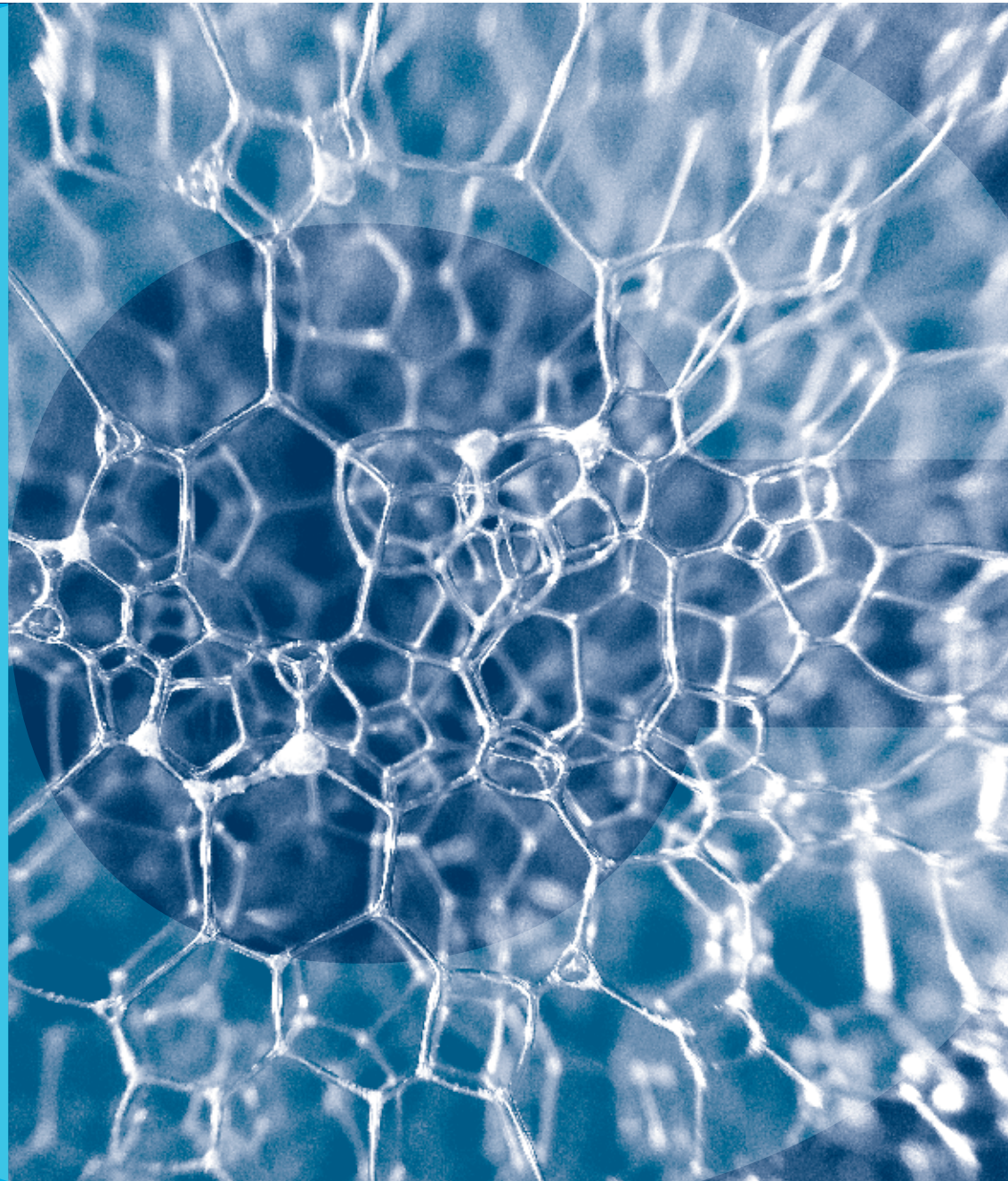
HALTERMANN CARLESS

Pentanes – The smart choice for energy-efficient innovation.



Tailor-made Pentanes

Discover excellence in Pentane solutions

Experience tailor-made solutions with Haltermann Carless, the global leader in Cyclopentane manufacturing and the exclusive European producer of all three Pentane isomers: n-, iso- and Cyclopentane. With a commitment to quality and customers focus, we take pride in offering a broad range of Pentane blends tailored to meet your individual requirements.

Unmatched versatility: High quality Pentane blends for every need

At Haltermann Carless, we understand that every customer has distinct requirements. Our extensive portfolio of Pentane blends, customisable in any mixing ratio, ensures that you receive the ideal product to match your requirement profile, which can be characterised by performance, quality or cost efficiency of the final product. Manufactured at our production site in Speyer, Germany, our Pentanes offer a minimum purity level of 95%.

Applications across industries: Where quality matters

Our Pentane formulations find application in a wide range of industries, showcasing their versatility and reliability. Whether they contribute to the insulation of buildings, cooling appliances or district heating systems, serve as solvents and process media in the chemical industry or are used as foaming gels in the cosmetics industry, our products consistently deliver compelling results.

Delivery reliability and future-ready solutions

At Haltermann Carless, we prioritise the security of supply and the high quality of our products. Our state-of-the-art hydrogenation unit demonstrates our commitment to meeting the evolving needs of our customers. This expansion allows us to increase Cyclopentane production capacity by up to 70%, addressing global market demands, expanding our market presence in key industries and regions, and promoting sustainability.



Mass balance Pentanes: Reducing CO_2 footprint

Haltermann Carless takes the commitment to sustainability further by offering mass balance Pentanes, contributing to the reduction of CO_2 emissions. This innovative approach aligns with the broader goal of minimising environmental impact and fostering a circular economy.

CO_2
reduction
with Pentanes

Contributing to climate balance

Unlocking climate solutions through Pentanes in insulation

In the pursuit of a sustainable and climate-neutral future as outlined in the European Commission “Fit for 55” programme – a roadmap towards climate neutrality in the EU by 2050 – Pentanes play a vital role. As blowing agents in insulating materials they enable an excellent insulating performance of modern materials, such as Polyurethane (PU) foams, and contribute significantly to efficient insulation.

Crucial role of insulation in energy transition

As the world aligns with ambitious climate targets, the insulation industry emerges as a key player in the energy transition. Efficient insulation, whether in refrigerators, buildings, or pipe systems, is pivotal to achieving climate objectives. Pentanes stand as the backbone of modern insulation materials, ensuring their insulating performance is at its peak.

Eco-sound Pentanes: A responsible choice

Pentanes demonstrate an excellent eco-balance, characterised by zero Ozone Depletion Potential (ODP) and a low Global Warming Potential (GWP < 1).

Adhering to global regulations for stratospheric ozone layer protection, Pentanes are the main sustainable alternative to the banned high GWP Chlorofluorocarbons (CFCs) and Hydrofluorocarbons (HFCs) as well as to the substances regulated under PFAS (Per- and Polyfluoroalkyl Substances).



Highly-efficient insulating foams

Pentane blowing agents: Unleashing the power of insulation

Insulation materials, such as Polyurethane (PU), Extruded Polystyrene (XPS), and Expanded Polystyrene (EPS), owe their exceptional properties to Pentane blowing agents. These agents play a crucial role during the manufacturing process, enhancing insulation performance and dimensional stability. Depending on the isomers used – n-/iso-/Cyclopentane or a blend – the product features can be amended to individual requirements.

Polyurethane (PU) foam: Elevating insulation performance with Cyclopentanes

Cyclopentanes ensure excellent insulation performance with low insulation thickness in Polyurethane (PU) foam production. This is due to the fact that cell gas has a lower heat-conductivity than the ambient air and therefore remains partially in the foam cells of the PU. This provides flexibility in construction and makes PU foams with Cyclopentanes ideally suited for household appliances like refrigerators and freezers, historic buildings as well as other various construction applications such as thermal and pipe insulation.

Extruded Polystyrene (XPS) and Expanded Polystyrene (EPS): Versatility redefined

In the manufacturing of Extruded Polystyrene (XPS) and Expanded Polystyrene (EPS) for the construction and packaging industries, our Pentane S grade offers a versatile product formulation. Tailored to meet the specific needs of your project, our Pentane S ensures optimal insulation while maintaining the required dimensional stability.



High-quality Pentanes
with superior characteristics:

- Ideal alternative to CFCs, HFCs and substances regulated under PFAS
- Free from disturbing impurities such as aromatics, sulphur and odour
- No Ozone Depletion Potential (ODP = 0)
- Low Global Warming Potential (GWP < 1)
- High purities of 95% and more
- Pentane blends in any mixing ratio



High-purity Pentanes for cosmetics

Unleashing the power of iso-Pentanes

Enhance your cosmetic formulations with our high purity iso-Pentanes, carefully manufactured to meet the exacting standards of the cosmetics industry. Our iso-Pentanes are a key ingredient in self-foaming shower gels and shaving foams, enhancing the user experience with its excellent qualities.

Innovative formulation: iso-Pentanes dissolved in the cosmetic products are activated when exposed to the heat of water and the skin. This results in fine-pored and stable foam that is particularly easy to spread.

Compliance with cosmetic standards

We understand the critical importance of adhering to stringent cosmetic requirements. Our high purity Pentanes are formulated with utmost care to meet and exceed industry standards, ensuring the safety and quality of your cosmetic formulations.



Pentanes for catalytic processes

Purity and consistency for stable production processes

The chemical industry uses Pentanes in various catalytic processes. As hydrocarbon-based solvents they play an important role in diverse applications, primarily contributing to the production of Linear Low Density Polyethylene (LLDPE).

Our Pentanes are carefully developed to meet the highest standards. They ensure low impurities and consistent quality that are essential for sustainable and stabilising production processes. As a result, Pentanes contribute to the overall quality of your end product.





Comprehensive customer service



Benefit from our comprehensive 360° service

At Haltermann Carless, we pride ourselves on providing a comprehensive service that goes far beyond expectations. Our commitment to excellence is evident in our bespoke, high-quality Pentanes and customised logistics solutions and everything in between. With years of expertise in the Pentanes business, we have established a close relationship with our customers, allowing us to truly understand and cater to their specific requirements.

Tailor-made products

Are you looking for product or application solutions that are not off-the-shelf? Then you have come to the right place, because “custom fit” is a top priority for us. As the only manufacturer in Europe that produces n-, iso- and Cyclopentanes from our highly flexible inhouse production assets we can offer you any blend ratio according to your specific requirements.

Joint development work

For generations, we have been a reliable and strong partner for our customers when it comes to developing customised solutions. Are you looking for co-thinkers, questioners, idea generators, perfectionists & problem solvers? Then you have found the right partner.

First class lab & technical service

Modern equipment, extensive testing and analysis facilities, as well as highly qualified personnel ensure our consistently high product quality. Our own laboratories ensure this through our control system with raw material controls, in-process and final controls.

Dedicated sustainability support

Raw materials, sustainable products, life cycle analysis or important certifications – our experts advise you with a wide range of services on the subject of sustainability and support you in achieving your climate protection goals.

Bespoke supply chain solutions

Promising quality also means reliable delivery. Our supply chain team will work out the best solution for your transportation needs. Our production site in Speyer, Germany, provides the ideal base for worldwide deliveries, as we are strategically located near Frankfurt Airport and the Rhine river, we have our own jetty on the plant premises, loading and unloading stations for rail tank cars, and loading points for tank trucks. All Pentanes can be delivered in bulk via road-tankers, isotank containers and rail cars or packed in drums of 200 litres, 60 litres and 20 litres. 100 litres pressurised cylinders for testing purposes are available on request in certain regions.

High production flexibility

We offer you the greatest possible individuality and flexibility - also in the area of production. This applies equally to product quantities or the production of new developments.

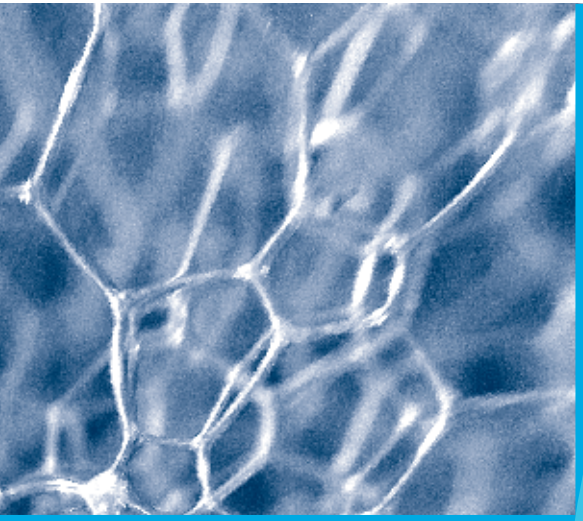
Technical data

Grade	Application	Production	Composition:			Initial boiling point	Initial boiling point	Final boiling point		Vapour pressure		Thermal conductivity	Ozone depletion potential*	Global warming potential*	Hazardous classification
			n-Pentane (wt %)	iso-Pentane (wt %)	Cyclopentane (wt %)	(°C)	(°F)	(°C)	(°F)	25 °C (kPa)	50 °C (kPa)				
n-Pentane 95	General purpose	GER	min. 95			35	95	37	99	68	159	+	0	<1	F
iso-Pentane 95		GER		min. 95		25	77	32	90	91	205	+	0	<1	F+
Cyclopentane		GER			min. 95	48	118	50	122	42	103	+++	0	<1	F
Pentane S	EPS, Catalytic solvent	GER	78–82	18–22		29	84	36	97	73	168	+	0	<1	F+
Pentane 75		GER	70–77	22–28		31	89	37	99	74	174	+	0	<1	F+
Cyclopentane IP 85	PU Appliances / PU Construction	GER		10–17	83–87	43	110	50	122	50	119	+++	0	<1	F
Cyclopentane IP 70		GER		24–28	70–74	38	100	50	122	57	134	+++	0	<1	F
Cyclopentane IP 50		GER		45–53	47–53	31	88	49	120	67	154	++	0	<1	F+
Cyclopentane IP 30		GER		65–73	27–33	28	82	42	108	77	174	++	0	<1	F+
n-/Cyclopentane 93/7	General purpose	GER	86–91		6–9	36	95	50	122	67	155	+	0	<1	F
n-Pentane 95 cosm.	Cosmetic industry	GER	min. 95			35	95	37	99	68	159	+	0	<1	F+
iso-Pentane 95 cosm.		GER		min. 95		25	77	32	90	91	205	+	0	<1	F+
n-Pentane 95	Catalytic solvent	GER	min. 95			35	95	37	99	68	159	+	0	<1	F+
iso-Pentane 95		GER		min. 95		25	77	32	90	91	205	+	0	<1	F+

* According to the Scientific Assessment of Ozone Depletion 2018 (Appendix A.3) published by the World Meteorological Organization, United Nations Environment Programme, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration and European Commission all Pentane isomers and their blends have an ODP of 0 and a GWP < 1. https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf

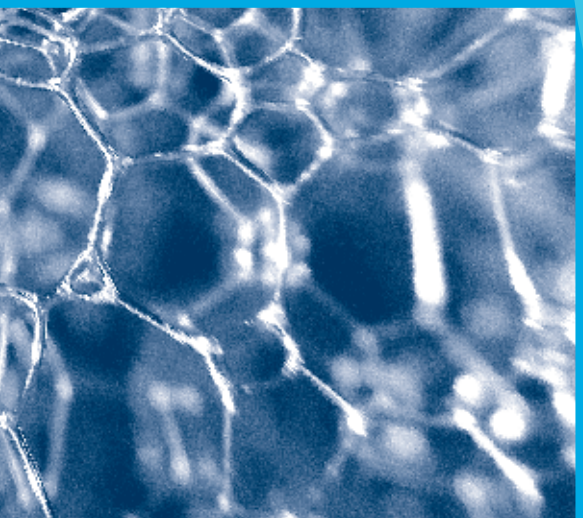


Backed by decades of expertise in producing, blending, and distributing Pentanes, Haltermann Carless is your trusted partner – delivering the solutions you need today and tomorrow.



More about our Pentanes:

www.haltermann-carless.com/pentanes
www.haltermann-carless.com/blog
www.haltermann-carless.com/study-performance-of-ternary-pentane-blends



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