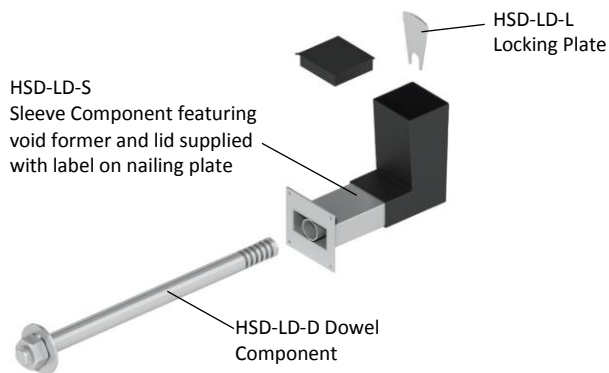


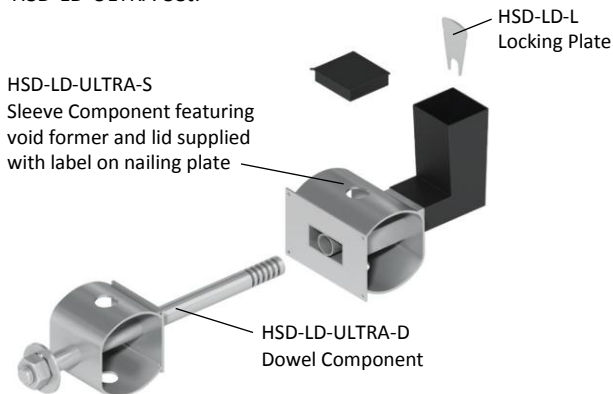
Components

HSD-LD-Set:



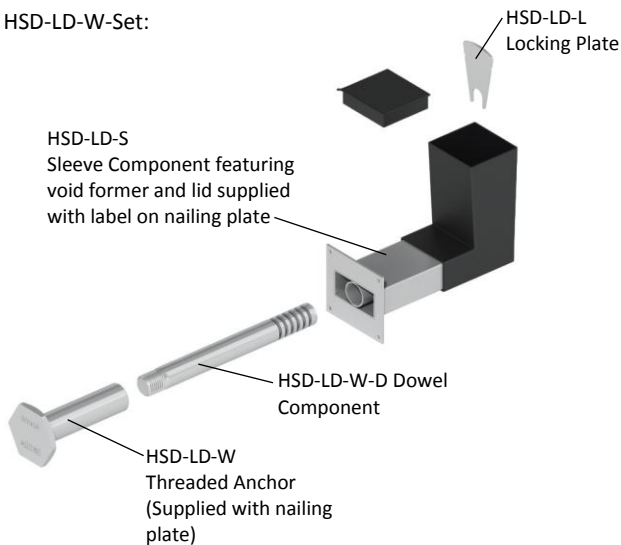
The HSD-LD-Set consists of HSD-LD-D Dowel Component, the HSD-LD-S Sleeve Component, the HSD-LD-L Locking Plate and the HSD-LD Epoxy Resin.

HSD-LD-ULTRA-Set:



The HSD-LD-ULTRA-Set consists of HSD-LD-ULTRA-D Dowel Component, the HSD-LD-ULTRA-S Sleeve Component, the HSD-LD-L Locking Plate and the HSD-LD Epoxy Resin.

HSD-LD-W-Set:

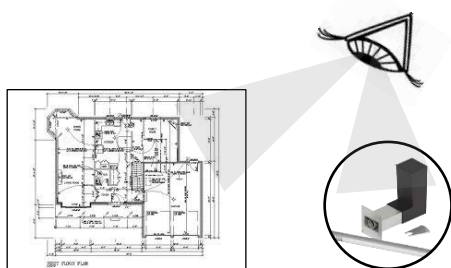


The HSD-LD-W-Set consists of HSD-LD-W-D Dowel Component, HSD-LD-W Threaded Anchor, HSD-LD-S Sleeve Component, the HSD-LD-L Locking Plate and the HSD-LD Epoxy Resin.

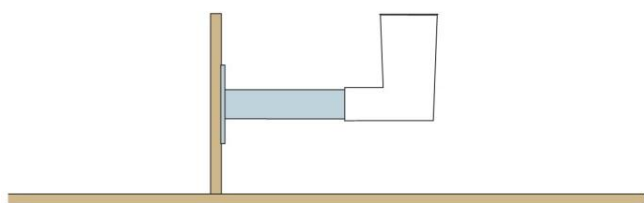
Dowels and sleeves are delivered separately and have to be combined on site.

Installation of HSD-LD and HSD-LD-ULTRA

The instructions below refer to the HSD-LD Lockable Dowel. The HSD-LD-ULTRA Lockable High Capacity Dowel is installed in a similar manner.



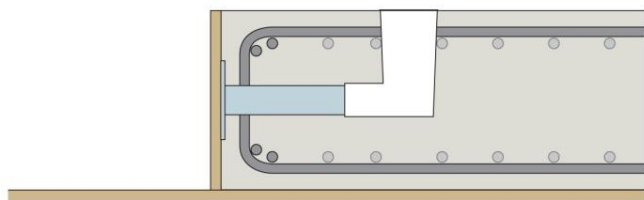
- ① Ensure that the part number of the shear dowels is the same as specified in the drawings.



- ② Nail sleeve to formwork either central in the slab or for slab depths over 12" so the void former is level with the top of the slab. Do not remove sticky label, this prevents ingress of concrete into the sleeve.



Make sure the sleeves are installed as accurately as possible in the horizontal plane to allow unimpeded horizontal movement of the dowel. Improper installation leads to binding of the dowel in the sleeve as it tries to move. This causes concrete cracking – and is the leading cause of failure in dowel systems.



- ③ Attach the local reinforcement as specified by the engineer based on HALFEN's recommendations. Pour the concrete of the slab that contains the sleeve.

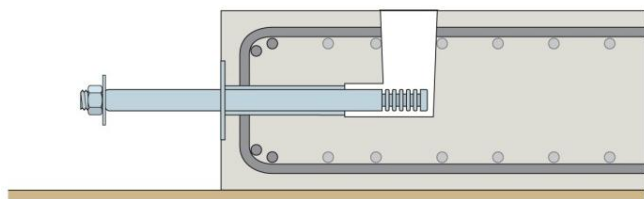


Ensure that the reinforcement bars are installed as specified by the engineer!

Ensure, the lid is installed on the top of the sleeve to prevent concrete from entering the sleeve.



Ensure proper concrete vibration to accomplish appropriate concrete compaction around the sleeve!

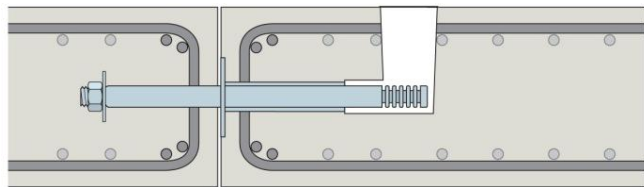


- ④ When the concrete has achieved sufficient strength, remove formwork and peel off or puncture the label to reveal the cylindrical sleeve only. Insert the dowel until it is app. ¾" from the back of the void former.



Make sure, the dowel has enough space to the back of the void former to allow for movement.

Installation of HSD-LD and HSD-LD-ULTRA



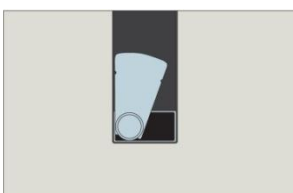
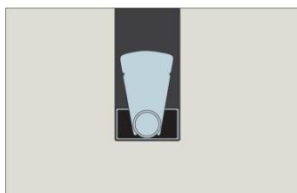
- ⑤ Attach the local reinforcement structure to engineer's detail based on HALFEN's recommendations and pour the concrete of the slab that contains the dowel.



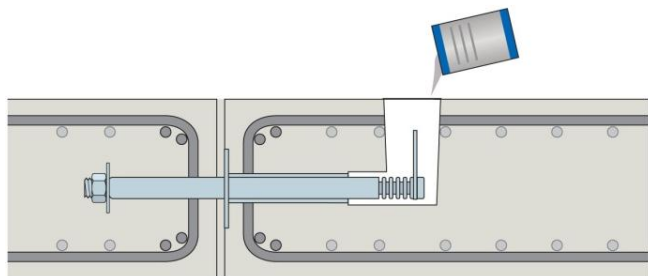
Ensure proper concrete vibration to accomplish appropriate concrete compaction around the dowel!



- ⑥ After a time period specified by the consulting engineer (generally 28-120 days), when movement between the slabs has stabilized and the joint between the slabs has been filled, the dowel is ready to be locked. Fit the Locking Plate to the dowel on a groove in the center of the void former.



The fan-shaped Locking Plate allows the dowel to be locked in any position.

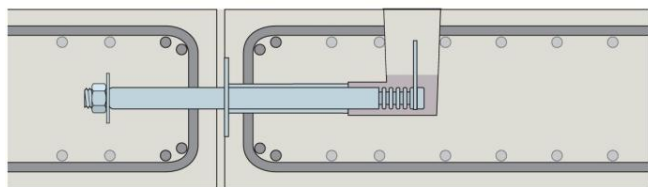


- ⑦ Fill the joint between the slab and the wall before installing the pourable epoxy resin: HALFEN can provide information on suitable joint filler. Mix the two-part epoxy resin and pour it into the void former. It is essential the resin fills the stainless steel area of the sleeve towards the joint and reaches the notches on the Locking Plate, which indicate minimum resin depth.



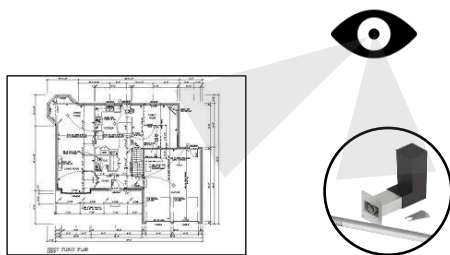
Make sure the resin fills the sleeve at least up to the notches in the Locking Plate!

Resin minimum depth

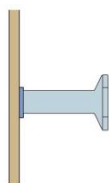


- ⑧ After 24 hours the rest of the void former can be filled with cementitious material, level with the top of the slab, to complete the installation. The locked dowel continues to transfer vertical load between the slabs, but movement can no longer take place.

Installation of HSD-LD-W



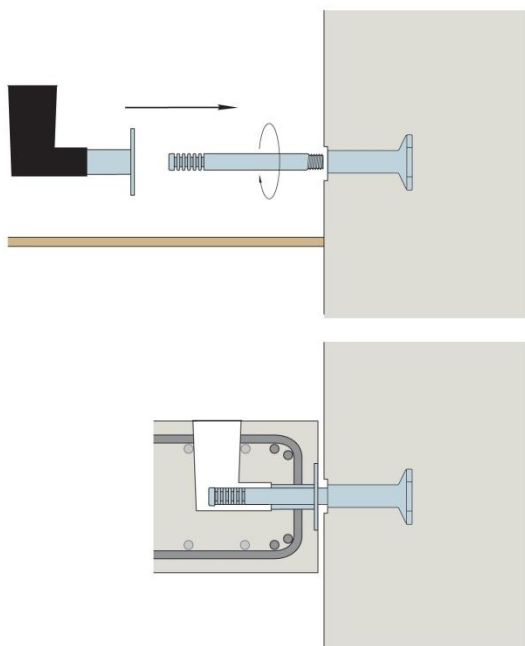
- ① Ensure that the part number of the shear dowels is the same as specified in the drawings.



- ② Ensure that the threaded nailing plate is fully engaged with the HSD-LD-W Threaded Anchor. Then nail it to the formwork so the HSD-LD-W-D dowel will be central in the adjoining slab (or within 6" of the top for slabs over 12"). Install the local reinforcement as specified by the engineer based on HALFEN's recommendations and cast the concrete. Reinforcement around the threaded anchor should be at least #4 bars, installed at maximum 8" vertical and horizontal centers.



Ensure proper concrete vibration to accomplish appropriate concrete compaction around the dowel!



- ③ When concrete reaches sufficient strength, remove the formwork and remove nailing plate. Fully screw the dowel into the anchor. Puncture the label of the sleeve to reveal the cylindrical sleeve only. Push the sleeve over the dowel, until the dowel is approximately $\frac{3}{4}$ " from the back of the void former. Ensure the lid is secured to prevent debris from entering the void former.



Make sure, the dowel has enough space to the back of the void former to allow for movement.

- ④ Place the local reinforcement according to the engineer's detail based on HALFEN's recommendations and pour the concrete of the slab that contains the sleeve.



Ensure that the reinforcement bars are installed as specified by the engineer!

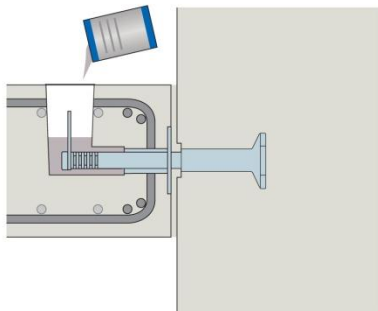


Make sure, the dowel has enough space to the back of the void former to allow for movement.

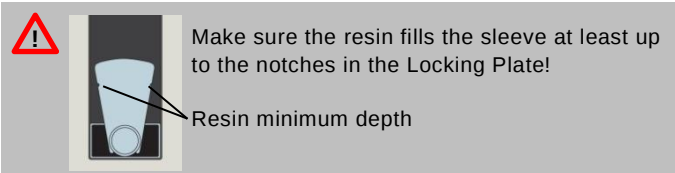
Installation of HSD-LD-W



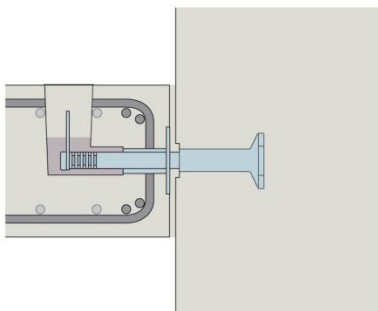
- ⑤ After a period of time predetermined by the engineer (generally 28-120 days), when movement between the slabs has stabilized and the joint between the slabs has been filled, the dowel is ready to be locked. Fit the Locking Plate on a groove in the center of the void former.



- ⑥ Fill the joint between the slab and the wall before installing the pourable epoxy resin: HALFEN can provide information on suitable joint filler. Mix the two-part epoxy resin and pour it into the void former. It is essential the resin fills the stainless steel area of the sleeve towards the joint and reaches the notches on the Locking Plate, which indicate minimum resin depth.



- ⑦ After 24 hours the rest of the void former can be filled with cementitious material, level with the top of the slab, to complete the installation. The locked dowel continues to transfer vertical load between the slabs, but movement can no longer take place.



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