TECHNICAL DATA / SPECIFICATIONS

Cyclin® produces insulation panels that are highly suitable for acoustic applications as well as for thermal insulation. Cyclin® Puur is a strong, resilient cellulose sound-absorbing board with excellent sound-absorbing properties. Cyclin® Puur has an optimal moisture-regulating property. As a result, Cyclin® Puur contributes to a healthier working and living climate in buildings. At the end of its service life, we take the product back to reuse it 100% in our own factory.*

Country of production	The Netherlands
Product composition	Paper, binder fibre (6%), flame retardant
Thickness range	Standard 30mm to 70mm *Tolerance: ±3mm*
Panel dimensions	120 cm x 60 cm (custom sizes available on request) *Tolerance: ±5mm*
Circularity	100%
Density	80 [kg/m3] *Tolerance: ± 10%*
Sound absorption property	α_w = 1 from 50mm, and Class A from 40mm thickness In accordance with NEN-EN-ISO11654 NRC = 1 from 60mm in accordance with ASTM C423
Thermal conductivity (lambda) *field measurement*	λ = 0.044 [W/mK] (Rd = 1.74 at 80 mm)
Thermal capacity of cellulose	2.11 [kJ/Kg*K]
Vapour diffusion resistance	μ = 1.1
Fire resistance / class	Tested fire class: Cyclin® Puur: E; In wall system with 2 x plasterboard: B Due to its specific weight, the flammability of Cyclin® Puur is comparable to glass wool.*[source: report on biobased insulation materials, Nieman Adviseurs]*

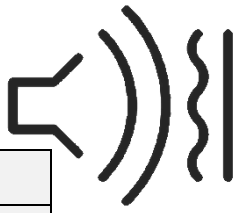
Applications

- Acoustic insulation / absorption / damping
- Insulation of partition walls (drywall construction)
- Retrofit insulation for acoustics
- Vapour-open thermal retrofit insulation
- In timber-frame walls
- In metal-stud walls
- Acoustic insulation applications in interiors

Benefits

- Production based on your dimensions*
- Regulates humidity, providing a pleasant climate (vapour-open system)
- Excellent acoustic properties, for more calm and comfort
- CO2 footprint: 0.5 kg/kg Cyclin® Puur
- CO2 storage: 1.37 kg/kg Cyclin® Puur
- 100% Circular
- Bio-based
- Non-irritating and harmless to handle
- (Residual) waste returned to producer, uncontaminated

Cyclin® Puur as an acoustic material



Sound absorption										
thickness	**Sound absorption coefficient per octave band [Hz]**							**α_w**	**α_w class**	**NRC**
	63	125	250	500	1000	2000	4000			
40mm	0.00	0.16	0.63	1.10	1.13	1.02	0.77	0.9	A	0.90
50mm	0.01	0.20	0.76	1.16	1.14	1.01	0.83	1.0	A	0.95
60mm	0.01	0.37	0.93	1.11	1.05	1.01	0.83	1.0	A	1.00
70mm	0.01	0.41	1.00	1.13	1.09	1.03	0.84	1.0	A	1.00

- ✓ Cyclin weighs approximately 72-88 [kg/m3], resulting in very good sound insulation and sound damping properties.
- ✓ Sound damping: α_w=1 (α_w =1 at 315Hz) from 50mm, and Class A from 40mm thickness in accordance with NEN-EN-ISO11654; NRC = 1 from 60mm in accordance with ASTM C423
- ✓ Sound insulation; selected measurements:
    - a door with 9mm MDF on both sides and 40mm Cyclin in between has an R_w of 37 dB in accordance with NEN-EN-ISO 10140-2, 2010
    - a door with 9mm MDF on both sides and 60mm Cyclin in between has an R_w of 41 dB in accordance with NEN-EN-ISO 10140-2, 2010
    - a concentration cell with a 10m² wall fitted with 35mm Cyclin has a DnT,A value of 42 dB in accordance with NEN 5077, compared to DnT,A = 35dB without Cyclin
    - a wall of 2.8m² with 2x12.5mm plasterboard on both sides and 50mm Cyclin in between shows an Rw of 45-56 dB in accordance with ISO 717-1

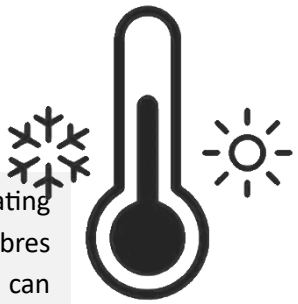
Cyclin® Puur as a thermal material

Insulation value

Thickness [mm]	Rd [m2.K/W]
20	0.43
30	0.65
40	0.87
50	1.09
60	1.30
70	1.52
80	1.74

Phase shift

Thickness [mm]	phase shift [hours]
20	0.4
30	1.0
40	1.7
50	2.7
60	3.9
70	5.3
80	6.9



The good moisture-regulating properties of cellulose fibres mean that a Cyclin panel can absorb and release up to 30% moisture, thereby damping fluctuations in humidity within a room.

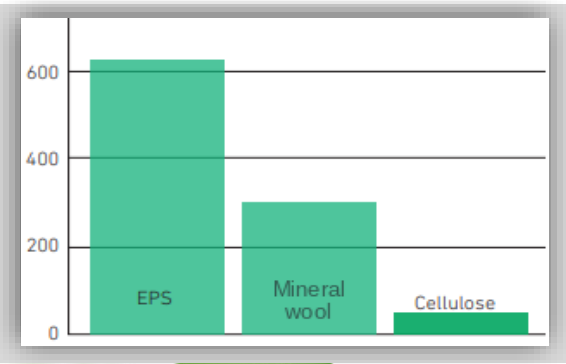
Cyclin®Puur and sustainability

Cyclin is made from waste streams of newsprint and therefore falls under the category of biobased materials.

Moreover, more so than with most other biobased materials, this concerns raw materials of recycled origin that have nearly reached the end of their usable life. This makes the upcycling into Cyclin a highly valuable application for the environment, a fact also recognized by parties such as the Nederlandse Milieu Federatie (Dutch Environmental Federation).

The **LCA** (Life Cycle Analysis) of Cyclin® Puur shows an **MKI** (Environmental Cost Indicator) of only €0.055 per kg of Cyclin, and a very low **GWP** (Global Warming Potential) of 0.5 kg CO2-eq. per kg of Cyclin. Subtract the CO2 storage of 1kg CO2 per kg of Cyclin, and Cyclin is 0.5 kg ***CO2-negative***.

Unfortunately, Cyclin still uses a synthetic binder fibre, as do all other biobased insulation materials. Fortunately, we use only 6% binder fibre, while our counterparts use between 8 and 20%.



CO2 - Nitrogen - Ammonia

Research shows that Cyclin® insulation material stores CO2 equal to its own weight, and that producing Cyclin® insulation material requires only a fraction of the energy needed for insulation material made from mineral raw materials such as mineral wool or EPS. As a result, Cyclin® contributes little to nothing to nitrogen deposition or to acidification (ammonia emissions).

Healthy panels – sound panels
Because it contains no toxic materials and offers excellent properties in terms of sustainability, thermal insulation, sound, and moisture regulation, Cyclin® contributes to a healthy and comfortable living environment. People in such an environment feel better, are ill less often, and perform better.

Circularity
Cyclin is a 100% circular material. We take back Cyclin® Puur panels and offcuts and can reuse them 100% as a raw material in our production process without any additional processing. We charge a deposit on pallets and ask for packaging material to be returned so that we can have it recycled responsibly. This way, we do not leave our customers with waste.

Conclusion
All of this makes Cyclin® one of the most sustainable and circular materials for sound insulation available on the market.

Cyclin® and its "Sound Business" pricing policy

Cyclin® manufactures in the Netherlands. As part of our "Sound Business" approach, we charge a fair selling price based on a healthy, but not excessive, margin. We believe in doing business honestly, and therefore not in offering huge discounts, since that would be structurally unfair to smaller customers. That, too, is Sound Business to us

General recommended prices:
Cyclin® Puur has a standard size of 120 cm x 60 cm with variable thicknesses. Custom sizes are generally available on request, at extra cost. This means you will have virtually no cutting/offcut waste on site. We will take back any cutting/offcut waste at the applicable raw material cost. The final price will also depend on the purchase volume. Please contact us for a no-obligation quote.

Delivery of products:
Products are delivered ex works. Ordered products can be collected by appointment from our location in Venlo between 8:00 and 17:00. If the customer leaves transport to us, we will pass on the transport invoice to you based on the value invoiced to us, plus 20% administration and handling costs. We aim to deliver within 10 working days of receiving a written order. Our general terms and conditions apply; these are available and can be viewed on our website www.cyclin.nl