JOINT STABILIZER INSTALLATION GUIDE

INTRODUCTION

These instructions instruct you how to install Joint Stabilizers in concrete floors. Joint Stabilizer's are designed to improve load transfer and reduce differential movement at joints and cracks in interior concrete floors.

The Joint Stabilizer is a mechanical device that is shaped like a metal cylinder that is divided lengthwise into two halves. The device can be installed at the joint between two slabs, or in cracks within a single slab. A hole in the top of the cylinder allows access to a bolt head. Tightening the bolt with a torque wrench forces the two halves apart, locking the device in place and exerting pressure against each slab. A built-in Belleville spring allows the cylinder to condense or expand as needed to accommodate moderate concrete expansion or shrinkage due to temperature changes.

Joint Stabilizer cylinders are 3 inches (76.2 mm) in diameter and come in three lengths.

- JS5: 5" length (127 mm), for use in floors 6" (152 mm) or thicker
- JS6: 6" length (152 mm), for use in floors 7" (178 mm) or thicker
- JS7: 7" length (178 mm), for use in floors 8" (203 mm) or thicker

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INSTALLATION TOOLS NEEDED

- Dipstick Floor Profiler or other instrument for measuring differential movement (eg, Modified Benkelman Beam or D-meter)
- Chalk or paint for marking floor
- Tape measure
- Water-cooled core drill with a high quality 3" (76.2 mm) bit and vacuum pump/pad
- Vacuum cleaner
- Torque wrench
- Torque wrench with 3/8" (9.525 mm) allen-head fitting

The Joint Stabilizer Installation Tool saves time and makes the job easier, but is not necessary for successful results.

Joint Stabilizer Installation Tool

GENERAL INSTRUCTIONS

1. **Determine which joints and cracks need to be stabilized.** The standard way to do this is to measure differential movement with an electronic level (ie, a dipstick) as a loaded vehicle crosses each joint or crack. No stabilization is required in joints and cracks showing differential deflection of less than 0.01" (0.25mm). Stabilization is almost always required when the amount of differential deflection exceeds 0.24" (0.60 mm). Joints and cracks with readings in between those thresholds may or may not need stabilization, depending on floor usage.

   To measure differential movement with a dipstick, load a forklift with the maximum amount of weight expected to be carried. Drive the forklift up close to one side of the joint and take a deflection reading. Then have the truck move forward to the other side of the joint and take a second reading. Subtract the first reading from the second, making sure to consider the plus (+) and minus (-) signs as shown below:

   • First reading +0.011", second reading +0.007": difference 0.004"

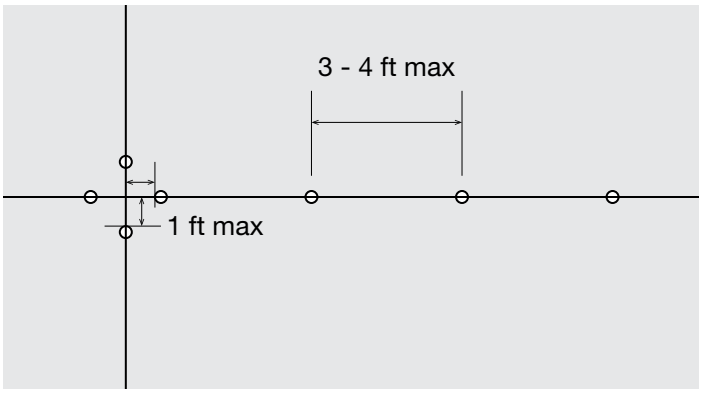
   • First reading +0.003", second reading -0.004": difference 0.007"

   • First reading -0.050", second reading -0.052": difference 0.002"

   Note that the second reading should always be equal to or less than the first. If the second reading is greater than the first, a mistake was probably made.

   Note: Another way to determine the need for stabilization is to measure load-transfer efficiency (LTE) with a falling-weight deflectometer.

2. **Determine the Joint Stabilizer spacing.** The default is to put four Joint Stabilizers at each intersection, centered 12" (300 mm) from the corners. Other Joint Stabilizers installed in between the intersections should be spaced approximately 4 ft (1200 mm) on center.



   Note: Wider spacing is sometimes possible. Try various spacings and test the repaired joint or crack by measuring for differential movement midway between the Joint Stabilizers. If it does not exceed the specified limit, then the spacing should work.

   Note: Avoid installing Joint Stabilizers directly under the wheel path in very narrow aisles. Please under the rack or foot path instead.

3. **Mark the floor to show where all Joint Stabilizers will go.**

   Note: We recommend starting at the intersections between longitudinal and transverse joints, then move outward along the joints.

4. **Drill a hole through the floor slab at each marked location, ensuring that the hole is centered on the joint or crack.** Prior to drilling, ensure there are no electrical or plumbing conduits in the area to be drilled.

   Note: Be sure to use a core drill with a high quality 3 in. (76.2mm) bit. Note that the bit must be very close to 76.2mm. A 75 mm core bit, which some might call a nominal 3-inch bit, is not big enough. Using a core that is excessively worn may also result in the hole being drilled too small.

   Note: The use of a core drill equipped with a vacuum pump and pad is highly recommended to ensure secure anchoring to the floor and stabilize the core bit. Faulting or chipping may result if the hole is not drilled straight and perpendicular to the surface.

5. **Remove any debris from the drilled hole, and vacuum up all drilling residue, including water.**

   Note: leaving drilling debris at the bottom of the hole may cause the cylinder to come in contact with the base when the slab flexes downward, potentially causing concrete spalling around the top lip of the cylinder.

6. **Measure the length of the core removed from the hole and use that information to choose the proper Joint Stabilizer cylinder size.** The length of the Joint Stabilizer cylinder should be at least 1" (25 mm) less than the slab thickness. This prevents the cylinder from coming in contact with the base when the slab flexes downward. If the bottom of the cylinder strikes the base, this may result in concrete damage around the top lip of the cylinder.

   Note: If needed, you can use a 5" (JS5) or 6" (JS6) cylinder in thicker floors (eg, 7" or more). The impact on performance is insignificant.

7. **Place the Stabilizer in the hole, but only partway.** Leave about half its length sticking out, and keep a grip on the cylinder to prevent it from falling in.

   Note: The Joint Stabilizer Installation Tool speeds and simplifies initial positioning and tightening. See next section for instructions on how to use the tool.

8. **Tighten the Joint Stabilizer bolt with a 3/8" allen wrench.** This will force the Stabilizer's two halves apart. Keep tightening till the Stabilizer begins to grab the sides of the hole. Then lower the Stabilizer into the hole till it is flush with the floor surface, taking care to keep the slot on the cylinder lined up with the joint or crack. You may have to tighten or loosen the bolt slightly as you do this.

9. **Check to ensure that the Stabilizer is flush with the floor surface and that the slot on the cylinder is lined up with the joint or crack.** Adjust as needed.

10. **Using a torque wrench, tighten the bolt to 85 ft-lbs or 115N-m.**

    Note: After installing a lot of cylinders along a long joint, go back and check the torque on each cylinder to ensure that the slab has not shifted, causing torque values to change. See Slab Shifting section below for more information.

11. **Be sure to repair any pre-existing spalling at the same time the cans are installed.** Recommend refilling joint and grinding concrete if joint is faulted.

USING THE INSTALLATION TOOL

1. **Lift the black turn handle on the top of installation tool to retract hexagonal drive pin.**

2. **Lift up on side handle to squeeze attachment prongs on the bottom close together.**

3. **Insert prongs into the slot on the top of the cylinder.** Release side handle to allow the prongs to spread apart and hold the cylinder in place.


Joint Stabilizer Installation Tool

4. **Insert the cylinder into the cored hole, resting the bottom of the installation tool across the top of the hole.** This should position the cylinder so it is flush with the floor surface.

5. **Push down on the black turn handle to engage the hexagonal drive pin with the expansion screw in the cylinder.**

6. **Turn the black handle in a clockwise direction to expand the cylinder just enough to keep it from slipping down in the hole.**

7. **Raise the black handle to withdraw the drive pin, lift up the side handle to squeeze the prongs together, and detach the installation tool from the cylinder.**

8. **Torque the cylinder to the target 85 ft-lbs using a torque wrench.**

SPECIAL SITUATIONS

- **Using joint or crack filler**
- **Uneven joints and cracks**
  - Positioning cylinders below the floor surface
  - Extreme temperatures
  - Freezer floors
  - Thin slabs
  - Slab shifting
  - New construction

USING JOINT OR CRACK FILLER

The installation of Joint Stabilizers is often combined with the filling of joints and cracks. If you install the filler before drilling the holes for the Stabilizers, the drilling can melt the filler, creating a sticky mess.

Do the work in this order:

1. **Prepare the joint or crack.** This normally involves removing the old filler, if any, and chasing the joint or crack with a saw or crack router.
2. **Install the Joint Stabilizers,** following the General Instructions above.
3. **Fill the joint or crack.**

FAULTED JOINTS AND CRACKS

A faulted joint or crack is one with an obvious step or lip, the result of one side being higher than the other. While Joint Stabilizers are designed to provide load transfer, they cannot, on their own, undo faulting that has already occurred.

If the faulting is very slight, you may not have to correct it. In that case install the Stabilizers so they are flush with the floor surface on the low side of the faulted joint or crack. It's better for a Stabilizer to be low than high.

Bigger faults can be corrected in three ways: by grinding, by raising the low side with grout, or by lowering the high side with an applied load. In some cases, full depth removal and replacement is required to fix extreme faulting.

Grinding will work on any floor, though in extreme cases it might leave the slab too thin. Grinding can take place before or after the installation of Joint Stabilizers.

The other methods will work only if you level the floor first and then use Stabilizers to lock it in place. Note that these methods don't always succeed in fully levelling the joint. You may have to combine them with grinding.

POSITIONING CYLINDERS BELOW THE FLOOR SURFACE

Joints Stabilizers are normally installed flush with the floor surface, and most floor users are happy with that. But some users prefer that the top of the cylinders be positioned slightly below the surface, either to hide them from view or to make it easier to refill the joint or crack in years to come.

Positioning Joint Stabilizers slightly lower than the floor surface does not seem to affect their performance, provided they don't extend below the slab's bottom and come in contact with the base when the slab is loaded.

EXTREME TEMPERATURES

Joints and cracks normally widen as the temperature falls and narrow as the temperature rises. These changes occur because concrete shrinks as it cools and expands as it warms.

Joint Stabilizers employ two internal Belleville springs to handle changes in joint and crack width up to 1/8" (3.2 mm). This allows the cylinders to expand or condense with the concrete, meaning no adjustments are necessary for most indoor applications.

If installing Joint Stabilizers in a floor that will never experience freezing temperatures—either because you live in the tropics or because the building will be heated—you need not worry about this. But if the floor will be subject to freezing temperatures, avoid installation when the temperature is unusually hot or cold. For installation in freezer floors, read the next section.

Extreme temperature swings can cause joint to expand or contract in excess of the Joint Stabilizer design limit. If you install Joint Stabilizers in midsummer when it's very hot, and six months later the temperature falls to below freezing, the cylinders could become loose, causing a reduction in load transfer effectiveness. Conversely, if you install Joint Stabilizers in extreme cold weather, they could become too tight when hot weather returns, and this could conceivably crack the adjacent concrete or damage the Joint Stabilizer. The risk of trouble goes up as the distance between joints and cracks increases. Dominant joints with wider joint openings may also experience more problems under extreme temperature swings.

Retorquing the cylinders to adjust for temperature changes and concrete shrinkage is not recommended.

FREEZER FLOORS

In freezer floors, wait until the building is down to its operating temperature before installing Joint Stabilizers.

If the floor is later brought back to ambient temperature—a rare event, but it does happen—consider removing the Joint Stabilizers before starting the warm-up. Re-install the Stabilizers only when the floor is back down to its operating temperature.

Whether you need to remove the Joint Stabilizers from a freezer floor on warm-up depends on the width of the repaired joints and cracks. If a joint or crack is less than ¼" (6mm) wide at operating temperature, it's probably safe to leave the Joint Stabilizers in place.

THIN SLABS

Joint Stabilizers have not been used or tested extensively in slabs less than 5" (125mm) thick. Don't use them in slabs under this thickness without field testing to ensure that no problems occur. What matters here is the actual thickness, not the specified thickness. It's not unusual to find areas in the slab that are less than the specified design thickness.

SLAB SHIFTING

When torqued to the proper amount, each Joint Stabilizer exerts 8,000 lbs (36kN) of force against the edge of the slab. In some cases, this may cause smaller, lighter slabs to shift, especially if they are on an unrestricted edge. The amount of friction with the sub-base may also promote or inhibit shifting. Placing Joint Stabilizers or joint filler in adjacent joints can help keep lighter slabs from shifting.

Note that slab movement may have a positive effect in that fixing one joint with Joint Stabilizers may cause the slabs to shift slightly, tightening up adjacent joints and improving load transfer through more aggregate effective interlock.

NEW CONSTRUCTION

When installing Joint Stabilizers in a new floor, take your time. First, don't even think of starting the installation till the concrete has achieved a compressive strength of at least 20MPa. Any less, and you run the risk of breaking the concrete.

Second, joints and cracks widen over time as the new concrete dries out. If you install Stabilizers too early, there is a chance the joint or crack could widen so much that the Stabilizers become loose. If you can wait a few months—90 days is a good, round number, and one commonly specified for joint fillers -- you greatly reduce the risk. If you can wait more than a few months, all the better.

If the job schedule requires that Joint Stabilizers be installed early, be prepared to retorque them later.