

This document is intended to provide a general understanding of FENIX NTM, its manufacture, properties, typologies and relevant international standards. It provides information on maintenance, processing and installation methods, as well as some good practice recommendations for its use. The advice and recommendations are of advisory nature only. If you wish to use and apply FENIX NTM, please ask a professional consultant for assistance.

FENIX NTM is a registered trademark of Arpa Industriale since 2013.

NOTES

Updated technical data sheets on FENIX NTM can be downloaded from the website fenixntm.com. Before use, customers and final users of the product are required to check the presence of updated technical information regarding product performance from the websites www.arpaindustriale.com or www.fenixntm.com. In any circumstance, in any contractual relationship, Arpa Industriale shall exclusively refer to the technical information published on its websites. Arpa Industriale shall not accept any liability in case final user or customer refers to any other technical information regarding the products

CONTENTS

1. General information

- 1.1 Product description
- 1.2 Composition
- 1.3 Sizes - Thicknesses
- 1.4 Fields of application
- 1.5 Properties of FENIX NTM
- 1.6 Certifications and sustainability

2. Maintenance and Cleaning

- 2.1 Maintenance
- 2.2 Cleaning recommendations
- 2.3 General precautions
- 2.4 Thermal healing of superficial micro scratches

3. Storage and transport

- 3.1 Storage
- 3.2 Transport (general indications)
- 3.3 Transport of FENIX NTM Thin
- 3.4 Transport of FENIX NTM Solid

4. Preconditioning

- 4.1 How to prepare HPL laminates and substrates

5. Processing FENIX NTM Thin

- 5.1 How to cut FENIX NTM Thin
- 5.2 Milling
- 5.3 Drilling
- 5.4 Edges
- 5.5 Bending
- 5.6 Production of composite panels

6. Processing FENIX NTM Solid

- 6.1 General processing guidelines
- 6.2 How to cut FENIX NTM Solid
- 6.3 Drilling
- 6.4 Milling
- 6.5 Edges/milling templates
- 6.6 Gluing
- 6.7 Installation guidelines for FENIX NTM Solid panels
- 6.8 Installation guidelines for FENIX NTM "Cuore a Tema" (Theme Core) panels

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

FENIX NTM® - NanoTech Matt material- is an innovative product created for interior design. Designed by Arpa Industriale, it combines elegant aesthetic solutions with state-of-the-art technological performance obtained thanks to the use of nanotechnologies and next generation acrylic resins.

The panel surface has unique properties such as: thermal healing of superficial micro scratches, low light reflectivity thanks to extreme opacity, soft touch and anti-fingerprint feature.

The nanoparticles of the surface make it highly resistant to scratches and abrasion, as well as to stains thanks to the barrier effect and thermal healing of superficial micro scratches.

The structure of the nanoparticles used for FENIX NTM (nano dimension, below 100 nm) are amorphous and not crystalline.

Thanks to the high technology manufacturing process, these nanoparticles are evenly distributed and incorporated in a homogeneous way in the coating of the surface designed specifically for FENIX NTM. After hardening of the surface coating, the nanoparticles are fully integrated and fixed inside the coloured part of FENIX NTM. FENIX NTM is suitable for contact with food as there is no evidence of substance migration from the material.

1.2 COMPOSITION

FENIX NTM is a material produced by simultaneous application of heat and pressure (>7 MPa) in order to obtain a homogeneous non porous product with high density. 60% of FENIX NTM manufacturing process results from high -pressure thermo-lamination and 40% implies the use of nanotechnologies and processes developed exclusively by Arpa Industriale and its partners.

The core structure is composed of paper impregnated with thermosetting resins whereas the coloured external surface is made of decorative paper treated with next generation acrylic resins that are hardened and fixed with Electron Beam Curing process.

FENIX NTM is made of paper (over 60%) and thermosetting resins (30 - 40%).






1.3 SIZES - THICKNESSES

FENIX NTM is available in a wide range of colours, sizes and thicknesses:

- 15 colours (11 solid colours and 4 pearlescent colours);
- 2 panel sizes 4200x1600 mm and 3050x1300 mm;
- 4 standard thicknesses. Thin: 0,9 and 1,2 mm; Solid: 10 and 12 mm.

Customization of colours, sizes and thicknesses available upon request (for orders starting from 2,000 linear meters against an extra charge). Protective film included.

Code	Name	Code	Name
0029	Bianco Malè	0721	Blu Delft
0030	Bianco Alaska	0724	Grigio Bromo
0032	Bianco Kos	0725	Grigio Efeso
0716	Rosa Colorado		
0717	Castoro Ottawa	2628	Zinco Doha
0718	Grigio Londra	2629	Bronzo Doha
0719	Beige Luxor	2630	Piombo Doha
0720	Nero Ingo	2638	Titanio Doha

Thickness	Decor	Type/Core	Size	
 mm				
0,9 mm	All FENIX NTM range	Standard	•	•
1,2 mm	All FENIX NTM range	With matched colour core	•	•
10,0 mm	All FENIX NTM range except 0029, 0030, 0032, 0720	Single sided black core	•	•
	All FENIX NTM range	Double sided black core	•	•
	0029, 0030, 0032	Double sided white core	•	•
12,0 mm	All FENIX NTM range except 0029, 0030, 0032, 0720	Single sided black core	•	•
	All FENIX NTM range	Double sided black core	•	•
	0029, 0030, 0032	Double sided white core	•	•

Radiometric and colorimetric reports taken on each colour can be downloaded from fenixntm.com website (except for the four Doha finishes). Each data sheet – designed to provide adequate information to the user and/or the prescriber - describes the chromatic behaviour in relation with three parameters: type of light source, incidence angle of the light and angle of observation. Please note that Bianco Alaska 0030 can exhibit slight pink tones in the presence of certain types of lighting, depending on the observation angle and/or the light's angle of incidence (INRiM test report dated February 2015).

Code	Name	PANTONE CMYK Coated	PANTONE Solid Coated	PANTONE Solid Uncoated	RAL Classic/Design	NCS
0029	Bianco Malè	P 7-1 C	-	-	CLASSIC/9010	S 0502-Y
0030	Bianco Alaska	P 75-1 C	-	-	CLASSIC/9003	S 0502-R50B
0032	Bianco Kos	P 1-9 C	-	-	CLASSIC/9016	S 0500-N
0716	Rosa Colorado	P 171-6 C	408 C	7518 U	DESIGN/040 60 10	S 4005-Y80R
0717	Castoro Ottawa	P 170-4 C	7531 U	7531 U	DESIGN/080 60 10	S 4005-Y20R
0718	Grigio Londra	P 172-8	424 C	Warm Grey 10U	DESIGN/080 50 05	S 5502-Y
0719	Beige Luxor	P 19-9 C	4685 C	4685 U	DESIGN/075 80 10	S 2010-Y30R
0720	Nero Ingo	P 179-16 C	Black 7 C	Black U	DESIGN/000 25 00	S 8500-N
0721	Blu Delft	P 108-6 C	653 C	7692 U	DESIGN/260 0 25	S 5030-R90B
0724	Grigio Bromo	P 173-13 C	425 C	433 U	CLASSIC/7012	S 6502-B
0725	Grigio Efeso	P 179-C	Cool Grey 3C	427 U	CLASSIC/7047	S 2000-N
2628	Zinco Doha	-	-	-	-	-
2629	Bronzo Doha	-	-	-	-	-
2630	Piombo Doha	-	-	-	-	-
2638	Titanio Doha	-	-	-	-	-

NOTE

PANTONE, RAL, NCS references are the nearest equivalents and should be verified visually.
The Colour Equivalence data sheet can be downloaded from fenixntm.com

1.4 FIELDS OF APPLICATION

Thanks to its special characteristics, FENIX NTM can be used both for horizontal and vertical surfaces and in a very wide range of typical interior design applications, both for home and business markets: kitchens, bathrooms, as a material for worktops, coating shutters, doors and walls; hospitality, healthcare, as well as furnishings and fittings such as tables, bookcases, chairs, partitioning. Its surface characteristics make it a highly performing material and, furthermore, it can represent a valid alternative to other materials, such as solid surfaces or glass, with the added advantage of easy workability.

Fields of application: kitchen, bathroom, furniture, healthcare, hospitality, offices, transport, lifts, doors.

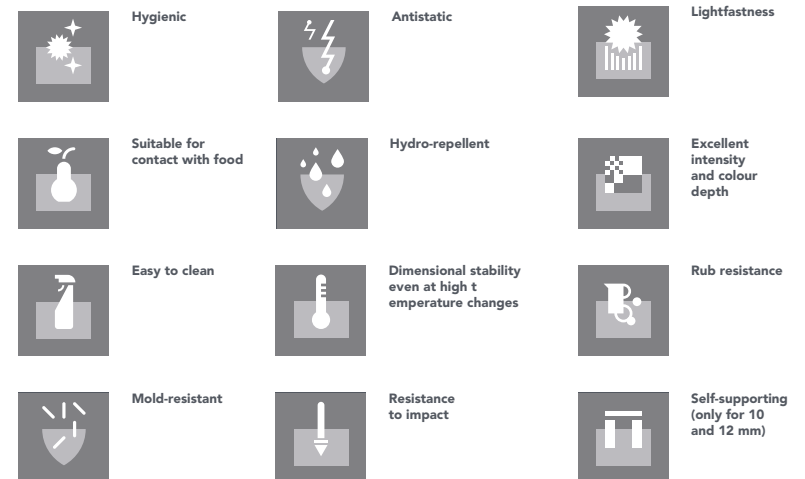
1.5 FENIX NTM PROPERTIES

8 main characteristics:

- Low light reflectivity
- Extremely matt surface
- Thermal healing of superficial micro-scratches
- Anti-fingerprints, soft touch
- Resistance to scratches and abrasion
- Resistant to dry heat
- High resistance to acid solvents and household reagents
- Enhanced anti-bacterial properties



Additional properties of FENIX NTM



1.6 CERTIFICATIONS AND SUSTAINABILITY

FENIX NTM has obtained NSF, Greenguard IAQ and IMO MED certifications (for 0,9 mm thickness). NSF certifies that the material is suitable for contact with food.

Based in Ann Arbor, Michigan, NSF International is an independent international body specialising in technical and scientific consultancy in the fields of health and safety. The NSF registration guarantees the user that the formulae and the composition follow food safety regulations.

The Greenguard IAQ - Indoor Air Quality - certification guarantees that the product has low pollutant emissions in indoor spaces. Greenguard IAQ is an independent no-profit body that checks and certifies the low level of chemical emissions and it is an international reference point for many sustainable building programmes.

The 0.9 mm thick FENIX NTM is certified according to the marine IMO MED regulations as material suitable for marine applications, because of its properties of fire reaction resistance and heat emissions. IMO MED is an international marine standard regarding ship safety.



SUSTAINABILITY

Long duration:

Products made with FENIX NTM stand out for their strong resistance to damage and are therefore long-lasting. This entails a reduced production of waste over time, a more efficient use of resources and greater energy saving, in a word, more respect for the environment.

Disposal and recycling:

FENIX NTM does not require any particular treatment for disposal processes. Thanks to its cellulose content, at the end of its life cycle, the material can be disposed of as panel material or being just cut to smaller pieces, with CER index 030199 "Not otherwise specified waste" or sent for energy recovery in incinerators authorised for urban waste in compliance with applying regulations. Due attention must be taken to apply the correct CER Index and to follow the regulations on disposal when the material has been processed and used to create items and composites by the customer. For instance, inside Arpa Industriale factory, wastes of FENIX NTM are used as fuel to produce the energy necessary for production. Residual ashes can be treated as solid urban waste (EAK Code 120105).

FENIX NTM®

2. MAINTENANCE AND CLEANING

Thanks to the technologies used, FENIX NTM – besides its main properties of matt surface, anti-fingerprints, soft touch and thermal healing of superficial micro-scratches – stands out for specific properties, such as: extreme ease of cleaning, high inhibition of bacteria and mould growth, high resistance to rub, scratches and abrasion, as well as acid solvents and household reagents. These properties facilitate normal cleaning processes and do not require particular maintenance for the material.

2.1 MAINTENANCE





FENIX NTM surface should be cleaned regularly but does not require any particular maintenance. Almost all normal household cleaning products or disinfectants are perfectly well tolerated (household degreasers rinsed with warm water).

For the daily cleaning, it is suggested to use a melamine foam sponge, also known as magic sponge.

In case of dirt which cannot be cleaned with normal household detergents, due to the irregular topography and close surface of FENIX NTM, the use of non-aggressive aromatic solvents (acetone) is suggested. In case of micro scratches, please refer to the specific surface thermal healing instructions.

2.2 CLEANING RECOMMENDATIONS

The tables below show the cleaning products and the recommended methods to the different types of dirt.

Type of dirt	Recommended cleaning product
 <p>Syrup, fruit juice, jam, spirits, milk, coffee, wine, soap, ink</p>	 <p>1. REMOVE stains using a degreaser applied on a wet microfibre cloth</p> <p>2. RINSE with microfibre cloth warm</p>
 <p>Animal and vegetable fats, sauces, dry blood, egg, black smoke, gelatine, vegetable and vinyl based glues, organic residues, gum, arabic</p>	 <p>1. REMOVE using kitchen paper.</p> <p>2. REMOVE stains using a degreaser on a microfibre cloth.</p> <p>3. RINSE using a microfibre cloth and warm water.</p>



Hair spray, vegetable oil, Biro and felt tip pens, wax, foundations and greasy make-up, residual solvent marks, nail polish, spray lacquer, linseed oil, synthetic oil paints, neoprene glues, traces of silicone, limescale deposits.



1. REMOVE stains using kitchen paper and acetone (nail polish remover).
 2. CLEAN using a degreaser on a microfibre cloth.
 3. RINSE using a microfibre cloth and warm water.

2.3 GENERAL PRECAUTIONS

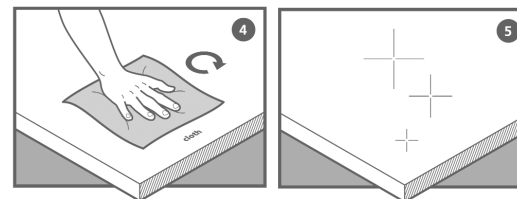
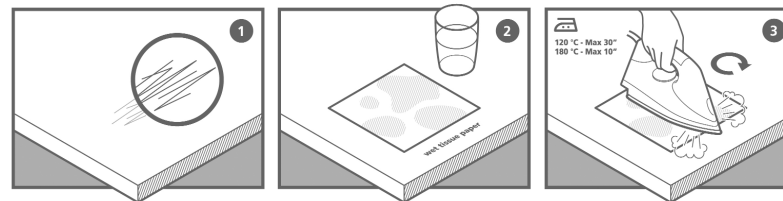
For best results in cleaning FENIX NTM, it is important to remember certain precautions:

- although very durable, the surface of FENIX NTM must still never be treated with products containing abrasive substances, abrasive sponges (extra green abrasive fibre) or unsuitable products media, such as sandpaper or steel wool;
- products with a high content of acid or very alkaline products should be avoided as they could stain the surface;
- when using solvents, the cloth used must be perfectly clean so as not to leave marks on the FENIX NTM surface. In any case, streaks can be easily removed by rinsing with hot water and drying;
- avoid furniture polishes and wax based detergents in general, because they tend to form a sticky layer on the dense FENIX NTM surface, to which the dirt adheres.

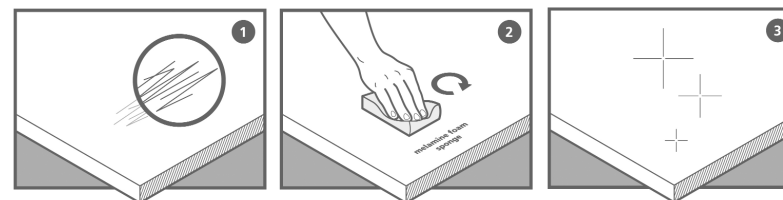
2.4 THERMAL HEALING OF SUPERFICIAL MICRO SCRATCHES

One of FENIX NTM most innovative property is the thermal healing of superficial micro scratches. After the scratch, place a thin paper (kitchen/tissue paper) between the iron and the damaged FENIX NTM surface in order to prevent further scratching produced by the iron. The paper must be damp. Place the iron on the paper on the damaged surface for maximum 30 seconds at 120°C.

After ironing, wipe the surface and dry with a dry cloth (microfiber cloth or kitchen/tissue paper). It has been observed that after 100 cycles of removing superficial micro scratches and repairs using the iron, there is still no evidence of scratches on FENIX NTM surface (scratches made in the same area). If the structure of the material is not permanently damaged, the product can resist to more than 100 repair cycles of superficial micro scratches. Furthermore, small abrasions can be removed using a melamine foam sponge either straight away or after 24 hours.



Maintenance using an iron



Maintenance using a melamine foam sponge

3. STORAGE AND TRANSPORT

Panel transportation and handling should only be carried out using suitable equipment. Panels must always be handled with care to prevent damage to the external surfaces. Even if FENIX NTM is not an inflammable material, fire prevention and protection measures must be adopted as per wood based products.

3.1 STORAGE

Store panels in dry, clean, frost-free rooms.
Place pallets and panels on a flat surface that provides full support.
Keep panels in the original packaging whenever possible.
Remove straps if panels are to be stored for a long period of time.
Prevent moisture from forming between panels.
Do not place moisture-sensitive (paper) layers between panels. Avoid partial (on one side only) exposure to moisture or heat:

1. by removing protective film within 24 hours after packaging has been removed;
2. by stacking the panels one on top of each other;
3. by avoiding gaps between panels, e.g. when panels have been machined. Protective films should always be removed from both sides at the same time.

Due to the type of protective film, contact with direct sunlight should be avoided.

3.2 TRANSPORT (GENERAL INDICATIONS)

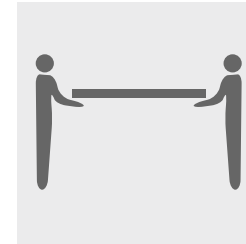
FENIX NTM panels should be handled with great care to avoid breaking and damage. During loading and unloading operations, the panels should be lifted and not slid, unless they are back to back, in pairs. One panel rubbing against another could cause surface scratches or abrasions. Single sheets should be carried with the decorative part facing the carrier's body. In case of large panels, two people are needed to handle them and it is recommended to bend the panels in a lengthwise direction. Prevent dust from depositing on and between panels.
Use adhesive stickers for marking / coding and remove immediately after installation.

3.3 HANDLING FENIX NTM THIN

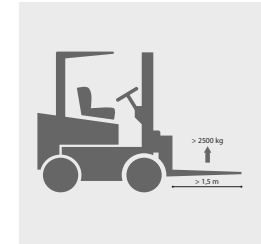
In case of thin panels (0.9 mm thick), individual sheets may be rolled up for handling with the decorative side facing inward to form a cylinder about 600mm in diameter or at least large enough not to damage the panel. To transport stacks of sheets, use platforms of suitable size and stability and secure the sheets using straps or stretch film, in order to avoid dangerous slipping. Secure the panels using straps during transportation. Place corner protections under the metal straps.



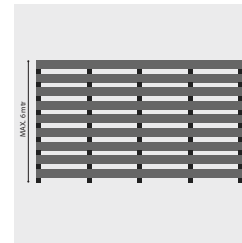
During transportation, the panel decorative side should be facing the carrier's body



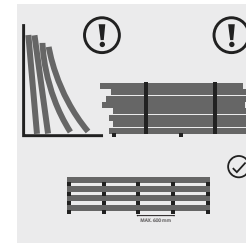
Two persons are always required to handle large sheets.



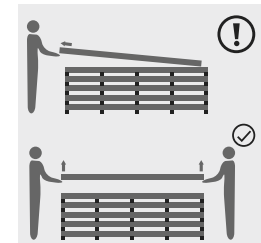
Fork length >1.5m with load capacity >2500Kg



6 m max height for stacking pallets



Correct panel positioning



Panel handling should be carried out by two people



Panels should be stored in sheltered rooms

3.4 TRANSPORTING FENIX NTM SOLID

Secure the panels using straps during transportation. Place corner protections under the straps.

Note regarding panels with adhesive protective film

The protective film is designed to temporary protect the surface from dust, scratches and marks left by handling equipment; they do not protect from corrosion, dampness or chemical agents.

Panels covered with protective film should be stored in a clean dry atmosphere at room temperature (ideally 20°C), avoiding exposure to atmospheric agents and UVA rays.

The protective film should be removed from panel surfaces after application and before the final item.

In case of thick panels with protective film on both sides, the film should always be removed from both sides at the same time. In any case the removal should take place within six months from the date of shipping by Arpa Industriale.

Arpa Industriale shall not accept liability for improper use of panels covered with a protective film nor for any consequences of an incorrect application.

Protective film symbols:

Meaning of "Crossed out sun": the protective film used is photosensitive, therefore storing panels under the sun light is to be avoided.

Meaning of "Arrow": the product has a slight direction, which is only visible under some light conditions.

Direction is indicated on product packaging for extra precaution.

FENIX NTM®
fenixntm.com



FENIX NTM®
fenixntm.com

FENIX NTM®

4. PRECONDITIONING

4.1 HOW TO PREPARE FENIX NTM PANELS AND SUBSTRATES

FENIX NTM panels are composed of 60/70% cellulose fibre. They are very sensitive to temperature variations and above all, to humidity variations that can cause dimensional movements. Dimensional changes of FENIX NTM panels can be different from those of the support and so cause warping of the finished panel. This inconvenience can be solved by:

- pre-conditioning of both support and panels, before gluing;
- balancing the composite panel so that both sides are made of panels with identical properties;
- ventilation and humidity control of the room where the composite panel is installed;
- installing the panel so that to allow its dimensional changes, if any.

Pre-conditioning

In order for FENIX NTM panels and substrate to reach a balanced and constant level of humidity, both the panel and substrate need to be pre-conditioned at the same time before gluing.

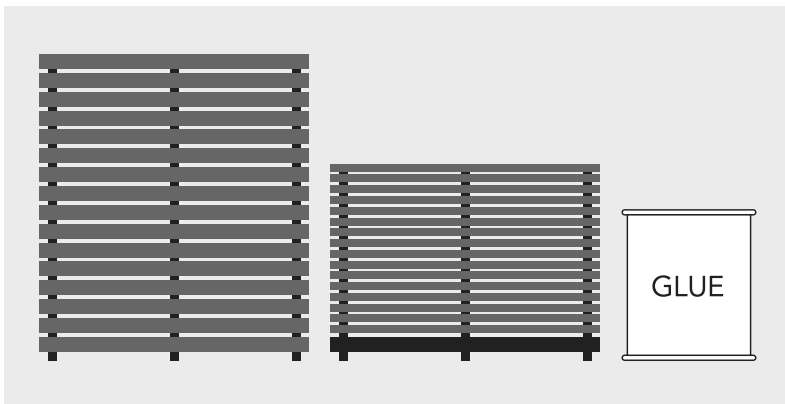
This operation makes it possible to reduce any differences in the materials to a minimum, particularly in case of changing environmental conditions that generate tensions. Solutions imply either "cold" or "hot" techniques.

Cold pre-conditioning Method A

Panels and substrates are stacked together for at least three days in a room where humidity and temperature conditions are similar to those of the place where finished panels will be installed. If these panels are installed in a warm place with constant low humidity, their components should be conditioned in a warm and dry atmosphere to avoid subsequent shrinking.

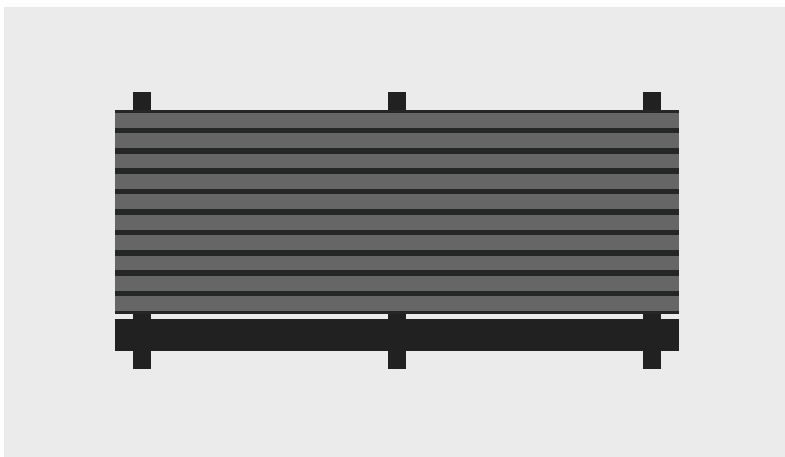
Method B

Panels, substrates and glue should be placed for about ten days in a room with a temperature ranging between 18°C and 20°C, with a humidity percentage of 50% and a good air circulation.



Method C

FENIX NTM sheets that constitute the opposite sides of the same panel are stacked back to back, in pairs, for at least three days in a dry room, until they reach a similar degree of humidity. After gluing, each movement caused by humidity variations will be similar in size and direction on each side of the panel, thus reducing the risk of warping. With this method, conditioning of the substrate in the same place is not required.



Hot pre-conditioning

FENIX NTM sheets are arranged in pairs, spaced apart, in order to allow hot air to circulate. Duration and temperatures will vary depending on the type of glue used (for example, 10 hours at 40°C or 6 hours at 50°C).

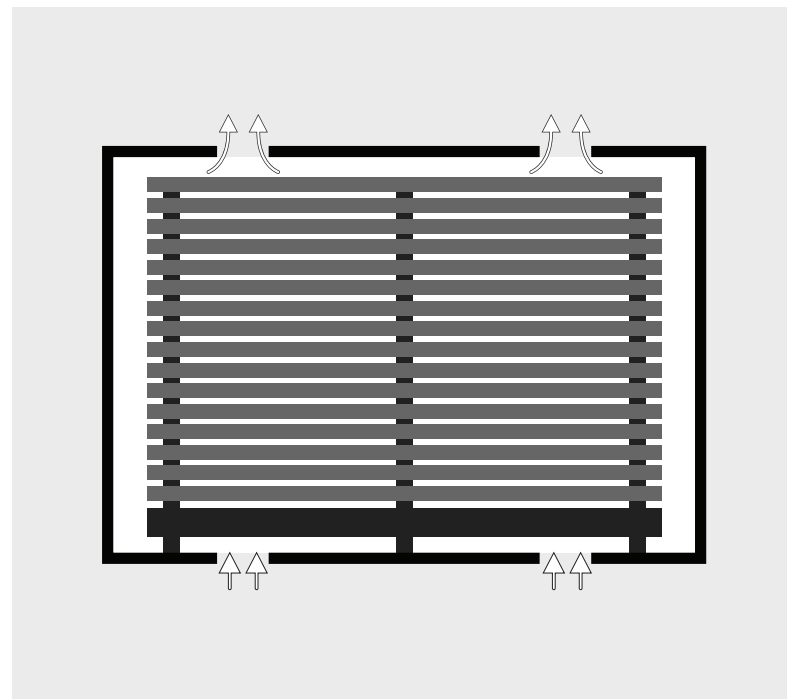
Should it be necessary to speed up the operation, the panels can undergo an accelerated partial drying process, by placing them, separated by battens, in a small heated room, for about 3 hours at a temperature of 40°C or for 2 hours at a temperature of 50°C.

To speed up the operation even further, a heat press can be used whereby panels are processed in two at a time (face to face) for about ten minutes. Gluing should be carried out a few hours later.

Please note: These guidelines apply when weather conditions at the panel's intended location are temperate.

For extreme conditions, it is advisable to refer to Arpa Industriale assistance service.

If the composite panel's final destination is one with low relative humidity, it is advisable to pre-condition both the substrate and the panel at a similar relative humidity and at room temperature or at a higher temperature for a shorter period; e.g. 20 hours at 40°C or 10 hours at 50°C. It is never advisable to exceed 50°C. Gluing should be carried out immediately after pre-conditioning, strictly in accordance with the manufacturers' recommendations.



Sheet balancing

For a correct sheet balancing, the same type of panel FENIX NTM should be used on both sides (thickness 0.9 mm or 1.2 mm - and if possible from the same production batch).

Stresses may occur between two different materials bonded together.

To avoid subsequent distortion in the resulting panel, it is therefore desirable to use materials with identical properties on both sides, subject to the same dimensional changes in relation to environmental variations. This is an essential strategy, especially if the panel is self-supporting or not directly supported by a rigid structure.

The larger the area to be clad, the more essential it is to consider these factors: choice of the most appropriate sheets for balancing the panel, density, symmetry and the rigidity of the substrate.

Ideally the panels to be used for both sides of the finished composite panel should be taken from the same sheet or from panels of the same type, thickness, colour and production batch and from the same manufacturer.

It is important that the two panel sides are cut in the same direction, i.e. in the direction of the paper, which is the same as the direction of sanding. In this way, the dimensional movement of the panel will, in fact, be minimal compared with what would occur if the sides were cut in the opposite direction.

Although not recommended because the risk of warping cannot be totally ruled out, it is possible, in standard and non-critical applications, to use materials other than FENIX NTM on one side of a composite panel provided they are designed to create a correct balancing (HPL Arpa with 1.0 mm thickness for FENIX NTM 0.9 mm and HPL Arpa > 1.2 mm thickness for FENIX NTM 1.2 mm). Naturally, it is important to choose materials with physical properties more similar to those of FENIX NTM, as the more these differ from those of FENIX NTM, the more likely it is that stresses will be created due to the lack of symmetry.

Ventilation and humidity control

Both FENIX NTM Thin and Solid sheets are always covered with protective film on both sides as standard supply by Arpa Industriale.

To store them properly, the protective film should never be removed from just one side.

It is also important to remember that FENIX NTM panels and wood fibre substrates are materials that are sensitive to humidity variations in the air. FENIX NTM for example, expands by about 1.5 mm per linear metre in both length and width directions. So adequate space for expansion should be envisaged between one sheet and the next.

FENIX NTM®

5. PROCESSING FENIX NTM THIN

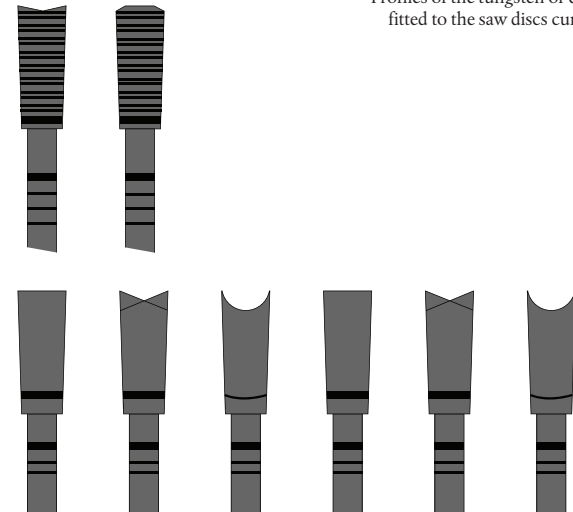
Processing FENIX NTM Thin is explained in details in the following chapters: cutting, milling, drilling, edging and gluing.

5.1 HOW TO CUT FENIX NTM THIN

FENIX NTM Thin should preferably be cut with saws using blades with tungsten carbide inserts; these are long-lasting, but must be handled with care as they can easily be damaged if they come into contact with metal surfaces.

Cutting by hand

Hand-held circular saws are used only in certain circumstances, where on-site work is required. The tool must be well sharpened so that great pressure is not required, thus reducing the risk of chipping and / or cracking the material. The operation should always be carried out in compliance with codes of practice and safety regulations.



Profiles of the tungsten or diamond inserts fitted to the saw discs currently available

Cutting with bench machinery

This essentially entails circular saws.

To get good results with bench circular saws it is essential:

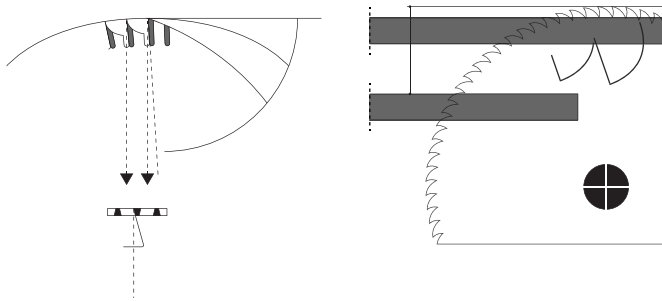
- to place the FENIX NTM panel with the decorative side in the opposite direction to the rotation of the blade. In addition, the sheet must be well supported and secure with an adjustable height pressure tool to prevent movement and vibration.
 - To use an accurate guide.
 - To make sure that the saw blade is aligned with the worktop and has the right protrusion.
- It is also possible to cut several sheets together. In the case of panels with decoration on one side only, all sheets should be placed with their decorative sides facing upwards. Alternatively, the stack of sheets should be placed on a "sacrificial panel" that has the same or superior hardness and texture as those being cut to shape.

Recommended specification for circular saws:

- Tooth pitch, 10 to 15 mm
- Cutting speed, 3,000 to 4,000 rpm
- Tip speed, 60 to 100m/s
- Forward speed, 15 to 30m/min.

The blades should not be too thin; if they are less than 2mm thick, they lose rigidity and then vibrate, making the cut less precise.

Blade forward outline



Cutting composite panels

Everything mentioned so far also applies to the cutting of composite panels with the decorative part glued onto one or both sides of the substrate.

In this case too, band saws are not recommended.

Best results are achieved using fixed circular saws fitted with scribes and by carefully adjusting the blade height.

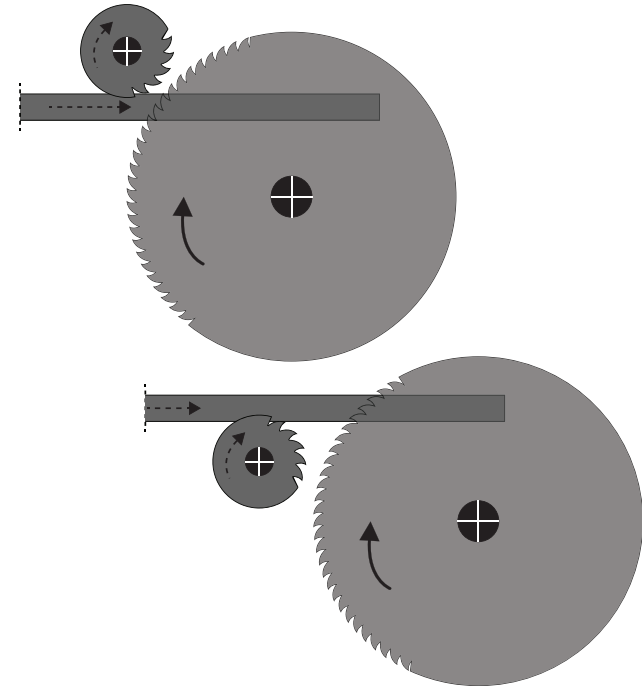
The quality of the cut also depends on the profile and the number of teeth, the tip speed, the forward speed and the blade's angle of entry and exit.

For cutting composite panels it is recommended:

1. to choose the most suitable blade
2. to use a low forward speed and not to "attack" the material
3. to operate a dust suction unit during processing.

Operations should be carried out in compliance with codes of practice and safety regulations.

Circular saws with a scoring blade



5.2 MILLING

Depending on the circumstances, milling can be carried out in various ways, using hand-held tools or fixed equipment.

Milling with hand-held tools

For an accurate job it is always essential to use machining centres.

Hand-held cutters, as well as belt sanders or grinding wheels, are used especially to trim the projecting edges of panels already glued onto a support. In this case, the base of the cutter must be covered with felt to protect the decorative finish side during the work.

The laminate surface should be cleaned of any dust and grit and it is essential to remove the chips during the operation, by suction.

For the machined part to be properly finished, a rotation speed of at least 20,000 rpm is required.

Cutters with two blades, one straight and one tilted, are suitable both for a square cut and for chamfering. To avoid damaging the tools, the section of panel to be milled should not project beyond the support by more than 2 to 3mm.

For continuous operations or for major jobs, the use of power tools with parallel blades is recommended.

Milling with fixed equipment

Milling machines or wood machining centres with spindles with interchangeable blades can be used. The recommended tool attachments are: cutters, discs or bits in solid tungsten carbide or in steel with tungsten carbide or diamond inserts, and with one or more vertical or angled teeth.

In the case of curved edges, it is better to cut out the rough shape required first, leaving a 1mm surplus.

The next step will be milling to the finished shape required.

Smoothing by hand

To finish the edges or chamfer the corners by hand, various tools such as files or sandpaper can be used.

To trim the edges or chamfer the sharp corners, square (rather than milled) files are used, making sure to use them in a direction away from the decorative side towards the core.

It is also possible to use fine files or abrasive paper (100-150 sandpaper) and dual speed scrapers. To avoid scratching the surface, it is important to proceed gently and possibly in two stages: first with a coarser and then with a finer sandpaper.

5.3 DRILLING

The techniques shown apply both for drilling individual FENIX NTM sheets and for drilling panels that are already glued to a support.

These operations should also be carried out in compliance with codes of practice and safety regulations. For best results and to avoid the risk of future splits or cracks, it is important to bear in mind the following:

- Holes for screws should have a diameter at least 0.5mm greater than the diameter of the screw itself. This is because the screw must have some “play” in all directions without touching the edges of the hole, to allow for slight dimensional movements in the panel caused by changes in environmental conditions and to avoid cracks appearing around the hole itself.
- The drill speed should never be such as to overheat the surface of the decorative panel and damage it.
- To avoid splintering the material around the drill bit exit hole, it is recommended to place the panel on a hardwood board.
- To prevent round head screws as well from “gripping” too tightly, plastic or rubber washers can be used.
- After drilling, it is advisable to check that the edge of the hole is clean and smooth. If this is not the case, carefully rectify it because any micro-spalling can lead to cracking in the future.

Drilling tools

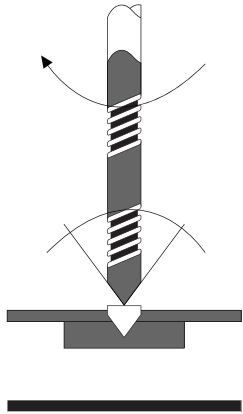
The choice of tools depends on the size of the hole that has to be made. Basically it involves hand tools, pillar tools or a machining centre that can mill as well as drill.

a) Twist drill bits

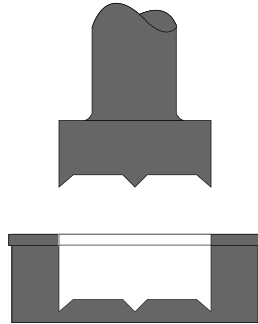
The most suitable bits for drilling FENIX NTM panels are special steel twist drills bits for plastics, with a tip angle of 60° to 80° (rather than the 120° of normal metal bits), a sharp helix angle and a wide flute for rapid chip removal. The recommended rake angle is 7° with an 8° angle of attack.

b) Hole cutters

These are recommended for larger holes.



Drilling using a twist drill bit



Drilling using a hole cutter

How to make internal cuts

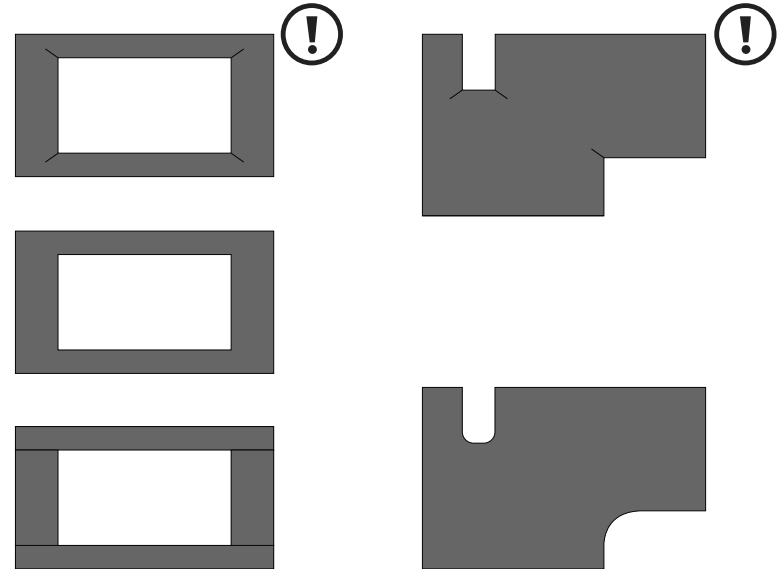
The following refers both to FENIX NTM panels and to composite panels with FENIX NTM sheets applied to one or both sides.

When carrying out internal fretwork, it is important to know that right angled cuts may cause breakage or cracking of the material. In order to avoid these, all the corners of the internal cut-outs should be evenly rounded, polished and brushed to remove any chips. The inner radius of the rounded corner must be as large as possible.

For internal cut-outs with side dimensions of up to 250 mm, the rounding of the corners should create a radius of at least 5 mm. If the length of the cut is greater, the radius of the corners should be greater too. Before cutting the side of the opening, it is better to form the interior angles directly with the milling machine or drill, rounded to the required radius.

If the design requires interior right angles, this should be achieved by assembling FENIX NTM panels together at each corner with butt joints.

Right angle cut-outs can cause breakage or cracking in the panel



Interior trim corners should be rounded

5.4 EDGES

FENIX NTM panels, in the Thin version, can be edge-banded using the same colour with 1.2 mm thickness ("Theme core") or using ABS/PP edge-banding strip developed in partnership with manufacturers of edge-banding material (e.g. Rehau and Döllken). A polyurethane glue should be used for edge-banding 1.2 mm thick FENIX NTM panels. ABS or polymer edge-banding strips can be glued using hot-melt glues, with new laser systems or with air systems.

FENIX NTM Colours	FENIX NTM Code	Edge banding	Dollken edge code*	Rehau edge code
Bianco Malè	0029	PP	82P3	71409
Bianco Malè	0029	ABS	49U3	91470
Bianco Alaska	0030	PP	91U8	71385
Bianco Alaska	0030	ABS	94M2	78828
Bianco Kos	0032	PP	90W3	71024
Bianco Kos	0032	ABS	75W1	78919
Rosa Colorado	0716	PP	upon request	2989E
Rosa Colorado	0716	ABS	50U0	140127
Castoro Ottawa	0717	PP	02V1	2934E
Castoro Ottawa	0717	ABS	57U0	140037
Grigio Londra	0718	PP	94U9	2935E
Grigio Londra	0718	ABS	56U8	140040
Beige Luxor	0719	PP	43V8	2955E
Beige Luxor	0719	ABS	49U9	73142
Nero Ingo	0720	PP	87N3	2856E
Nero Ingo	0720	ABS	65U3	98522
Blu Delft	0721	PP	00W9	2990E
Blu Delft	0721	ABS	50U3	140128
Grigio Bromo	0724	PP	90W5	71406
Grigio Bromo	0724	ABS	75W2	71406
Grigio Efeso	0725	PP	90W6	71407
Grigio Efeso	0725	ABS	76W8	71407
Zinco Doha	2628	PP	78V3	2956E
Zinco Doha	2628	ABS	80U1	2956E
Bronzo Doha	2629	PP	78V2	2933E
Bronzo Doha	2629	ABS	56U6	2933E
Piombo Doha	2630	PP	02W7	2970E
Piombo Doha	2630	ABS	58U2	2970E
Titanio Doha	2638	PP	90W4	upon request
Titanio Doha	2638	ABS	66W8	2864W

* All Dollken edges have printable surfaces (DC).

The Edging Equivalences data sheet can be downloaded from fenixntm.com

5.5 BENDING

0.9 mm FENIX NTM can be cold bent with radius not below 15 cm using “form-counter form” / “mould-counter mould” systems. We recommend hot bending using dynamic postforming machinery because the acrylic surface of FENIX NTM panels, in case of processing operations as those indicates, can be subject to superficial micro-cracking on the decorative part.

5.6 PRODUCTION OF COMPOSITE PANELS

FENIX NTM Thin is a semi-finished product that requires gluing onto a substrate in almost all its applications

Substrates

The substrate supports the panel and must resist distortion. The substrate should therefore be selected according to the characteristics of the application, the intended use of the composite panel and the environment in which needs to be installed according to the following characteristics:

- stability
- planarity
- rigidity
- mechanical properties
- uniformity of thickness
- resistance to water and humidity
- fire performance properties

For the surface of FENIX NTM panels to appear perfectly smooth and uniform, the surface of the substrate should also be of similar conditions. Imperfections on the substrate, in fact, tend to be transferred to the panel surface, especially if the sheet is very thin.

Plywood, chipboard and MDF panels are generally excellent substrates because they experience similar dimensional movements to FENIX NTM panels, as they are themselves made of cellulose.

In other cases, metal or mineral-based, kraft paper and foam plastics substrates are used instead.

Adaptability of substrates

The table below contains a list of substrate materials that can be combined with FENIX NTM panels and their degree of adaptability.

Recommended substrates

Substrate	Degree of adaptability
<p>Panel of particle board</p> <p>(Chipboard)</p>	<p>Fixing methods depend on the thickness of the composite panel. The structure of chipboard (chip shape, resin content, density etc.) greatly influences its surface quality and characteristics.</p> <p>The most appropriate chipboards for bonding to decorative laminates are multilayer chipboards.</p> <p>P3 EN 312-3 type chipboards are an ideal backing for FENIX NTM in dry climate areas and can be produced also with fire-repellent properties.</p> <p>P5 EN 312-5 type panels are more resistant to moisture and can be installed in areas of greater humidity.</p> <p>To avoid damage due to shrinkage and distortion, the panels should be sanded evenly on both sides.</p> <p>Panels must meet the minimum requirements of the standards. The nominal density should be no less than 650kg/m³.</p>
<p>Medium or high density fibreboard (MDF - HD)</p>	<p>They should be sanded before bonding. (usually carried out by the manufacturer) They are made using a dry process and use synthetic resins for bonding the wood fibres together; they have a uniform structure and a fine texture that enables well-shaped finishes to be achieved, with smooth edges.</p> <p>They can be treated to increase fire and moisture resistance. Their nominal density should be no less than 800kg/m³.</p>
<p>Plywood panels</p>	<p>Thin panels are not self-supporting. Fixing techniques depend on the thickness of the composite panel. Low density plywoods in hardwood such as poplar are particularly suitable for bonding to FENIX NTM panels.</p>
<p>Laminboard panels</p>	<p>Laminboard panels are suitable only if formed of narrow enough strips. Otherwise, surface undulations may appear in low humidity conditions.</p>
<p>Honeycomb structure substrates</p>	<p>These can be used as internal components of a substrate or combined with a frame.. They can be made of wood, metal, impregnated paper, cardboard (recycled or otherwise), polycarbonate or polypropylene.</p> <p>In aluminium, they are ideal for creating panels that are both rigid and lightweight, with FENIX NTM panel coating on both sides. They come in different thicknesses and various cell sizes and are bonded with epoxy resin-based adhesives.</p> <p>In non-impregnated Kraft paper - they are generally used as a core in plywood sandwich panels or panel doors; they are also used with direct lamination in applications where weight restrictions or impact resistance are more important.</p> <p>Impregnated Kraft paper - resists moisture better when impregnated and is normally used in small cell formats. Plastics such as polycarbonate and polypropylene are durable, light and not sensitive to moisture.</p>
<p>Tempered glass</p>	<p>A likely support onto which FENIX NTM can be applied is tempered glass to obtain uniform colours, also on the edge of the glass panel, it is suggested to use specific polyurethane glues in combination with the paint on the balancing side of the support.</p>

Non Recommended substrates

Substrate	Degree of adaptability
<p>Mineral-based substrates</p>	<p>Concrete, calcium silicate or vermiculite panels. There are several non-combustible substrates, mostly calcium silicate-based. FENIX NTM panels must only be used on substrates made of a unique block because these are more resistant to delamination.</p>
<p>Metal substrates</p>	<p>Metals have different dimensional movement compared with FENIX NTM panels. Aluminium and steel are suitable substrates if their surface is prepared carefully before bonding the FENIX NTM panel to it (with PUR or epoxy glue).</p>
<p>Foam plastics (polystyrene, PVC, polyurethane, phenol based, etc)</p>	<p>Rigid foams are self-supporting substrates with good thermal insulation; they are suitable substrates for direct lamination. Phenolic foams have good fire resisting properties. They can also be found as the "core" in timber frames.</p>
<p>Plaster or concrete surfaces</p>	<p>The uneven surfaces of these substrates do not normally lend themselves to the direct application of panels. In addition, the dimensional movements of the materials are mostly incompatible.</p>
<p>Simple plaster or wallpaper surfaces</p>	<p>The dimensional movement of the panel on the paper could result in breakage.</p>
<p>Solid wood</p>	<p>This is unsuitable. The irregular dimensional movements cause surface undulations. As a substrate for panels, it can only be used in small areas.</p>

How to bond FENIX NTM panels to substrates

Firstly, prior to bonding, the panel surfaces and substrates should be thoroughly cleaned of any dust, grease or other particles of other material that could cause defects or stains.

Bonding temperature

Normally, bonding is best carried out at room temperature, but never below 15°C. At higher temperatures the setting time of the glue is reduced. It is advisable to carry out tests to check how the glues react in the particular environmental conditions.

Adhesives

The choice of glue from among the many types available should be determined by the type of substrate and the purposes of the finished product.

Classification of adhesives

Based on their reaction to heat:

- Thermoplastic adhesives. They soften with heat. This group includes chloroprene and neoprene-based glues, those based on PVAc (polyvinyl acetate), silicones, acrylics, thermo-melting (hot melt) and special glues.
- Thermosetting adhesives. These harden when heated, after initially softening. Belonging to this group are glues based on urea and formaldehyde, melamine and formaldehyde, resorcinol and formaldehyde, as well as phenolic and polyurethane (one or two-component PUR) glues, polyester and epoxy resins.

Based on method of application:

- High-pressure adhesives
 - a) High pressure and long duration. Pressure is exerted by a mechanical or hydraulic press on the panel and substrate which are in full contact and at a set temperature, Belonging to this group are PVAc, acrylic, urea and phenolic based glues as well as resorcinol and formaldehyde-based glues.
 - b) High pressure and short duration. Pressure is exerted for a short time (static pressure contact adhesive), but distributed evenly by hammering or using a rubber roller, in other words placing a load on the panel being built. Belonging to this group are: Neoprene - Chloroprene - PVAc B2-B2.
- Low pressure adhesives
 - a) Low pressure and long duration. Polyester-based glues, PUR polyurethane glues, Epoxy glues
 - b) Pressure exerted and short duration

Thermo-melting (hot melt) glues, (to be applied with special equipment)

Bonding with presses

There are two possible methods of bonding with presses:

- with cold presses. These can be used with steel sheets and limited pressure.
- with hot presses. These can be used with stainless steel sheets, by placing a sheet in every empty compartment.

Hardeners

Neoprene-based adhesives are used with a hardening agent, which increases the heat resistance of the glue. Thermosetting adhesives are used with accelerators and catalysts, which ensure a good hold, reducing the temperature and the period of application.

Types of adhesives

Thermoplastic adhesives

Neoprene/ Chloroprene	Polychloroprene based, available in solvent or in aqueous solution; with OR without hardener.
PVAc	Polyvinyl acetate- based emulsion. Available as one or two-component glue: the latter shows greater resistance to heat and humidity. If the substrate is compact and uniform, this ensures a good bond, being easy to use and fast setting. Being liquid, it should be distributed carefully over the surface to prevent fibres or chips from lifting at a later stage.

Acrylic compounds

Silicone

Hot melt (Thermo-melting)	Almost exclusively used for bonding edges and assembling pieces. They must not be used near hot surfaces.
--------------------------------------	---

Thermosetting adhesives

Urea glues (UF)	Urea and formaldehyde-based. Durable and resistant to high temperatures but with poor water resistance. Applied with presses at high temperatures.
Melamine glues	Synthetic resins obtained by polycondensation of formaldehyde with melamine. Water, abrasion and heat resistant with considerable transparency to light radiation.
Resorcinol and formaldehyde-based glues	Use with hot or cold pressure for bonding the panel to moisture-resistant and some fire-resistant substrates. Good weathering resistance.
Phenolic glues	Resistant to water, weathering and high temperatures. They reduce considerably in volume while setting.
Polyurethane glues	These are strong and flexible and adhere well to smooth or porous surfaces; they withstand low temperatures better than other glues, while not tolerating high temperatures well. They have good cavity-filling properties. One or two-component, they are excellent for bonding panels to difficult substrates such as polystyrene, metal, plastics, etc.
Polyester	This is more sensitive to heat than other adhesives.
Epoxy resins	These bond well to many materials and require only a light pressure. The wide range of hardeners available for epoxy glues allows setting times that range from a few seconds (if the temperature is high) to many minutes or hours (at room temperature). They are resistant and durable, have good cavity-filling properties and reduce very little in volume after drying.

Glues and substrates

Substrates	Thermoplastic Adhesives				Special Glues
	Neoprene Chloroprene	PVAc	Silicone <small>Acrylic compounds</small>	Hot melt <small>Acrylic compounds</small>	
Wood Based	• <small>Treatment cold</small>	• <small>Treatment hot</small>		•	
Paper Based with honeycomb structure	• <small>Treatment cold</small>	• <small>Treatment hot</small>			
Plastic foam based or honeycomb materials Polystyrene			•		
PVC	•		•		
Phenol- formaldehyde	•	•			
Polyurethane	•				
Metal based sheet or honeycomb structure	•			•	
Mineral substrates in sheets or plaster based foams		•			
Concrete	•	•			
Concrete foam	•	•			
Glass foam	•	•			

Glues that can be used according to the type of substrate

Substrates	Thermosetting adhesives						
	Urea glues UF	Melamine glues	Resorcinol and formaldehyde based glues	Phenolic glues	Polyurethane glues	Polyester	Epoxies
Wood	•	•	•	•	•	•	•
Paper with honeycomb structure	•	•	•	•	•	•	•
Plastic foam or honeycomb materials: Polystyrene					•		•
PVC					•		•
Phenol formaldehyde	•	•	•	•	•	•	•
Polyurethane					•	•	•
Metal in sheets or honeycomb structures			•		•	•	•
Mineral substrates in sheets or plaster-based							
Concrete					•	•	•
Concrete foam					•	•	•
Glass foam					•	•	•

Gluing

For best results and to prevent the risk of undulations, surface distortions (or blisters) and cracking, certain precautions can help.

- Pre-condition the panel in temperature and humidity conditions similar to those where it will be installed.
- Avoid the use of, especially hand-applied, contact adhesives if the panel is to be installed in rather damp areas.
- Use contact adhesives only if the panel is no more than 60 cm wide, applying it evenly to both surfaces in not too thick a layer.
- Cut the longer side of the composite panel lengthwise of the sheet, parallel to the direction of sanding. FENIX NTM dimensional movements are in fact smaller lengthwise than crosswise.

FENIX NTM®

6. PROCESSING FENIX NTM SOLID

Given their composition, FENIX NTM Solid panels can expand and shrink. Temperature and humidity on both front and rear sides should not differ over long periods of time. The lower side of horizontal worktops and the rear side of vertical wall coating should therefore be well ventilated. Panel edges should not remain wet for long periods of time. If the panels are secured by means of profiles, these should be provided with draining elements. When fixing panels it is important to envisage a maximum movement of 2.5 mm/m². Drill holes and joints should be dimensioned accordingly. Do not tighten screws too much in order to allow the panels a minimum clearance.

Conditioning

FENIX NTM Solid panels should be conditioned before processing and installation so that they can reach a balanced condition in their environment.

6.1 GENERAL PROCESSING GUIDELINES

Machined panels should be processed exclusively by a professional of the sector with suitable tools. The homogeneous composition of the material makes it possible to machine both sides and the surface. FENIX NTM panel machining is similar to that of high quality hardwood. The hardness of the panels makes greater demands on tools than when machining materials composed of softwood. The use of hard metal tools is recommended. Diamond-tipped tools are recommended for large sized elements. This ensures a very good finish and a long tool life.

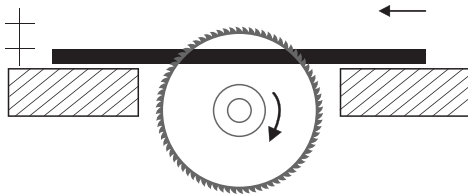
Health and safety

Please note that serious dangers are inherent with the use of (carpentry) machinery. In any case, it is recommended to strictly follow the guidelines of the machinery manufacturers and the recommendations of workplace safety bodies.

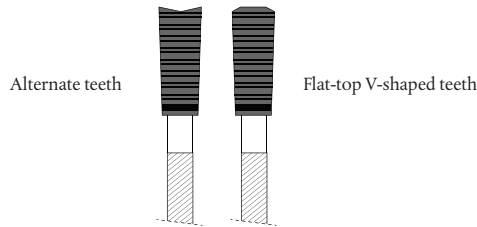
6.2 HOW TO CUT FENIX NTM SOLID

The following general guidelines apply to cuts made onto FENIX NTM panels using circular saws.
Feed: 7 - 22 m/min (23 - 72 ft/min).
Teeth: alternate or flat-top V-shaped teeth

Positioning: always position the teeth on the decorative side of the panel. Edge cutting: best results are obtained using bench machinery. Sharp edges can be rounded by means of sandpaper or a milling machine. Rake angle: best performance are obtained with a 45° rake angle. Use rubbers shims to prevent the panels from sliding in case the machine is not equipped with a mobile work top.



Saw blade height adjustment



Bench circular saw

Keep decorative side facing upwards when saw cutting, drilling and milling. When a decorative side must be slid over the machine's worktop while machining, it is recommended to place a protective panel, for example of hardwood, on the worktop.

Diameter		Teeth	Rpm	Thickness of the blade		Blade height adjustment	
mm	inch			mm	inch	mm	inch
300	~12	72	~ 6 000/min	3,4	~ 1/8	30	~ 1
350	~14	84	~ 5 000/min	4,0	~ 3/16	35	~ 1
400	~16	96	~ 4 000/min	4,8	~ 3/16	40	~ 1

Hand-held circular saw

When using a hand-held circular saw, the panel side with no pigment should be turned upwards.

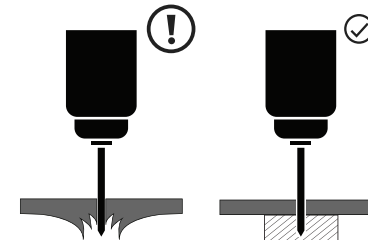
Diameter		Teeth	Rpm	Thickness of the blade		Blade height adjustment	
mm	inch			mm	inch	mm	inch
150	~6	36	~ 4 000/min	2,5	~ 1/8	15	~ 5/8
200	~6	36	~ 4 000/min	3,0	~ 1/8	20	~ 3/4

Jig saw

Jig saw: carbide-tipped, interior corners of cut-outs should be drilled first with 8 - 10 mm (= 5/16 - 3/8 in) hole diameter. Consider the use of a specific jig saw blade for decorative surfaces.

6.3 DRILLING

The use of carbide-tipped HSS-drill bits with 60-80° angle is recommended. FENIX NTM panels should be drilled using support sheets.



Large holes, e.g. for suspension and locking equipment, should be drilled using combination drill bits. The exit speed of the drill bit must be carefully selected so as not to damage the product surface. Shortly before the drill bit exits the work piece in full diameter, the feed rate must be reduced by 50%. During drilling operations, the counter-pressure should be increased using hardwood or equivalent material to prevent the surface from breaking.

6.4 MILLING

Milling shapes:

- straight and slanted bits for cutting edges and bevelling
- hollow or round ground bits for rounded edges
- diamond circular saw blades for grooves

Material:

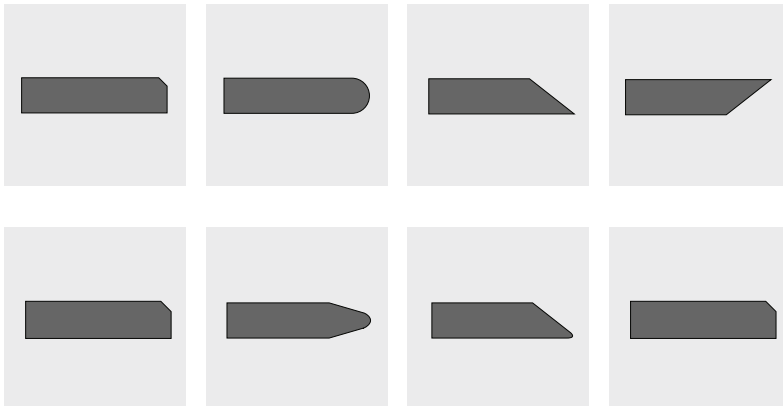
Hard metal or diamond cutters Manually operated milling cutter or spindle moulder:

Diameter		Rpm	Speed		Feed	
mm	inch		m/s	ft/s	m/min	ft/min
20-25	~1	~ 18 000 - 24 000/min	20 - 30	~ 65-100	5	~ 16
125	~5	~ 6 000 - 9 000/min	40 - 60	~ 130-200	5-15	~ 16 - 50

6.5 EDGES / MILLING TEMPLATES

Edges should be safe, free from saw marks and jagged edges. For better appearance it is advised to polish edges. There are several edge treatments for both functional and aesthetic consideration.

Some examples follows:



6.6 GLUEING

FENIX NTM Solid panels can be glued to each other and onto many materials using one or two component adhesives, such as epoxy or polyurethane adhesive systems. Gluing is in many cases carried out together with a mechanical joint to provide sufficient pressure during drying.

Please follow the instructions below for thickening the edges of panels with FENIX NTM Solid strips:

- make sure panels and strips have the same "grain direction"
- pre-condition panels, strips and adhesive in the same way (temperature and humidity preferably adjusted as for future conditions of use)
- remove grease from surfaces to be glued, slightly roughen them and ensure they are dust-free
- strictly follow the instructions provided by the adhesive manufacturer

Type of glue	Application	Open time	Pressure	Set time
Epoxy adhesives	100-250 g/m ²	depending on the type	0,2 N/mm ²	4-8 hrs at 20°C
Polyurethane	100-250 g/m ²	depending on the type	0,2 N/mm ²	4-8 hrs at 20°C

6.7 GUIDELINES FOR PANEL INSTALLATION FENIX NTM SOLID

General installation guidelines

There are two major installation systems for FENIX NTM Solid panels:

- mechanical (screws and rivets)
- chemical (glue).

FENIX NTM Solid can be used as so-called suspended cladding elements. This means that the material is assembled on a supporting sub frame. The panel can be fixed visibly or invisibly. It is important when determining the sub frame to take the following points into account:

- the load-bearing requirements
- maximum fixing distances for the panels
- the necessary ventilation or moisture regulating provisions
- the possibility for panels to move
- the available panel sizes
- the thickness of any insulating layer
- the anchoring options in the building (wall) construction
- the legal requirements.

Corner solutions

When joining 2 panels in a corner it is important to take the panel movement into account. To avoid tension at the joint it is advisable to keep the leg length of the corner element as small as possible (max 400 mm).

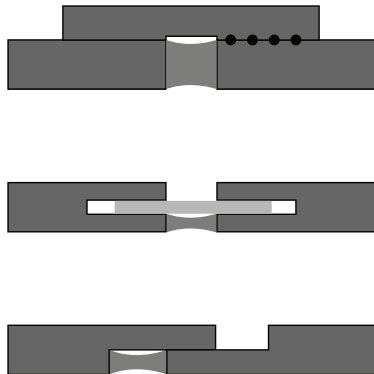
Compact panels can be joined together in corners in various ways:

- glued aluminium or plastic corner profile
- glued aluminium or plastic tongue
- built-in tongue and groove joint with support.

Joints and connections

Solutions for vertical joints include:

- expansion joint
- built-in groove
- rebated joint



In view of possible changes in size as a result of moisture and temperature changes, joints should be left free both for vertical and horizontal connections in such a way that the panel can move by a maximum of 2.5 mm/m. Thanks to the excellent workability of the material, it is possible to accurately seal vertical and horizontal joints without auxiliary profiles. For panel thicknesses from 8 mm upwards it is possible to make connections in the form of rebated joints or as built-in groove connections

Horizontal joints: either built-in groove or rebated joint connections can be used for horizontal joints. Joints must be made in such a way that the panels can move by 2.5 mm/m maximum. The recess in the rebated joint must measure at least twice the width of the joint itself.

Vertical joints: built-in groove connections can be used for vertical joints. Panel thickness on each side of the groove must be at least 2.9 mm. In case aluminium grooves are used, a panel thickness of 8 mm is sufficient.

Joint sealing using mastic

When FENIX NTM panels are used for interior applications where high standards of hygiene are required, wall constructions with airtight seals are often preferred. The joints are then sealed with an elastic mastic.

This sealing material must be mould repellent (ISO 846) and resistant to disinfectants, if it is used in the aforementioned applications. Furthermore, for maximum bond between the sealing material and the panel, it is necessary to avoid draughts, damp, dust and dirt. It is recommended to use FENIX NTM Solid panels in combination with silicone or polyurethane mastic.

Important guidelines for applying elastic sealing material:

- The joint must be absolutely clean, dry and free of grease
- If necessary, a primer should be applied to facilitate bonding
- The sealing material must on no account adhere to the reverse side (bonding on three x sides) because this can cause breakage of the panel. It is advisable to use a separating film or a polyethylene tongue.
- To ensure that the sealing material is not under excessive strain, grout joints should be wide enough and their depth should not be greater than their width.

Visible fixing with screws or rivets

FENIX NTM Solid panels can be fixed to a timber sub-frame structure using fast fix screws or they can be fixed to a metal sub-frame structure using aluminium rivets.

The sub-frame structure must be assembled in such a way that the area behind the panel is ventilated. In this way, the temperature and humidity rate will be the same on both sides of the panel.

When fixing panels with screws or rivets, it is important to ensure that panels can move freely and evenly. The diameter of all pre-drilled holes in the panels must be 8 mm when using fast fix screws that have a diameter of 4 mm. When using rivets with a 5 mm diameter, one hole - centrally positioned in the panel - must be pre-drilled with a 5.1 mm diameter and all other holes must be pre-drilled with a 10 mm diameter. A special nosepiece must be used on the riveting tool to keep the head of the rivet 0.3 mm away from the panel surface.

All joints must be at least 8 mm wide.

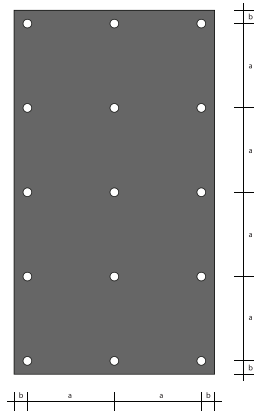
Panel thickness: from 6 mm upward

(For efficiency and performance purposes, a minimum thickness of 8 mm is recommended).

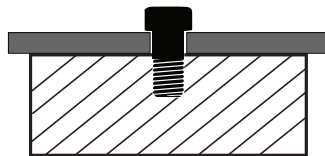
a = horizontal and vertical fixing distance (see table)
 b = edge fixing clearance.
 20 mm minimum
 10 times the panel thickness maximum
 Recommended maximum panel height: 3050mm

Recommended max. fixing centres (mm)	Panel thickness		
	6	8	10
2 fixing in one direction	450	600	750
3 or more fixings in one direction	550	750	900

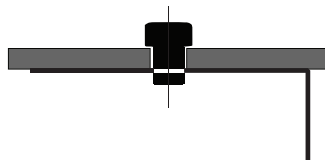
Note: Fixing distances for ceiling application must be multiplied by 0,75.



Visible fixing with screws on wooden supports



Visible fixing with screws on metal supports



Invisible fixing with adhesive

FENIX NTM panels can be fixed onto a timber or metal supports using special adhesive systems that enable dimensional variation of both coating and support. The guidelines of qualified glue manufacturers must be followed in order to achieve high-quality connections. Arpa is not responsible for the selection or use of adhesives in fixing systems.

The sub-frame structure must be assembled in such a way that the area behind the panel is ventilated. In this way, the temperature and humidity rate will be the same on both sides of the panel. The adhesive must be applied only in a vertical direction and always on the full height of the panel.

All joints must be at least 8 mm wide.

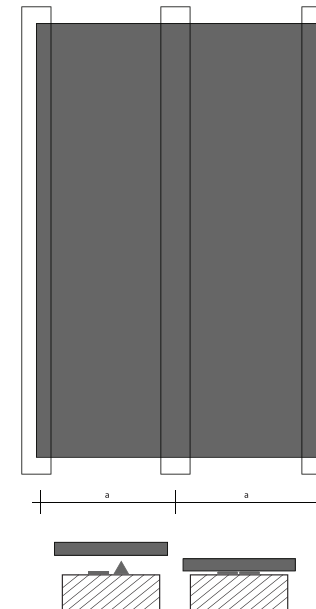
The maximum installation size of the panel is 3050 mm x 1300 mm.

For efficiency and performance purposes, thicknesses under 8 mm are not recommended.

Maximum horizontal fixing distances (a)

Maximum fixing centres (mm)	Panel thickness	
	8	10
2 fixing in one direction	600	650
3 or more fixings in one direction	650	650

Adhesive system including double sided tape for temporary fastening while the adhesive sets:



Horizontal Worktops

FENIX NTM Solid panels are used as worktops or as table tops.

Thickness

Minimum thickness: 10 mm

Panel thickness and fixing distances as well as expected load capacity, are directly linked and must be calculated correspondingly.

Fixing

Assemble using inserts or threaded screws. Maximum drill hole depth equals panel thickness minus 3 mm.

Drill hole diameter in panels should be according to the instructions of the supplier of the fixing means, and capable of withstanding the shank of the screw.

Drill holes in the support construction must allow the panels to move: drill slotted holes or operate so that the diameter of the drill holes equals screw diameter plus 3 mm. If more than two panels are joined together (e.g. for long wall benches), slotted holes of sufficient length should always be made in the support construction.

Support

Steel or aluminium support s should be sturdy and rigid enough to prevent panel warping as a result of the load applied on top of the upper surface. If any other elements are fitted under the panel (drawers, boxes, pipes), then the support must be dimensioned accordingly.

The distance between the support and the processed panel edge should not be under 25 cm.

6.8 INSTALLATION GUIDELINES FOR FENIX NTM

"CUORE A TEMA" (THEME CORE) (BIANCO MALÈ, ALASKA, KOS)

Processing FENIX NTM "Theme Core" is the same as processing FENIX NTM Solid panels. Despite the fact that these products are compatible with most of the tools and techniques envisaged for the processing of normal panels, the use of additional techniques is necessary in order to take advantage of their full potential.

Handling and storage

The composition of FENIX NTM "Theme Core" makes them slightly more fragile than FENIX NTM Solid and they should therefore be handled with care. They should always be stored horizontally. Vertical storage is not recommended given the risk of damaging the edges. Edges and corners are particularly exposed and could be damaged as a result of impacts. Storage conditions are the same as those recommended for normal compact panels.

Machining operations

All traditional tools and machinery used for FENIX NTM Solid panels can be used to the manufacture of FENIX NTM "Theme Core" and it is recommended to follow all the general recommendations regarding machining.

How to cut the panels

Use the same standard equipment as those used for other FENIX NTM Solid products (see chapter 6). Cutting tools and saw blades should always be kept sharp to avoid chipping. Because FENIX NTM "Theme Core" are more brittle, to avoid chipping on the lower side during cutting operations using circular saws, precautions should be taken such as:
Lowering the saw in the bench; reducing the throat of the saw by placing a piece of hardboard under the cut; changing the saw blade for one with negative angle teeth; or simply allowing an extra amount for edge trimming. Large sheets may be cut by scoring but extra care must be taken to prevent shattering.

Gluing

The use of non-pigmented or transparent quick drying adhesives are recommended to achieve a visually satisfactory end result.

Assembly

To obtain a good result when joining 2 pieces of FENIX NTM "Theme Core", it is advisable to use a mechanical fixing system.

LOSS OF STRUCTURE

For design or functionality purposes, different machining and scoring operations can be carried out on FENIX NTM "Theme Core" panels: in this case, please note that the scoring will alter FENIX NTM surface structure and lead to the loss of all specific characteristics of the product.

Arpa Industriale S.p.A.

Via Piumati, 91
12042 Bra (CN) - Italy
Tel. +39 0172 436111
Fax +39 0172 431151
E-mail: arpa@arpaindustriale.com
export@arpaindustriale.com

Filiale di Lissone

Via B. Cellini, 29
20035 Lissone (MB) - Italy
Tel. +39 039 795525
Fax +39 039 2782484
E-mail: lissone@arpaindustriale.com

Filiale di Padova

Via Cesare Battisti, 13
35010 Limena (PD) - Italy
Tel. +39 049 8848105
Fax +39 049 8848004
E-mail: padova@arpaindustriale.com

Filiale di Pesaro

Via dell'Industria, 8/10
Loc. Chiusa di Ginestreto
61100 Pesaro (PU) - Italy
Tel. +39 0721 482295/482012
Fax +39 0721 482292
E-mail: pesaro@arpaindustriale.com

Arpa France S.A.R.L.

50, Impasse de la Balme
69805 Saint Priest - CEDEX - France
Tel. +33 (0)4 78 90 00 23
Fax +33 (0)4 78 90 64 66
E-mail: arpafrance@arpaindustriale.com

Arpa Germany

E-mail: arpadeutschland@arpaindustriale.com

Arpa Industriale Iberica S.L.U.

Calle Ribera, 5
08003 Barcelona - Spain
Tel. +34 932 687 061
Fax +34 931 163 300
E-mail: arpaiberica@arpaindustriale.com

Arpa Nederland B.V.

Nieuw Matheneserstraat 69
3113 AE Schiedam - The Netherlands
Tel. +31 (0)10 2857315
Fax +31 (0)10 2857331
E-mail: arpanl@arpaindustriale.com

Arpa UK Limited

Unit 32, Brookhouse Road,
Parkhouse Industrial Estate West,
Newcastle-under-Lyme,
Staffordshire ST5 7RU - United Kingdom
Tel. +44 (0)1782 561914
Fax +44 (0)1782 561846
arpauk@arpaindustriale.com

Arpa USA

62, Greene Street
New York, NY 10012 - USA
Tel. +1 877 277 2669
Fax +1 877 538 5607
E-mail: arpausa@arpaindustriale.com

FENIX NTM®

DISCLAIMER

The disclaimer that follows is a summary of the applicable full disclaimer (which can be found on arpaindustriale.com). The information provided by Arpa Industriale S.p.A. ("Arpa") in this document is solely indicative. Arpa is unable to warrant the accuracy and completeness of this information. No rights can be derived from the information provided; the use of the information is at the other party's risk and responsibility. This document does not guarantee any properties of Arpa's products. Arpa does not warrant that the information in this document is suitable for the purpose for which it is consulted by the other party. The document does not contain any design, structural calculation, estimate or other warranty or representation that customers and third parties may rely on. Colours used in Arpa's communications (including but not limited to printed matter) and in samples of Arpa's products may differ from the colours of the Arpa's products to be supplied. Arpa's products and samples are produced within the specified colour tolerances and the colours (of production batches) may differ, even if the same colour is used. The viewing angle also influences the colour perception. Customers and third parties must have a professional adviser inform them about (the suitability of) the Arpa's products for all desired applications and about applicable laws and regulations. Arpa reserves the right to change (the specifications for) its products without prior notice. To the maximum extent permitted under the applicable law, Arpa is not liable (neither contractual nor non-contractual) for any damage arising from or related to the use of this document, except if and to the extent that such damage is the result of wilful misconduct or gross negligence on the part of Arpa and/or its management. All oral and written statements, offers, quotations, sales, supplies, deliveries and/or agreements and all related activities of Arpa are governed by the General Terms and Conditions of Arpa Industriale S.p.A. All oral and written statements, offers, quotations, sales, supplies, deliveries and/or agreements and all related work of Arpa USA, Inc. ("Arpa USA") are governed by the Arpa USA General Terms and Conditions of Sale. All intellectual property rights and other rights regarding the content of this document (including logos, text and photographs) are owned by Arpa and/or its licensors.