

HVAC

HVAC Duct Systems are designed to ensure both the thermal energy efficiency of buildings and the acoustic comfort of the occupants, whilst minimizing the risk of fire and smoke spread in a building. Installation design takes into account the air exchange rates in the building, the number of occupants and their activities, its interior characteristics and the materials from which it is constructed.

HVAC Duct systems require thermal insulation where the most efficient option and the option with maximum fire safety is glass mineral wool, usually in roll form wrapped around the outer duct wall. The Duct wrap incorporates an aluminum foil facing that acts as a vapour barrier.

Due to glass mineral wools exceptional sound-absorbing properties, insulation can also be installed on the inner wall of the duct where the insulation acts as an acoustic absorber, reducing duct transmitted noise such as crosstalk and sound energy from air movement and mechanical equipment.

Design Considerations

The designer will have to consider many factors when designing a HVAC ducting system and when considering the choice of insulation material including:

- Thermal Insulation
- Acoustic Performance
- Energy Efficiency
- Fire Safety
- Control of Condensation
- Environmental impact of the materials.

Thermal Insulation

HVAC metal duct systems require thermal insulation to reduce heat loss, avoid condensation and improve comfort. The most common materials for this application are glass wool rolls which are wrapped around the duct's outer surface.

A temperature controlled work environment is vital to employee health and productivity.; Insulation in walls, ceilings and ducts makes it possible to maintain not only an energy efficient building, but also a more comfortable environment for building occupants. The work environment requires consistent temperatures throughout the entire building with hot and cold spots minimized.

Glass mineral wool duct insulation products should be included to help a building's HVAC system deliver conditioned air at design temperatures without over-working

the HVAC system. Besides potentially reducing the size of HVAC equipment, properly insulated ducts also contribute to reduced operating costs.

Control of condensation

Preventing unwanted moisture, especially in the HVAC system, is another important function of insulation in commercial construction. Glass mineral wool HVAC insulation helps prevent moisture from condensing on the inside or outside of ducts, and dripping onto ceiling tiles.

Knauf Insulation's glasswool products with factory applied Aluglass facing are an ideal substitute for conventional insulation barriers to deter moisture. With Aluglass's zero water vapour permeability credentials, water vapour cannot permeate through, and this eliminates the need for any additional application of vapour barriers.

Energy Efficiency

Insulating ducts and pipes will ensure energy efficiency is sustained, which in turn will save energy and lower operating costs.

Acoustic Insulation

HVAC installations generate different levels and spectra of sound, depending on the design, installation and equipment power source. Of primary concern in acoustic design is the transmission of noise produced by fans and air conditioning units via the ducts. Knauf utilize specifically designed interior insulation materials for sheet metal ducts to be used in HVAC applications which provide an optimum combination of efficient sound absorption with minimal airstream surface friction. Where installed, building occupants benefit from less unwanted noise and more consistent temperatures for improved comfort.

Spread of Fire

Incorrect or poorly designed duct networks may contribute to the spread of fire and smoke throughout a building, as they offer

direct physical access by which the fire can travel. Unlike many alternative insulation options, due to its non-combustible nature, glass mineral wool will minimize the fire propagation and create a passive fire protection in case of a break out of fire.

In particular, smoke emitting from, burning plastics such as polyethylene and a range of PVC products also has an increased toxicity and threat to life. The vast majority of today's fires are likely to involve plastics, and apart from soot, the smoke will produce poisonous gases that will include carbon monoxide, hydrogen chloride, hydrogen oxide, sulphur dioxide, ammonia and chlorine amongst others, depending on the plastic that is burning.

Indoor Air Quality

Ducts are used in HVAC to deliver and remove air. Airflows include supply air, return air and exhaust air. Ducts commonly also deliver ventilation air as part of the air supply. As such, air ducts are one method of ensuring acceptable indoor air quality as well as thermal comfort.

ECOSE Technology is a revolutionary binder chemistry that makes Knauf Insulation products even more sustainable. It is based on rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals traditionally used in fiber glass insulation products. ECOSE Technology reduces binder embodied energy and does not contain phenol, added formaldehyde, acrylics or artificial colors.

With the ECOSE Technology, Knauf Insulation has become the world's first company to receive the coveted Eurofins Indoor Air Comfort Gold standard.

The Gold standard certificate was awarded to Knauf Insulation's revolutionary glass mineral wool products made with ECOSE Technology and provides a strong endorsement of the enhanced environmental performance of Knauf Insulation's new ECOSE Technology product range.

Duct wrap

Exterior of rectangular or round sheet metal ducts

Atmosphere Duct Wrap

- Suitable for the exterior of rectangular or round sheet metal ducts and spaces or surfaces where temperature and condensation must be controlled.
- Provides a high degree of thermal insulation, enabling a greater degree of energy efficiency in the ducting system
- FSK facing has a water vapor permeance of .02 perms
- Aluglass facing has a maximum water vapor permeance of 0 perms, eliminating the need for additional vapor barriers.

- Eurofins Indoor Air Quality Gold Standard
- Flame Spread 25 and Smoke Developed 50 when tested in accordance with UL 723, ASTM E 84
- Zero Ozone Depletion Potential (ODP)
- Zero Global Warming Potential (GWP)



Products

Atmosphere™ Duct Wrap is a thermal and acoustic insulation blanket. Atmosphere Duct Wrap is used as external insulation on commercial or residential heating or air conditioning ducts. It is suitable for the exterior of rectangular or round sheet metal ducts and spaces or surfaces where temperature and condensation must be controlled.

Typical construction

Knauf Insulation Atmosphere Duct Wrap is used as external insulation on commercial or residential heating or air conditioning ducts. It is suitable for the exterior of rectangular or round sheet metal ducts and spaces or surfaces where temperature and condensation must be controlled.

Installation

Preparation

Install Knauf Insulation Atmosphere Duct Wrap over clean, dry sheet metal ducts.

All sheet metal joints and seams must be sealed to prevent air leakage from the duct.

Application

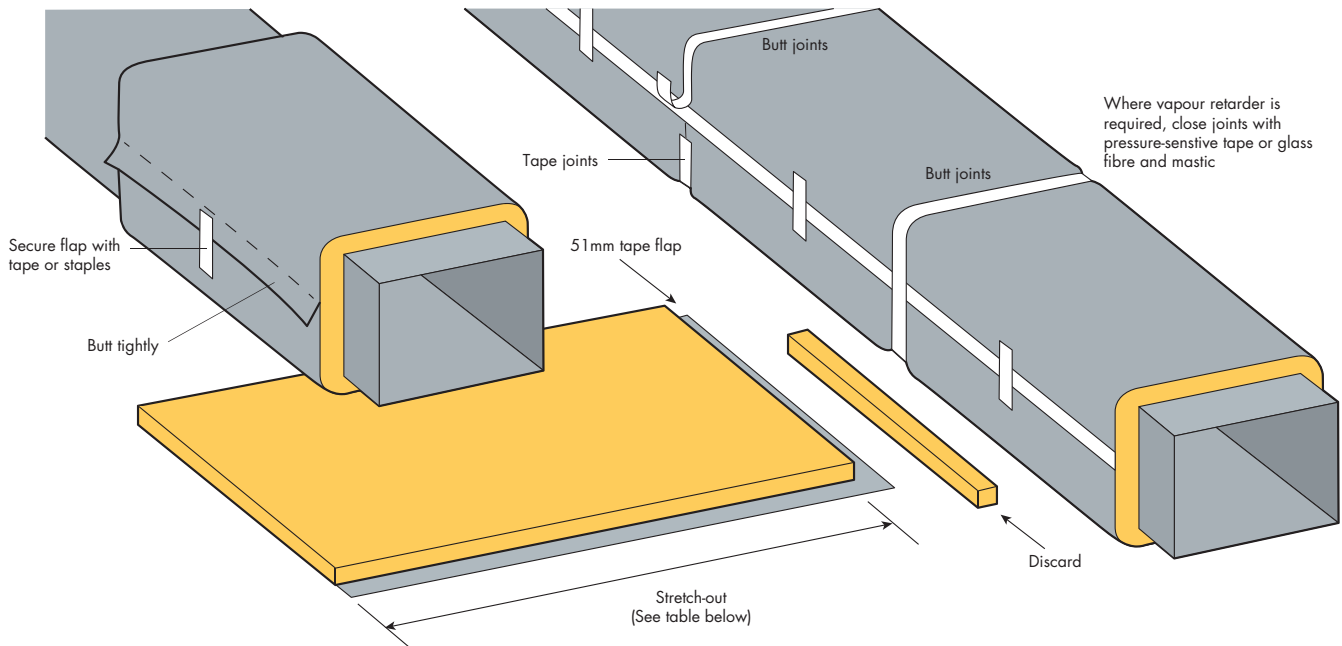
- Install Knauf Insulation Atmosphere Duct Wrap with facing to the outside to obtain specified R-value using a maximum of 25% compression
- Butt all insulation joints firmly together. Longitudinal seam of the vapor retarder must be overlapped a minimum of 50mm. A 50mm tab is provided for the circumferential seam and must be overlapped
- Where vapor retarder performance is necessary, all penetrations, joints, seams and damage to the facing should be sealed with an foil tape or glass fabric and mastic prior to system startup
- Pressure sensitive tapes should be a minimum 76 mm wide and be applied with moving pressure using an appropriate sealing tool

- Staples should be outward clinch and placed approximately 152 mm on center
- Closure systems should have a 25/50 F.H.C. per UL 723
- For rectangular ducts over 610 mm wide, secure the insulation to the bottom side of the duct with mechanical fasteners spaced on 457 mm centers to reduce sag. Care should be taken to avoid over compressing the insulation with the retaining washer
- It is neither necessary nor desirable to adhere duct wrap to duct surfaces with adhesive

Installation Procedures

Use the Application graphic to determine stretch-outs required for the nominal thickness of insulation to limit average compression of the insulation 25% or less.

Typical installation



Performance

Thermal

Duct Wrap Roll with Thermal Conductivity of 0,035 w/mK and Thermal Resistance of 0.71 w²/mK.

Duct Wrap Roll Ultimate with Thermal Conductivity of 0.033 and Thermal Resistance of either 1.51 w²/mK and 0.79 w²/mK.

Duct Wrap Slab with Thermal Conductivity of 0.031 w/mK and Thermal Resistance of 1.61 w²/mK and 0.81 w²/mK.

Fire

Duct Wrap is tested and listed UL 723, ASTM E84

Classification (UL723)	FSK	Aluglass
Flame spread	not over 25	not over 25
Smoke developed	not over 50	not over 50

Stretch outs				
Insulation thickness (mm)	Installed compressed thickness (mm)	Round (mm)	Square (mm)	Rectangular (mm)
38	29	P+241	P+203	P+178
51	38	P+305	P+254	P+203
56	42	P+330	P+279	P+216
64	48	P+368	P+318	P+241
76	57	P+432	P+368	P=292

P = Perimeter of duct to be installed