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GSI Coiled Duct

Ducting for the future

SAFE | AGILE | TOGETHER | WITH INTEGRITY

GCD v1.3

Ducting for the Future

- **GSI Coiled Duct (GCD)**

  Faster + Safer + Stronger + Cheaper = Better

  GSI Coiled Duct is leading a new era of Communication, Control & Underground Cable duct infrastructures. GCD is unique - a transformational product that delivers key benefits to construction projects:

  - High speed of installation;
  - Reduced Health & Safety risks on projects;
  - A ducted network of high strength that will remain intact for 50+ years;
  - Significant project cost savings now and in the future;
  - Strong benefits for the environment;
  - Enhanced sustainability for projects.

Why use GSI Coiled Duct?

- GSI Coiled Duct (GCD) is a very robust ducting system;
- GCD is delivered in long continuous lengths;
- GCD is manufactured with integral inner ducts or as a smooth wall duct, allowing for various outer and inner duct configurations and colours;
- GCD is strong, permitting installation at shallow depths with no additional bedding materials required;
- GCD is air and water tight by design. GCD connections and repairs are uniquely designed to maintain this environment;
- GCD is quick to install. Rates of 1,000m+ per day are achievable;
- GCD is simple and easy to work with.

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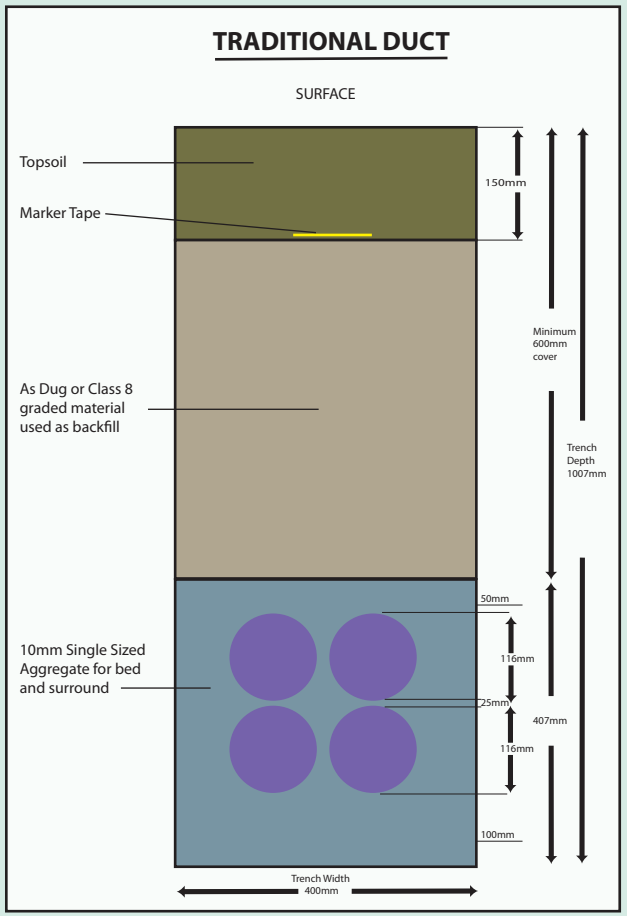
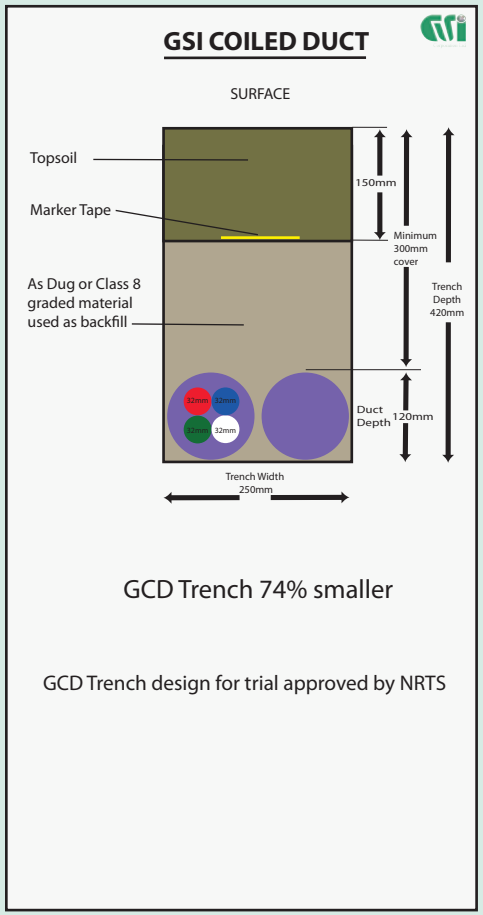
Installation Comparisons

TRENCH CROSS SECTION VIEWS:





GCD Trench 74% smaller

GCD Trench design for trial approved by NRTS

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Faster

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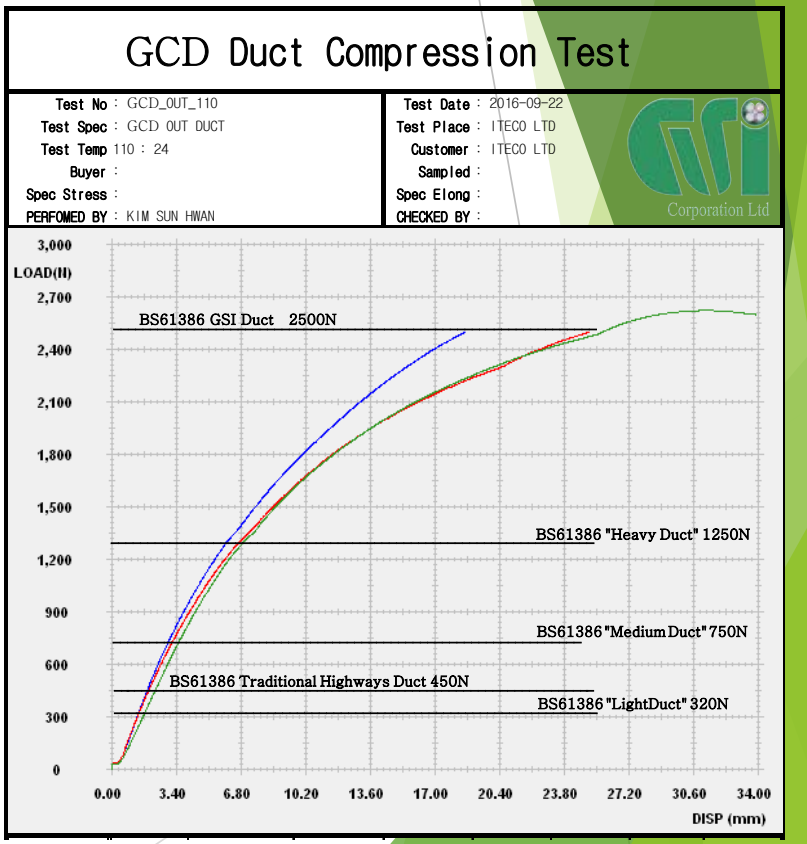
- 110mm GSI Coiled Duct (GCD) is delivered in lengths of 600m;
- 600m can be completely uncoiled along a route in 10 minutes;
- GCD is easily cut to the right lengths for every section;
- GCD can be installed as fast as a trench can be cut:
  - Conventional diggers can cut 480m per shift;
  - Trenching machines can cut in excess of 1,000m per shift;
  - GCD trenches are 74% smaller than traditional trenches.
- GCD is flexible and follows curves and turns. There is no dis-jointing;
- So, GCD installations are completed 4-8 times the average speed of traditional duct installations.

Safer

- GSI Coiled Duct (GCD) reduces the time spent working in a High Risk environment. 20Km scheme @ 720m/day, man hours can be expected to reduce by 4,167 hours;
- GCD is installed mechanically between chambers. Men do not have to work in trenches joining every 6m of duct;
- GCD has almost no memory and lies flat on the ground;
- Requirement for air testing can be removed completely. Currently this is approximately $^{1}/_{3}$ of all time spent installing traditional duct;
- Trenches for GCD are narrow and shallow – 74% smaller than a traditional trench. There is no real requirement for men to work in trenches;
- GCD requires less materials handling on site, jobs are completed quicker;
- GCD does not require extra protective aggregates to be imported nor waste to be removed. Hazardous vehicle operations (and costs) are significantly reduced;
- So, safety risks are reduced by >60%.

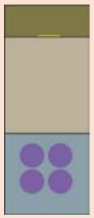
Stronger

- GSI Coiled Duct (GCD) will not cut with spades and even diggers have difficulty causing damage;
- Digger operators can ‘feel’ GCD duct in the ground without causing damage;
- GCD inner ducts are air tested to 130psi.
  Highways air tests to 100mmH_2O = 0.14psi;
- GCD has a compression strength >2500N, traditional duct is 450N;
- So, GCD is stronger and survives compression and impacts.



Cheaper

34km Project Costs & Benefits

4 man Gang 10 Hour Shift	GSI Coiled Duct		Traditional Duct
Output per day	720 m/shift	360 m/shift	120 m/shift
No. of days/shifts	47 days	94 days	283 days
Installed Cost / metre	£ 25.30 *	£ 25.30 *	£ 31.73 *
Cost Saving	20%	20%	-
Time Saving	(236) days	(189) days	-
(compared with traditional duct)			
Benefits:	**Faster installation** **Safer Installation** **Strong & Flexible solution** **No protective aggregates** **No disposal of waste soil** **No air testing** **Better for the future**		Slower installation Less safe installation Fragile & brittle solutions Import aggregates Disposal of soil Air testing

* based on 2018 independent industry tenders/quotations

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Other Benefits

- **Practical**
  - GSI Coiled Duct (GCD) can be installed above an old duct network. Old ducts do not have to be removed;
  - Chambers are not required to accommodate changes in direction or elevation. Fewer chambers may be required with GCD;
  - Finishing a job quicker can reduce long periods of traffic management.
- **Environmental**
  - Shallow, narrow trenches create less environmental damage. GCD is less likely to require future reinstatement, further reducing damage and disruption;
  - GCD's long life maintains integrity and reduces future maintenance costs;
  - GCD reduces transportation of materials benefiting the environment and reducing traffic congestion and pollution.
- **Additional Cost Savings**
  - If duct installation is on the critical path, GCD can enable a project to be completed earlier. Moving a site office early can save considerable sums ~ £350,000 per week;
  - GCD does not require aggregates to be imported. No soil has to be disposed of or reprocessed as waste.

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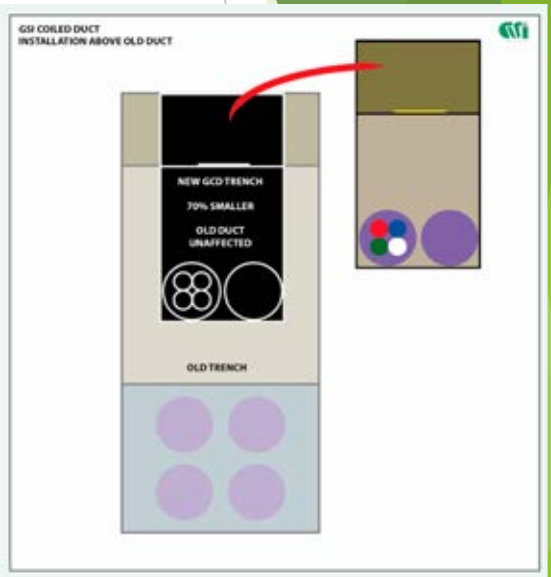

Rolling Installation

- **Long open sections of trenching are not necessary. A rolling installation can be carried out:**
  - Duct is uncoiled and laid out along the length of the trench area;
  - As the trench is cut, duct is installed into the trench;
  - As the duct is laid, the trench can be immediately refilled behind;
  - Confidence testing is not required between chambers.

Retro-Fitting Chambers

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- Chambers can be installed around an existing GCD network without damaging existing cables;
- Outer and inner ducts in the new chamber can be removed easily without affecting cables;
- Split collars seal the GCD to chamber walls and hold the duct tight.

Other installation techniques

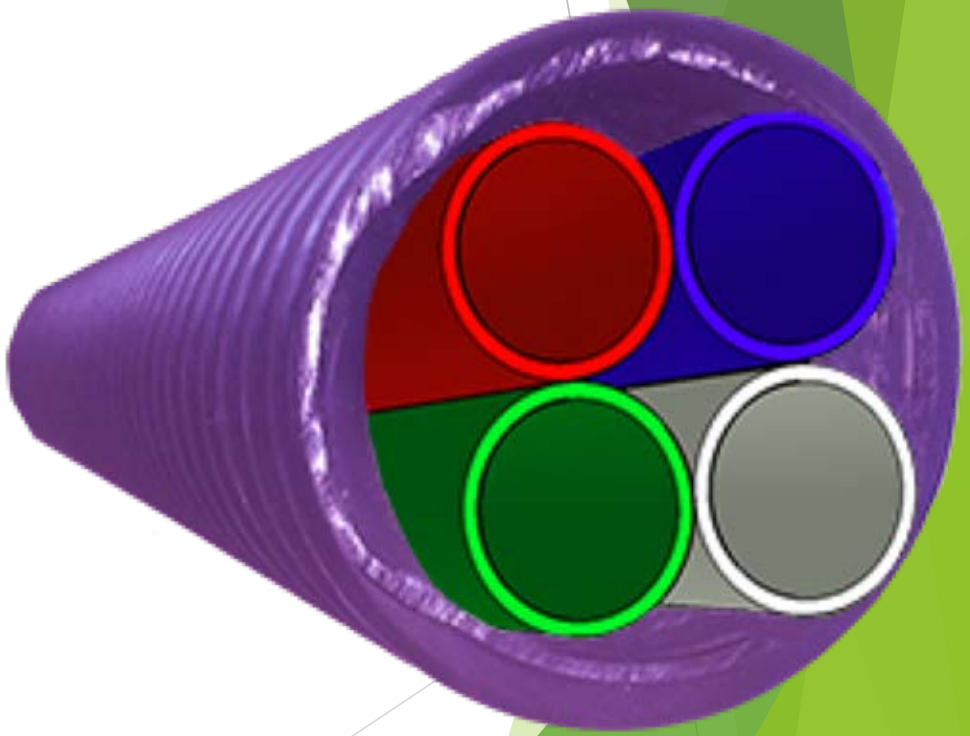
- **Directional (Horizontal) Drilling**
  - Pulling in GSI Coiled Duct (GCD) is easier;
  - Pulling pits are shallow (if required at all);
  - GCD duct is fed directly from a coil at the site;
  - GCD is continuous, no pipe-welding is required.

- **Pipe Bursting (in testing)**
  - GCD has completed trials using Pipe Bursting technology;
  - GCD's strength enables a continuous duct to be inserted into an old duct network to replace old duct, avoiding trenching and over ground works;
  - Further testing, development and assessment of this process is to be carried out.

Why use anything else?

- GSI Coiled Duct delivers a network that is:
  - Completed faster;
  - Completed more safely;
  - Stronger, long lasting and better for the environment;
  - Significantly cheaper now and;
  - Also reducing future repair and maintenance costs.

Faster + Safer + Stronger + Cheaper = Better



GSI Coiled Duct vs Traditional Duct – Key Differences

Traditional Duct	GSI Coiled Duct (GCD)	
SPEED	**SPEED**	FASTER
110/100mm 6m sticks, jointing collars with rubber seals every 6m and spacers every1m	110/88mm GCD can be delivered in continuous lengths of up to 600m	
Duct can disjoint easily, especially around bends	Cannot disjoint. Continuous GCD follows the flow and contour of the trench	
Multiple packing on road side	Uncoiled from an A frame in one process which means A frame does not have to remain on the roadside	
Position of sticks along roadside How long to position ??	600m reel can be uncoiled in 10 minutes	
Size of trench • Width = 450 or 600mm • Depth = 970mm	Size of trench - about 70% smaller • Width = 300mm • Depth = as little as 420mm	
Large trench: imported gravel creates greater environmental damage. Excess material needs to be removed. Creates French drains High environmental impact	Small trench: No imported materials. Graded 'as dug' material used for backfill Big reduction in ecological/environmental damage. No French drains created	
Multiple joins along route	Continuous duct - no joins between chambers	
Needs 650mm cover. (Requires deep trench to overcome poor duct compression strength)	Only needs 300mm cover (due to increased duct strength)	
On average 120m installed per shift	480m installed per shift based on trial output	
SAFETY	**SAFETY**	SAFER
Every stick, jointing collar with seal and spacers need to be fitted by persons working in trench	GCD is fed in from side of trench	
Air testing is carried out every 2 sticks in length (x4) which equates to 20min/hr. Air testing mandatory from chamber to chamber at 0.14psi	No air testing needed. Air tight by design. Duct air tested in factory at 130psi	
Road worker safety: Excessive manual handling needed to fit sticks; multiple awkward lengths to work and handle	Road worker safety: Mechanically installed. Manual handling only required at chambers	
Road user safety: long periods of TM	Road user safety: periods of TM reduced due to no working in trenches to install and test duct. Replacement of multiple sticks, collars and spacers by just 2 continuous lengths of GCD	
Increased vehicle movements for import and disposal or materials	Reduced vehicle movements – less materials required	
	Trenches 70% smaller. Expected to reduce man hours by some 3,750 hours (125 days) over 20km route @ 480m/day H&S risks reduced >60%	

GSI Coiled Duct vs Traditional Duct – Key Differences

Traditional Duct	GSI Coiled Duct (GCD)	
STRENGTH	**STRENGTH**	**STRONGER**
Compressive strength around 450N	Compressive strength around 2500N	
Is easily damaged, broken and/or crushed with spades, diggers and other plant	GCD will not cut with spades. Even diggers have difficulty causing damage	
Digger operators will break duct in the ground before they know it is there	Digger operators can 'feel' GCD in the ground without causing damage	
Does not recover after compression	Compressed GCD will show significant recovery	
Straight corrugated outer wall does not absorb stresses. Stress is focussed	Spiral outer wall absorbs and spreads stress • Easy attachment to chambers with spiral connectors; • Easy stripping of duct with spiral cutting tools	
Ducts are expected to fill with water within days. Air tests only valid at time of test	Plugged ducts should remain dry throughout life. Air tight environment should be life long	
COST	**COST**	**CHEAPER**
Cheaper to purchase More expensive installed costs	More expensive to purchase Cheaper installed costs	
Chambers required to accommodate changes in direction and elevation	GCD accommodates changes in direction and elevation. Fewer Chambers are required	
	Installed costs cheaper by around 18%	
Other attributes	**Other attributes**	
Each duct is a hollow single bore	A variety of ducts are available from single smooth wall up to 9 integral colour coded ducts	
Retro-fitting chambers not easy to create robust sealed connections	Retro-fitting chambers is easy and robust with GCD	
Old duct network must be removed before new duct can be installed	GCD can be installed above old duct network, leaving old ducts untouched	

Go to www.gsiduct.com to download further information of all GCD features & benefits

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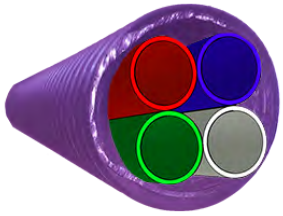

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