



ALPHA DUCTS

ALPHA-PIR AIR DUCT SYSTEM

Premium quality and performance
pre-insulated Polyisocyanurate air duct system.

PRODUCT TECHNICAL BROCHURE

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INTRODUCTION

ALPHA-PIR air duct system is a light weight premium quality and performance pre-insulated Polyisocyanurate air duct system for air distribution.

ALPHA-PIR air duct system consists of **ALPHA-PIR** Polyisocyanurate panels, specified joining systems and range of accessories in addition to the recommended fabrication and installation procedures.

The ducts are fabricated in sections up to 4 m (13') length and offer multiple advantages in reducing cost and energy usage when compared to the conventional sheet metal duct systems.

ALPHA-PIR air duct system is compatible with the standard sheet metal control dampers, fire dampers, access doors and supporting systems used in the conventional sheet metal duct systems.

RANGE AND LIMITATIONS

ALPHA-PIR air duct system is recommended to be used in the systems of supply, return, fresh air and exhaust for air conditioning, heating and ventilation within the below limits:

Maximum air velocity:

20 m/s (3937 fpm)

Maximum pressure:

2000 Pa (8 in. w.g.) positive and
750 Pa (3 in. w.g.) negative.

Temperature:

Air temperature between -20°C
and +80°C (-4°F and +176°F).

Size:

Please refer to the fabrication and installation procedures. Any size can be fabricated after the technical consultation of ALPHA DUCTS LLC technical team.

ALPHA-PIR air duct system is recommended to be used in various types of projects: residential, commercial, mixed use, hotels and light industrial.

ALPHA-PIR air duct system is highly recommended to be used in high specifications projects like hospitals, food and beverage industry, pharmaceutical industry, air and hygiene controlled environments and many more where the usage of fiber insulation is not allowed.

ALPHA-PIR air duct system is recommended to be used for internal and external applications and can be installed in visible open areas, above false ceilings and within confined enclosures.

ALPHA-PIR air duct system should not be used in the following applications:

- Chemical, fumes and smoke exhaust systems.
- Kitchen and grease exhaust systems.
- Air systems carrying any type of solid particles.
- Fire resistant duct systems.
- Hot air systems where the air temperature exceeds +80°C (+176°F).
- Air systems that do not have automatic temperature control as per the indicated range.
- In mechanical or electrical rooms, in underground and outdoor applications without additional mechanical or weather protection.

DESIGN AND PRESSURE DROP

ALPHA-PIR air duct system follows the same calculation and duct sizing methods used for the rectangular duct designing in the conventional sheet metal duct systems.









The pressure drop in **ALPHA-PIR** air duct system can be compared to the one in the conventional sheet metal duct systems. Therefore the pressure drop data from the sheet metal duct systems can be used for calculating the pressure drop in **ALPHA-PIR** air duct system.

AIR LEAKAGE

ALPHA-PIR air duct system fabricated in line with the recommended fabrication procedure using the specified types of transverse joints and the specified accessories comply with the air leakage requirements as per HVCA DW144 standard.

Standard	Joint		
	Male / Female	Polymer invisible flange	Aluminum invisible flange
HVCA DW144	Class C	Class C	Class C

ADVANTAGES AND BENEFITS

	Light weight: The ducts fabricated from ALPHA-PIR panels have a considerably lower weight when compared to the conventional sheet metal ducts.
	Installation speed: Because of the light weight, the ducts fabricated from ALPHA-PIR panels can be installed faster than the conventional sheet metal ducts and therefore offer a huge saving in installation time and manpower cost.
	Environment friendly: ALPHA-PIR panels are CFC and HCFC free.
	Moisture resistance: The usage of the aluminium foil facing makes ALPHA-PIR panels highly resistant to moisture and eliminates the need of a vapor barrier used with the traditional fiber insulation.
	Health and safety: ALPHA-PIR panels are resistant to bacteria and microbes, fungal and mould growth, will not sustain vermin, are odorless and have a fiber free foam core.
	Visible application: ALPHA-PIR air duct system is aesthetically pleasing in open to view applications.
	External application: ALPHA-PIR air duct system can be used in external applications provided that it is protected from adverse weather conditions and sunlight.
	Air leakage: The recommended fabrication procedure allowing the combination of the suitable number of pieces in addition the possibility of fabricating duct pieces in sections up to 4 m (13') length will reduce the total number of joints in ALPHA-PIR air duct system compared to the conventional sheet metal duct systems. This will result in reducing the volume of air leakage in the full system.

PRODUCT DATA








ALPHA-PIR panels consist of a formaldehyde free, fiber free, high performance rigid thermoset Polyisocyanurate foam core faced on both sides with an extremely durable, protective, low vapor permeability 80 or 200 micron (3.15 or 7.87 mil) aluminium foil.

The foam core is produced using a CFC / HCFC free blowing agent having zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

The aluminium foil is bonded to the foam core by heat reaction during the manufacturing process without using additional adhesives. The aluminium foil is lacquered with a factory applied corrosion resistant polymer coating.

Availability: The panels are available in the thicknesses of 20 mm and 30 mm ($\frac{25}{32}$ " and $1\frac{3}{16}$ "). The standard panel size is 4000 mm x 1200 mm (13.12' x 3.94').

Color: White foam core with silver facings.

	Thermal conductivity	0.022 W/m.K (0.15 Btu.in/hr.ft ² .°F)	ASTM C518 at 10°C (50°F)
	Water vapor transmission	ZERO g/h.m ² (grain/h.ft ²)	ASTM E96
	Foam core density	42 to 48 kg/m ³ (2.62 to 3 pcf)	BS EN 1602
	Temperature range	-20°C and +80°C (-4°F and +176°F)	As per standard practice
	Minimum compressive strength	200 kPa (29 psi)	BS EN 826 at 10% deformation
	Minimum flexural strength	1080 kPa (156.6 psi)	ASTM C203
	Minimum closed cell content	90%	BS EN ISO 4590

FIRE, SMOKE AND TOXICITY PROPERTIES

Fire propagation	Class 0	BS 476 part 6
Surface spread of flame	Class 1	BS 476 part 7
Smoke generation - Average Ds (max)	In absence of pilot flame: 2 (25 kW/m ² irradiance) 94 (50 kW/m ² irradiance) In presence of pilot flame: 3 (25 kW/m ² irradiance)	IMO FTP part 2 (ISO 5659-2)
Toxicity data	At 25 kW/m ² irradiance: Pass (in absence of pilot flame) Pass (in presence of pilot flame)	IMO FTP part 2
Toxicity index	5.7	NES 713
Surface burning characteristics	Class A Flame spread index: less than 25 Smoke development index: less than 450	ASTM E84 / UL 723 / NFPA 255
Reaction to fire classification	Class C-s2 d0	BS EN 13501-1

FABRICATION AND INSTALLATION

ALPHA-PIR air duct system should be fabricated by trained fabricators only in line with the recommended fabrication procedure.

Only the specified types of transverse joints and the specified accessories should be used to guarantee the performance of the duct system as per the various approvals, certifications and listings.

Installation of the duct system should be done as per the recommended installation procedure and industry accepted standards.

CERTIFICATIONS

ALPHA DUCTS LLC is certified to the highest international standards of quality, occupational health, safety and environment:

- ISO 9001 for quality management system.
- ISO 14001 for environment management system.
- ISO 45001 for occupational health and safety management system.



ALPHA DUCTS LLC reserves the right to amend the product specifications without prior notice. Product thickness mentioned should not be considered as available in ex-stock. Final approval must always be obtained from the local Engineer/ Authorities prior to the commencement of fabrication and installation.

ALPHA DUCTS LLC believes that the information and recommendations in this brochure are accurate and reliable. However, since the installation and the usage conditions are not under the control of ALPHA DUCTS LLC, the final performance of the system is the responsibility of the customer.



ALPHA DUCTS LLC
United Arab Emirates - Dubai
Jabal Ali Industrial Area - P.O. Box: 336762

Phone +971 4 2724715
Fax +971 4 2724904
Mail info@alphaducts.com
Website www.alphaducts.com