

altro

Designed for possibilities.  
Made for people.



Featuring new ShieldGrip technology  
and offering unrivalled recyclability

**Altro Transflor Artis™, Altro Transflor Metris™,  
Altro Transflor Sonis™**

Technical performance guide

[altro.com/us](https://altro.com/us)



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# Supporting your steps to net zero transportation

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Advancements in electric and hydrogen powered propulsion vehicles have taken public transport in a positive, cleaner, more sustainable direction. But the reality is, as global bus fleets make the transition to zero emission vehicles, operators find themselves faced with a variety of new challenges from operating new technologies.

The pursuit of cleaner transport demands vehicles be more economical than ever while continuing to deliver the necessary levels of performance required in a high use public space.

Furthermore, to build passenger appeal in the pursuit of increasing ridership, these vehicles have to offer an environment in which people want to travel. A space which is stylish, comfortable and safe.

So, to address all these considerations Altró's latest collection – the all new Altró Transflor Artis™, Altró Transflor Metris™ and Altró Transflor Sonis™ - has been engineered to put you in control of performance delivering our renowned levels of safety with an array of new benefits – including thermal management, acoustic insulation, and weight optimisation – to suit the precise needs of your zero emission vehicles.







No smoking  
No eating  
No drinking  
on this bus

CAUTION ON THIS VEHICLE DOES NOT TURN RED

Altro Transflor Artis™  
Spiced Bamboo  
TFWSA2219F ▶





# Thermal insulation



“The loss of ambient heat in an operational bus occurs largely through its main structure walls, floor, roof and windows. This is thought to be around 78% of total heat loss\*. Most of this heat loss is through windows, however around 8% is lost through the floor.”

\* Chiriac, G., Lucache, D.D., Nițucă, C., Dragomir, A. and Ramakrishna, S., 2021. Electric Bus Indoor Heat Balance in Cold Weather.





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# Thermal management

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Interior temperature is vital to passenger comfort, but high dependency on heating or air conditioning can cause considerable drain on batteries reducing service range. Alto can't control the elements, but we can help keep vehicle interiors comfortable for passengers whatever the weather.

Buses operate in extreme climates all around the globe. As the industry transitions to zero emission vehicles, the ability to maintain efficient temperature regulation is vital. Specifying materials which contribute to insulation aid thermal management and support optimized service range.

Running heating or air conditioning systems naturally requires valuable power. It's therefore essential that - once achieved - an optimum temperature can be maintained. Alto Transflor Metris and Alto Transflor Sonis are engineered to ensure low thermal conductivity to better prevent interior temperature from escaping from the vehicle. They also have high thermal resistance which works to stop the outside temperature from creeping in.

So, whether your vehicle is faced with the bitter cold of winter or the blazing heat of summer our floors can help to enhance passenger comfort.

## Insulation measures for thermal management

**Thermal conductivity** is perhaps the more commonly referenced measure in terms of a material's thermal insulation. This refers to the level with which temperature can be transferred through a material. Materials with low conductivity offer better insulation against heat and cold.

**Thermal resistance** is the reciprocal of thermal conductivity, so refers to the capacity for a material to limit the transfer of temperature. Therefore, materials with a high thermal resistance are more adept at preventing heat (or cold) from entering or escaping the vehicle.



# Acoustic insulation

The transition to zero emission vehicles from internal combustion engines has changed the sounds experienced by the travelling passenger. In the absence of the constant low frequency rumbling of a diesel engine, a symphony of new, previously masked sounds is now audible throughout the vehicle.

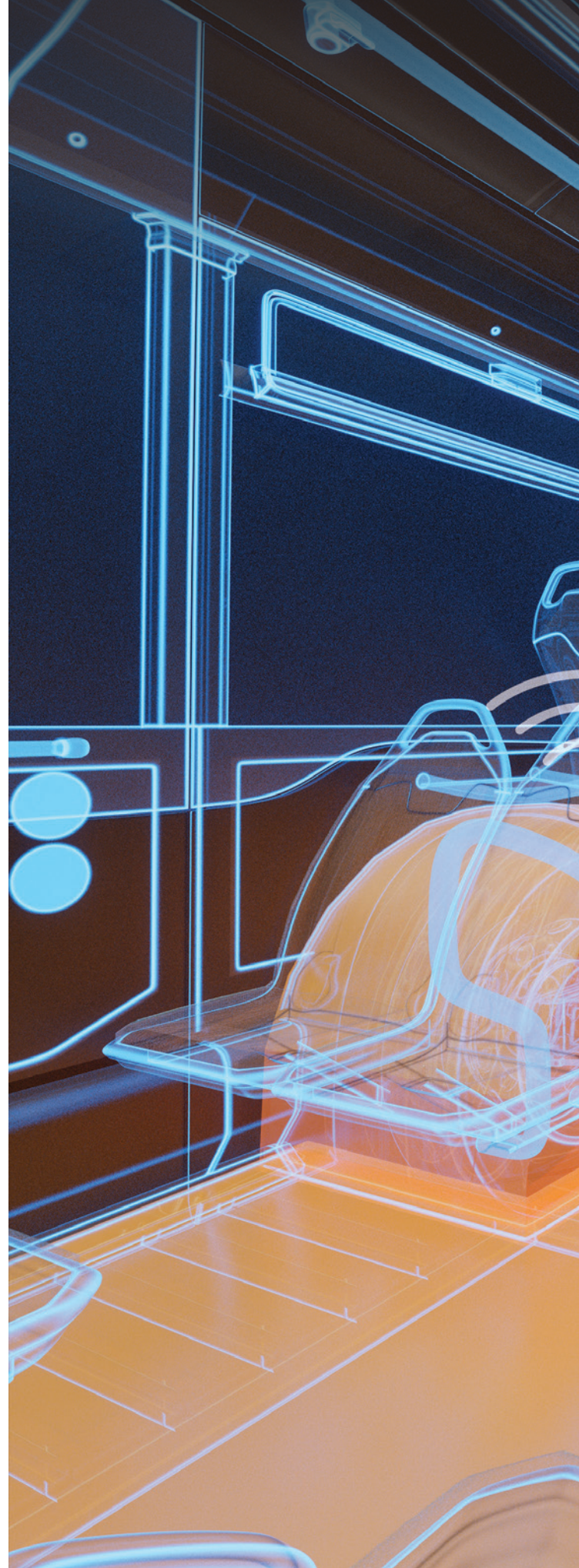
Ambient noise emanating from other areas of the bus such as tires, brakes and inverters, as well as sound from the world outside like the wind and traffic noise are noticeably more intrusive. This is because they are largely higher frequency, airborne sounds to which the human ear is more sensitive.

Excessive or constant noise can have significant impact on passenger comfort. In fact, for certain passengers, such as those with autism and sufferers of hyperacusis (when everyday sounds seem much louder to you than they should) sound can be a decisive reason not to use public transport.

Historically, acoustic performance of flooring has been measured by impact sound and the transference of a noise such as footsteps through the floor to a space below as it would be in a building.

With our latest collection Altro has painstakingly developed solutions which provide both impact and airborne acoustic performance. These are exceptionally well suited to insulating against the high frequency sounds generated by zero-emission buses.

By selecting an Altro bus floor you can be assured that it has been tested in line with the appropriate standards it's intended to meet - ISO 717-1 and ISO 717-2. Better still, it will contribute to improved passenger comfort and accessibility without having to compromise on other areas of benefit such as product weight.



## Did you know?

Altro's latest bus floors have been engineered to perform against high and low frequency sound, helping you improve passenger experience.



# Acoustic insulation

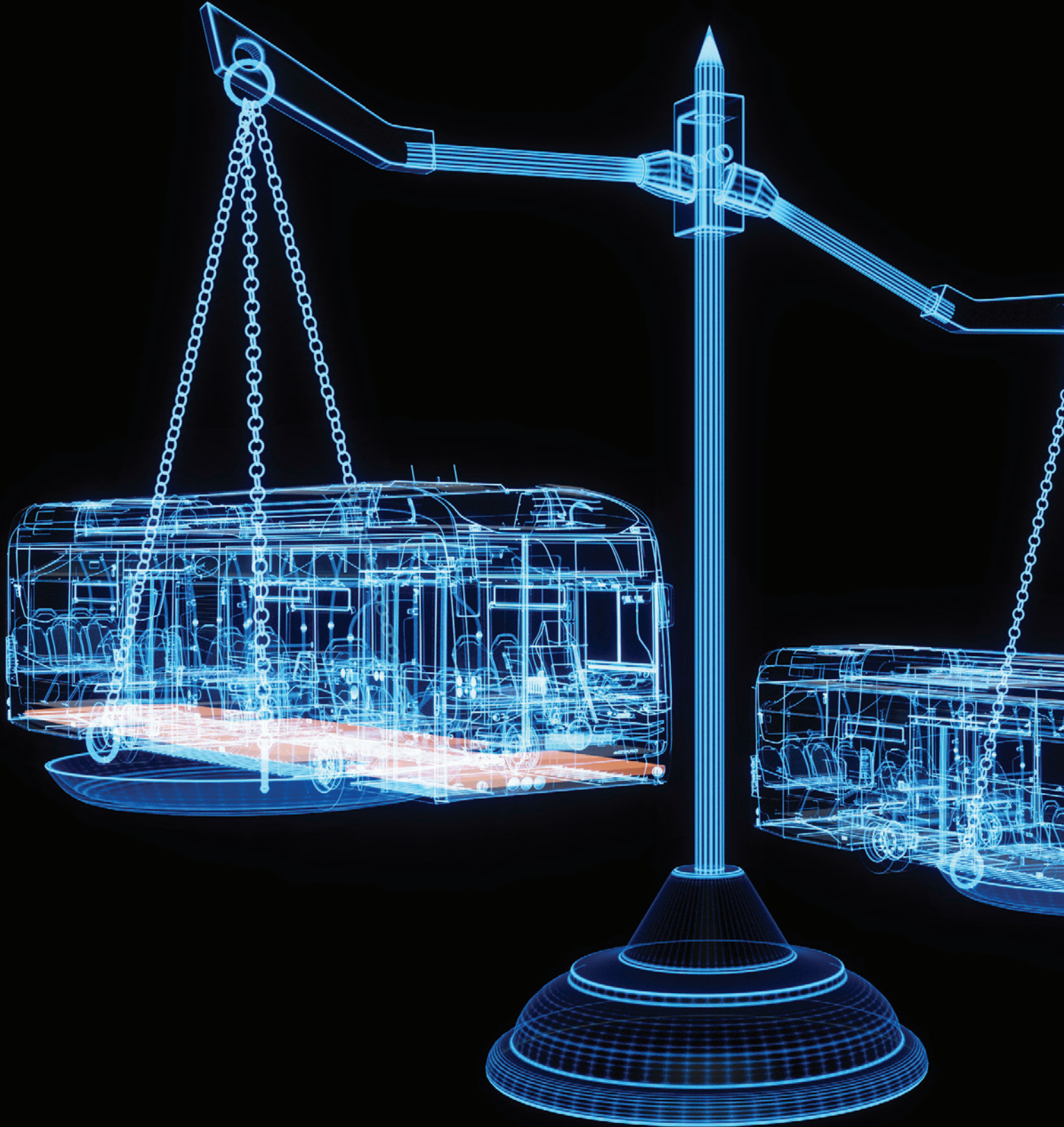


Altro's pre-cut flooring service is cross-compatible with our reverse welding service.





# Weight differential





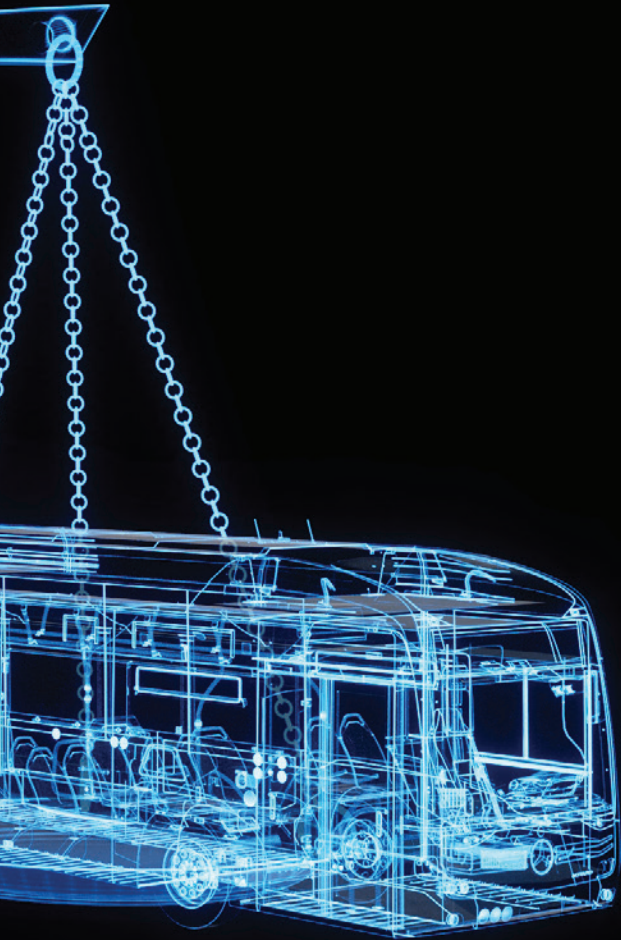
# Balancing performance

While the move away from internal combustion engines to electric powertrains has created new technical challenges to overcome, the need to keep vehicle weight at a minimum has remained constant. So Altro Transflor Artis, Altro Transflor Metris and Altro Transflor Sonis have been specifically developed to offer maximum performance with minimum weight.

What use is insulating a vehicle to improve its thermal regulation if the associated benefits are negated by the necessity to add excessive extra weight? For the first time vehicle floors can deliver acoustic and thermal insulation benefits without needing to compromise on weight.

Control rests with our customers who can determine the level of performance required for their specific operating needs and select the balance that best suits them.

Operating a fleet in extreme climates? A fully-insulated acoustic option will likely be your best option to regulate temperature. However, if weight is your top priority, then why not consider a compact-acoustic floor. It really is up to you.



## Did you know?

Even our heaviest acoustic option Altro Transflor Sonis still offers weight savings of up to 26% over comparable industry alternatives.



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# A new line of defence

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To enhance the performance of our latest flooring options even further, Altro has developed ShieldGrip technology. This intelligent surface enables floors to be cleaned more easily than ever before without any compromise on slip resistance.

A vital element to the development of our latest Altro Transflor Artis, Altro Transflor Metris and Altro Transflor Sonis ranges, ShieldGrip delivers sustained, one in a million slip resistance without the inclusion of hard aggregate particles even in wet conditions. The result is a highly stain resistant, easy to clean surface which meets the most rigorous safety standards globally.

Driven by the necessity for certain vehicles to be cleaned exclusively with neutral-based detergents, the improvements achieved reduce the collection of dirt and grime and repel staining agents more effectively to deliver our best ever cleaning results.

Fully tested and certified to all globally recognized slip resistance standards, floors protected by ShieldGrip safeguard passengers and optimize cleaning programs to keep interiors looking great, services running efficiently and enhancing passenger experience.



## Did you know?

Altro tests floors against the most commonly encountered and extreme contaminants such as coffee, grease and marker pen to achieve optimum stain resistance and cleanability.

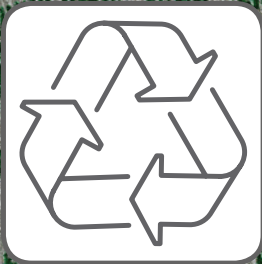


# ShieldGrip



Altro Transflor Sonis™  
Farmhouse Oak  
TFSN3904 ▶





# Sustainability

Altro Transflor Artis™  
Edonite  
TFAR22013F ▶

Altro Transflor Artis™  
Maras  
TFAR22004F ▶





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## The next step in recyclability

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Sustainability continues to drive innovation in the automotive industries and has been a critical factor in the development of our latest collection. Inspired by the needs of zero emission buses, Altro has created its most sustainable products yet to take recyclability to a level never before seen in transport flooring.

With the sustained slip-resistance of Altro Transflor Artis, Altro Transflor Metris and Altro Transflor Sonis being derived from new Altro ShieldGrip technology there is no longer a dependency on hard aggregates to deliver the levels of sustained slip resistance bus floors need to provide.

As a result of this advancement, Altro has been able to introduce a bold new change to allow the vinyl to be processed far more easily and enable recycling of waste and off-cuts on a wider scale.



# A range of benefits

Our latest collection of Altro ShieldGrip protected floors puts you in control of the performance most suitable for your fleet. Don't listen to the notion that acoustic insulation requires a super thick floor or shiver at the thought of the additional weight required to achieve effective thermal management. Altro has an option to suit all vehicles wherever they are, whatever the weather.

One size rarely fits all – especially in the automotive industries - so Altro Transflor Artis, Altro Transflor Metris and Altro Transflor Sonis allow you to strike the perfect balance of design and performance. As each option increases in thickness so too does the insulative performance benefits. Simply evaluate your vehicle's needs then choose a design and product construction best suited for your operating conditions.

Our research has shown that transport operators making the transition to zero emission fleets are crying out for a more balanced approach. With this exciting new collection you can finally specify a well-rounded floor covering which offers benefits across acoustics, thermals and weight, all without compromise. Simply select the level of performance required for the environment in which your fleet operates, your choice of design and then enjoy a range of benefits.

Built on 70-years of slip resistance ingenuity and fused with innovative, industry-leading recyclability these are the next generation of floors, for next generation vehicles.

2.2mm 4.93 lb/sy

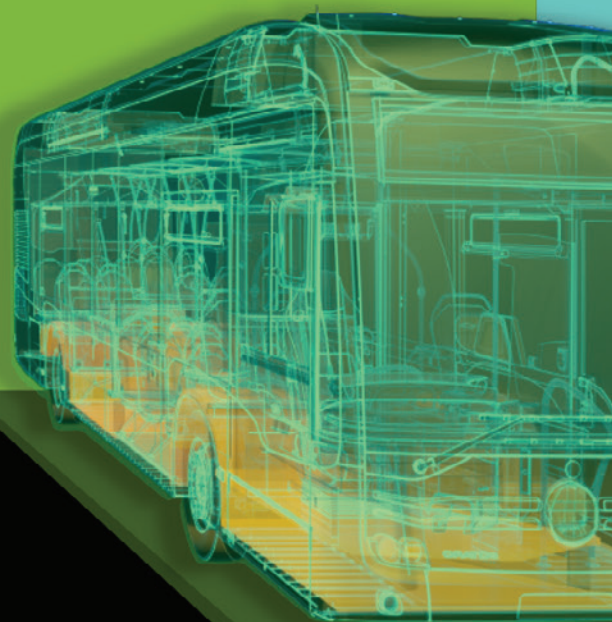
Thermal insulation



Impact sound insulation



Airborne sound insulation



Altro Transflor  
Comp



2.85mm      4.73 lb/sy



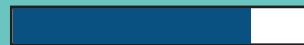
Thermal insulation



Impact sound insulation



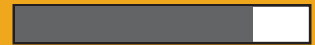
Airborne sound insulation



3.9mm      5.34 lb/sy



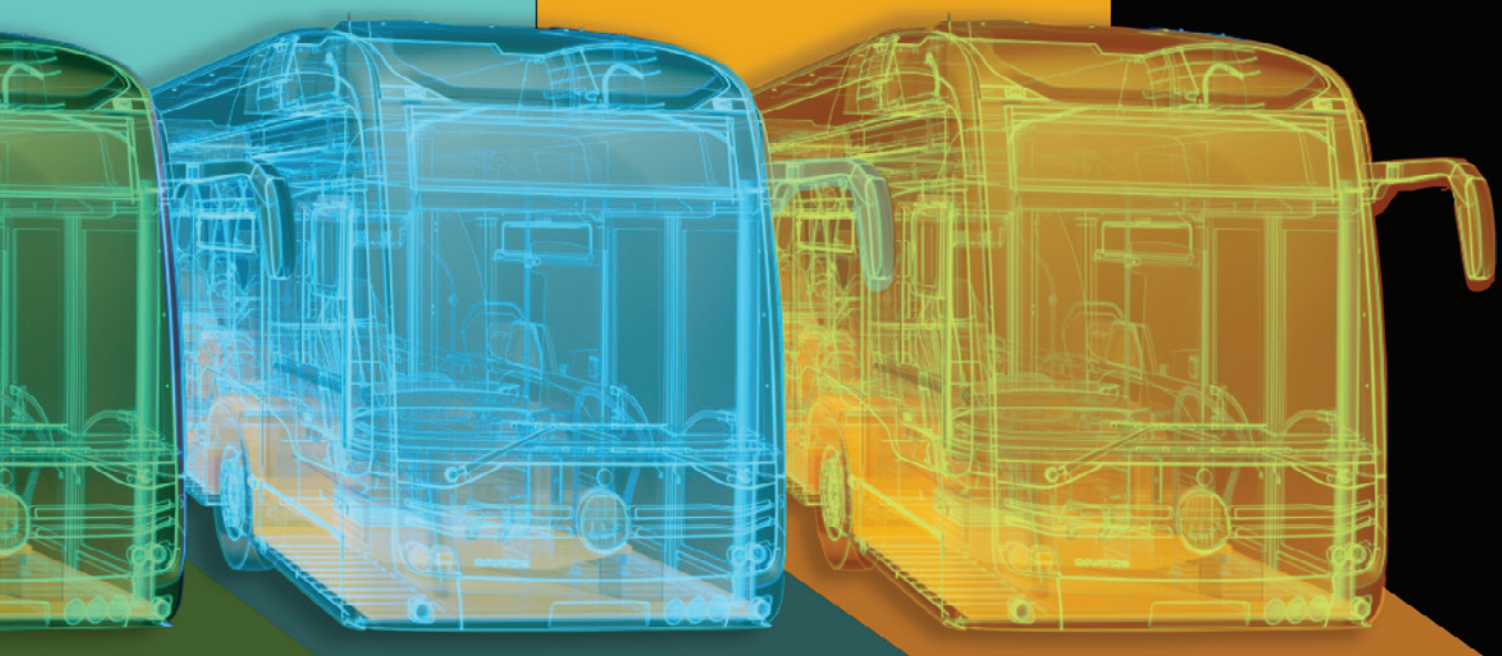
Thermal insulation



Impact sound insulation



Airborne sound insulation



**Altro Transflor Artis**  
**Compact**

**Altro Transflor Metris**  
**Compact-acoustic**

**Altro Transflor Sonis**  
**Full acoustic**



# Altro Transflor Artis™ (2.2mm), Altro Transflor Metris™ (2.85mm), Altro Transflor Sonis™ (3.9mm)



**Farmhouse Oak** WR338 / A1M338 / LRV 38  
TFWSA2204F (2.2 mm) | TFME2804 (2.85 mm)  
TFSN3904 (3.9 mm)



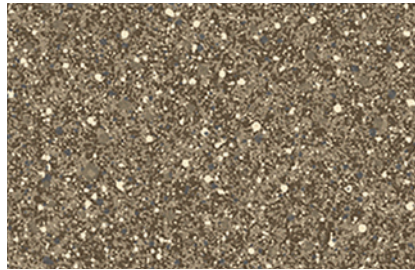
**Autumn Maple** WR339 / A1M339 / LRV 24  
TFWSA2205F (2.2 mm) | TFME2805 (2.85 mm)



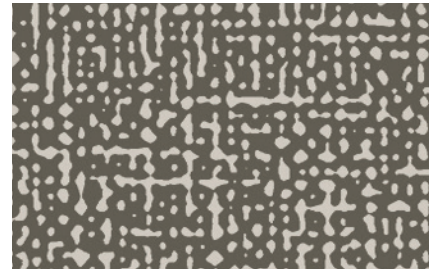
**Tudor Oak** WR471 / A1M337 / LRV 16  
TFWSA2223F (2.2 mm)



**Spiced Bamboo** WR342 / A1M224 / LRV 21  
TFWSA2219F (2.2 mm)



**Halite** WR418 / A1M239 / LRV 21  
TFAR22003F (2.2 mm) | TFME28003 (2.85 mm)



**Pinã** WR494 / A1M494 / LRV 23  
TFAR22016F (2.2 mm) | TFME28016 (2.85 mm)  
TFSN39016 (3.9 mm)



**Urban Cherry** WR337 / A1M337 / LRV 17  
TFWSA2203F (2.2 mm)



**Antique Walnut** WR341 / A1M160 / LRV 15  
TFWSA2207F (2.2 mm)



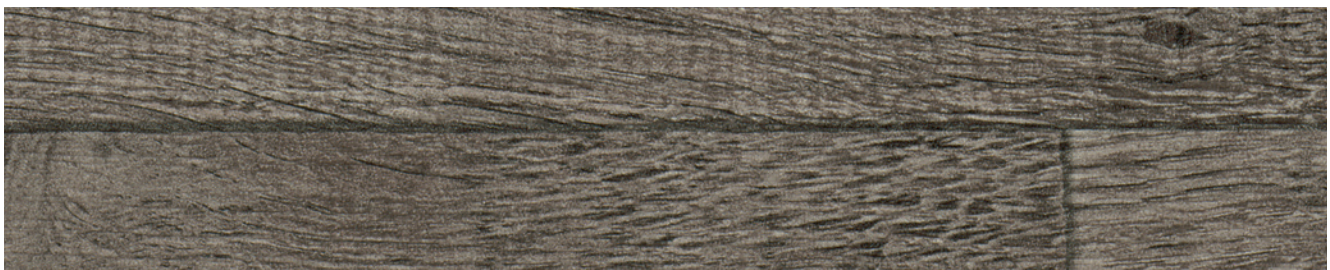
**Oak Riche** WR227 / A1M227 / LRV 10  
TFWSA2214F (2.2 mm) | TFME2814 (2.85 mm)  
TFSN3914 (3.9 mm)



**Vintage Cherry** WR336 / A1M239 / LRV 22  
TFWSA2202F (2.2 mm) | TFME2802 (2.85 mm)  
TFSN3902 (3.9 mm)

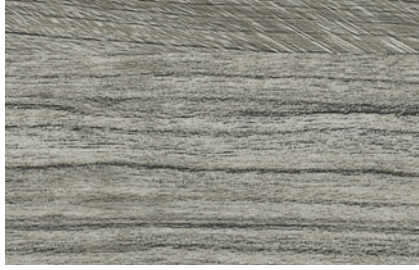


**Century Oak** WR346 / A1M62 / LRV 8  
TFWSA2212F (2.2 mm)

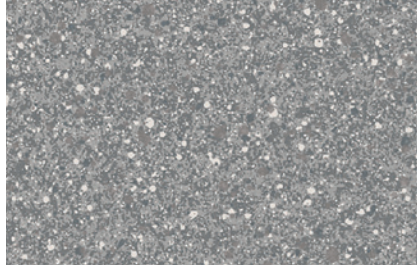


**Worn Oak** WR322 / A1M239 / LRV 19  
TFWSA2232F (2.2 mm) | TFME2832F (2.85 mm) | TFSN3932 (3.9 mm)

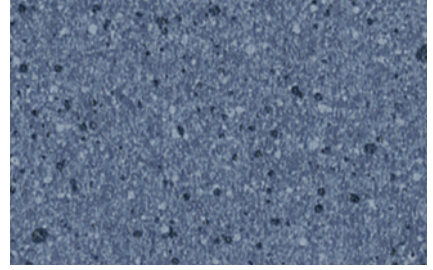




**Slate Oak** WR478 / A1M390 / LRV 26  
TFWSA2229F (2.2 mm)



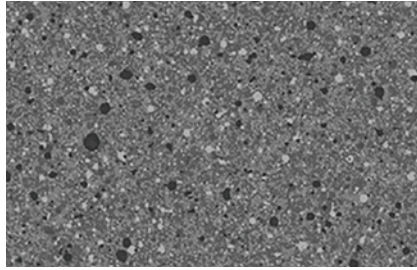
**Natrolite** WR390 / A1M390 / LRV 30  
TFAR22014F (2.2 mm)



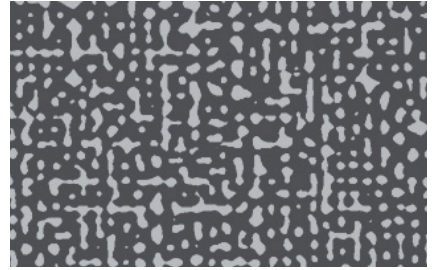
**Edonite** WR458 / A1M74 / LRV 18  
TFAR22013F (2.2 mm)



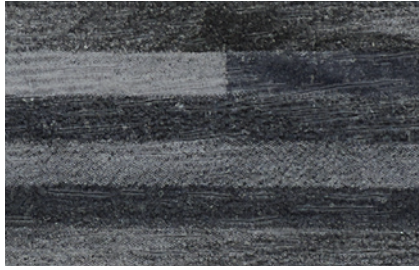
**Jacobean Oak** WR470 / A1M83 / LRV 11  
TFWSA2222F (2.2 mm) | TFME2822 (2.85 mm)



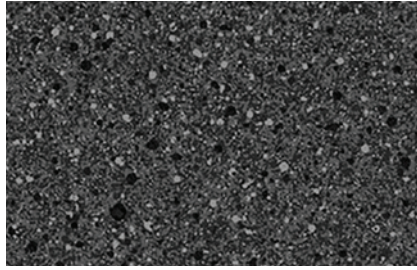
**Maras** WR391 / A1M82 / LRV 18  
TFAR22004F (2.2 mm)



**Rayon** WR506 / A1M82 / LRV 20  
TFAR22015F (2.2 mm)



**Iron Bamboo** WR232 / A1M100 / LRV 14  
TFWSA2226F (2.2 mm)



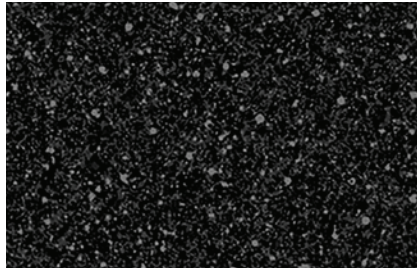
**Trapani** WR314 / A1M82 / LRV 11  
TFAR22005F (2.2 mm) | TFME28005 (2.85 mm)  
TFSN39005 (3.9 mm)



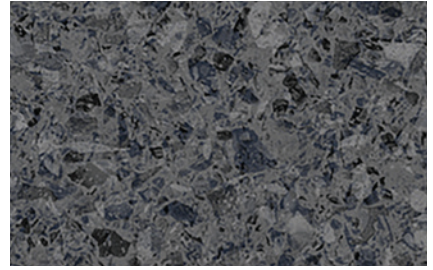
**Sisal** WR501 / A1M82 / LRV 13  
TFAR22017F (2.2 mm)



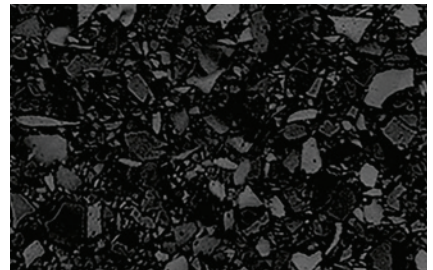
**Manor Oak** WR348 / A1M348 / LRV 7  
TFWSA2216F (2.2 mm) | TFME2816 (2.85 mm)  
TFSN3916 (3.9 mm)



**Tavira** WR485 / A1M485 / LRV 7  
TFAR22006F (2.2 mm)



**Fleur** WR481 / A1M83 / LRV 15  
TFAR22008F (2.2 mm)



**Onyx** WR485 / A1M485 / LRV 8  
TFAR22010F (2.2 mm) | TFAR28010 (2.85 mm) | 17  
TFSN39010 (3.9 mm)



# Technical table

## Altro Transflor Artis

|                           |  |  |
|---------------------------|--|--|
| Flooring type             | EN ISO 10582<br>EN ISO 11638<br>ASTM F1303                   | Heterogeneous floor<br>Heterogeneous floor<br>Type I |
| Fire performance          | ECE R-118<br>FMVSS 302 / CMVSS 302                           | Pass   |
| Slip resistance           | EN 13893<br>PTV<br>ASTM D2047<br>EN 16165 Annex B / ASR A1.5 | DS<br>≥ 36<br>≥ 0.6<br>R10                           |
| Impact sound insulation   | EN ISO 10140-3   | ca. 4 dB   |
| Airborne sound insulation | EN ISO 10140-2   | ca. 23 dB  |
| Thickness                 | EN ISO 24346   | 2.2 mm / 0.088"                                      |
| Wear layer thickness      | EN ISO 24340   | 0.7 mm / 0.027"                                      |
| Flexibility               | EN ISO 24344<br>ASTM F1303                                   | Pass   |
| Thermal conductivity      | EN 12667   | 0.131 W/mK   |
| Dimensional stability     | EN ISO 23999   | ≤ 0.4%   |
| Weight                    | EN ISO 23997   | 2.68 kg/m <sup>2</sup> / 4.93lb/sy                   |
| Roll dimensions           | EN ISO 24341   | 2 m x 20 m = 40 m <sup>2</sup><br>6'7" x 65'5"       |
| Light fastness            | EN ISO 105-B02   | ≥ 6  |
| Wear resistance           | EN 660-2   | Group T  |
| Residual indentation      | EN ISO 24343-1<br>ASTM F970                                  | ≤ 0.10 mm  |
| Chemical resistance       | EN ISO 26987   | Good   |
| Castor chair abrasion     | ISO 4918   | Yes, type W  |
| Electrical behaviours     | EN 1815  | ≤ 2 kV, antistatic                                   |



| Altro Transflor Metris                         | Altro Transflor Sonis                          |
|--|--|
| Heterogeneous floor                            | Heterogeneous floor                            |
| Heterogeneous floor                            | Heterogeneous floor                            |
| Type I   | Type I   |
| Pass   | Pass   |
| DS   | DS   |
| ≥ 36   | ≥ 36   |
| ≥ 0.6  | ≥ 0.6  |
| R10  | R10  |
| ca. 15 dB                                      | 19 dB  |
| ca. 23 dB                                      | ca. 24 dB                                      |
| 2.85 mm / 0.11"                                | 3.9mm / 0.15"                                  |
| 0.7 mm / 0.027"                                | 0.7 mm / 0.027"                                |
| Pass   | Pass   |
| 0.108 W/mK                                     | 0.076 W/mK                                     |
| ≤ 0.4%   | ≤ 0.4%   |
| 2.60 kg/m <sup>2</sup> / 4.79 lb/sy            | 2.9 kg/m <sup>2</sup> / 5.34 lb/sy             |
| 2 m x 20 m = 40 m <sup>2</sup><br>6'7" x 65'5" | 2 m x 20 m = 40 m <sup>2</sup><br>6'7" x 65'5" |
| ≥ 6  | ≥ 6  |
| Group T  | Group T  |
| ≤ 0.20 mm                                      | ≤ 0.10 mm                                      |
| Good   | Good   |
| Yes, type W                                    | Yes, type W                                    |
| ≤ 2 kV, antistatic                             | ≤ 2 kV, antistatic                             |



## Samples

If color choice is critical, please request a sample of the material.

 800.382.0333

 [samples@altro.com](mailto:samples@altro.com)




Altro USA - Transport Division 12648 Clark Street, Santa Fe Springs, CA 90670

USA 800.382.0333 CANADA 800.565.4658

 [transport@altro.com](mailto:transport@altro.com)



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