



INSIGHT

HELICAL PILES VERSUS GROUND SCREWS

HELICAL PILES · TECHNICAL INSIGHT

Topic

Foundation selection
Helical piles

Sector

All sectors

Author

Gavin Rixon FICE
Founder & Chief Executive Officer

Published

October 2026

Reading Time

5 minutes

Related Services

Helical pile design (GTL-X)
Ground investigation review
Pile load testing
Independent design review

Standards Referenced

BS EN 1997-1
BS 8004:2015
ICC-ES AC308
ASTM D1143, D3689, D3966

Contact

info@gtlint.com



Summary

To a client walking a site, a helical pile and a ground screw look much the same: a steel shaft screwed into the ground with a machine, with no excavation and no concrete. The resemblance ends there.

One is an engineered deep foundation designed and verified to recognised standards. The other is, in most cases, a proprietary product selected from a catalogue. Choosing between them is a design decision, and it should be made as one.

What Each One Is

A **helical pile** is a central steel shaft carrying one or more helical bearing plates. The plates are sized and spaced so that each one bears on competent ground, and the pile carries load in compression, tension and, with suitable configuration, lateral load. Shaft section, wall thickness, plate diameter, depth and corrosion allowance are all designed for the specific loads and ground at the site.

A **ground screw** is generally a tapered tube with a continuous thread along part of its length. It works by friction and interlock over a short embedded length, typically one to two metres. Ground screws are well suited to light, lightly loaded structures in reasonably uniform ground: fencing, signage, decking, garden buildings and small solar arrays.

How the Capacity Is Established

This is the essential difference. The capacity of a helical pile is calculated from the ground investigation using recognised geotechnical methods, to BS EN 1997-1 and BS 8004:2015 in the UK and Europe, or to the International Building Code and ICC-ES AC358 in North America.

The design is then verified by static load testing on site, to standards such as ASTM D1143 (compression), ASTM D3689 (tension) and ASTM D3966 (lateral), before production installation. Characteristic and design values are stated, and the factor of safety or partial factors applied are recorded in the design.

The capacity of a ground screw is usually taken from the manufacturer's load tables, which are based on the manufacturer's own testing in the manufacturer's chosen soils. That is reasonable for a garden building. It is not a site-specific design, and it does not tell the owner how the screw will behave in the ground at their site.

A Note on Installation Torque

Both systems record installation torque, and torque is often presented as proof of capacity. GTL's position is that torque is a valuable control on the work, because a sudden change in torque shows a change in the ground or a problem with the installation. It is not a substitute for a geotechnical design and a load test.

Torque-to-capacity correlations are empirical, vary with soil type and shaft geometry, and are least reliable in exactly the soft, layered or variable ground where foundation performance matters most.

Where Each One Belongs

Consideration	Helical pile	Ground screw
Typical use	Buildings, plant, pipe racks, pylons, bridges, marine and temporary structures	Fences, signs, decking, garden buildings, small solar arrays
Load carried	Compression, tension and lateral, designed to the loads	Light loads within the manufacturer's tables

Consideration	Helical pile	Ground screw
Embedment	To competent ground, often several metres or more	Typically 1 to 2 m
Design basis	Site-specific geotechnical design to a recognised standard	Manufacturer's tables
Verification	Site load testing and installation records	Usually none beyond installation torque
Responsibility	Designer accountable for the foundation	Product supplier

Questions to Ask Before You Choose

1. Who has designed the foundation, and to which standard?
2. What ground investigation is the design based on?
3. How will the design capacity be verified on site, and to which test standard?
4. What corrosion allowance or protection has been designed for the required life?
5. Who carries responsibility if the foundation does not perform?

If the answers are "the supplier", "none", "by torque", "galvanising" and "unclear", the product may still be adequate for a light structure. It is not an engineered foundation, and it should not be specified as one for buildings, plant or public structures.

Key point. GTL has designed and installed more than one million helical piles. We recommend them where they are the right answer, and we say so when they are not.