



UNDERGROUND · CS-410

SEND THE ROBOT DOWN THE HOLE, NOT THE SOLDIER

A surface plant that pushes a steerable head into ground with no line, no map, no signal.

BORING · CONDUIT EMPLACEMENT · DENIED-GROUND ACCESS

- PATENT PENDING
- EXPORT-CONTROLLED — INTERNATIONAL TRANSFER SUBJECT TO CANADIAN GOVERNMENT PERMITS
- CARRIER AND CONDUIT TOOL — NO WARHEAD, NO FUZE, NO ENERGETIC MATERIAL

30 YRS HORIZONTAL-DIRECTIONAL- DRILLING HERITAGE IN-HOUSE	1 FIBRE — GUIDANCE, COMMS, PAYLOAD FEED AND THE BREADCRUMB BACK OUT	0 RADIO OR GPS LINKS ANYWHERE IN THE DESIGN	0 WARHEADS, FUZES OR ENERGETIC MATERIALS, IN ANY VARIANT
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OVERVIEW

A BORING PLANT. THE ANCHOR OF THE UNDERGROUND FAMILY.

Part of the 3-system Underground line — shares its envelope and doctrine with Aquifer, Ferret.

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Badger CS-410 is **not a machine that rides into the hole** — it is a coiled-tubing micro-bore **surface plant**. A coil reel feeds tubing through a hydraulic straightener into a clamp-and-push stroke drive, which advances the string through an entry guide and into the ground. Nothing else enters the ground.

The method is displacement boring: no spoil return, no cuttings to manage, no trench. The drive pushes a steerable compaction head downhole, and the tubing that follows it in can be the delivered product itself — the conduit left behind in the bore. Badger is the only platform in the seven-platform underground family with a mission and deployment model of its own; every other underground platform works a hole that already exists.

The heritage behind the push is real. Canadian Shield's parent group carries three decades of horizontal-directional-drilling heritage in-house — mobile HDD rigs to 1,000,000 lb pull, a trade practised on real ground, not a clean-sheet guess. Badger re-houses that trade in a smaller, steerable, fibre-guided package — built on that lineage, not a substitute for it.

THE CLAIM

SEND THE ROBOT DOWN THE HOLE. NOT THE SOLDIER.

This is the doctrine's most literal expression. A steerable head goes into denied or inaccessible ground instead of a person — no line-of-sight, no line to lay, no one standing over a live bore. The plant stays on the surface; the risk stays out of the ground.

HOW IT WORKS

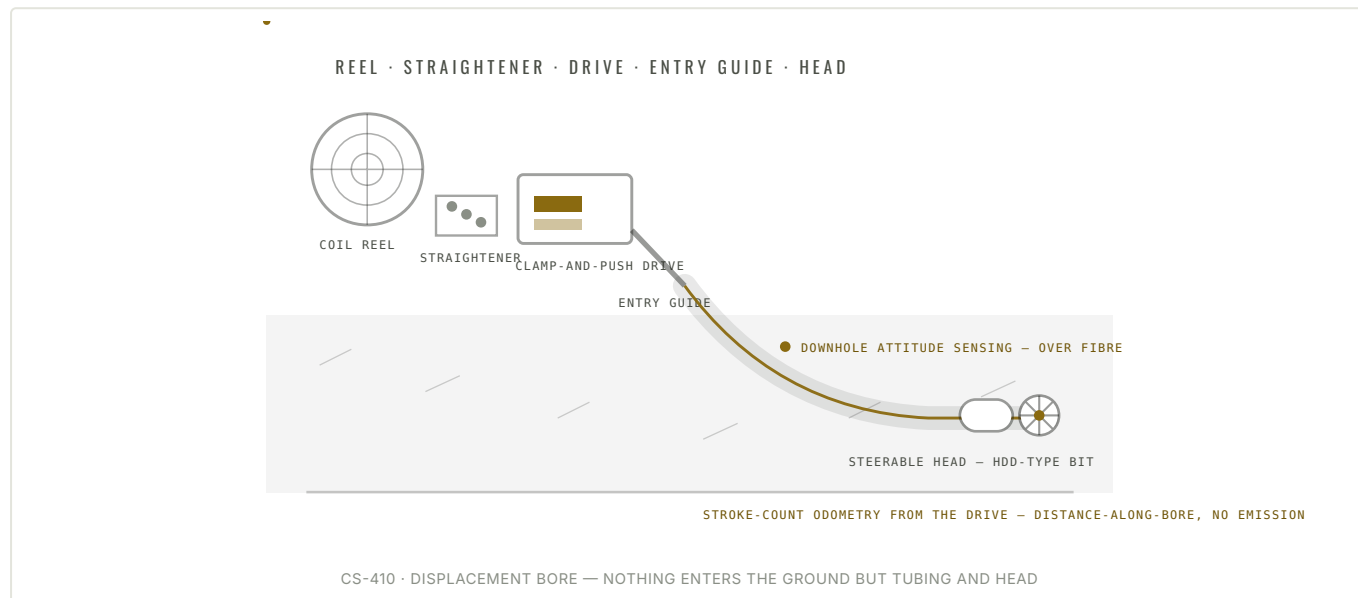
MECHANISM

A REEL, A STRAIGHTENER, A DRIVE — AND A STEERABLE HEAD

The coil reel pays out tubing under controlled tension into a hydraulic straightener, which takes the reel-set curvature out of the string before it reaches the drive. The clamp-and-push stroke drive is the plant's heart: a clamp grips the tubing, a hydraulic stroke advances it a fixed increment, the clamp releases and resets, and the cycle repeats — the same clamp-and-push cadence that moves any coiled-tubing string, applied at bore scale.

At the working end, the entry guide sets the initial heading and the string transitions from surface handling to bore. Downhole, a steerable compaction head — carrying an HDD-type bit face, tricone or PDC depending on formation — displaces the ground ahead of it. No spoil return: the bore doesn't need mucking out, because nothing is cut loose and carried back.

Guidance is fibre-only — Tier 2 of the fleet's no-radio doctrine. Downhole attitude sensing rides the fibre back to the operator; stroke-count odometry from the drive gives distance-along-bore without a single emission; and the method leans on HDD walkover and wireline-locating heritage the group already practises from the surface. A human holds the loop the entire run — the fibre is the loop.



SPECIFICATIONS

CAPABILITIES & SPECIFICATIONS

BADGER CS-410	
PLANT & RIG	BORE & TUBING
Configuration	Coiled-tubing micro-bore surface plant — reel, straightener, clamp-and-push drive, entry guide
Power pack	Diesel-hydraulic (HDD standard) or electric-hydraulic option
Mobilization	Single trailer/skid, road-transportable — hours class
Crew	2-3 operators, surface only
Operating temperature	-40 °C to +40 °C
	Bore diameter class
	~50-150 mm (2-6 in)
	Coiled-tubing OD
	~38-60 mm (1.5-2.375 in) class
	Reel tubing capacity (reach)
	~300-600 m per reel
	Max bore length (spliced)
	~1,000 m class
	Delivered product
	Conduit — the coiled tubing left in the bore
DRIVE & PERFORMANCE	TOOLING & HEAD
Push / pull force class	~50-150 kN stroke drive
Drive cycle	Clamp, stroke, release, reset — a fixed increment per stroke
Penetration rate	~3-8 m/hr, formation-dependent
	Downhole head
	Steerable compaction head — displacement bore, no spoil return
	Bit face
	HDD-type — tricone or PDC to suit formation
	Entry
	Entry guide sets the initial heading at the surface
GUIDANCE & CONTROL	COMPLIANCE
Guidance tier	Tier 2 — fibre-guided, human-in-the-loop
Downhole sensing	Attitude over the fibre — steering data back to the operator
Odometry	Stroke-count from the drive — distance-along-bore, no emission
Emissions in any tier	None — no radio, no GNSS
	Patent status
	Patent pending
	Export control
	Export-controlled — international transfer subject to Canadian government permits; export posture is counsel-first
	Munitions classification
	Carrier and conduit tool, never a munition — no warhead, no fuze, no energetic material
	Existing-passage scope
	Working a hole that already exists is sibling scope — Ferret CS-420 and the family's other passage workers

RANGES ARE STATED AS CLASSES; ANY RATE STATES ITS FORMATION AND ANY FORCE STATES ITS CLASS. THE PLANT DRAWS ON THREE DECADES OF HORIZONTAL-DIRECTIONAL-DRILLING PRACTICE IN-HOUSE — MOBILE HDD RIGS TO 1,000,000 LB PULL — AND STAYS ON THE SURFACE: NOTHING ENTERS THE GROUND BUT THE TUBING AND THE HEAD.

THE TRADES, STATED

NO RADIO. NO GPS. THE PUREST CASE IN THE FLEET.

Every Canadian Shield platform is built no-radio, no-GPS by design. Underground, that doctrine stops being a design choice and becomes a physical fact: rock and soil kill RF outright. There is nothing to jam, because there was never a link to begin with. Badger's single guidance fibre carries attitude sensing, comms, lube and payload feed downhole, and doubles as the breadcrumb back out — and for Badger specifically, it is also the conduit product left behind in the bore.

The heritage claim is real, not marketing. Canadian Shield's parent group carries three decades of horizontal-directional-drilling heritage in-house, including mobile HDD rigs to 1,000,000 lb pull — Badger is built on that heritage. The civil twin, Aquifer CS-411, shares the same plant architecture — same reel, same drive, same fibre guidance — and is the export-light line that helps fund the defence side; sharing the architecture is not the same as being exempt from export control, and Aquifer's own export posture is a separate, counsel-first question.

And the family rule stands wherever Badger is sold: it carries tubing, sensors and conduit — never a warhead, never a fuze, never an energetic material, in any variant.

DEPLOYMENT

A BORE, WALKED THROUGH.

One bore, walked end to end — illustrative of how the plant is used, not a mission record.

FAMILY CONTEXT

MAKE THE HOLE. OR WORK THE HOLE.

Badger and Aquifer make the hole. Ferret, Mole, Muskrat, Gopher and the Farell Pig work holes and passages that already exist — they enter, listen in, swim, crawl or ride. Badger's plant architecture, deck-standard fibre and safety chain are the engineering the rest of the family builds on — that is why it comes first.

01 · ARRIVAL

MOBILIZE, SURVEY, ANCHOR, SEAT THE FIBRE

The plant mobilizes on a single trailer or skid and runs the same walkover and pre-job survey discipline an HDD crew runs today. The rig positions on the entry line and anchors for reaction load; the coil reel seats, the straightener aligns, and the guidance fibre threads through to the head before the first stroke. No link check — there is no link.

02 · WORK

CLAMP, PUSH, STEER, REPEAT

The drive clamps the tubing, strokes it forward an increment, releases and resets — stroke by stroke, downhole. The operator steers the head off downhole attitude sensing carried over the fibre, with stroke-count odometry giving distance-along-bore. A human holds the loop for the entire run; uncertain ground or a lost attitude read and the drive stops and holds.

03 · RECOVER

RETRACT, OR LEAVE THE CONDUIT IN PLACE

At breakthrough or target depth, the tubing either retracts back through the drive for reel recovery, or stays exactly where it is — the designed conduit product, left in the bore. Either way the plant demobilizes on the same trailer it arrived on. If a run ever stops early, the string is exactly where it stopped: holding, silent, waiting for a person.

THE FAMILY

RELATED SYSTEMS

CS-411 · CIVIL TWIN

AQUIFER

The same plant architecture — same reel, same drive, same fibre guidance — pointed at civil and utility ground; the export-light line that helps fund the defence side.

CS-420 · WORKS THE HOLE

FERRET

Works holes and passages that already exist — it enters where Badger bores, on the plant architecture, fibre and safety chain Badger sets.

Badger CS-410 · patent pending · export-controlled — international transfer requires Canadian government permits; export posture is counsel-first. A surface boring plant that carries tubing, fibre and conduit — never a strike platform. No warhead, no fuze, no energetic material in any variant; no radio and no GPS in any guidance tier — rock and soil kill RF outright. The plant stays on the surface: nothing enters the ground but the tubing and the head. Working a hole that already exists is sibling scope — Ferret CS-420 and the family's other passage workers, not this plant.



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Make the hole. Or work the hole.

01

REQUEST A TECHNICAL EXCHANGE

A working session with engineering, not sales — bring your engagement problem, we bring the mechanism.

02

REQUEST THE UNDERGROUND FAMILY DATA PACK

Drawings, tolerances and test basis for Badger and its siblings, gated behind export screening.

03

DISCUSS A TRIAL QUANTITY

Tell us end-user, jurisdiction, quantity band and timeline — we respond against your program, not a price list.

SALES

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GENERAL

info@cdnshield.ca

WEB

cdnshield.ca

Direct lines, named points of contact and facility details are shared with qualified programs following screening — not withheld, sequenced.

Canadian Shield is a defence and industrial drone company, backed by SIG: four-domain uncrewed systems built for jammed, GPS-denied environments — no-radio by design, manufactured for cost and salvo depth.

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