



**MADE IN
GERMANY!**

HEICO-LOCK® HLK-WASHERS FOR STEEL CONSTRUCTION

HEICO
Befestigungs-
technik GmbH

Z-14.4-702

Fraunhofer
MVO08



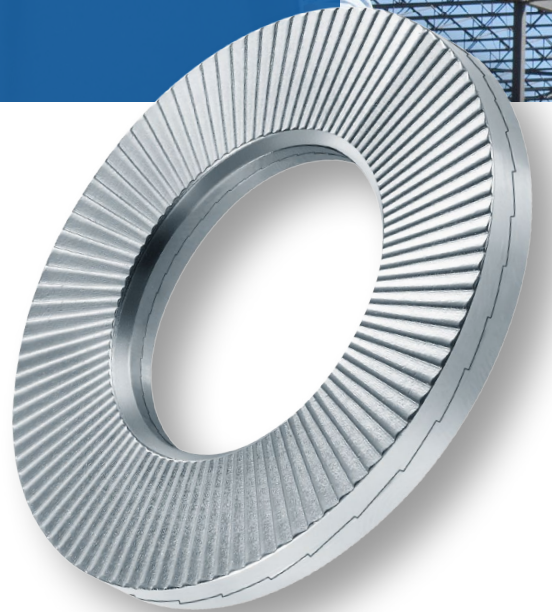
HEICO-LOCK® HLK-WASHERS

The HEICO-LOCK® HLK-Washers deliver high quality anti-vibration security for HV sets according to DIN EN 14399-4 and DIN EN 14399-8.

Even under extremes of vibration or severe dynamic loads in steel construction the HEICO-LOCK® HLK-Washers, which are approved by the German Institute for Structural Engineering (DIBt), provide maximum reliability. Due to the increased under head radius of HV bolts, the HEICO-LOCK® HLK-Washers are chamfered on the internal diameter to ensure optimal surface contact while tightening.

- Designed to secure HV sets according to DIN EN 14399-4 and DIN EN 14399-8
- Replacing washers according to DIN EN 14399-6
- Can be used for bolted connections of cat. A to E according to DIN EN 1993-1-8, a. o. suitable for slip-resistant connections
- Approved and certified construction product (certificate of conformity)
- Approved for use by General Building Supervisory Authority (DIBt) Approval No Z-14.4-702
- Very easy to install and remove (HLK-Washers are supplied as a pre-assembled pair)
- High corrosion resistance provided by use of a zinc flake coating
- Available for HV sets from M12 up to M36

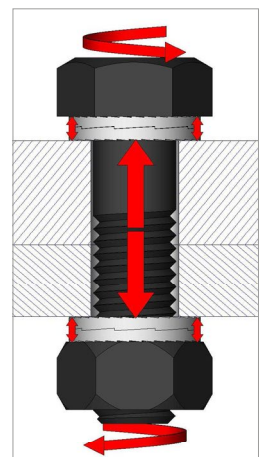
For detailed information regarding the General Building Supervisory (DIBt) Approval No. Z-14.4-702 visit www.heico-lock.com or www.dibt.de



FUNCTIONAL PRINCIPLE

An important feature of the HEICO-LOCK® HLK-Washers, setting them apart from commonly used plain, chamfered washers (according to DIN EN 14399-6), is the prevention of self-loosening through the certified HEICO-LOCK® wedge locking principle over the entire service life of the bolted joint.

- Wedge-shaped surface on the inside of the HLK-Washers, radial teeth on the outside
- Interlocking embedding of the radial teeth with the respective mating surface (when tightening the bolted joint)
- System movement only possible between the inner wedge shaped cams. Movement across these wedge shaped surfaces effectively self locks the bolt.
- Increase in clamping force



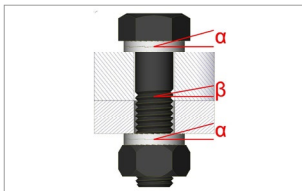


TECHNICAL DATA



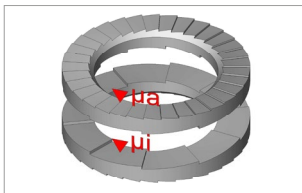
1. Difference in hardness: $H_{\text{HEICO}} > H_{\text{Material}}$

- The surface hardness of HEICO-LOCK® HLK-Washers is greater than the hardness of HV sets according to DIN EN 14399-4 and DIN EN 14399-8 (strength class 10.9, max. 380 HV)
Steel (though-hardened, zinc flake coated) $485 \pm 25 \text{ HV0.3}$



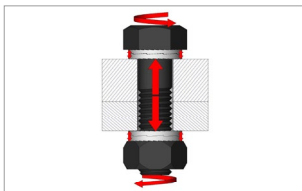
2. Difference in angles: $\alpha > \beta$

- The wedge angle (α) between the HEICO-LOCK® HLK-Washers is greater than the pitch (β) of the bolt thread
- This angle means the expansion in thickness of the HEICO-LOCK® HLK-Washers is greater than the possible longitudinal movement of the bolt along the thread



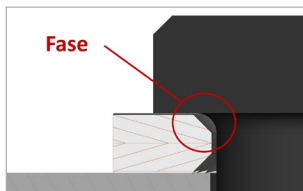
3. Difference in friction: $\mu_a > \mu_i$

- The wedge-shaped surfaces have a considerably lower friction coefficient μ_i than the toothed outside of the washers (friction coefficient μ_a)
- Loosening caused by dynamic stresses causes movement between the two washers in the region of the wedged surfaces



4. Difference in preload: $F_{\text{dyn}} > F_{\text{stat}}$

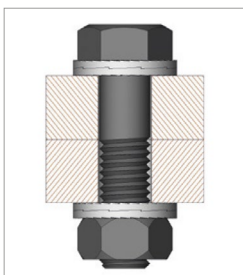
- An expansion in thickness of the HEICO-LOCK® HLK-Washers as a result of loosening leads to an increase in the clamping force
- This causes an increase in the preload compared to when in a static state and thus causes the bolt to self-lock



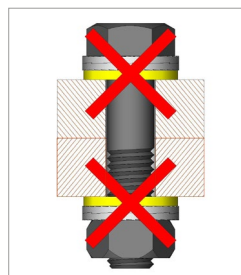
5. Dimensions of HEICO-LOCK® HLK-Washers

- With both parts of the washer having a chamfer on the internal diameter, the HLK-Washers are specifically designed to compliment the increased radius between the underside of the bolt head and the bolt shank of HV bolts, thus ensuring there is no interference with the underhead radius of the bolt and a secure bolted joint is maintained

INSTALLATION EXAMPLES



HV sets need to be secured on both sides of a through-hole: One pair of HEICO-LOCK® HLK-Washers under the bolt head and one pair under the nut body.



HEICO-LOCK® HLK-Washers are a direct substitute for the commonly used plain chamfered washers according to DIN EN 14399-6. No locking function will be achieved when the HLK-Washers are combined with additional washers or fasteners!

HEICO-LOCK® HLK-WASHERS

PRODUCT OVERVIEW

M	Steel *) Item No.	Internal-Ø [mm]	External-Ø [mm]	Box Qty [Pair]	Torque controlled method		Combined method	
					Tightening torque **) $M_{A,HLK}$ [Nm]	Preload force **) $F_{p,HLK}$ [kN]	Prelim. tightening torque ***) $M_{A,KV,HLK}$ [Nm]	Preload force *****) $F_{p,C}$ [kN]
12	HLK-12	13	24	200	150 (170***)	45 (50***)	150	59
16	HLK-16	17	30	100	360 (400***)	90 (100***)	300	110
20	HLK-20	21	37	100	760	145	550	172
22	HLK-22	23	39	50	1.050	170	800	212
24	HLK-24	25	44	50	1.250	200	950	247
27	HLK-27	28	50	25	1.550	260	1.200	321
30	HLK-30	31	56	25	2.600	315	1.800	393
36	HLK-36	37	66	25	3.500	460	2.600	572

*) Carbon Steel

**) Parameters for reduced preload force $F_{p,HLK} = 0,9 \times F_{p,C}$ acc. to DIN EN 1993-1-8/NA

***) Parameters for reduced preload force $F_{p,HLK} = 1,0 \times F_{p,C}$ acc. to DIN EN 1993-1-8/NA

****) Required further rotation angles θ acc. to DIN EN 1090-2 table 21

*****) Preload force $F_{p,C}$ acc. to DIN EN 1090-2

FIELDS OF APPLICATION



ENERGY & OFFSHORE



BRIDGE CONSTRUCTION



STEEL CONSTRUCTION



SPECIAL STEEL CONSTR.

A STRONG GROUP BEHIND A STRONG PRODUCT

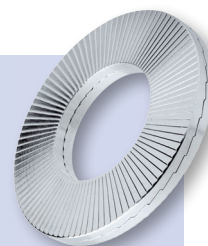
The HEICO group, based in the town of Ense in Westphalia, Germany, is a family-owned business with a long tradition. The company has been working passionately in the field of fastening technology since 1900. HEICO operates internationally with multiple company sites strategically located throughout the world. The group offers the highest degree of technical support and individual testing options.

Find out more about us: www.heico-group.com



HEICO-LOCK® WEDGE LOCK WASHERS

For bolted joint applications where HV sets are not used the HEICO group offers the certified HEICO-LOCK® Wedge Lock Washers. Even under extremes of vibration or dynamic loads, the HEICO-LOCK® Wedge Lock Washers provide maximum reliability - working at low and high preload levels. For further information about the HEICO-LOCK® products, please visit www.heico-lock.com



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