

Comparison of Ductwork Systems

Attributes	Metal (GI)	Spiralite Insulated	Pre-Insulated (PI)	Fabric
Product Attributes				
Internal Application	Duct + Glue + Insulation + Vapour Barrier + Canvas Cloth	Insulated Duct	Pre-Insulated Duct	Fabric Duct
External Application	Duct + Glue + Insulation + Vapour Barrier + Canvas Cloth + Cladding	Insulated Duct + factory applied weatherproof laminate	None	None
Insulation	None; on site after ductwork installed	Fully insulated Phenolic duct	Pre-Insulated PIR	None
Thermal Conductivity	Fibreglass – 0.035 W/m.K NBR Insulation – 0.033 W/m.K Foam Insulation – 0.034 W/m.K	Phenolic – 0.018 to 0.022 W/m.K	PIR – 0.022 to 0.026 W/m.K	None
Thickness and Density	Various depending on use. Typically higher thickness of insulation is required to achieve desired thermal performance	22mm and 30mm; 55-60kg's/m ³	20mm and 30mm; 45-48kg's/m ³	Thickness based on size and use Density N/A
Facings	None	Phenolic duct faced on both sides with a protective and durable 25.4 micron aluminium foil reinforced with a 5 mm glass scrim	20mm thickness with 80/80 micron, embossed epoxy primed aluminium foil; 30mm thickness with 80/200 micron	None
Internal Vapour Barrier Laminate	None	3-ply cryogenic; additional robustness, pressure resistance, smoothness and allows no foreign particles into air stream	None	None
Longevity	Good	Excellent; extra strength due to unique internal laminate and patented production technique	Poor – construction of duct not robust	Very poor – should only be used for temporary installations
Shapes & Dimensions	Rectangular, Square and Spiral; weigh limits sizes	Circular and flat oval; any other polygon shape available for straight sections only; no size limitation	Square and rectangular only; practical limitations to usage only for indoor applications	Circular only. Normally higher size requirement due to greater static pressures
Weight	Heavy – approx. 11.7 kg/sq.m of metal ducting and insulation	About 85% lighter than GI ductwork & insulation – approx. 1.4 kg/sq.m	Lighter than GI ductwork	Depends on fabric used and construction method

Colours Available	GI metal finish; would have to paint for additional colour requirement, which is prone to corrosion and deterioration in quality; additional laminate added to insulation	Any RAL colour available; any effect available	Silver embossed foil; would have to paint for additional colour requirement, which is prone to corrosion and deterioration in quality; additional laminate can be added	As specified by manufacturer
Performance				
Fire and Smoke	Typically classified as UK Class 0	<p>Insulation panel is:</p> <ul style="list-style-type: none"> • UK Class 0 (BS 476 Parts 6 & 7 - Fire Propagation & Flame Spread and BS 5111 Parts 1 & 3 – Smoke; • EuroClass B-s1,d0 (European Fire Classification System); • IMO FTP Code Part 2 and 5 - low flame spread, low smoke opacity and toxicity; • UL Listed as a Class 1 Air Duct, to Standard for Safety UL 181 • FSI: 10 (25 max) SDI: 10 (50 max) ASTM 84 	Insulation core is flammable; outer facings are Class O for flame spread but deteriorates quickly and produce high smoke levels	None unless specially treated
Condensation	High potential due to thermal bridging and reduced thermal performance	None due to internal connections, built in vapour barriers and optimal thermal performance	Uninsulated connection material; issue of thermal bridging for temperature loss and condensation	High potential and causes mould growth
Air Tightness	Typically Class A at 500 pa	Class C at 2,500 pa; no leakage at 7,667 pa	Typically Class A at 500 pa	Poor – diffusion of air often includes natural leakage
Pressure Resistance	Good	High pressure resistance (tested to 7,667 pa)	Poor; typically maximum 1,500 pa	Depends on fabric used and construction method, incl. use of metal bracing system
Pressure Drops and Friction Losses	Industry standards	10% to 25% lower due to shape and smooth internal laminate	High due to shape and roughness of internal surfaces	Typically much higher than GI ductwork
Moist and Chemically Hostile Atmospheres – pool rooms and leisure centres,	All ductwork has to be zinc or epoxy coated prior to installation	Phenolic insulation >90% closed cell and offers resistance to damage from moisture; outer	PIR insulation >95% closed cell and mainly resistant to damage from water; limited information	Exposure to moisture accelerates mould growth

marine/coastal applications		coatings and laminates resistant to chlorine and sodium chloride; only internal connectors need to be Aluzinc	available regarding outer coatings and resistance to chlorine and sodium chloride	
Water Resistance – external use	Typically will corrode over relatively short time	Phenolic insulation >90% closed cell and offers resistance to damage from moisture; with weatherproof laminates gives full resistance	PIR insulation >95% closed cell and mainly resistant to damage from water; require additional cladding for weatherproofing	Should not be used externally as no resistance unless specially treated
Environmental & Energy				
Sustainability (whole-of-life)	Minimal with far greater carbon footprint	Optimal with significant environmental benefits	Minimal	Minimal with high energy usage
BREEAM/LEED Credits; Estidama/Pearl and Dubai Green Building Compliant	Reduced compliance	Maximum available for responsible sourcing, embodied energy and innovation; Trustmark approved and Estidama/Pearl compliant	Some credits available under environmental performance criteria	Some credits available
Energy Efficiency	Reduced due to higher air leakages, higher internal friction and lower thermal efficiency	Optimal airflow + thermal efficiency, resulting in measured energy saving of up to 48%. Refer Separate presentation.	Poor due to inefficient airflows and high pressure drops	Very poor due to leakage, high internal surface friction and poor directional diffusion
Delivery, Installation & Site Issues				
Production Lead Time	Up to 4 weeks	Up to 2 weeks	Up to 2 weeks	Typically 6-8 weeks for delivery from the US or China
Delivery to Site & Manual Handling	Expensive and difficult due to weight, size and sharp edges	Easy due to weight and nature of materials; sections can also be delivered flat packed or connected for quicker installation	Lightweight and no sharp edges; can be delivered flat packed to site	Lightweight and easy to deliver to site; can be difficult for larger sections and bracing systems
Installation Time and Speed	Normal, but then 2 nd and 3 rd fit added for insulation and vapour barrier	At least 50% quicker than GI plus insulation	Quick, but all on-site fabrication	Can be quicker than GI ductwork based on hanging systems
Ease of Installation	Difficult, particularly in confined spaces, higher up and for larger sizes	Light weight and speed make it quick and easy to install; off-site fabrication so quality standards maintained and enforced	Light weight and speed make it quick and easy to install, but all on-site fabrication and variable standards	Can be quicker than GI ductwork based on hanging systems

Space Required	Additional space required for insulation and increased thickness	Reduced space required due to minimum insulation thickness and reduced duct sizing	Additional space required as compared to flat oval	Typically bigger sizes required due to increased airflow requirements
Supports in Moist/Chlorine Atmospheres	Zinc or other treated systems	Treated Gripple/Zipclip or Unistrut systems	Treated Gripple/Zipclip or Unistrut systems	Zinc or other treated systems
H&S on Site	Onerous due to weight, sharp edges, hot cutting, hard to work at height	Much less onerous and most pre-fabricated off-site, therefore less site activity	Less onerous than GI ductwork, but significant on-site fabrication activity	Much less onerous than GI ductwork
Pre-fabrication and Connection Off-site	Not possible	Sections can be pre-connected for extra installation speed; shoes can be added off site	Possible but seldom done due to nature of ducts	Not possible due to nature of material
Overall Site Installation Programme Benefits	None	<ul style="list-style-type: none"> • Less site activity and risk due to offsite fabrication • Easier/quicker delivery and manual handling • Quicker and easier to install - only 1 fit • Quicker, easier and less costly variations and less costly defect rectification • Greater programme certainty 	Easier/quicker delivery and manual handling; quicker and easier to install; only 1 fit for both ductwork and insulation	Less site activity and risk due to offsite production; on-site modification not possible
Ongoing Operational Issues				
Cleaning – Internal	As per industry standards	Less dirt accumulation, less adherence, mould resistant, quicker and easier to clean	As per industry standards; dirt accumulation in the corners	Significant dirt and mould accumulation; very difficult to take down and launder
Cleaning - External	As per industry standards	As per industry standards; easier and more robust with additional coloured laminate	As per industry standards	Can only be dusted; dirt and stains easily visible if a light colour
Alterations, Repairs & Maintenance	Difficult and costly	Easy and cheap - most can be done with silicone and tape	Easy and cheap – most done with silicone and tape, although ductwork can be relatively fragile	Difficult and costly as should only be factory repaired to maintain airtightness
Costs				
Installed Rates - Internal Applications	Typically the installed cost of GI duct + insulation + coating +	Typically the installed cost of Spiralite is less	Installed cost of PI is less than Spiralite and the GI plus	Installed cost of uninsulated fabric duct is more

	cloth is greater than the Spiralite equivalent	than the equivalent specification	insulation equivalent	expensive than the GI, Spiralite and PI equivalent
Installed rates - External Application	Typically the installed cost of GI duct + insulation + coating + cloth + weatherproof + cladding is greater than the Spiralite equivalent	Typically the installed cost of Spiralite + weatherproofing is much less than the equivalent specification	N/A as not robust enough to use externally	N/A as cannot be used externally
Cost – Whole-of-Life	High	Lowest	Slightly higher than GI ductwork because of leakages, rough internal surface and damages = greater OPEX costs	High due to increased OPEX costs
Other Cost Implications	<ul style="list-style-type: none"> Increased delivery cost Increased installation time Increased site variation costs Increased defect rectification cost 	<ul style="list-style-type: none"> Low delivery costs Reduced installation time Reduced site variation and defect rectification costs Some training and QA costs for first installations of new contractors 	<ul style="list-style-type: none"> Low delivery costs Reduced installation time Reduced site variation and defect rectification costs 	<ul style="list-style-type: none"> Low delivery costs Reduced installation time Increased defect rectification cost Increased modification and variation cost

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