

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
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European Technical Assessment

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

HEICO-LOCK® wedge lock washers (type: HLS/HLB) for
non-preloaded bolting assemblies

Product family
to which the construction product belongs

Locking washers preventing self-loosening of bolting
assemblies

Manufacturer

HEICO Befestigungstechnik GmbH
Ensestraße 1-9
59469 Ense-Niederense
DEUTSCHLAND

Manufacturing plant

HEICO Befestigungstechnik GmbH
Ensestraße 1-9
59469 Ense-Niederense
DEUTSCHLAND

This European Technical Assessment
contains

8 pages including 4 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 331565-00-0602

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Specific part

1 Technical description of the product

HEICO-LOCK® wedge lock washers with narrow bearing surface (type HLS) and wide bearing surface (type HLB) are self-locking securing washers for non-preloaded structural bolting assemblies according to EN 15048-1:2016 under dynamic loads or vibrations.

HEICO-LOCK® wedge lock washers (type: HLS/HLB) washers consist of a pair of washers with radial teeth on the outer side and cams on the inner side. The preassembled washers are installed in pairs, cam face to cam face. One pair of washers is placed between bolt head and structure and another pair of washers is placed between nut and the structure. The radial teeth press into the substrate during tightening which leads to a form of locking feature. Thereby only single washers of a pair can turn against each other. The cam angle is greater than the pitch of the bolt thread creating a positive locking function.

Annex A 1 contains examples of HEICO-LOCK® wedge lock washers (type: HLS/HLB) and further technical information.

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

HEICO-LOCK® wedge lock washers (type: HLS/HLB) are intended to be used instead of washers for non-preloaded structural bolting assemblies according to EN 15048-1:2016 M5 to M39 to prevent bolting assemblies from unintentional loosening. The securing effect is only guaranteed if requirements for execution according to annex C are respected.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of HEICO-LOCK® wedge lock washers (type: HLS/HLB) of at least 25 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.

To ensure the securing effect of HEICO-LOCK® wedge lock washers (type: HLS/HLB) the hardness of the structural parts shall not be higher than the hardness of the securing washers themselves.

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
Geometry	see annex B 1 and B 2
Hardness of washers	see annex A 1
Preloading	NPA
Securing effect	see annex C 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Durability

Essential characteristic	Performance
Corrosion resistance	see annex A 1

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

In accordance with EAD No. 331565-00-0602, the applicable European legal act is: 1998/214/EC.

The system to be applied is: 2+

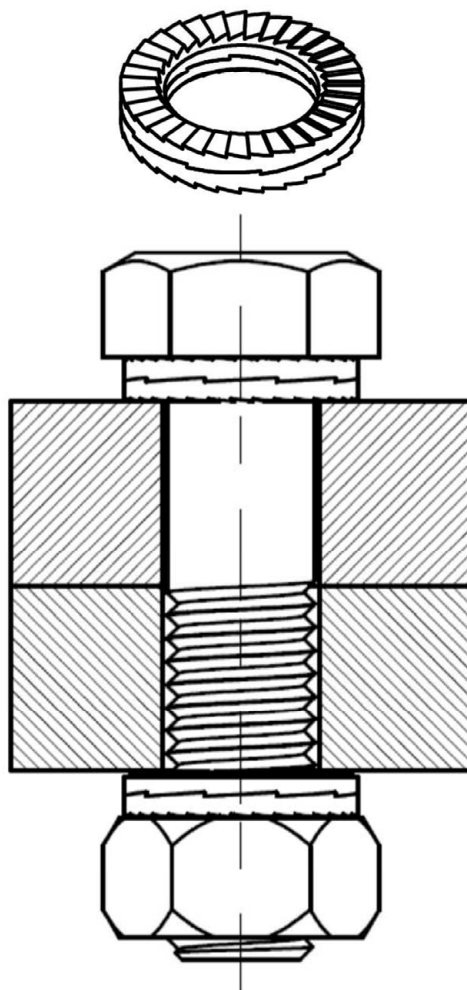
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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

Issued in Berlin on 28 April 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Böckermann



Sample for a bolted connection with
HEICO-LOCK® wedge lock washer

Material: Quenched and tempered steel C45E, material number 1.1191
acc. to EN 10083-2

Hardness: 485 \pm 25 HV_{0,3} SC

Corrosion protection: Zinc-flake coating Delta Protekt KL 100 + sliding coating VH 302 GZ

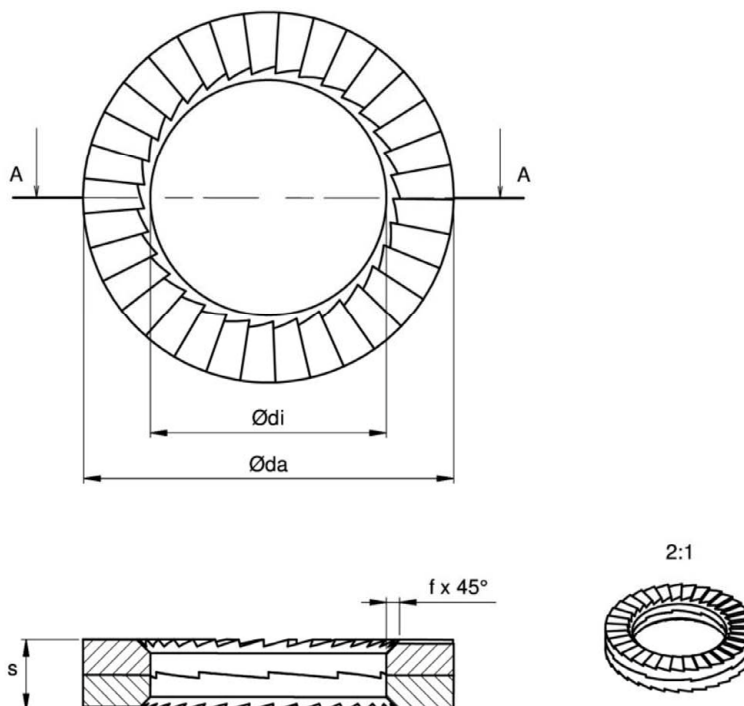
HEICO-LOCK® wedge lock washers Type HLS and HLB for non-preloaded bolting
assemblies

Sample for a bolted connection with wedge lock washer, information on material,
hardness and corrosion protection

Annex A 1

Table B1 Main dimensions of wedge lock washers type HLS

Washer designation	Nominal bolt diameter	$\varnothing d_i$ [mm]	$\varnothing d_a$ [mm]	s [mm]	f [mm]
HLS-5	M5	5.4	9.0	1.7	-
HLS-6	M6	6.5	10.8	1.7	-
HLS-8	M8	8.6	13.5	2.7	-
HLS-10	M10	10.7	16.6	2.7	-
HLS-12	M12	13.0	19.5	2.7	-
HLS-14	M14	15.2	23.0	3.7	-
HLS-16	M16	17.0	25.4	3.7	-
HLS-20	M20	21.4	30.7	3.7	-
HLS-22	M22	23.4	34.5	3.7	-
HLS-24	M24	25.3	39.0	3.7	0.5
HLS-27	M27	28.4	42.0	5.4	1.0
HLS-30	M30	31.4	47.0	5.7	1.0
HLS-33	M33	34.4	48.5	5.5	1.0
HLS-36	M36	37.4	55.0	6.2	1.0
HLS-39	M39	40.4	58.5	6.2	1.0



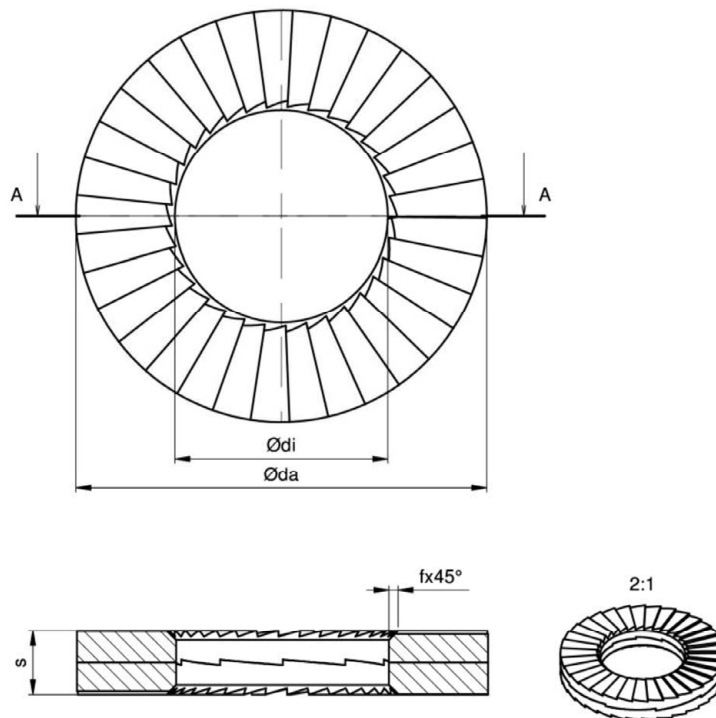
HEICO-LOCK® wedge lock washers Type HLS and HLB for non-preloaded bolting assemblies

Main dimensions of wedge lock washers type HLS

Annex B 1

Table B2 Main dimensions of wedge lock washers type HLB

Washer designation	Nominal bolt diameter	$\varnothing d_i$ [mm]	$\varnothing d_a$ [mm]	s [mm]	f [mm]
HLB-5	M5	5.4	10.8	1.7	-
HLB-6	M6	6.5	13.5	2.7	-
HLB-8	M8	8.6	16.6	2.7	-
HLB-10	M10	10.7	21.0	2.7	-
HLB-12	M12	13.0	25.4	3.7	-
HLB-14	M14	15.2	30.7	3.7	-
HLB-16	M16	17.0	30.7	3.7	-
HLB-20	M20	21.4	39.0	3.8	-
HLB-22	M22	23.4	42.0	4.7	-
HLB-24	M24	25.3	48.5	4.7	0.5
HLB-27	M27	28.4	48.5	6.7	1.0
HLB-30	M30	31.4	58.5	6.7	1.0
HLB-33	M33	34.4	58.5	6.7	1.0
HLB-36	M36	37.4	63.0	6.7	1.0
HLB-39	M39	40.4	75.5	6.6	1.0



HEICO-LOCK® wedge lock washers Type HLS and HLB for non-preloaded bolting assemblies

Main dimensions of wedge lock washers type HLB

Annex B 2

Table C1 Minimum torque moments $M_{\text{AHL5-B}}$ for achieving the securing effect for wedge lock washers type HLS and HLB

Nominal diameter	Minimum torque moments $M_{\text{AHL5-B}}$ [Nm]			
	Strength class			
	4.6	5.6	8.8	10.9
M5	2	3	6	9
M6	4	5	11	15
M8	9	11	24	36
M10	17	22	50	70
M12	28	36	78	115
M14	46	60	120	180
M16	65	85	180	267
M20	120	160	330	490
M22	160	210	450	670
M24	200	270	580	850
M27	300	400	860	1,200
M30	410	550	1,160	1,700
M33	560	730	1,560	2,300
M36	710	940	2,000	2,900
M39	960	1,200	2,500	3,700

Bolted connections with HEICO-LOCK® wedge lock washers shall be designed in accordance with EN 1993-1-3 or EN 1993-1-8, in each case in conjunction with the National Annex, depending on the component thicknesses to be connected.

The total layer thickness of metallic coatings and / or organic coatings on the components to be connected shall not exceed 200 µm in the area of the HEICO-LOCK® wedge lock washers.

It should be noted that each HEICO-LOCK® wedge lock washer consists of two individual washers bonded together. Wedge lock washers where this bonding has already been loosened before assembly may no longer be used.

In order to achieve the securing effect with the bolted connections, the minimum torque moments $M_{\text{AHL5-B}}$ according to Table C1 shall be used.

HEICO-LOCK® wedge lock washers which were already installed shall not be used again after dismantling.

HEICO-LOCK® wedge lock washers Type HLS and HLB for non-preloaded bolting assemblies

Minimum torque moments in Nm for achieving the securing effect for wedge lock washers type HLS and HLB

Annex C 1