



07
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AIRnet Aluminium Pipes: Complete Fire Protection

In Compliance with Standard EN 1366-3:2021 / EN 13501-2:2016.

Introduction

A fire-free industry is what we can all strive for. At Atlas Copco Group, we pride ourselves on the highest safety standards for employees, customers, partners, and stakeholders.

This emphasis on safety permeates all our products and the services we offer. One of the key concerns when it comes to safety is protection from fire.

This brochure shall demonstrate, the benefits of AIRnet, a key fire protection solution that can greatly benefit the global industry.

Every industrial workplace, even those which are home to some of the most expensive and critical operations is prone to fire risks.

In the case of fire incidents, the consequences could be disastrous including heavy losses of materials, products, infrastructure, and most importantly the loss of life, which can't be recovered in monetary terms. Having preventive measures in the workplace place against fire hazards is thus imperative and cannot be ignored.

Fire damage can lead to:

- Disruption of supply
- Injury or death
- Harm to reputation
- Environmental damage
- Overall business well-being



Fire safety is crucial for any business or industrial application. Across the world, there have been countless examples of businesses closing down or being adversely affected by a lack of fire safety.

It is pertinent to implement actions that limit the risk of fire damage starting from the materials used within your application and setup.

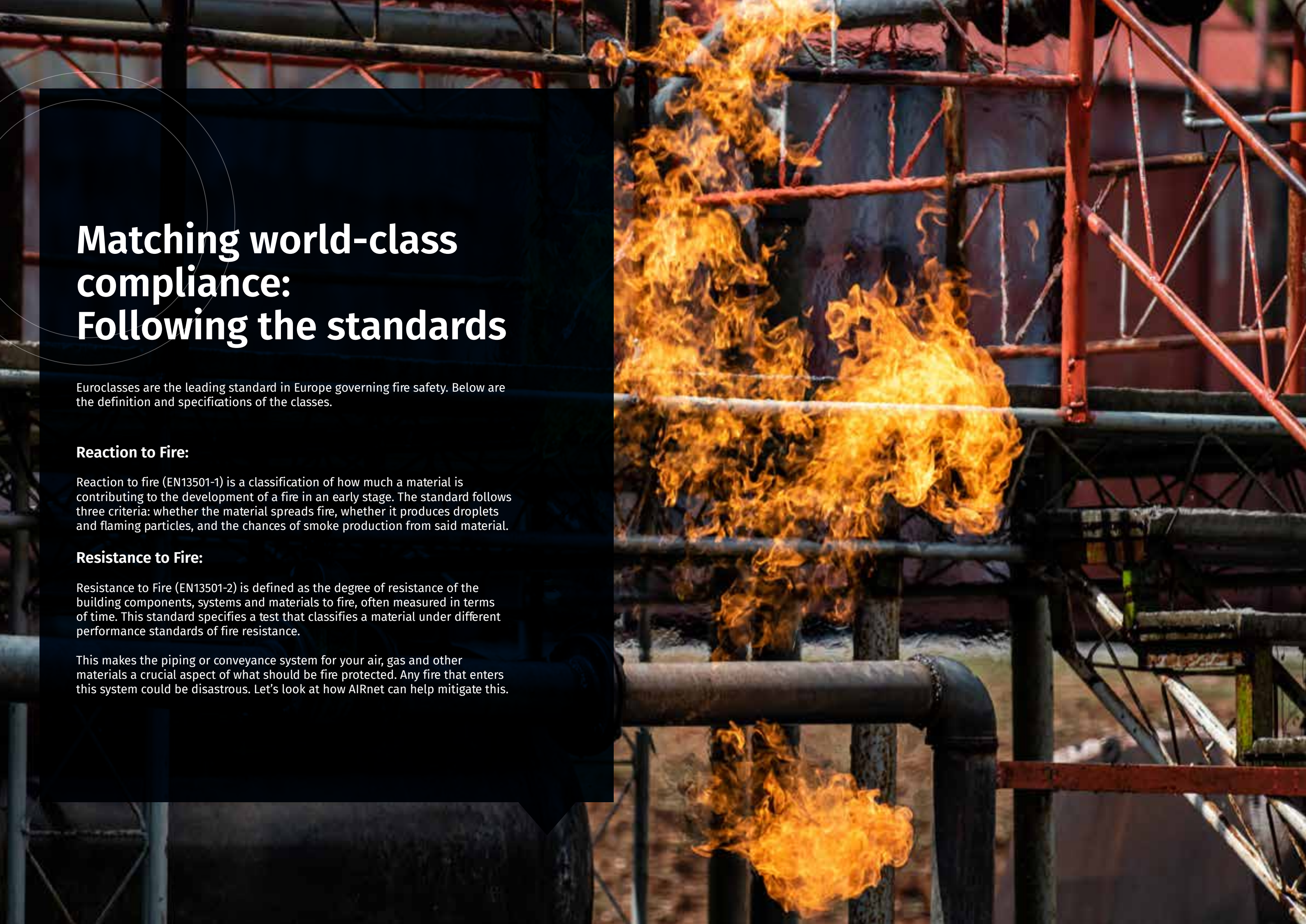
Here are some of the most common causes of fire in industries:

1. Electrical machinery: In electrical machines, fires can be caused by wiring, extension cords, circuits, etc.
2. Combustible dust: In situations when airborne dust is a threat of being combustible, it can pose a grave threat to the industrial setup.
3. Hot work: This includes activities like welding, brazing, burning, heating, and soldering which can cause a fire hazard.
4. Flammable liquids and gases: This can be a cause of concern, especially for industries dealing with flammable materials, oil, crude oil, etc.

It is important to consider very specific factors in protecting businesses, people and the community from these risks. Timeliness in these situations can prove crucial in evacuation, assistance, and damage mitigation. A single minute wasted can be catastrophic.

In order to save on this time, the damage limitation must start from the planning of a production area. This lies in the components used in conjunction with their **fire reaction and fire resistance**.

The materials that are used in your building, process or application, must react at the slowest possible rate and resist flames at the highest rate too.

A photograph of a fire test rig. A large, intense fire is burning on a metal structure, likely a fire test chamber or a fire test rig. The fire is bright orange and yellow, with a lot of smoke. The structure is made of metal pipes and beams, some of which are painted red. The background is dark and out of focus.

Matching world-class compliance: Following the standards

Euroclasses are the leading standard in Europe governing fire safety. Below are the definition and specifications of the classes.

Reaction to Fire:

Reaction to fire (EN13501-1) is a classification of how much a material is contributing to the development of a fire in an early stage. The standard follows three criteria: whether the material spreads fire, whether it produces droplets and flaming particles, and the chances of smoke production from said material.

Resistance to Fire:

Resistance to Fire (EN13501-2) is defined as the degree of resistance of the building components, systems and materials to fire, often measured in terms of time. This standard specifies a test that classifies a material under different performance standards of fire resistance.

This makes the piping or conveyance system for your air, gas and other materials a crucial aspect of what should be fire protected. Any fire that enters this system could be disastrous. Let's look at how AIRnet can help mitigate this.

Your anti-fire solution

AIRnet provides a complete compressed air distribution solution from start to finish. We continuously add and upgrade our products to ensure the highest efficiency of your distribution network.

The lightweight materials and modular technology give you the advantage of modifying or expanding your network without affecting your operations. It also ensures enhanced fire safety with a specialized sealing system for your AIRnet pipes.

Classification of the AIRnet Aluminium Piping range according to Euroclass EN13501-1:

Euroclass	Reaction to Fire	Smoke Production		Falling Drops or Flaming Particles	
A1	No contribution to fire	-	-	-	-
A2	No contribution to fire	s1	Little smoke production	d0	No drop or flaming particles
B	Very limited contribution to fire	s2	Average smoke production	d1	Drop or flaming particles resisting less than 10 seconds
C	Limited contribution to fire				
D	Acceptable contribution to fire	s3	Significant smoke production	d2	Drop or flaming particles resisting more than 10 seconds
E	Acceptable contribution to fire	Not tested yet		No indication or d2	
F	No performance requirement				

REACTION TO FIRE CLASSIFICATION: B-s1, d0

This classification is only valid for the final conditions of use described in the present report.

Classification: Vertical configuration with pipe penetrations placed in a horizontal position

Sample (*)	Classification
Fire resistance classification: sample D158 (aluminium pipe \varnothing 158 x 4 mm, sealing system : sealant + block + sealant)	No Class
Fire resistance classification: sample D25 (aluminium pipe \varnothing 25 x 1.5 mm, sealing system : sealant + block + sealant)	E 15-U/U E 60-U/U
Fire resistance classification: sample D50 (aluminium pipe \varnothing 50 x 2 mm, sealing system : sealant + block + sealant)	EI 45-U/U E 60-U/U
Fire resistance classification: sample D63 (aluminium pipe \varnothing 63 x 2.5 mm, sealing system : sealant + block + sealant)	E 45-U/U
Fire resistance classification: sample D80 (aluminium pipe \varnothing 80 x 3 mm, sealing system : sealant + block + sealant)	EI 15-U/U
Fire resistance classification: sample D40 (aluminium pipe \varnothing 40 x 2 mm, sealing system : sealant + block + sealant)	EI 45-U/U E 60-U/U
Fire resistance classification: sample D20 (aluminium pipe \varnothing 20 x 1.5 mm, sealing system : sealant + block + sealant)	EI 60-U/U
Fire resistance classification: sample D100 (aluminium pipe \varnothing 100 x 3 mm, sealing system : sealant + block + sealant)	EI 15-U/U

Classification: Horizontal configuration with pipe penetrations placed in a vertical position

Sample (*)	Classification
Fire resistance classification: sample D158 (aluminium pipe Ø 158 × 4 mm, sealing system : sealant + block + block + sealant)	EI 20-C/C E 120-C/C
Fire resistance classification: sample D25 (aluminium pipe Ø 25 × 1.5 mm, sealing system : sealant + block + block + sealant)	EI 90-U/U E 120-U/U
Fire resistance classification: sample D80 (aluminium pipe Ø 80 × 3 mm, sealing system : sealant + block + block + sealant)	E 30-U/U
Fire resistance classification: sample D40 (aluminium pipe Ø 40 × 2 mm, sealing system : sealant + block + block + sealant)	E 120-U/U
Fire resistance classification: sample D50 (aluminium pipe Ø 50 × 2 mm, sealing system : sealant + block + block + sealant)	E 90-U/U
Fire resistance classification: sample D63 (aluminium pipe Ø 63 × 2.5 mm, sealing system : sealant + block + block + sealant)	E 120-U/U
Fire resistance classification: sample D20 (aluminium pipe Ø 20 × 1.5 mm, sealing system : sealant + block + block + sealant)	EI 90-U/U E 120-U/U
Fire resistance classification: sample D100 (aluminium pipe Ø 100 × 3 mm, sealing system : sealant + block + sealant)	EI 30-C/C E 120-C/C

Best results: Vertical position: EI- 90 minutes & E - 120 minutes
Best results: Horizontal position: EI - 60 minutes & E - 60 minutes

E - Integrity

Integrity E is the ability of the element of construction that has a separating function, to withstand fire exposure on one side only, without the transmission of fire to the unexposed side as a result of the passage of flames or hot gases. They may cause ignition either of the unexposed surface or of any material adjacent to that surface.

C/C

When piped are tested in the capped on both end configuration.

I - Thermal insulation

Thermal insulation I is the ability of the element of construction to withstand fire exposure on one side only, without the transmission of fire as a result of significant transfer of heat from the exposed side to the unexposed side. Transmission shall be limited so that neither the unexposed surface nor any material near that surface is ignited. The element shall also provide a barrier to heat, sufficient to protect people near to it.

U/U

When piped are tested in the uncapped on both end configuration.

The sealing system recommended by AIRnet: FiloSeal+HD FIRE

FiloSeal+HD FIRE is a highly certified fire, gas and water sealing system for both ducts and transit frames:

- Up to 4 hours of fire resistance in transit frames
- Up to 4 hours of fire resistance in ducts Tested to BS EN1366-3 2009
- Up to 2 bar Pressure Resistance 100 Kg pulling Force on the cables when sealed - 10xd at 45°, with 1 bar pressure bending test.

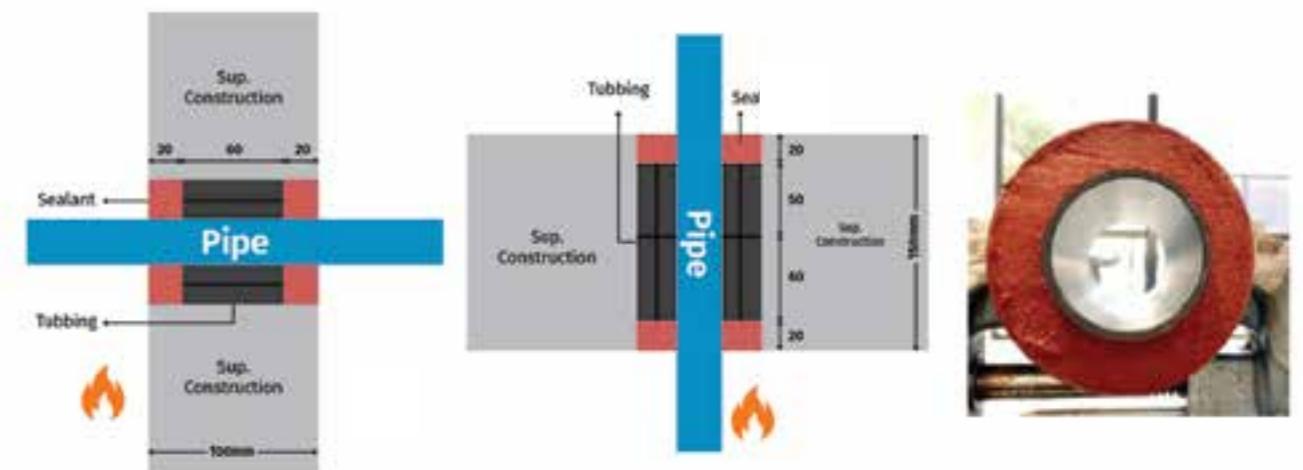
Key features

- Fire resistant (BS EN1366-3 2009)
- Flexible, one component fire resistant adhesive and sealing compound in a cartridge - (310ml)
- High levels of Gas and Water tightness
- Excellent adhesion, applicable to all common building materials
- Resistant against Water, Alkaline, and Chemical agents
- Resistant to termites (*Mastotermes Darwiniensis*) Northern Australian termites
- Resistant to Rats
- Resistant to Hydrogen Sulphide / Methane and many other Gases (NedLab)
- Non-corrosive
- Solvent free
- Shock absorbing
- Nontoxic, neutral and almost odorless
- Also suitable for limiting the EX-zones during transitions (observe chemical resistance)
- Suitable for any shaped duct / borehole / opening
- Quick and easy installation
- A complete kit
- Seals all known materials, PVC & PE sheathed cables, PILC, (HD) PE pipes
- Suitable for renovations, can be installed retrospectively
- Over 25 years of operational experience

Procedure for installation

The following is a procedure that showcases how Filoseal+ HD Fire can be correctly installed for ideal fire protection:

- The seal must be tested on both sides with a flame test. For this, both openings must be sealed with the Filoseal+ HD Fire.
- The seals are made in a situation where it is in the floor with a thickness of 150mm and in a situation where it is in a wall with a thickness of 100mm.
- Since both sides must be sealed for the fire with the Filoseal+ HD, we came up with a unique setup. It looks like this:



Additional operations for sealing both sides of a transit compared to a seal on one side:

- Wall: Push the 60mm Hexagonal blocks into the transit and make sure they are nicely centered so that there is 20mm space on both sides for the MD+ to seal.
- Floor: Push the 60mm blocks into the transit and make sure there is a 20mm space up to the exit for the MD+ to seal. On the other side of the wall, the blocks need to be cut off by 10mm to make sure.
- Additionally on this side, is a 20mm space left up to the exit of the transit. The situation is pictured above.

The blocks are already pre-cut, so you will find 50mm and 60mm long blocks in the materials we have sent. (Make sure, when using the 50mm blocks, that the side we cut, is on the inside of the transit and does not come in contact with the MD+)

Installation procedure

STEP 1.

Clean the duct and the transit with the cleaning cloth.



STEP 2.

Sand the duct with the sandpaper up to 2cm into the transit and clean the duct once again to remove the sanding residues.



STEP 3.

Push the big hexagonal blocks around the pipe. Make sure they are 2cm into the transit.



STEP 4.

Push the small hexagonal blocks into the opening of the large blocks already in transit.



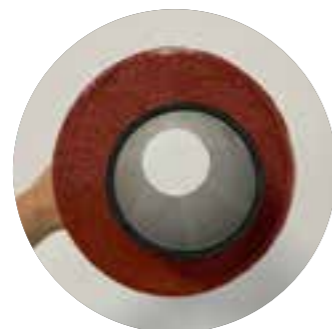
STEP 5.

Apply a layer of MD+ 2cm thick. Make sure the MD+ fills the transit until it is smooth with the wall.



STEP 6.

Fill the sponge with water and squeeze it dry. Dab on the MD+ until it is nice and even. Now the MD+ should have a layer of 2cm all over.



STEP 7.

Wall 100mm thick: Apply also a layer of MD+ 2 cm thick on the other side of the wall. (Repeat step 5 & 6).
 Floor 150mm thick: Push the 50mm long blocks in on the other side of the transit. repeat all the above steps. If everything is done correctly, you now also have 2cm left on this side for the layer of MD+



* MD+ should always be 2cm thick on both sides of the wall or floor, and the lengths of hexagonal blocks should be adjusted accordingly.

**AIRnet aluminium
Product
Information**

AIRnet is a reusable aluminum piping system designed in line with EN 13480-3 to deliver a fast, easy, and reliable distribution network for Compressed Air, Nitrogen, and Vacuum. AIRnet technologies and innovations are based on technical expertise gained from more than 140 years of experience with pressurized air applications and equipment.



PIPES

20 (¾") - 25 (1") - 40 (1 ½") - 50 (2") - 63 (2 ½") - 80 (3") - 100 (4") - 158 (6") mm

Applications	Compressed Air and Vacuum	EN standard
Additional Gasses	Nitrogen, Helium, Argon, Neon, Xenon and Krypton	
Material	Extruded aluminum alloy EN AW-6060 T6 (similar to alloy 6063T5)	EN 755-2 (ASTM B241)
Safety factor	4 for all diameters (burst pressure)	(Calculated according to ASME B31.1)
Working pressure	Max 16 bar(g) (Max 232 psig)	
Working temperature	-20°C to 80°C (-4°F to 176°F)	
Vacuum level	13 mbar(a) (0.189 psia)	
Dewpoint	Lowest allowable pressure dewpoint is -40°C (-40°F)	
Outside treatment	Polyester powder paint (QUALICOAT certified)	
Inside treatment	Chrome free conversion treatment	
Colors	Blue RAL 5012, Green RAL 6018 and Grey RAL 7001	



Preserving the power of air