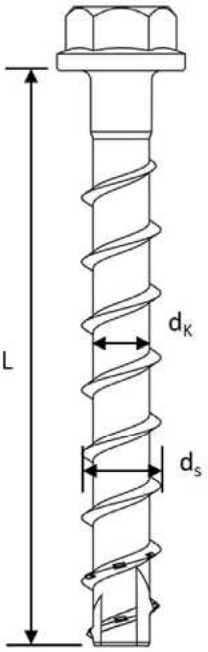
Table 2: Dimensions

Concrete screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Screw length	≤ L	[mm]	500						
Core diameter	d_K	[mm]	4,0	5,1		7,1		9,1	
Thread outer diameter	d_s	[mm]	6,5	7,5		10,6		12,6	

Marking:
W-BS/S
Screw type: W-BS or TSM
Screw size: 6
Screw length: 60







WÜRTH concrete screw W-BS/S

Product description
Material, dimensions and marking

Annex A3

Deutsches Institut für Bautechnik DIBt

Specification of Intended use

Anchorages subject to:

- Static or quasi-static actions in tension, shear or combined tension and shear or bending
- Exposure to fire (for dry masonry only)

Base materials:

- Masonry made of solid bricks and perforated bricks see Annex B3
- Minimum thickness of member h_{min} see Annexes C2, C7, C12, C17, C22
- Bearing joints must be completely filled with mortar of at least compressive strength class M5 according to EN 998-2:2016. Butt joints may, but do not have to be filled with mortar.
- In case of fire, all joints must be completely filled with mortar according to EN 998-2:2016 with strength class at minimum M5
- Dry or wet masonry (during installation)

Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- Temperature range of the masonry over the period of use: -40°C to +80°C

Design:

- The anchorage is designed in accordance with EOTA Technical Report TR 054:2022-07.
- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and masonry work.
- Screws with nominal embedment depth smaller than 50 mm may only be used for anchoring of statically indeterminate systems
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor to supports, etc.).
- The screw may be placed in the wall side and in the reveal side of the masonry. The installation parameters for installation in the reveal side must be observed in accordance with Annex B8. In case of Silka XL solid calcium silicate brick KS 12DF, the installation is possible in the wall side only.
- For solid blocks, the characteristic load-bearing capacities also apply to larger block formats, greater compressive strengths and densities of the masonry blocks.
- Installation in the joint and close to the joint is not permitted; the distances to joints according annexes C3, C8, C13, C18, C23 must be observed.

WÜRTH concrete screw W-BS/S	
Intended use Specification	**Annex B1**

Deutsches Institut für Bautechnik DIBt

Specification of Intended use - continuation

Installation:

- Bridging of non-load-bearing layers (e.g. plaster) is possible. When selecting the screw length L, the thickness of the plaster layer t_{plast} must be taken into account. $L \geq h_{nom} + t_{plast} + t_{fix}$ (see figures in Annex A1)
- During installation, the joint, axis and edge distances specified by the planner must be taken into account.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site
- The borehole is drilled with hammer, percussion, suction or masonry drills in hammer mode or rotary mode. The masonry must not be damaged during hammer drilling. If cracks occur during drilling, the rotary mode must be used. In this case, the drill hole must be discarded.
- Incorrectly drilled holes must be filled with high-strength mortar.

WÜRTH concrete screw W-BS/S	
Intended use Specification continuation	**Annex B2**

Deutsches Institut für Bautechnik DIBt

Table 3: Solid and perforated bricks, dimensions and properties



Solid calcium silicate brick KS acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
KS 20 - 2,0 - NF	L: ≥ 240 D: ≥ 115 H: ≥ 71	≥ 26,0	≥ 2,0	C2 – C6



Silka XL solid calcium silicate brick KS 12DF acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
KS - R (P) 20 - 2,0 - 12DF	L: ≥ 498 D: ≥ 175 H: ≥ 248	≥ 14,0	≥ 1,8	C7 – C11



Perforated calcium silicate brick KSL 3DF acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
SWKV KSL 12 - 1,6 - 3DF	L: ≥ 240 D: ≥ 175 H: ≥ 113	≥ 17,0	≥ 1,5	C12 - C16



Solid clay brick MZ acc. to DIN EN 771-1:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
MZ 20 - 2,0 - NF	L: ≥ 240 D: ≥ 115 H: ≥ 71	≥ 21,0	≥ 2,1	C17 – C21



Solid light weight concrete brick acc. to DIN EN 771-3:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
VBL 4 - 1,0 - 2DF	L: ≥ 240 D: ≥ 115 H: ≥ 113	≥ 4,0	≥ 1,5	C22 – C24

WÜRTH concrete screw W-BS/S

Intended use
Solid and perforated bricks, dimensions and properties

Annex B3

Table 4: General installation parameters

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Nominal drill hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40		8,45		10,45	
Drill hole depth	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Clearance hole diameter	$d_f \leq$	[mm]	7	8		12		14	

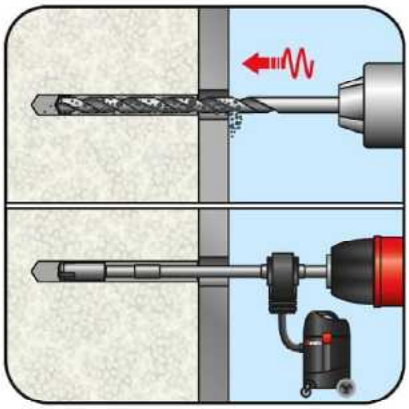
WÜRTH concrete screw W-BS/S

Intended use
General installation parameters

Annex B4

Deutsches Institut für Bautechnik DIBt

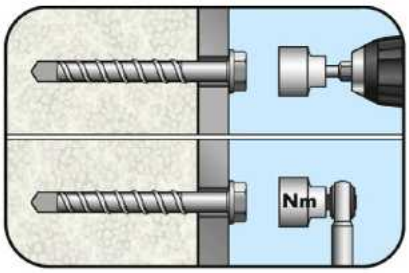
Installation instruction



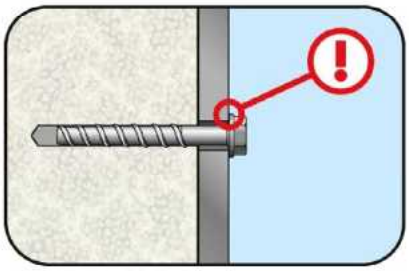
Drill hole in hammer mode or rotary mode. Joint distances, spacing and edge distances must be taken into account.

Optional:
Remove dust by suction or blow it out.
Alternatively, ventilate the drill hole three times. Therefore, pull the rotating drill out of the drill hole. Start a the bottom of the drill hole.

Alternative: Use a suction drill bit



Screw in with a tangential impact screwdriver, drill driver or manually with a ratchet or screwdriver.
For further details on screwing in, please refer to the brick-type-related Annexes C2 to C24.
The maximum torque $T_{imp,max}$ or T_{inst} shall be considered.

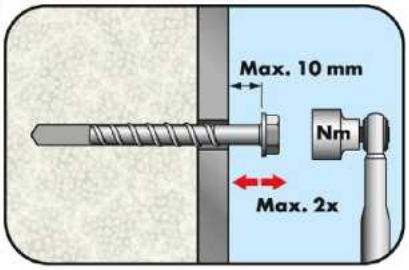


The screw head must be in contact with the fixture and must not be damaged. It must not be possible to continue turning the screw easily. The maximum torque T_{inst} must not be exceeded during a check.

WÜRTH concrete screw W-BS/S	
Intended use Installation Instructions	**Annex B5**

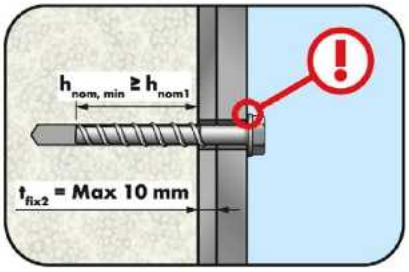
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Installation Instruction - Adjustment



Screw out a maximum of 10 mm, align the fixture, support it and screw it tight again. The maximum torque T_{inst} must be considered.

Optional:
Screw out a maximum of 10 mm a second time, align the fixture, support it and screw it tight again. The maximum torque T_{inst} must be considered.



After adjustment the screw head must be in contact with the fixture and must not be damaged. It must not be possible to continue turning the screw easily. The maximum torque T_{inst} must not be exceeded during the test.

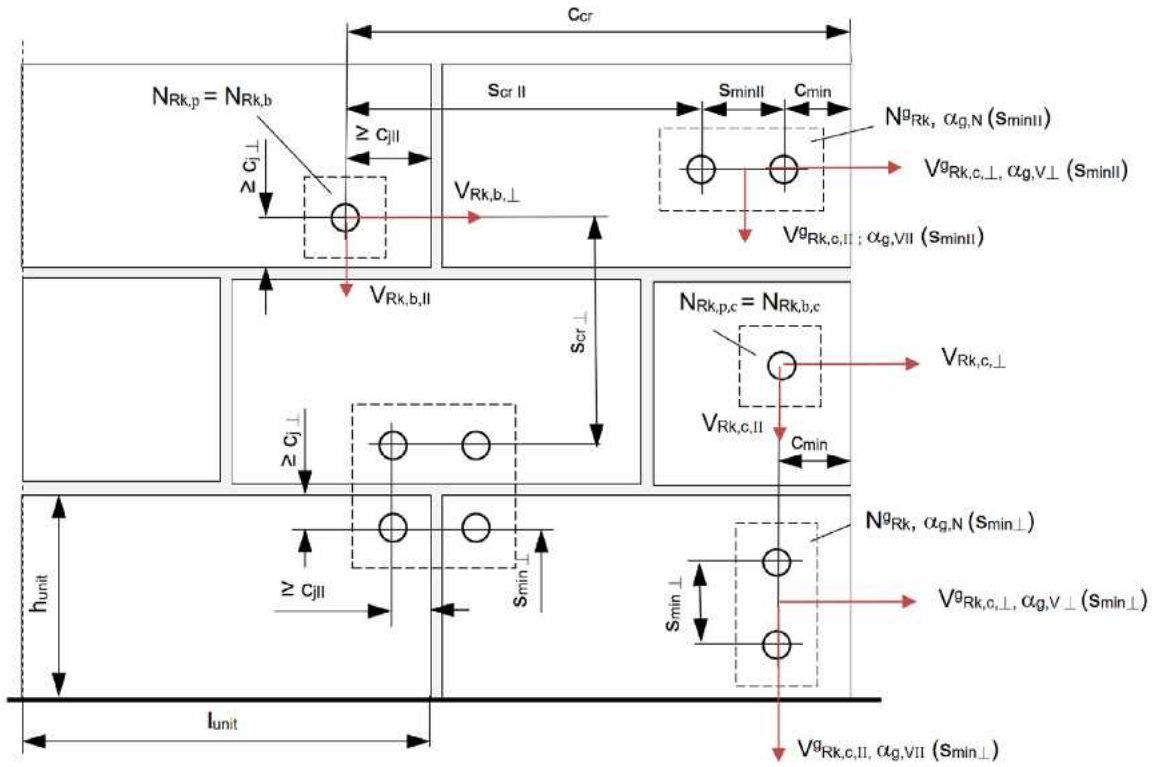
All in all, the fixture may not be supported more than 10 mm.

The required embedment depth h_{nom} must at least be adhered to. Consider the maximum torque $T_{imp,max}$ or. T_{inst} also during adjustment.

The maximum torque T_{inst} must not be exceeded during a check.

WÜRTH concrete screw W-BS/S	
Intended use Installation instruction – adjustment	**Annex B6**

Possible installation positions, the distance c_j must be observed



c_{min}	= minimum edge distance to the free edge of the wall
$c_{j\parallel}$	= distance to the vertical joints without influence on resistance of the screw anchor
$c_{j\perp}$	= distance to the horizontal joints without influence on resistance of the screw anchor
$s_{min\,II}$	= minimum spacing parallel to horizontal joint
$s_{min\perp}$	= minimum spacing perpendicular to the horizontal joint
c_{cr}	= edge distance for transmission of the characteristic resistance of single screw anchor = $1{,}5h_{nom}$
$s_{cr\parallel}$	= characteristic spacing parallel to the horizontal joint = $3{,}0h_{nom}$
$s_{cr\perp}$	= characteristic spacing perpendicular to the horizontal joint = $3{,}0h_{nom}$
l_{unit}	= length of the masonry unit
h_{unit}	= height of the masonry unit
$\alpha_{g,N}(s_{min\,II})$	= group factor under tension load for minimum spacing parallel to horizontal joint
$\alpha_{g,N}(s_{min\perp})$	= group factor under tension load for minimum spacing perpendicular to the horizontal joint
$\alpha_{g,V\parallel}$	= group factor under shear load parallel to the edge ($\alpha_{g,V\parallel} = \alpha_{g,V\parallel}(s_{min\,II}) = \alpha_{g,V\parallel}(s_{min\perp})$)
$\alpha_{g,V\perp}$	= group factor under shear load perpendicular to the edge ($\alpha_{g,V\perp} = \alpha_{g,V\perp}(s_{min\,II}) = \alpha_{g,V\perp}(s_{min\perp})$)

$N_{Rk} = N_{Rk,b} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c}$
$V_{Rk,\perp} = V_{Rk,,b\perp} = V_{Rk,c\perp}$; $V_{Rk,\perp} = V_{Rk,,b\perp} = V_{Rk,c\perp}$

Für $s \geq s_{cr}$: $\alpha_{g,N}(s_{min\,II}) = \alpha_{g,N}(s_{min\perp}) = \alpha_{g,V\parallel} = \alpha_{g,V\perp} = 2$
Für $s_{min} \leq s \leq s_{cr}$: $\alpha_{g,N}(s_{min\,II})$; $\alpha_{g,N}(s_{min\perp})$; $\alpha_{g,V\parallel}$; $\alpha_{g,V\perp}$ according to installation parameters of brick in Annex C
$N^g_{Rk}(s_{min\,II}) = \alpha_{g,N}(s_{min\,II}) \times N_{Rk}$ (group of 2 anchors with minimum spacing parallel to horizontal joint)
$N^g_{Rk}(s_{min\perp}) = \alpha_{g,N}(s_{min\perp}) \times N_{Rk}$ (group of 2 anchors with minimum spacing perpendicular to horizontal joint)
$V^g_{Rk\parallel} = \alpha_{g,V\parallel} \times V_{Rk,\parallel}$; $V^g_{Rk,\perp} = \alpha_{g,V\perp} \times V_{Rk,\perp}$ (group of 2 anchors)
$N^g_{Rk} = \alpha_{g,N}(s_{min\,II}) \times \alpha_{g,N}(s_{min\perp}) \times N_{Rk}$ (group of 4 anchors)
$V^g_{Rk\parallel} = \alpha_{g,V\parallel}{}^2 \times V_{Rk,\parallel}$; $V^g_{Rk,\perp} = \alpha_{g,V\perp}{}^2 \times V_{Rk,\perp}$ (group of 4 anchors)

WÜRTH concrete screw W-BS/S

Intended use
Possible installation position

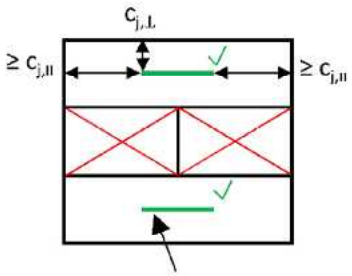
Annex B7

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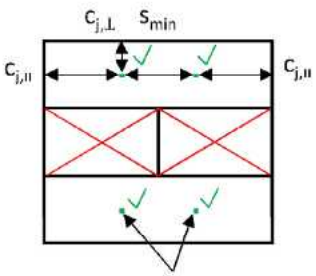
Installations parameter for installation in the reveal site

Positioning in reveal in brick types KS NF, MZ NF, VBL 2DF

Single anchor

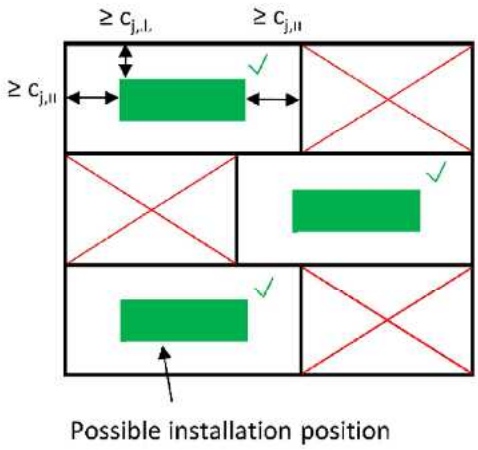


Double anchor group

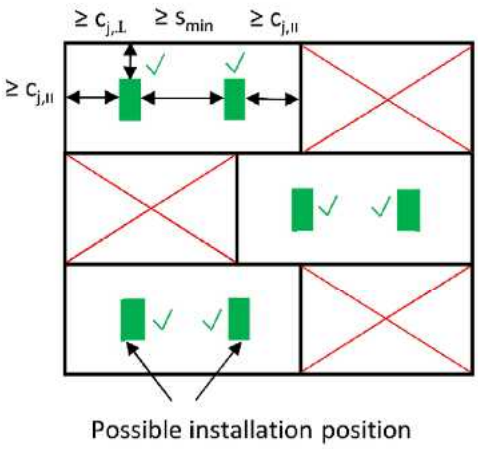


Positioning in reveal in brick type KSL 3DF

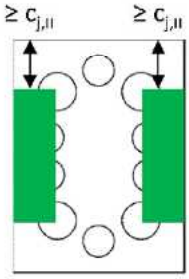
Single anchor



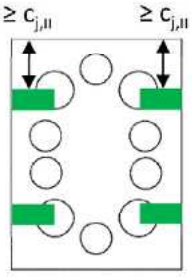
Double anchor group



Top view



Top view



WÜRTH concrete screw W-BS/S

Intended use
Possible installation in reveal

Annex B8

Table 5: Characteristic resistance to steel failure

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Steel failure for tension and shear loading									
Characteristic resistance under tension loading	$N_{Rk,s}$	[kN]	8,7	14,0		27,0		45,0	
Partial factor	$\gamma_{Ms,N}$ [1)]	[-]	1,5						
Characteristic resistance under shear loading	$V_{Rk,s}$	[kN]	4,4	7,0		13,5	17,0	22,5	34,0
Partial factor	$\gamma_{Ms,V}$ [1)]	[-]	1,25						
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	5,3	10,9		26,0		56,0	

[1)] In absence of other national regulations

WÜRTH concrete screw W-BS/S

Performances
Characteristic resistance to steel failure

Annex C1

Deutsches Institut für Bautechnik DIBt

Table 6: Material characteristics solid calcium silicate brick KS



Solid calcium silicate brick KS acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Min. wall thickness h_{min} [mm]
KS 20 - 2,0 - NF	L: ≥ 240 D: ≥ 115 H: ≥ 71	≥ 26,0	≥ 2,0	240

Table 7: Installation parameters solid calcium silicate brick KS

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Nominal drill hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40		8,45		10,45	
Drill hole depth	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Clearance hole diameter	$d_f \leq$	[mm]	7	8		12		14	
Max. torque for manual installation	$T_{inst} \leq$	[Nm]	6	11		27		37	46
Impact screw driver	$T_{imp,max}$	[Nm]	Max. torque according to the manufacturer's instructions						
			185			300			

Table 8: Min. edge distance, spacing, group factors

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Min. edge distance	c_{min}	[mm]	80						
Min. spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,65	1,70	1,05	1,15	1,15	1,05	1,65
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,55	1,70	1,05	1,15	1,20	1,10	1,20
	$\alpha_{g,V,II}$	[-]	1,55	1,55	1,35	1,15	1,05	1,05	1,35
	$\alpha_{g,V,\perp}$	[-]	1,30						

WÜRTH concrete screw W-BS/S

Performances
Solid calcium silicate brick KS – material characteristics, installation parameters, min. edge distance and spacing, group factors

Annex C2

Table 9: Reduction factors depending on the distance to joints

W-BS screw size			5	6	8	10
Distance to joints	$c_{j\perp}$	[mm]	≥35			
	$c_{j\parallel}$		≥80			
Reduction factor	$\alpha_{j,N}$	[-]	1 (full resistance)			
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$					
Distance to joints	$c_{j\perp}$	[mm]	<35			
	$c_{j\parallel}$		<80			
Reduction factor	$\alpha_{j,N}$	[-]	Screw must not be used			

WÜRTH concrete screw W-BS/S

Performances
Solid calcium silicate brick KS – installation parameters close to the joints

Annex C3

Deutsches Institut für Bautechnik DIBt

Table 10: Characteristic resistances

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Compressive strength f_{mean}	[N/mm²]		≥ 26,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	3,5	3,1	4,9	4,1	4,3	3,8	4,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,3	5,3	8,6	6,3	11,3	7,7	13,0
	$V_{Rk,,\perp}$	[kN]	3,3						
Compressive strength f_{mean}	[N/mm²]		≥ 30,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	3,7	3,4	5,3	4,4	4,6	4,0	4,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,7	5,7	9,3	6,7	12,1	8,3	13,9
	$V_{Rk,\perp}$	[kN]	3,5						
Compressive strength f_{mean}	[N/mm²]		≥ 35,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	4,0	3,7	5,7	4,8	5,0	4,4	5,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,1	6,1	10,0	7,3	13,1	8,9	15,0
	$V_{Rk,\perp}$	[kN]	3,8						
Compressive strength f_{mean}	[N/mm²]		≥ 38,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	4,2	3,8	6,0	5,0	5,2	4,5	5,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,4	6,4	10,4	7,6	13,7	9,3	15,7
	$V_{Rk,\perp}$	[kN]	4,0						

WÜRTH concrete screw W-BS/S

Performance
Solid calcium silicate brick KS – characteristic resistances

Annex C4

Deutsches Institut für Bautechnik DIBt

Table 11: Displacements

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Tension load	F_N	[kN]	1,00	0,89	1,40	1,17	1,23	1,09	1,29
Displacement in tension direction	δ_{N0}	[mm]	0,02	0,04	0,04	0,04	0,03	0,02	0,01
	$\delta_{N\infty}$	[mm]	0,03	0,08	0,08	0,07	0,05	0,04	0,03
Shear load parallel to the edge	$F_{V,II}$	[kN]	1,51	1,51	2,46	1,80	3,23	2,20	3,71
Displacement in shear direction parallel to the edge	$\delta_{V0,II}$	[mm]	0,93	0,09	1,51	0,52	1,00	0,22	0,98
	$\delta_{V\infty,II}$	[mm]	1,40	0,13	2,26	0,78	1,50	0,33	1,46
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,94						
Displacement in shear direction perpendicular to the edge	$\delta_{V0,\perp}$	[mm]	0,22			0,03		0,02	
	$\delta_{V\infty,\perp}$	[mm]	0,33			0,05		0,03	

Table 12: Performance under fire exposure for anchor groups

W-BS screw size			5	6	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Characteristic resistance to local brick failure of groups under fire exposure					
$N^g_{Rk,fi}$	[kN]	R30-R90	$0,09 \cdot N^g_{Rk,b}$	$0,09 \cdot N^g_{Rk,b}$	$0,15 \cdot N^g_{Rk,b}$
		R120	$0,08 \cdot N^g_{Rk,b}$	$0,08 \cdot N^g_{Rk,b}$	$0,12 \cdot N^g_{Rk,b}$
Min. edge distance and spacing	[mm]	$c_{min,fi} = c_{j,fi}$	$2 \times h_{nom}$ [1)]		
		$s_{min,fi}$	107		

[1)] At least the distances set out in Table 13 shall be observed

WÜRTH concrete screw W-BS/S

Performances
Solid calcium silicate brick KS – displacements and performance under fire exposure for anchor groups

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Table 13: Fire exposure – Characteristic resistance

W-BS screw size				5	6	
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
			[mm]	35	35	55
Steel failure for tension and shear load						
Characteristic resistance	R30	$N_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$N_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$N_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$N_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$V_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$V_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$V_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$V_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,80	1,20	1,20
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,50	0,90	0,90
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,30	0,50	0,50
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,20	0,30	0,30
Pull-out failure						
Characteristic resistance	R30	$N_{Rk,p,fi30}$	[kN]	1,10	0,40	0,72
	R60	$N_{Rk,p,fi60}$	[kN]	0,80	0,40	0,72
	R90	$N_{Rk,p,fi90}$	[kN]	0,50	0,40	0,72
	R120	$N_{Rk,p,fi120}$	[kN]	0,30	0,32	0,57
Breakout failure						
Characteristic resistance	R30	$N_{Rk,b,fi30}$	[kN]	1,10	0,28	0,79
	R60	$N_{Rk,b,fi60}$	[kN]	0,80	0,28	0,79
	R90	$N_{Rk,b,fi90}$	[kN]	0,50	0,28	0,79
	R120	$N_{Rk,b,fi120}$	[kN]	0,30	0,23	0,63
Edge and joint distance						
R30 - R120		$c_{min,fi} = c_{j,fi,II}$	[mm]	120	120	120
		$c_{j,fi,\perp}$	[mm]	35	35	35
Spacing						
R30 - R120		$s_{cr,fi}$	[mm]	4 x h_{nom}		

WÜRTH concrete screw W-BS/S

Performances
Solid calcium silicate brick KS – characteristic resistance under fire exposure

Annex C6

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Table 14: Material characteristics Silka XL solid calcium silicate brick KS 12DF



Silka XL solid calcium silicate brick KS 12DF acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Min. wall thickness h_{min} [mm]
KS - R (P) 20 - 2,0 - 12DF	L: ≥ 498 D: ≥ 175 H: ≥ 248	≥ 14,0	≥ 1,8	175

Table 15: Installation parameters Silka XL solid calcium silicate brick KS 12DF

Use category (installation)			dry or wet							
W-BS screw size			5	6		8		10		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Nominal drill hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40		8,45		10,45	
Drill hole depth	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Clearance hole diameter	$d_f \leq$	[mm]	7	8		12		14	
Max. torque for manual installation	$T_{inst} \leq$	[Nm]	6	10		25		45	
Max. torque for drill driver installation	$T_{inst} \leq$	[Nm]	8	10	No performance assessed				
Impact screw driver	$T_{imp,max}$	[Nm]	Max. torque according to the manufacturer's instructions						
			No performance assessed	185		300			

WÜRTH concrete screw W-BS/S

Performances
Silka XL solid calcium silicate brick KS 12DF – material characteristics, installation parameters

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Table 16: Min edge distance, spacing, group factors

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Min. edge distance	c_{min}	[mm]	80						
Min. spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min\,II}$)	[-]	1,65	1,65	1,75	1,40	1,40	1,60	1,30
	$\alpha_{g,N}$ ($s_{min\,\perp}$)	[-]	1,30	1,30	1,80	1,25	1,25	1,40	1,25
	$\alpha_{g,V,II}$	[-]	2,00	2,00	1,65	2,00	1,65	1,40	1,40
	$\alpha_{g,V,\perp}$	[-]	2,00	2,00	1,45	2,00	1,10	1,40	1,05

Table 17: Reduction factors depending on the distance to joints

W-BS screw size			5	6	8	10
Distance to joints	$c_{j\,\perp}$	[mm]	≥40			
	$c_{j\,II}$		≥80			
Reduction factor	$\alpha_{j,N}$	[-]	1 (full resistance)			
	$\alpha_{j,VII} = \alpha_{j,V\perp}$					
Distance to joints	$c_{j\,\perp}$	[mm]	<40			
	$c_{j\,II}$		<80			
Reduction factor	$\alpha_{j,N}$	[-]	Screw must not be used			

WÜRTH concrete screw W-BS/S

Performances
Silka XL solid calcium silicate brick KS 12DF – min. edge distance and spacing, group factors group factors and installation parameters close to the joints

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Table 18: Characteristic resistances

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Compressive strength f_{mean}	[N/mm²]		≥ 14,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,3	2,3	4,1	6,3	6,3	6,4	6,7
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,2	3,2	9,7	3,2	9,7	17,4	17,4
	$V_{Rk,\perp}$	[kN]	3,6	3,6	8,3	3,6	7,5	5,9	9,8
Compressive strength f_{mean}	[N/mm²]		≥ 15,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,4	2,4	4,3	6,5	6,5	6,6	6,9
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,3	3,3	10,1	3,3	10,1	18,0	18,0
	$V_{Rk,\perp}$	[kN]	3,7	3,7	8,6	3,7	7,8	6,1	10,1
Compressive strength f_{mean}	[N/mm²]		≥ 20,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,8	2,8	4,9	7,5	7,5	7,6	8,0
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	11,7	3,8	11,7	20,8	20,8
	$V_{Rk,\perp}$	[kN]	4,3	4,3	9,9	4,3	9,0	7,0	11,7

WÜRTH concrete screw W-BS/S

Performances
Silka XL solid calcium silicate brick KS 12DF – characteristic resistances

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Table 19: Displacements

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Tension load	F_N	[kN]	0,66	0,66	1,17	1,80	1,80	1,83	1,91
Displacement in tension direction	δ_{N0}	[mm]	0,02	0,02	0,04	0,01	0,01	0,01	0,02
	$\delta_{N\infty}$	[mm]	0,04	0,04	0,08	0,02	0,02	0,02	0,05
Shear load parallel to the edge	$F_{V,II}$	[kN]	0,91	0,91	2,77	0,91	2,77	4,97	4,97
Displacement in shear direction parallel to the edge	$\delta_{V0,II}$	[mm]	0,98	0,98	3,00	0,98	3,00	2,95	2,95
	$\delta_{V\infty,II}$	[mm]	1,47	1,47	4,50	1,47	4,50	4,42	4,42
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	1,03	1,03	2,37	1,03	2,14	1,69	2,80
Displacement in shear direction perpendicular to the edge	$\delta_{V0,\perp}$	[mm]	0,42	0,42	0,03	0,42	1,00	0,05	0,44
	$\delta_{V\infty,\perp}$	[mm]	0,63	0,63	0,05	0,63	1,50	0,08	0,66

Table 20: Performance under fire exposure for anchor groups

W-BS screw size			5	6	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Characteristic resistance to local brick failure of groups under fire exposure					
$N^g_{Rk,fi}$	[kN]	R30-R90	$0,09 \cdot N^g_{Rk,b}$	$0,09 \cdot N^g_{Rk,b}$	$0,15 \cdot N^g_{Rk,b}$
		R120	$0,08 \cdot N^g_{Rk,b}$	$0,08 \cdot N^g_{Rk,b}$	$0,12 \cdot N^g_{Rk,b}$
Min. edge distance and spacing	[mm]	$c_{min,fi} = c_{j,fi}$	$2 \times h_{nom}$ [1)]		
		$s_{min,fi}$	107		

[1)] At least the distances set out in Table 21 shall be observed

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Table 21: Fire exposure – Characteristic resistance

W-BS screw size				5	6	
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
			[mm]	35	35	55
Steel failure for tension and shear load						
Characteristic resistance	R30	$N_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$N_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$N_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$N_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$V_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$V_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$V_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$V_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,80	1,20	1,20
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,50	0,90	0,90
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,30	0,50	0,50
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,20	0,30	0,30
Pull-out failure						
Characteristic resistance	R30	$N_{Rk,p,fi30}$	[kN]	1,10	0,40	0,72
	R60	$N_{Rk,p,fi60}$	[kN]	0,80	0,40	0,72
	R90	$N_{Rk,p,fi90}$	[kN]	0,50	0,40	0,72
	R120	$N_{Rk,p,fi120}$	[kN]	0,30	0,32	0,57
Breakout failure						
Characteristic resistance	R30	$N_{Rk,b,fi30}$	[kN]	1,10	0,28	0,79
	R60	$N_{Rk,b,fi60}$	[kN]	0,80	0,28	0,79
	R90	$N_{Rk,b,fi90}$	[kN]	0,50	0,28	0,79
	R120	$N_{Rk,b,fi120}$	[kN]	0,30	0,23	0,63
Edge and joint distance						
R30 - R120		$c_{min,fi} = c_{j,fi,II}$	[mm]	120	120	120
		$c_{j,fi,\perp}$	[mm]	35	35	35
Spacing						
R30 - R120		$s_{cr,fi}$	[mm]	$4 \times h_{nom}$		

WÜRTH concrete screw W-BS/S

Performances
Perforated calcium silicate brick KSL 3DF - characteristic resistance under fire exposure

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Table 22: Material characteristics perforated calcium silicate brick KSL 3DF



Perforated calcium silicate brick KSL 3DF acc. to DIN EN 771-2:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Min. wall thickness h_{min} [mm]
SWKV KSL 12 - 1,6 - 3DF	L: ≥ 240 D: ≥ 175 H: ≥ 113	≥ 17,0	≥ 1,5	175

Table 23: Installation parameters perforated calcium silicate brick KSL 3DF

Use category (installation)			dry or wet							
W-BS screw size			5	6		8		10		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Nominal drill hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40		8,45		10,45	
Drill hole depth	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Clearance hole diameter	$d_f \leq$	[mm]	7	8		12		14	
Max. torque for manual installation	$T_{inst} \leq$	[Nm]	3	4		9		9	
Max. torque for drill driver installation	$T_{inst} \leq$	[Nm]	9	11	No performance assessed				
Impact screw driver	$T_{imp,max}$	[Nm]	Max. torque according to the manufacturer's instructions						
			No performance assessed	100	200				

WÜRTH concrete screw W-BS/S

Performances
Perforated calcium silicate brick KSL 3DF- material characteristics, installation parameters

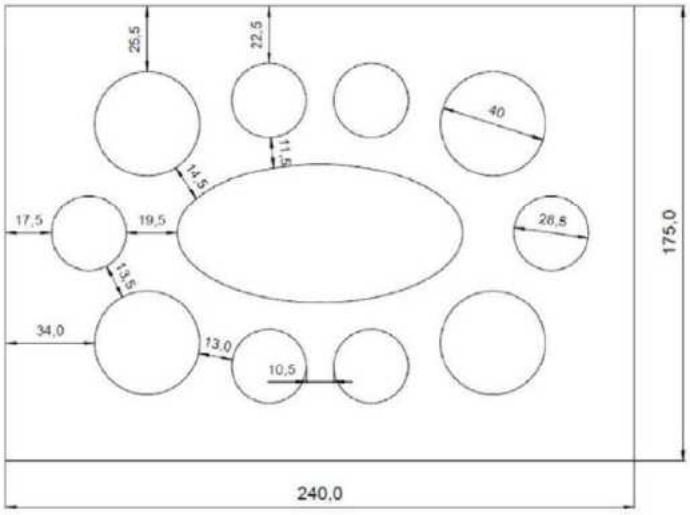
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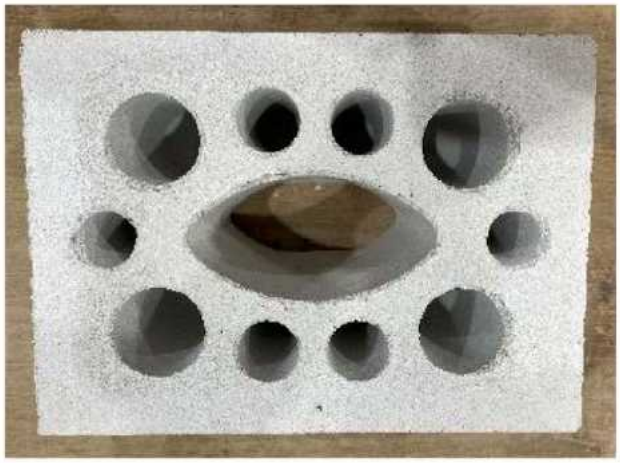
Table 24: Min. edge distance, spacing, group factors

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Min. edge distance	c_{min}	[mm]	58						
Min. spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min\,II}$)	[-]	2,00	2,00	2,00	1,55	1,55	1,95	1,80
	$\alpha_{g,N}$ ($s_{min\,\perp}$)	[-]	2,00	2,00	2,00	1,55	1,55	1,45	1,70
	$\alpha_{g,V,II}$	[-]	2,00	2,00	2,00	2,00	2,00	2,00	2,00
	$\alpha_{g,V,\perp}$	[-]	2,00	1,80	1,80	1,80	1,80	1,30	1,30

Table 25: Reduction factors depending on the distance to joints

W-BS screw size			5	6	8	10
Dinstance to joints	$c_{j\perp}$	[mm]	≥35			
	$c_{j\,II}$		≥58			
Reduction factor	$\alpha_{j,N}$	[-]	1 (full resistance)			
	$\alpha_{j,VII} = \alpha_{j,V\perp}$					
Distance to joints	$c_{j\perp}$	[mm]	<35			
	$c_{j\,II}$		<58			
Reduction factor	$\alpha_{j,N}$	[-]	Screw must not be used			





WÜRTH concrete screw W-BS/S

Performance
Perforated calcium silicate brick KSL 3DF – min. edge distance and spacing, group factors and installation parameters close to the joints

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Table 26: Characteristic resistances

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Compressive strength f_{mean}	[N/mm²]		≥ 17,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,1	1,1	1,1	1,6	1,6	2,2	2,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,4						
	$V_{Rk,\perp}$	[kN]	1,6	1,6	1,6	1,6	1,6	2,2	2,2
Compressive strength f_{mean}	[N/mm²]		≥ 20,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,3	1,3	1,3	1,9	1,9	2,5	2,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	3,8	3,8	3,8	3,9	3,9
	$V_{Rk,\perp}$	[kN]	1,8	1,8	1,8	1,8	1,8	2,5	2,5
Compressive strength f_{mean}	[N/mm²]		≥ 25,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,5	1,5	1,5	2,2	2,2	3,0	3,0
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	4,5	4,5	4,5	4,5	4,5	4,6	4,6
	$V_{Rk,\perp}$	[kN]	2,1	2,1	2,1	2,1	2,1	2,9	2,9
Interaction	X	[-]	1,0						

WÜRTH concrete screw W-BS/S

Performance
Perforated calcium silicate brick KSL 3DF – Characteristic resistances

Annex C14

Table 27: Displacements

Use category (Installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Tension load	F_N	[kN]	0,31	0,31	0,31	0,46	0,46	0,63	0,63
Displacement in tension direction	δ_{N0}	[mm]	0,01	0,01	0,01	0,01	0,01	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02
Shear load parallel to the edge	$F_{V,II}$	[kN]	0,97						
Displacement in shear direction parallel to the edge	$\delta_{V0,II}$	[mm]	0,80	0,80	0,80	0,80	0,80	1,42	1,42
	$\delta_{V\infty,II}$	[mm]	1,19	1,19	1,19	1,19	1,19	2,12	2,12
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,46	0,46	0,46	0,46	0,46	0,63	0,63
Displacement in shear direction perpendicular to the edge	$\delta_{V0,\perp}$	[mm]	0,01	0,01	0,01	0,01	0,01	0,01	0,01
	$\delta_{V\infty,\perp}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02

Table 28: Performance under fire exposure for anchor groups

W-BS screw size			5	6	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Characteristic resistance to local brick failure of groups under fire exposure					
$N^g_{Rk,fi}$	[kN]	R30-R90	$0,09 \cdot N^g_{Rk,b}$	$0,09 \cdot N^g_{Rk,b}$	$0,15 \cdot N^g_{Rk,b}$
		R120	$0,08 \cdot N^g_{Rk,b}$	$0,08 \cdot N^g_{Rk,b}$	$0,12 \cdot N^g_{Rk,b}$
Min. edge distance and spacing	[mm]	$c_{min,fi} = c_{j,fi}$	$2 \times h_{nom}$ [1)]		
		$s_{min,fi}$	107		

[1)] At least the distances set out in Table 29 shall be observed

Table 29: Fire exposure – Characteristic resistance

W-BS screw size				5	6	
Nominal embedment depth			h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
			[mm]	35	35	55
Steel failure for tension and shear load						
Characteristic resistance	R30	$N_{Rk,s,fi30}$	[kN]	0,70	1,00	1,00
	R60	$N_{Rk,s,fi60}$	[kN]	0,60	0,80	0,80
	R90	$N_{Rk,s,fi90}$	[kN]	0,40	0,50	0,50
	R120	$N_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$V_{Rk,s,fi30}$	[kN]	0,70	1,00	1,00
	R60	$V_{Rk,s,fi60}$	[kN]	0,60	0,80	0,80
	R90	$V_{Rk,s,fi90}$	[kN]	0,40	0,50	0,50
	R120	$V_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,50	0,80	0,80
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,40	0,60	0,60
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,20	0,40	0,40
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,20	0,30	0,30
Pull-out failure						
Characteristic resistance	R30	$N_{Rk,p,fi30}$	[kN]	0,70	0,19	0,19
	R60	$N_{Rk,p,fi60}$	[kN]	0,60	0,19	0,19
	R90	$N_{Rk,p,fi90}$	[kN]	0,40	0,19	0,19
	R120	$N_{Rk,p,fi120}$	[kN]	0,30	0,15	0,15
Breakout failure						
Characteristic resistance	R30	$N_{Rk,b,fi30}$	[kN]	0,70	0,13	0,21
	R60	$N_{Rk,b,fi60}$	[kN]	0,60	0,13	0,21
	R90	$N_{Rk,b,fi90}$	[kN]	0,40	0,13	0,21
	R120	$N_{Rk,b,fi120}$	[kN]	0,30	0,11	0,17
Edge and joint distance						
R30 - R120		$c_{min,fi} = c_{j,fi,\parallel}$	[mm]	101	101	101
		$c_{j,fi,\perp}$	[mm]	56	56	56
Spacing						
R30 - R120		$s_{cr,fi}$	[mm]	$4 \times h_{nom}$		

WÜRTH concrete screw W-BS/S

Performances
Perforated calcium silicate brick KSL 3DF – characteristic resistance under fire exposure

Annex C16

Deutsches Institut für Bautechnik DIBt

Table 30: Material characteristic solid clay brick MZ



Solid clay brick MZ acc. to DIN EN 771-1:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Min. wall thickness h_{min} [mm]
MZ 20 - 2,0 - NF	L: ≥ 240 D: ≥ 115 H: ≥ 71	≥ 21,0	≥ 2,1	240

Table 31: Installation parameters solid clay brick MZ

Use category (installation)			dry or wet							
W-BS screw size			5	6		8		10		
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Nominal drill hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40		8,45		10,45	
Drill hole depth	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Clearance hole diameter	$d_f \leq$	[mm]	7	8		12		14	
Max. torque for manual installation	$T_{inst} \leq$	[Nm]	2	3		16		23	
Max. torque for drill driver installation	$T_{inst} \leq$	[Nm]	4	9		14		No performance assessed	
Impact screw drvier	$T_{imp,max}$	[Nm]	Max. torque according to the manufacturer's instructions						
			No performance assessed					185	

WÜRTH concrete screw W-BS/S

Performances
Solid clay brick MZ – material characteristic, installation parameters

Annex C17

Table 32: Min. edge distance, spacing, group factors

W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Min. edge distance	c_{min}	[mm]	80						
Min. spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min\,II}$)	[-]	1,60	1,60	1,60	1,00	1,00	1,70	1,10
	$\alpha_{g,N}$ ($s_{min\,\perp}$)	[-]	1,75	1,75	1,75	1,15	1,15	1,45	1,40
	$\alpha_{g,V,II}$	[-]	1,45	1,45	1,45	1,45	1,45	2,00	1,05
	$\alpha_{g,V,\perp}$	[-]	1,20	1,20	1,20	1,20	1,20	1,50	1,15

Table 33: Reduction factors depending on the distance to joints

W-BS screw size			5	6	8	10
Distance to joints	$c_{j\perp}$	[mm]	≥35			
	$c_{j\,II}$		≥80			
Reduction factor	$\alpha_{j,N}$	[-]	1 (full resistance)			
	$\alpha_{j,VII} = \alpha_{j,V\perp}$					
Distance to joints	$c_{j\perp}$	[mm]	<35			
	$c_{j\,II}$		<80			
Reduction factor	$\alpha_{j,N}$	[-]	Screw must not be used			

WÜRTH concrete screw W-BS/S

Performances
Solid clay brick MZ – min. edge distance, spacing, group factors and installation parameters close to the joints

Annex C18

Table 34: Characteristic resistances

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Compressive strength f_{mean}	[N/mm²]		≥ 21,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,6	1,6	1,6	2,3	2,3	3,1	3,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,6	8,1
	$V_{Rk,\perp}$	[kN]	2,1	2,1	2,1	2,1	2,1	2,1	2,7
Compressive strength f_{mean}	[N/mm²]		≥ 25,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,7	1,7	1,7	2,5	2,5	3,4	3,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,7	2,7	2,7	2,7	2,7	2,8	8,9
	$V_{Rk,\perp}$	[kN]	2,3	2,3	2,3	2,3	2,3	2,3	3,0
Compressive strength f_{mean}	[N/mm²]		≥ 30,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,9	1,9	1,9	2,8	2,8	3,7	3,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,9	2,9	2,9	2,9	2,9	3,1	9,7
	$V_{Rk,\perp}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,5	3,2
Compressive strength f_{mean}	[N/mm²]		≥ 31,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,9	1,9	1,9	2,8	2,8	3,8	3,9
Characteristic resistance to shear load	$V_{Rk,,II}$	[kN]	3,0	3,0	3,0	3,0	3,0	3,2	9,9
	$V_{Rk,,\perp}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,6	3,3

WÜRTH concrete screw W-BS/S

Performances
Solid clay brick MZ – characteristic resistances

Annex C19

Deutsches Institut für Bautechnik DIBt

Table 35: Displacements

Use category (installation)			dry or wet						
W-BS screw size			5	6		8		10	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		[mm]	35	35	55	45	65	55	75
Tension load	F_N	[kN]	0,46	0,46	0,46	0,66	0,66	0,89	0,91
Displacement in tension direction	δ_{N0}	[mm]	0,01	0,01	0,01	0,01	0,01	0,03	0,02
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,05	0,05
Shear load parallel to the edge	$F_{V,II}$	[kN]	0,71	0,71	0,71	0,71	0,71	0,74	2,31
Displacement in shear direction parallel to the edge	$\delta_{V0,II}$	[mm]	1,08	1,08	1,08	1,08	1,08	0,04	2,24
	$\delta_{V\infty,II}$	[mm]	1,61	1,61	1,61	1,61	1,61	0,07	3,36
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,60	0,60	0,60	0,60	0,60	0,60	0,77
Displacement in shear direction perpendicular to the edge	$\delta_{V0,\perp}$	[mm]	1,13	1,13	1,13	1,13	1,13	0,03	0,34
	$\delta_{V\infty,\perp}$	[mm]	1,69	1,69	1,69	1,69	1,69	0,04	0,51

Table 36: Performance under fire exposure for anchor groups

W-BS screw size			5	6	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Characteristic resistance local brick failure of groups under fire exposure					
$N^g_{Rk,fi}$	[kN]	R30-R90	$0,09 \cdot N^g_{Rk,b}$	$0,09 \cdot N^g_{Rk,b}$	$0,15 \cdot N^g_{Rk,b}$
		R120	$0,08 \cdot N^g_{Rk,b}$	$0,08 \cdot N^g_{Rk,b}$	$0,12 \cdot N^g_{Rk,b}$
Min. edge distance and spacing	[mm]	$c_{min,fi} = c_{j,fi}$	$2 \times h_{nom}$ [1)]		
		$s_{min,fi}$	107		

[1)] At least the distances set out in Table 37 shall be observed

Table 37: Fire exposure – Characteristic resistance

W-BS screw size				5	6	
Nominal embedment depth		h_{nom}		h_{nom1}	h_{nom1}	h_{nom2}
			[mm]	35	35	55
Steel failure for tension and shear load						
Characteristic resistance	R30	$N_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$N_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$N_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$N_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$V_{Rk,s,fi30}$	[kN]	1,10	1,50	1,50
	R60	$V_{Rk,s,fi60}$	[kN]	0,80	1,10	1,10
	R90	$V_{Rk,s,fi90}$	[kN]	0,50	0,60	0,60
	R120	$V_{Rk,s,fi120}$	[kN]	0,30	0,40	0,40
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,80	1,20	1,20
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,50	0,90	0,90
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,30	0,50	0,50
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,20	0,30	0,30
Pull-out failure						
Characteristic resistance	R30	$N_{Rk,p,fi30}$	[kN]	1,10	0,28	0,28
	R60	$N_{Rk,p,fi60}$	[kN]	0,80	0,28	0,28
	R90	$N_{Rk,p,fi90}$	[kN]	0,50	0,28	0,28
	R120	$N_{Rk,p,fi120}$	[kN]	0,30	0,22	0,22
Breakout failure						
Characteristic resistance	R30	$N_{Rk,b,fi30}$	[kN]	1,10	0,20	0,31
	R60	$N_{Rk,b,fi60}$	[kN]	0,80	0,20	0,31
	R90	$N_{Rk,b,fi90}$	[kN]	0,50	0,20	0,31
	R120	$N_{Rk,b,fi120}$	[kN]	0,30	0,16	0,25
Edge and joint distance						
R30 - R120		$c_{min,fi} = c_{j,fi,II}$	[mm]	120	120	120
		$c_{j,fi,\perp}$	[mm]	35	35	35
Spacing						
R30 - R120		$s_{cr,fi}$	[mm]	$4 \times h_{nom}$		

WÜRTH concrete screw W-BS/S

Performances
Solid clay brick MZ – characteristic resistance under fire exposure

Annex C21

Deutsches Institut für Bautechnik DIBt

Table 38: Material characteristic solid light concrete brick VBL



Solid light concrete brick VBL acc. to DIN EN 771-3:2015-11				
Nomenclature	Dimensions [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Min. wall thickness h_{min} [mm]
VBL 4 - 1,0 - 2DF	L: ≥ 240 D: ≥ 115 H: ≥ 113	≥ 4,0	≥ 1,5	240

Table 39: Installation parameters solid light concrete brick VBL

Use category (installation)			dry	
W-BS screw size			8	10
Nominal embedment depth		h_{nom} [mm]	h_{nom} 65	h_{nom} 75
Nominal drill hole diameter	d_0	[mm]	8	10
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45
Drill hole depth	$h_0 \geq$	[mm]	85	95
Clearance hole diameter	$d_f \leq$	[mm]	12	14
Max. torque for manual installation	$T_{inst} \leq$	[Nm]	6	5
Max. torque for drill driver installation	$T_{inst} \leq$	[Nm]	10	14

Table 40: Min. edge distance, spacing, group factors

W-BS screw size			8	10
Nominal embedment depth		h_{nom} [mm]	h_{nom} 65	h_{nom} 75
Min. edge distance	c_{min}	[mm]	80	
Min. spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80	
Group factors	$\alpha_{g,N}$ ($s_{min\,II}$)	[-]	1,45	1,45
	$\alpha_{g,N}$ ($s_{min\,\perp}$)	[-]	1,35	1,35
	$\alpha_{g,V,II}$	[-]	0,90	0,90
	$\alpha_{g,V,\perp}$	[-]	0,75	0,75

WÜRTH concrete screw W-BS/S

Performances
Solid light concrete brick – material characteristics, installation parameters, min. edge distance and spacing, group factors

Annex C22

Table 41: Reduction factors depending on the distance to joints

W-BS screw size			8	10
Distance to joints	$c_{j\perp}$	[mm]	≥35	
	$c_{j\parallel}$		≥80	
Reduction factor	$\alpha_{j,N}$	[-]	1 (full resistance)	
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$			
Distance to joints	$c_{j\perp}$	[mm]	35	
	$c_{j\parallel}$		80	
Reduction factor	$\alpha_{j,N}$	[-]	Screw must not be used	

Table 42: Characteristic resistances

Use category (installation)			dry	
W-BS screw size			8	10
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}
		[mm]	65	75
Compressive strength f_{mean}	[N/mm²]		≥ 4,0	
Characteristic tension load	N_{Rk}	[kN]	0,6	1,2
Characteristic shear load	$V_{Rk,\parallel}$	[kN]	4,0	5,1
	$V_{Rk,\perp}$	[kN]	2,3	3,3
Compressive strength f_{mean}	[N/mm²]		≥ 5,0	
Characteristic resistance to tension load	N_{Rk}	[kN]	0,7	1,4
Characteristic resistance to shear load	$V_{Rk,\parallel}$	[kN]	4,4	5,7
	$V_{Rk,\perp}$	[kN]	2,6	3,7

WÜRTH concrete screw W-BS/S

Performances
Solid light concrete brick – characteristic resistances and installation parameters close to the joints

Annex C23

Table 43: Displacements

Use category (installation)			dry	
W-BS screw size			8	10
Nominal embedment depth		h_{nom}	h_{nom}	h_{nom}
		[mm]	65	75
Tension load	F_N	[kN]	0,17	0,34
Displacement in tension direction	δ_{N0}	[mm]	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02
Shear load parallel to the edge	$F_{V,II}$	[kN]	1,14	1,46
Displacement in shear direction parallel to the edge	$\delta_{V0,II}$	[mm]	1,94	2,11
	$\delta_{V\infty,II}$	[mm]	2,92	3,16
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,66	0,94
Displacement in shear direction perpendicular to the edge	$\delta_{V0,\perp}$	[mm]	0,36	1,92
	$\delta_{V\infty,\perp}$	[mm]	0,54	2,89

WÜRTH concrete screw W-BS/S

Performances
Solid light concrete brick – displacements

Annex C24

Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-16/0128 of 6 April 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Würth concrete screw W-BS 5 and W-BS 6
Product family to which the construction product belongs	Concrete screw size 5 and 6 mm for multiple use for non-structural applications in concrete and in prestressed hollow core slabs
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold-Würth-Straße 12-17 74653 Künzelsau DEUTSCHLAND
Manufacturing plant	Herstellwerk W9
This European Technical Assessment contains	15 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 001 Part 6: "Anchors for multiple use for non-structural applications", August 2010, used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.
This version replaces	ETA-16/0128 issued on 23 October 2017

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Specific Part

1 Technical description of the product

The Würth concrete screw W-BS in sizes of 5 and 6 mm is an anchor made of zinc-plated steel respectively steel with zinc flake coating and stainless steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

The essential characteristics regarding mechanical resistance and stability are included under the Basic Works Requirement Safety in use.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	See Annex C 3

3.3 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads as well as bending moments in concrete	See Annex C 1 and C 2
Edge distances and spacing	See Annex C 1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [97/161/EC].

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 6 April 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Tempel

Deutsches Institut für Bautechnik DIBt

product and installed condition

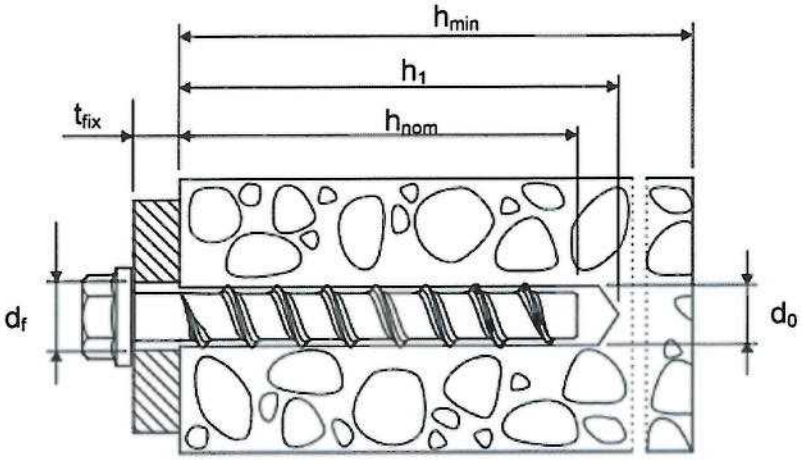
Concrete Screw W-BS 5 and W-BS 6



steel, zinc plated



stainless steel A4 and HCR

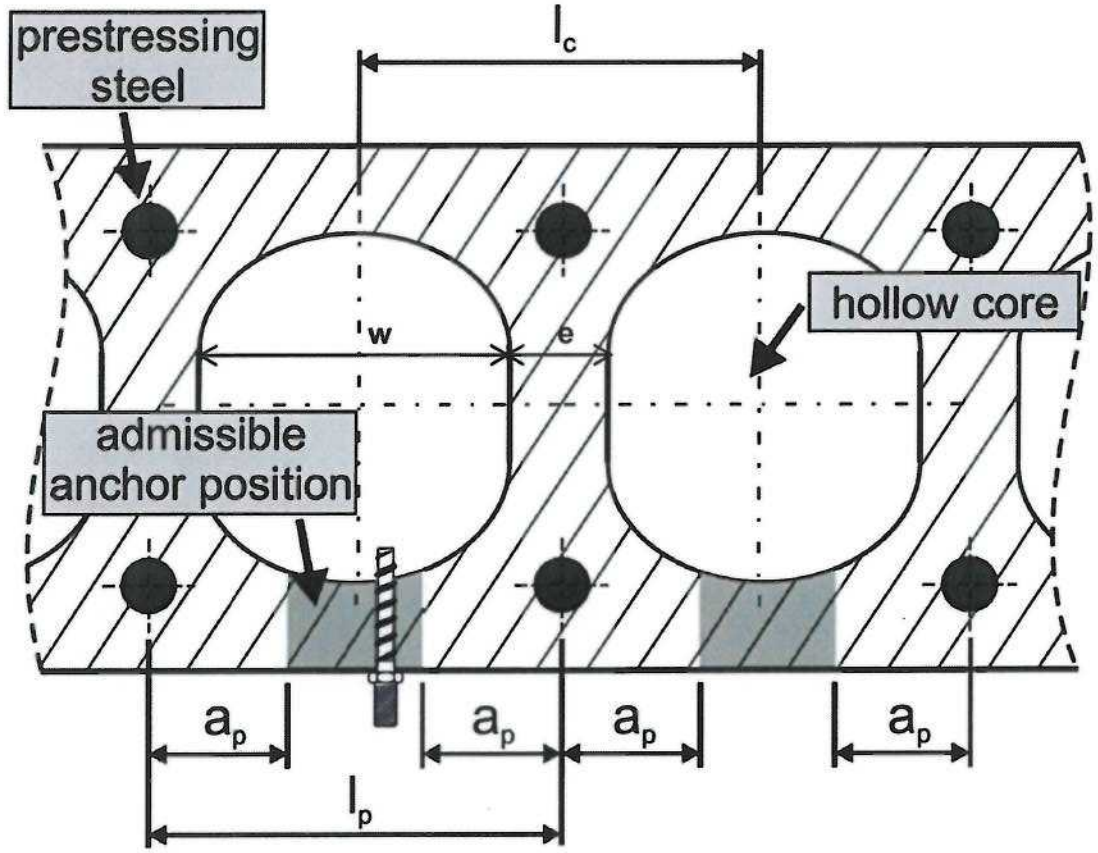


d_0	=	nominal drill bit diameter
h_{nom}	=	nominal anchorage depth
h_1	=	depth of the drill hole
h_{min}	=	minimum thickness of member
t_{fix}	=	thickness of fixture
d_f	=	diameter of clearing hole in the fixture

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR	**Annex A 1**
Product description Installed condition	

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installed condition in prestressed hollow core slabs



w / e ≤ 4,2

w core width

e web thickness

core distance	l_c	≥ 100 mm
prestressing steel	l_p	≥ 100 mm
distance between anchor position and prestressing steel	a_p	≥ 50 mm

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Product description

Installed condition

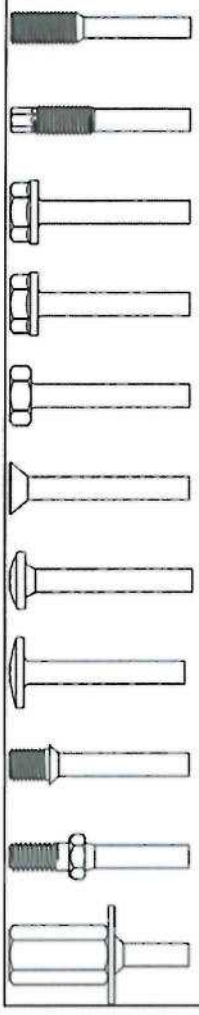
Annex A 2

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Table A1: Materials and variants

part	name	Material
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Concrete screw	W-BS/S: Steel EN 10263-4 galvanized acc. To EN ISO 4042 or zinc flake coating acc. to EN ISO 10683 (≥ 5µm) W-BS/A4: 1.4401, 1.4404, 1.4571, 1.4578 W-BS/HCR: 1.4529

			W-BS/S, W-BS/A4, W-BS/HCR
nominal characteristic steel yield strength	f_{yk}	[N/mm²]	560
nominal characteristic steel ultimate strength	f_{uk}	[N/mm²]	700
elongation at rupture	A_5	[%]	≤ 8



1) Anchor version with connection thread and hexagon socket
e.g. W-BS 8x105 M10 SW5

2) Anchor version with connection thread and hexagon drive
e.g. W-BS 8x105 M10 SW7

3) Anchor version with washer, hexagon head
e.g. W-BS 8x80 SW13 TX40

4) Anchor version with washer and hexagon head and TORX
e.g. W-BS 8x80 SW13 TX40

5) Anchor version with washer, hexagon head
e.g. W-BS 8x80 SW13

6) Anchor version with countersunk head
e.g. W-BS 8x80 TX40

7) Anchor version with pan head
e.g. W-BS 8x80 TX40

8) Anchor version with large pan head
e.g. W-BS 8x80 TX40

9) Anchor version with countersunk head and connection thread
e.g. W-BS 6x55 AG M8

10) Anchor version with hexagon drive and connection thread
e.g. W-BS 6x55 M8 SW10

11) Anchor version with internal thread and hexagon drive
e.g. W-BS 6x55 IM M8/10

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Product descriptions

Materials and variants

Annex A 3

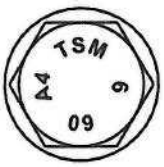
Deutsches Institut für Bautechnik DIBt

Table A2: Dimensions and markings

Anchor size			W-BS 5	W-BS 6
Length of the anchor	L ≤	[mm]	200	
Diameter of shaft	d_k	[mm]	4.0	5.1
Diameter of thread	d_s	[mm]	6.5	7.5



Marking
W-BS/S
Description: W-BS or TSM
Anchor size: e.g. 10
Length of the anchor: e.g. 100



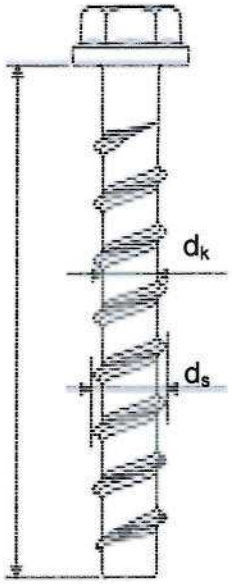
W-BS/A4
Description: W-BS or TSM
Anchor size: e.g. 10
Length of the anchor: e.g. 100
Material: A4



W-BS/HCR
Description: W-BS or TSM
Anchor size: e.g. 10
Length of the anchor: e.g. 100
Material: HCR



Marking "k" or "x" for anchors with connection thread and h_{nom} = 35 mm



Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Product descriptions
Dimensions and markings

Annex A 4

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Intended use

Anchorages subject to:

- static and quasi static loads
- Used only for multiple use for non structural application acc. to ETAG 001, Part 6: W-BS 5, W-BS 6
- Used for anchorages in prestressed hollow core slabs: W-BS 6
- Used for anchorages with requirements related to resistance of fire (not for using in prestressed hollow core slabs): W-BS 6

Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000
- strength classes C20/25 to C50/60 according to EN 206-1:2000
- cracked and uncracked concrete

Use conditions (Environmental conditions):

- The anchor may only be used in dry internal conditions: All screw types
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exits: screw types made of stainless steel with marking A4
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exits: screw types made of stainless steel with marking HCR
  Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi-static actions are designed for design method A in accordance with:
  - ETAG 001, Annex C, Edition August 2010
  - CEN/TS 1992-4:2009.
- Anchorages under fire exposure are designed in accordance with
  - EOTA Technical Report TR 020, Edition May 2004
  - CEN/TS 1992-4:2009, Annex D (it must be ensured that local spalling of the concrete cover does not occur).
- The design method according to ETAG 001, Annex C also applies for the specified diameter d_f of clearance hole in the fixture in Annex B2, Table B1.
- In CEN/TS 1992-4-1, section 5.2.3.1 the 3. indent will be replaced as follow: only the most unfavorable anchors of an anchor group take up shear loads, if diameter d_f of the clearance hole is larger than given CEN/TS 1992-4-1, Table 1.
- The condition according to CEN/TS 1992-4-1, Section 5.2.3.3, no. 3) is also fulfilled for the specified diameter d_f of clearance hole in the fixture in Annex B2, Table B1.

Installation:

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.
- The drill hole may be filled with injection mortar WIT-BS

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR	Annex B 1
Intended use Specifications	

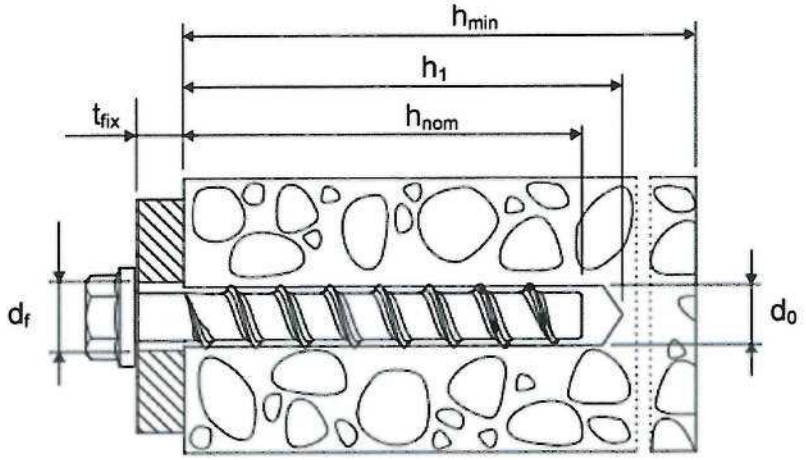
Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Anchor size				W-BS 5	W-BS 6	
Nominal embedment depth				h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
nominal drill bit diameter	d_0		[mm]	5	6	
cutting diameter opf drill bit	d_{cut}	≤	[mm]	5.40	6.40	
depth of drill hole	h_1	≥	[mm]	40	40	60
Nominal embedment depth	h_{nom}	≥	[mm]	35	35	55
diameter of clearing hole in the fixture	d_f	≤	[mm]	7	8	
Installation torque for version with connection thread	T_{inst}	≤	Nm	8	10	
Maximum nominal torque for installation with an impact screwdriver			[Nm]	Max. torque according to manufacturer's instructions		
				110	150	

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

Anchor size			W-BS 5	W-BS 6	
Nominal embedmenth depth			h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
minimum thickness of member	h_{min}	[mm]	80	80	100
minimum edge distance	c_{min}	[mm]	35	35	40
minimum spacing	s_{min}	[mm]	35	35	40



Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

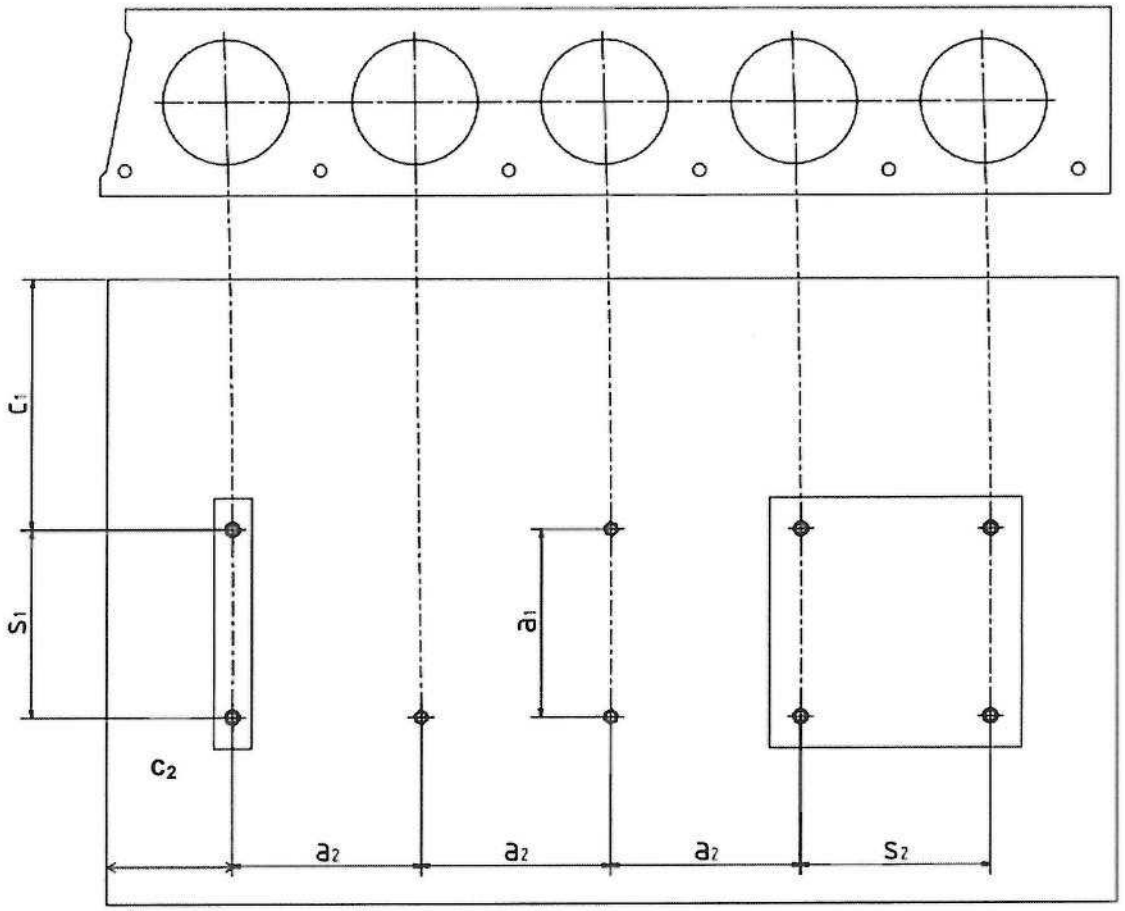
Intended use

Installation parameters

Annex B 2

Deutsches Institut für Bautechnik DIBt

Installation parameters for anchorages in prestressed hollow core slabs



c_1, c_2 edge distance

s_1, s_2 anchor spacing

a_1, a_2 distance between anchor groups

Minimum edge distance	c_{min}	≥ 100 mm
Minimum anchor spacing	s_{min}	≥ 100 mm
Minimum distance between anchor groups	a_{min}	≥ 100 mm

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Intended use

Installation parameters for anchorages in prestressed hollow core slabs

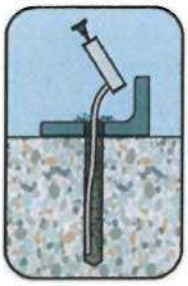
Annex B 3

Deutsches Institut für Bautechnik DIBt

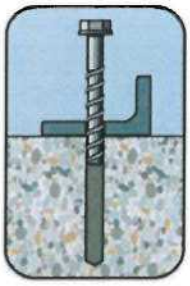
Installation instructions for concrete



Create drill hole



Clean the bore hole



Set the screw



Install the screw



Installation was sucesfull when the head of the anchor is fully supported on the fixture and it is not damaged

Installation instructions for anchorages in prestressed hollow core slabs



Locate the prestressing steel



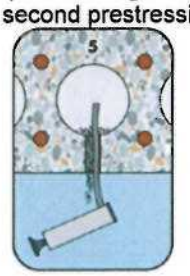
Mark the prestressing steel and locate the second prestressing steel



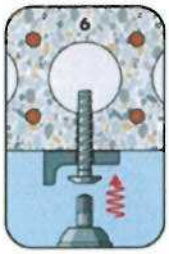
Mark the prestressing steel



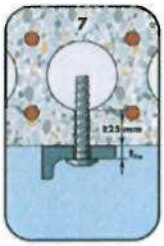
Drill the hole keep an eye on the distance



Clean the drill hole



Turn the screw in



Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Intended use

Installation parameters / installation instruction

Annex B 4

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic values for design method A according to ETAG 001, Annex C or CEN/TS 1992-4

Anchor size				**W-BS 5**	**W-BS 6**	
Nominal embedment depth				h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
steel failure for tension- and shear load						
characteristic load		$N_{Rk,s}$	[kN]	8.7	14.0	
		$V_{Rk,s}$	[kN]	4.4	7.0	
		k_2 [1]	[-]	0.8	0.8	
		$M^0_{Rk,s}$	[Nm]	5.3	10.9	
pull-out failure						
characteristic tension load in cracked and uncracked concrete C20/25		$N_{Rk,p}$	[kN]	1.5	1.5	7.5
increasing factor concrete for $N_{Rk,p}$		Ψ_C	C30/37	1.22		
			C40/50	1.41		
			C50/60	1.55		
concrete cone and splitting failure						
effective anchorage depth		h_{ef}	[mm]	27	27	44
factor for	cracked	k_{cr} [1]	[-]	7.2		
	uncracked	k_{ucr} [1]	[-]	10.1		
concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}		
	edge distance	$c_{cr,N}$	[mm]	1.5 x h_{ef}		
splitting failure	spacing	$s_{cr,Sp}$	[mm]	120	120	160
	edge distance	$c_{cr,Sp}$	[mm]	60	60	80
installation safety factor		γ_2 [2] = γ_{inst} [1]	[-]	1.2	1.2	1.0
concrete pry out failure (pry-out)						
k-Factor		k [2] = k_3 [1]	[-]	1.0		
concrete edge failure						
effective length of anchor		$l_f = h_{ef}$	[mm]	27	27	44
outside diameter of anchor		d_{nom}	[-]	5	6	

[1] Parameter relevant only for design according to CEN/TS 1992-4:2009

[2] Parameter relevant only for design according to ETAG 001, Annex C

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Performances

Characteristic values for design method A

Annex C 1

Deutsches Institut für Bautechnik DIBt

Table C2: Characteristic values of resistance in prestressed hollow core slabs C30/37 to C50/60

Anchor size		**W-BS 6**		
bottom flange thickness d_b	[mm]	≥ 25	≥ 30	≥ 35
characteristic resistance F^0_{Rk}	[kN]	1	2	3
installation safety factor γ_2 [1] = γ_{inst} [2]	[-]	1.2		

[1] Parameter relevant only for design according to ETAG 001, Annex C

[2] Parameter relevant only for design according to CEN/TS 1992-4:2009

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Performances
Characteristic values for anchorages in prestressed hollow core slabs

Annex C 2

Deutsches Institut für Bautechnik DIBt

Table C3: Characteristic values of resistance to fire exposure [1)]

Anchor size				**W-BS 6**			
				W-BS/S		**W-BS/A4, W-BS/HCR**	
Nominal embedment depth				h_{nom} = 35 mm	h_{nom} = 55 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
steel failure for tension- and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)							
Fire resistance class							
R30	Characteristic resistance	$F_{Rk,s,fi30}$	[kN]	0.9		1.2	
R60		$F_{Rk,s,fi60}$	[kN]	0.8		1.2	
R90		$F_{Rk,s,fi90}$	[kN]	0.6		1.2	
R120		$F_{Rk,s,fi120}$	[kN]	0.4		0.8	
R30	Characteristic resistance	$M^0_{Rks,,fi30}$	[Nm]	0.7		0.9	
R60		$M^0_{Rk,s,fi60}$	[Nm]	0.6		0.9	
R90		$M^0_{Rk,s,fi90}$	[Nm]	0.5		0.9	
R120		$M^0_{Rks,,fi120}$	[Nm]	0.3		0.6	
edge distance							
R30 bis R120		$c_{cr,\,fi}$	[mm]	$2 \times h_{ef}$			
spacing							
R30 bis R120		$s_{cr,\,fi}$	[mm]	$4 \times h_{ef}$			

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out failure and concrete edge failure shall be calculated according to TR 020 or CEN/TS 1992-4.

[1)] Not for using in prestressed hollow core slabs

Würth Concrete Screw W-BS/S, W-BS/A4, W-BS/HCR

Annex C 3

Performances
Characteristic values under fire exposure

iBMB MPA TU BRAUNSCHWEIG

Institute of Building Materials, Concrete Construction and Fire Safety | Braunschweig Civil Engineering Materials Testing Institute

Expert Opinion

– Translation –

Document number:	(2101/173/18) – CM dated 13/08/2018
Client:	Adolf Würth GmbH & Co. KG Reinhold-Würth-Straße 12-17 74653 Künzelsau
Order date:	20/06/2018
Order ref:	Mr Röger
Order received:	20/06/2018
Subject:	Assessment of Würth W-BS/S und W-BS/A4 concrete screws regarding their behaviour on exposure to fire according to the standard temperature-time curve (ETK) in accordance with DIN EN 1363-1, in order to determine the fire resistance
Basis for assessment:	See Section 1

This expert opinion comprises 6 pages including cover sheet and 6 annexes.

Materialprüfanstalt f. d. Bauwesen MPA BS 3 Braunschweig

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Notified body (0761-CPR) -
Approved as a civil engineering testing, inspection and certifying body as well as notified as a civil engineering testing and certifying body.

Contents

1 General 2

2 Description of the constructions 3

3 Assessment of Würth W-BS/S and W-BS/A4 concrete screws combined with solid structural elements 4

4 Special notes 5

1 General

An expert opinion on the Würth concrete screws combined with solid structural elements (masonry) under exposure to fire on one side was commissioned by Adolf Würth GmbH & Co. KG, Künzelsau on 20/06/2018.

The documents serving as basis for the expert opinion for the constructions to be assessed are listed below:

[1] DIN EN 1363-1, Fire resistance tests - Part 1: General Requirements,

[2] DIN 4102-4, Fire Behaviour of Building Materials and Components,

[3] Test Report No. 2101/713/17 dated 13/08/2018 issued by MPA Braunschweig, and

[4] Würth W-BS/S and W-BS/A4 concrete screws, Technical Data Sheets from Adolf Würth GmbH & Co. KG, Künzelsau.

The assessment for the Würth concrete screws was conducted on the basis of the fire tests carried out when installed in solid structural elements (reinforced concrete/masonry). Existing technical regulations and technical specifications, which regulate above all mechanical fasteners for cracked concrete combined with reinforced concrete elements when exposed to fire, currently provide no complete design concept for these fastening systems combined with reinforced concrete/masonry. According to Adolf Würth GmbH & Co. KG, Künzelsau, there is currently no complete construction supervisory authority certificate (e.g. ETA) for Würth concrete screws combined with reinforced concrete/masonry that lays down the regulations to be met by the execution described here in the event of fire.

2 Description of the constructions

The Würth W-BS/S and W-BS/A4 concrete screws consist of a screw shaft with special thread and are made in one piece. The loads are applied via the screw shaft and the thread pitches into the anchoring base. Following preparation of the borehole, the Würth concrete screws are installed with the admissible tightening torque in the ground and fastened there by self-tapping.

According to the client, the related technical specifications for Würth concrete screws installed in reinforced concrete/masonry – for the normal purpose of use – can be taken from the respective technical data sheets (e.g. installation instructions) of Adolf Würth GmbH & Co. KG, Künzelsau.

The fire-safety-related assessment is limited to mainly static (dead) loads combined with solid structural elements, which have to be classified in the fire resistance class at least corresponding to the one of the fastening systems.

The following table and the annexes summarize the design data (from the manufacturer) for Würth W-BS/S and W-BS/A4 concrete screws. Further information on Würth concrete screws can be taken from the technical data sheets (e.g. installation instructions) and approvals of Adolf Würth GmbH & Co. KG, Künzelsau.

Table 1: Würth W-BS/S concrete screws

Würth W-BS/S concrete screw	**Size**	**Connection thread**	**Ground**
W-BS/S 5 type S with hexagon head	5	-	Reinforced concrete Masonry (perforated sand-lime brick, sand-lime brick, clay brick)
W-BS/S 5 type P with pan head		-	
W-BS/S 5 type P with large pan head		-	
W-BS/S 5 type SK with countersunk head		-	
W-BS/S 6 type S with hexagon head	6	-	Masonry (perforated sand-lime brick, sand-lime brick, clay brick)
W-BS/S 6 type P with pan head		-	
W-BS/S 6 type P with large pan head		-	
W-BS/S 6 type SK with countersunk head		-	
W-BS/S 6 type I with female thread[1)]	6	IG M8/M10	
W-BS/S 6 type ST, hanger bolt with hexagon drive	6	M8	

1) Connection combined with nuts (strength class ≥ 8) und threaded rods (strength class ≥ 4.8)

Table 2: Würth W-BS/A4 concrete screws

Würth W-BS/A4 concrete screw	Size	Connection thread	Ground
W-BS/A4 6 type S with hexagon head	6	-	Masonry (perforated sand-lime brick, sand-lime brick, clay brick)
W-BS/A4 6 type P with pan head		-	
W-BS/A4 6 type SK with countersunk head		-	

For a more detailed description of the construction, reference is made to the annexes and the technical data sheets for Würth W-BS/S and W-BS/A4 concrete screws from Adolf Würth GmbH & Co. KG, Künzelsau.

3 Assessment of Würth W-BS/S and W-BS/A4 concrete screws combined with solid structural elements

The subject matter of this fire-safety-related assessment is the load-bearing behaviour of Würth concrete screws combined with undergrounds such as masonry made of sand-lime bricks ≥ KS 12-1.4-NF (in accordance with DIN V 106 (DIN EN 771-2)) or clay bricks ≥ Mz 12-2.0-2DF (in accordance with DIN 105-100 (DIN EN 771-1)) or perforated sand-lime bricks ≥ KSL 12-1.4-2 DF (in accordance with DIN V 106-100 (DIN EN 771-2)) or undergrounds made of reinforced concrete (strength class ≥ C20/25 ≤ C50/60) when exposed to fire in accordance with DIN EN 1363-1.

If smaller loads apply for the normal purpose of use according to the technical data sheets [4] of Adolf Würth GmbH & Co. KG, Künzelsau, these shall be binding. Independent of the fire-safety-related assessment, the suitability of the anchors has to be certified for the ground and application, also for the cold as-installed state.

With regard to the load-bearing behaviour under exposure to fire, steel failure and ground failure can be distinguished.

For the anchors assessed here, the failure of the Würth concrete screws (steel failure) was decisive. In terms of fire safety, it may be assumed with sufficient reliability that a failure of the ground examined here will not be decisive in case of fire.

The centre distance to be applied for the Würth concrete screws under exposure to fire is the distance that excludes a failure of the ground, which means the steel failure of the fastening system will be decisive. Moreover, the centre distances have to comply at least with the distances required for the cold as-installed state as per technical data sheets [4] of Adolf Würth GmbH & Co. KG, Künzelsau.

Further parameters (geometry, moisture, formwork spalling, eccentricity, position in the structural element and other influencing variables) have to be considered separately, if required.

The load-bearing behaviour (steel failure) under exposure to fire of the systems described above was determined on the basis of the fire tests conducted in solid structural elements (masonry).

$F_{fire(t)}$ ⇒ design value for Würth concrete screw

The load on the anchors can be applied as centric tensile load (N), shear load (V) or as a combination of both (oblique tension).

The design proposals for Würth concrete screws under tensile load and exposure to fire on one side in accordance with DIN EN 1363-1 can be taken from Annexes 4 to 6.

4 Special notes

4.1 This Expert Opinion is no substitute for the building authority certificate (abP, abZ, ETA).

4.2 This Expert Opinion applies only to Würth W-BS/S and W-BS/A4 concrete screws combined with solid structural elements (reinforced concrete / solid masonry according to Section 3) taking the constraints of the technical data sheets [4] of Adolf Würth GmbH & Co. KG, Künzelsau, into account.

4.3 The assessment of the Würth W-BS/S and W-BS/A4 concrete screws refers to the fastener combined with solid structural elements (reinforced concrete / solid masonry according to Section 3) under exposure to fire on one side according to the standard temperature-time curve in accordance with DIN EN 1363-1.

4.4 The validity of this Expert Opinion ends on 13/08/2023.

4.5 The validity of this Expert Opinion can be extended upon request and as a function of the state of the art.

This document is the translated version of Expert Opinion No. 2101/173/18 – CM dated 13/08/2018. The legally binding text is the aforementioned German Expert Opinion.

i.A.
ORR Dr.-Ing. Blume
Head of Department

Materialprüfanstalt f. d. Bauwesen MPA BS 3 Braunschweig

i.A.
Dipl.-Ing. Maertins
Engineer/official in charge

Technical data of Würth W-BS/S 5 concrete screws

Anchor type		
	Würth concrete screw	W-BS/S 5 type S with hexagon head
		W-BS/S 5 type P with pan head
		W-BS/S 5 type P with large pan head
		W-BS/S 5 type SK with countersunk head

Table 3: Material data

Anchor type		Material
Würth concrete screw	W-BS/S	Steel in accordance with manufacturer spec, galvanized min. 5 µm

Table 4: Installation parameters for Würth W-BS/S concrete screws

Würth W-BS/S concrete screws			Reinforced concrete (strength class ≥ C20/25 ≤ C50/60	Clay brick ≥ Mz 12-2.0-2DF acc.to DIN 105 / DIN 105-100 (EN 771-1) Sand-lime brick ≥ KS 12-1.4- NF acc. to DIN V 106 (DIN EN 771-2)	Perforated sand-lime birick ≥ KSL 12-1.4-2 DF acc. to DIN V 106-100 (DIN EN 771-2)[2)]
Min. embedment depth	h_{nom}	[mm]	35		
Nominal drilling diameter	d_o	[mm]	5		
Cutting bit diameter	$d_{cut} \leq$	[mm]	5.4		
Borehole depth	$h_1 \geq$	[mm]	40		
Through-borehole in attachment part	$d_f \leq$	[mm]	7		
Max. fastening height	t_{fix}	[mm]	$l_s - h_{nom}$		
Max. tightening torque[1)]	T_{inst}	[Nm]	10	8	4

1) As an alternative, the maximum tightening torque may be applied using a torque-controlled screwdriver (e.g. tangential screwdriver).

2) In perforated brick masonry, boreholes may only be prepared by rotation.

Fastening must be executed in load-bearing brick/reinforced concrete.

Technical data of Würth W-BS/S 6 concrete screws

Anchor type		
	Würth concrete screw	W-BS/S 6 type S with hexagon head
		W-BS/S 6 type P with pan head
		W-BS/S 6 type P with large pan head
		W-BS/S 6 type SK with countersunk head
		W-BS/S 6 type I with female thread
		W-BS/S 6 type ST, hanger bolt with hexagon drive

Table 5: Material data

Anchor type		Material
Würth concrete screw	W-BS/S	Steel in accordance with manufacturer spec, galvanized min. 5 µm
Threaded rod with nut and washer	M8	Steel; galvanized min. 5 µm; (strength class 4.8)

Table 6: Installation parameters for Würth W-BS/S concrete screws

Würth W-BS/S concrete screws			Clay brick ≥ Mz 12-2.0-2DF acc.to DIN 105 / DIN 105-100 (EN 771-1) Sand-lime brick ≥ KS 12-1.4- NF acc.to DIN V 106 (DIN EN 771-2)	Perforated sand-lime brick ≥ KSL 12-1.4-2 DF acc.to DIN V 106-100 (DIN EN 771-2)[2)]
Min. embedment depth	h_{nom}	[mm]	35	
Nominal drilling diameter	d_o	[mm]	6	
Cutting bit diameter	$d_{cut} \leq$	[mm]	6.4	
Borehole depth	$h_1 \geq$	[mm]	40	
Through-borehole in attachment part	$d_f \leq$	[mm]	8	
Max. fastening height	t_{fix}	[mm]	$l_s - h_{nom}$	
Max. tightening torque[1)]	T_{inst}	[Nm]	8	4

1) As an alternative, the maximum tightening torque may be applied using a torque-controlled screwdriver (e.g. tangential screwdriver).

2) In perforated brick masonry, boreholes may only be prepared by rotation.

Fastening must be executed in load-bearing brick/reinforced concrete.

Technical data of Würth W-BS/A4 6 concrete screws (stainless steel)

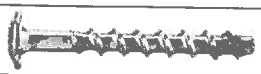
Anchor type		
	Würth concrete screw	W-BS/A4 6 type S with hexagon head
		W-BS/A4 6 type P with pan head
		W-BS/A4 6 type SK with countersunk head

Table 7: Material data

Anchor type		Material
Würth concrete screw	W-BS/A4	Stainless steel: material nos. 1.4401, 1.4404, 1.4571, 1.4578

Table 8: Installation parameters for Würth W-BS/A4 concrete screws

Würth W-BS/A4 concrete screws			Clay brick ≥ Mz 12-2.0-2DF acc.to DIN 105 / DIN 105-100 (EN 771-1) Sand-lime brick ≥ KS 12-1.4- NF acc.to DIN V 106 (DIN EN 771-2)	Perforated sand-lime brick ≥ KSL 12-1.4-2 DF) acc.to DIN V 106-100 (DIN EN 771-2)[2)]
Min. embedment depth	h_{nom}	[mm]	35	
Nominal drilling diameter	d_o	[mm]	6	
Cutting bit diameter	$d_{cut} \leq$	[mm]	6.4	
Borehole depth	$h_1 \geq$	[mm]	40	
Through-borehole in attachment part	$d_f \leq$	[mm]	8	
Max. fastening height	t_{fix}	[mm]	$l_s - h_{nom}$	
Max. tightening torque[1)]	T_{inst}	[Nm]	8	4

1) As an alternative, the maximum tightening torque may be applied using a torque-controlled screwdriver (e.g. tangential screwdriver).

2) In perforated brick masonry, boreholes may only be prepared by rotation.

Fastening must be executed in load-bearing brick/reinforced concrete.

Design proposal for Würth W-BS/S concrete screws under tensile load and exposure to fire in accordance with DIN EN 1363-1 in reinforced concrete

Table 9: Design proposal for Würth W-BS/S concrete screws in undergrounds made of reinforced concrete (strength class ≥ C20/25 ≤ C50/60)

Würth W-BS/S concrete screw	
Fire resistance time in minutes [min]	Maximum tensile/shear loads – max. F[1)] [kN] W-BS/S 5 type S W-BS/S 5 type P W-BS/S 5 type SK
30	0.84
60	0.62
90	0.40
120	0.29

1) It is to be checked, whether the admissible cold loads are binding; moreover, attachment parts always have to be proved separately.

Design proposal for Würth W-BS/S and W-BS/A4 concrete screws under tensile load and exposure to fire in accordance with DIN EN 1363-1 in masonry

Table 10: Design proposal for Würth W-BS/S and W-BS/A4 concrete screws in undergrounds made of ≥ KS 12-1.4- NF (acc.to DIN V 106 (DIN EN 771-2)) and clay brick ≥ Mz 12-2.0-2DF) acc.to DIN 105 / DIN 105-100 (EN 771-1)

Würth W-BS/S und W-BS/A4 concrete screws			
Fire resistance time in minutes [min]	Maximum tensile/shear loads – max. F[1)] [kN]		
	W-BS/S 5 type S W-BS/S 5 type P W-BS/S 5 type SK	W-BS/S 6 type S W-BS/S 6 type P W-BS/S 6 type SK	W-BS/A4 6 type S W-BS/A4 6 type P W-BS/A4 6 type SK
30	0.64	0.94	
60	0.49	0.72	
90	0.34	0.50	
120	0.27	0.39	

1) It is to be checked, whether the admissible cold loads are binding; moreover, attachment parts always have to be proved separately.

Table 11: Design proposal for Würth W-BS/S and W-BS/A4 concrete screws in undergrounds made of perforated sand-lime brick ≥ KSL 12-1.4-2 DF acc.to DIN V 106-100 (DIN EN 771-2)

Würth W-BS/S and W-BS/A4 concrete screws			
Fire resistance time in minutes [min]	Maximum tensile/shear loads – max. F[1)] [kN]		
	W-BS/S 5 type S W-BS/S 5 type P W-BS/S 5 type SK	W-BS/S 6 type S W-BS/S 6 type P W-BS/S 6 type SK	W-BS/A4 6 type S W-BS/A4 6 type P W-BS/A4 6 type SK
30	0.57	0.83	
60	0.43	0.64	
90	0.30	0.44	
120	0.23	0.34	

1) It is to be checked, whether the admissible cold loads are binding; moreover, attachment parts always have to be proved separately.

Table 12: Design proposal for Würth W-BS/S 6 type I and W-BS/S 6 type ST concrete screws in undergrounds made of sand-lime brick ≥ KS 12-1.4- NF (acc.to DIN V 106 (DIN EN 771-2)) and clay brick ≥ Mz 12-2.0-2DF) acc.to DIN 105 / DIN 105-100 (EN 771-1) and perforated sand-lime brick ≥ KSL 12-1.4-2 DF acc.to DIN V 106-100 (DIN EN 771-2)

Würth W-BS/S 6 type I and W-BS/S 6 type ST concrete screws		
Fire resistance time in minutes [min]	Maximum tensile/shear loads – max. F[1)] [kN]	
	W-BS/S 6 type I	W-BS/S 6 type ST
30	0.67	0.37
60	0.55	0.33
90	0.43	0.26
120	0.34	0.18

1) It is to be checked, whether the admissible cold loads are binding; moreover, attachment parts always have to be proved separately.

WÜRTH

Conutry of Origin

Certificate No.: 20231606002MM
Date: June 16th 2023

Declaration of Country of Origin

TO WHOM IT MAY CONCERN

We herewith declare under our sole responsibility that:

Wurth Concrete screw with countersunk head W-BS/A4 with Art. No. 5929 23#####

is manufactured exclusively in our factories in Europe under supervision of our Wurth Quality Control laboratories and the country of origin is Germany.

We trust to have been of service with this declaration and remain
With kindest regards,

Signature:

Ala Tashman
Field Engineer
WURTH GULF FZE

وورث جلف م.م.ح
WÜRTH GULF FZE
P.O.Box: 17036
Product Department

Wurth Gulf FZE-Plot # S61303, Jebel Ali South 6 ,Dubai ,U.A.E - P.O.Box:17036
T: +9714 8809991, 04 8834229(old), F: +971 4 8809255, 04 8834303(old), E: wurthglf@emirates.net.ae - www.wurth.ae

WÜRTH

Draft Warranty

Certificate No.: **20240209###**
Date: Feb 9th, 2024

Subject: Warrantee Certificate

Würth Concrete Screw W-BS/S with group article no. 5929 1xx xxx
Würth Concrete Screw W-BS/A4 with group article no. 5929 2xx xxx

To whom it may concern;

We hereby warrant the above products for a period of ten (10) years from date of invoice on material default only under following provisions based on correct installation and environmental conditions.

1. The anchors are installed in cracked and non-cracked concrete only and according to the intended use as stipulated in of European Technical Approval ETA-16/0128.
2. The anchors made of galvanized steel may only be used in structures subject to dry internal conditions

This warrantee does not include the fitness of the anchor for the intended use. These is given only when the anchorages are designed under the responsibility of an engineer experienced in anchorage work and verifiable calculation notes and drawings are taking account of the loads to be anchored. The position of the anchors is indicated in the design drawings. This as per ETAG 001 – Guideline for European Technical Approval of metal anchors for use in concrete and as stipulated in ETA-16/0128.

This warrantee is restricted to replacement of the original invoiced and delivered items against the original invoiced cost. No warrantee is given for any material damaged by faulty installation when not installed according to the installation instructions delivered with the material. Installation must be supervised by an experienced project engineer.

Yours Sincerely,

WURTH
P.O.Box: 17036
Jebel Ali
Dubai - U.A.E.
WURTH GULF FZE

DRAFT