

## **Installation Instruction Manual**

**For**

**ICC ES AC 443**

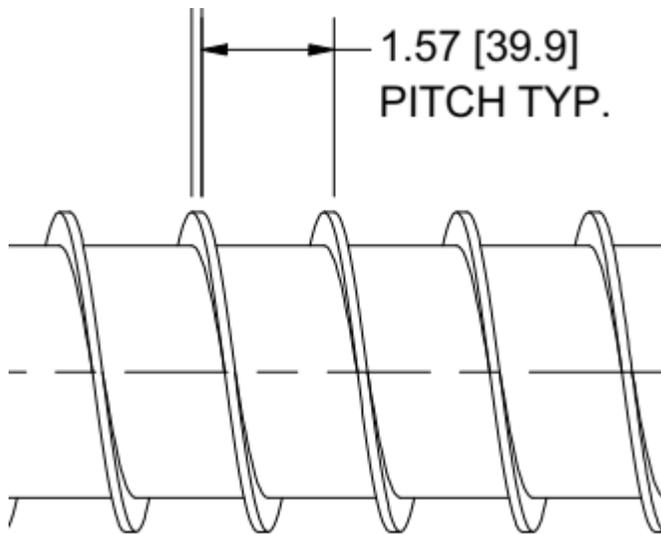
### **Pre-Installation**

- Know your soil composition: If you don't take time to determine your soil composition you must use the minimum allowable loads for the particular screw you are using when planning your structure. Determine as cohesive (high clay) vs. non-cohesive (low clay or high sand) to determine load capacity as listed in the relevant section of the ICC-ES report. By code a complete Geotech report and engineer certification is required.
- Safety equipment/PPE: Use adequate safety equipment while mechanically installing ground screws, i.e., steel toe shoes, safety glasses, gloves, hard hat, etc.
- Dial 811 call before you dig to ensure a clear path from utilities for the screw to penetrate into the subsurface.
- Be sure of above ground clearance of obstructions and nonessential personnel.
- Locate your desired screw positions with flags.
- Pilot holes to improve accuracy are helpful for very hard soil, but not necessary. If you choose to do so, predrill with a 1/3 diameter by 1/3 deep wood bit, or drive a rod or stake into the ground as plumb as possible. You will still need to use a level during installation to maintain plumb. Adjustments to level can still be achieved through the initial 2/3 depth of installation.

### **Installation**

- The product may be used as a foundation system to support various constructions, provided that it is installed according to the manufacturer's current instructions and within the scope of ICC ES AC443. Wood and metal framing preferred.
- Follow safe handling instructions laid out by the mechanized driver manufacturer
- Confirm that the adapter connecting the drive shaft of the mechanical driver to the screw that is being installed lines up and seats properly.
- If using a Model 3 (open top with 3 welded nuts) ground screw, install the bolts so they are flush with the inside of the ground screw before installation to help maintain the integrity of the nut during installation.
- If using a screw with a pre welded flange, make sure that the flange face and adapter face match and are bolted tight prior to attempting the install.

- Ground screws must be installed in a clockwise rotation and uninstalled in a counter clockwise rotation.
- During installation the rotation of the ground screw must be accompanied with appropriate downward pressure (crowd) to advance the screw one thread pitch per rotation. For example, the thread pitch is 40mm (1 1/2-1 5/8") on all ICC approved ground screws. Therefore, the screw should advance downward approximately 40mm or 1 1/2-1 5/8" per rotation.



If the screw is advancing at a significantly slower rate than the thread pitch there is not enough downward pressure. This causes the screw to churn (spin without advancing downward). Churning may cause the load capacity to be reduced or not meet established correlations. Conversely, if the screw is advancing at a significantly faster rate than the thread pitch there is too much downward pressure causing the screw to auger (advance downward like a drill bit vs. allowing the threads to engage the soil). This also puts undesired torque on the screw. Torque on the screw should not exceed the maximum torque of the screw as shown in the Tab 3 of the ESR Torque Data. Both of these errors will be apparent because soil cuttings will rise next to the screw. There should be no cuttings surfacing around the screw as shown below.



Should churning or augering occur without immediate correction, the screw should be removed and repositioned. If using the same hole is required, 3/8" "chip" gravel can be poured into the hole to re-establish the load-ability following the installation procedures described above. A maximum of 15 RPMs is advised and only with a mechanical driver capable of enough crowd to advance the screw as described above.

- Rotation must be used during installation. Simply pressing or pounding the screw into position does not allow the threading to engage the soil. This will lessen the tension (uplift) loading.
- If a void is encountered during installation, the screw should be removed and repositioned or removed and 3/8 chip gravel poured into the hole. This re-establishes the product's load capacity.
- Frost maps are used to determine screw length selection. Frost depths 0 to 42" use a minimum 1600mm or 5'3" screw. Frost depths 43 to 49" use a minimum 1800mm or 5'11" screw. Frost depths 50 to 56" use a 2000mm or 6'7" screw. Frost deeper than 56" are not covered by this Document and require Engineering Certification. These measurements are calculated to ensure 2/3 of the total thread length are installed below frost level to act against heave. \*\*Though it may occur, we do not claim any additional increase in loads as the screw length increases.

### **Obstructions and refusal**

- An obstruction causing refusal is when something in the subsurface does not allow the screw to continue its downward motion. At this point the soil will begin to churn and rise to the surface. At this point you can relocate the screw or predrill the hole as described below.
- Ground screws can be installed through cobbled rock and fractured shale without pre-drilling. However, large stone and bedrock require predrilling at a diameter slightly larger than the maximum diameter of the threads. If pre-drilling is required, drill cuttings or small gravel can be placed into the hole and the screw can then be reinstalled to depth. This action can be equated to installing a concrete screw (Tapcon).

**\*Always check with your local Code officials prior to purchase.**