A matter of experience

The basis for growing success

1913

we make it grow

PROGRESS SINCE 1913

COMPANY

Our history at a glance

2018 Inauguration of the new Innovation Center in Geeste

2017 Foundation of Klasmann-Deilmann Bioenergy SIA in Latvia

2016 Klasmann-Deilmann takes over distribution of the Growcoon propagation system

2015 Start of operation of a state-of-the-art Big Bale factory in Lithuania

2014 Publication of the world's first corporate and product carbon footprint in the growing media industry

2013 100th anniversary
Foundation of Klasmann-Deilmann China

2012 Takeover of Klasmann-Deilmann Polska
First sustainability report

2011 Foundation of Klasmann-Deilmann Latvia
Foundation of sales companies in the USA, Italy and Austria

2010 Start of GreenFibre production
Opening of the biggest and most modern substrate factory in the Baltics

2009 Launch of Renewable Energy and Resources Division

2008 Foundation of UAB Klasmann-Deilmann Bioenergy

2005 Takeover of Klasmann-Deilmann Ezerelis in Lithuania and Klasmann-Deilmann Belgium

2001 Foundation of Klasmann-Deilmann Asia Pacific

2000 Acquisition of stake in Lithuanian peat production sites Silute and Laukesa

1998 Takeover of Bol Group in the Netherlands

1996 Start of substrate production in Schiedam (NL)

1991 Start of composting operations

1990 Merger to create Klasmann-Deilmann GmbH

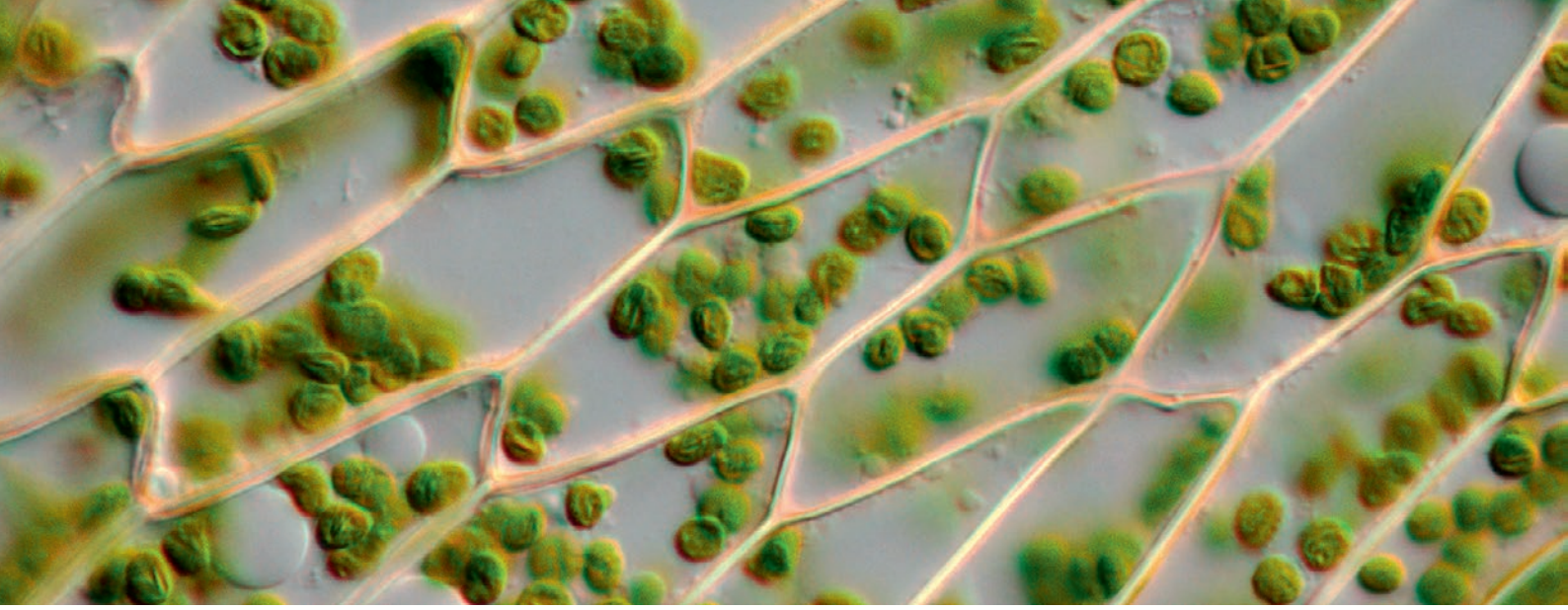
1959 Production of the very first ready-to-use substrate starts in Sedelsberg

1920 Carl Deilmann starts with peat extraction in Börgermoor

1913 Georg Klasmann establishes his Heseper Torfwerk (Hesepe based peatworks)

A BARROW FULL OF BENEFITS

RAW MATERIALS



Growing with premium raw materials

Sphagnum peat – a natural and unique material

Sphagnum peat is a natural organic material made up of decomposed plant matter from sphagnum moss that has accumulated in a water-saturated environment under anaerobic and acidic conditions. This unique environment can only be found in raised peat bogs.

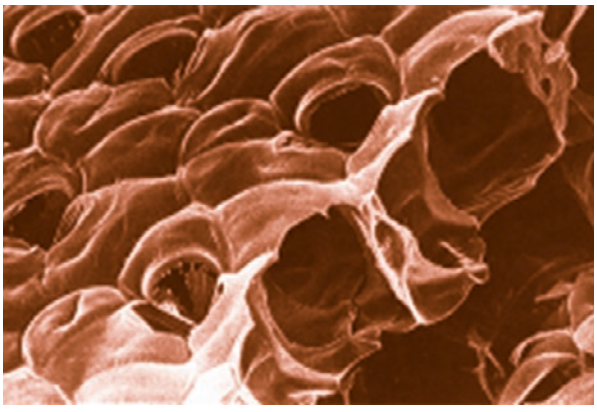
Globally, various peat types exist. Differences are related to:

- the formation environment
- the plant species from which the peat consists of
- the degree of decomposition of the peat

The peat type with the most beneficial properties for horticultural substrates is sphagnum peat from raised peat bogs.

Sphagnum plants (or peat moss) consist of leaves whose structure is naturally adapted to the storage of water and air. These leaves consist of two types of cells:

- The smaller ones, called chlorophyllose cells, contain the green chlorophyll.
- The larger ones, called hyaline cells, can rapidly exchange air and water. They constitute 80 % of the leaves.



Sphagnum peat – a long history

The unique cell structure makes sphagnum peat a natural ‘sponge’. Sphagnum peat retains up to 800 ml of water per litre and ensures thus a high water capacity in the substrate. Its very high porosity provides air and water storage properties that make it an ideal constituent for horticultural substrates.

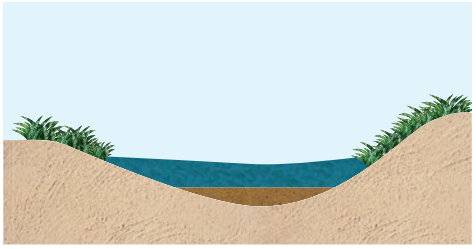
An impermeable soil, a natural basin: that was the beginning of peat bogs formation. Sedges and rushes started to settle. These grasses were fed with percolating waters rich in nutritional elements. The grasses did not decompose, as the environment was anaerobic. The result is 'herbaceous peat' or 'sedge peat'. These eutrophic peat bogs ("fen bogs") are very common all over the world. The chemical and physical properties of this peat are highly heterogeneous. Therefore, their use in growing media is largely restricted.

Oligotrophic peat bog ("raised bog") is the type of peat bog from which Klasmann-Deilmann extracts its premium peat raw materials. On top of the fen bog, sphagnum moss started to settle in water-saturated situations. Grasses became suppressed; layer-by-layer sphagnum moss rose upwards and created homogeneous non-decomposed peat material. Under these conditions, highly unfavourable to plants, the sphagnum moss colonized the peat bog to the detriment of the other species. The range of plant species present is greatly reduced, with more than 90 % of the peat bog consisting of sphagnum moss. This results in a very homogeneous peat moss which is suitable for use in professional horticulture.

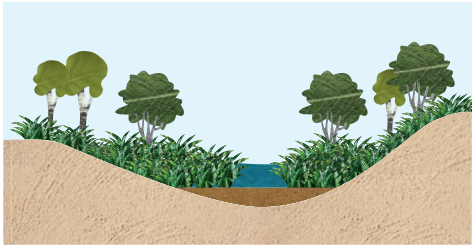
Indeed, the raised bog is fed by rainwater only, which leads to:

- very homogeneous organic material due to growth of sphagnum mosses only,
- low pH in the formation environment of the bog,
- few or no salts in the formation environment.

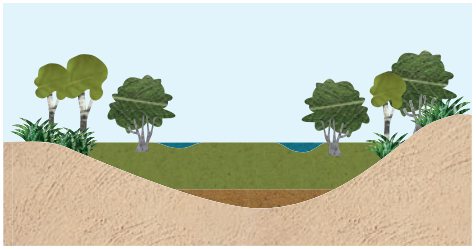
An oligotrophic peat bog has developed and the conditions have created sphagnum peat by the accumulation of sphagnum moss over the course of thousands of years. The annual growth of the sphagnum moss is around 20 cm or more lengthwise, which corresponds to 1 mm increase in height of the peat layer.



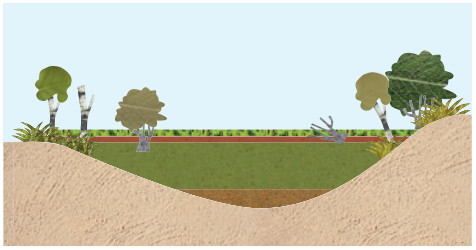
10,000 BC: Mud begins to form in shallow depressions



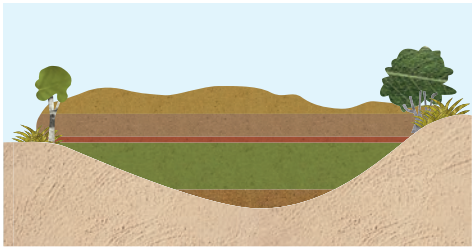
8,000 BC: Reed and sedge peat form as a layer over the mud.



7,000 BC: The first marshland forests grow in the depressions, with a further layer developing from the dead trees.



5,500 BC: The first bog plants turn into peat, principally peat mosses which today form what is known as black peat.



500 BC: The mosses accumulate over a long period and form the upper peat layer of the bog which is today known as white peat.

The different peat types – an orientation guide

Peat originating from fen bogs is called ‘herbaceous peat’ or ‘sedge peat’. Peat formed in raised bogs, consisting essentially of sphagnum moss, is known as ‘raised bog peat’. This is the only peat raw material that possesses the required quality for professional substrates. Moreover, it is available in sufficient quantities to ensure a reliable supply of growing media to the horticultural industry. The worldwide extraction of peat used for growing media is about 28.552 million m^3 per year.

The decomposition of peat results from both the physical and biochemical decomposition of the organic plant material. The degree of decomposition influences the properties of the peat to a very great extent. The youngest peat layer on top of a raised peat bog is called white peat. The oldest layer at the bottom is called black peat. This is the criterion used most frequently for defining peat types and their horticultural application.

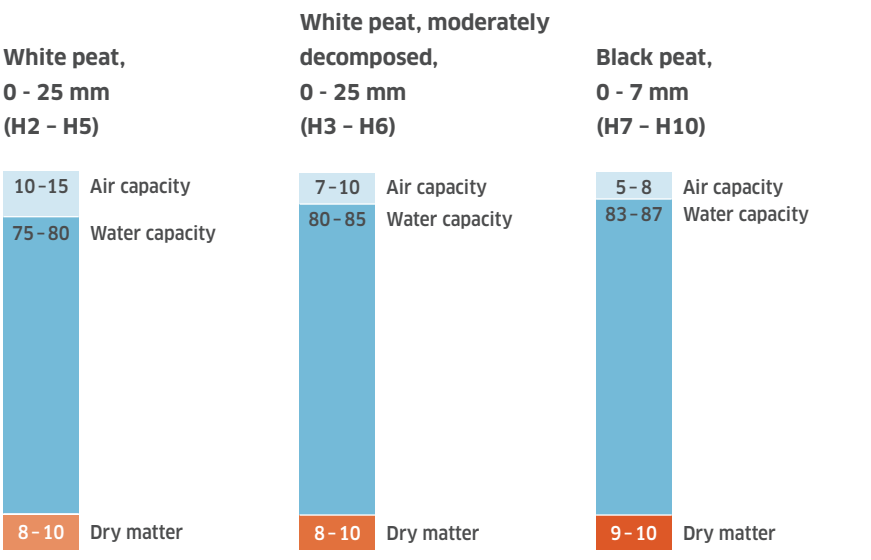
On a scientific basis the degree of decomposition of peat is determined according to the “von Post” scale, ranging from H1 to H10. The plant structure of the peat moss is still visible between H1 and H5. In black peat with a higher degree of decomposition, plant structure is no longer identifiable.

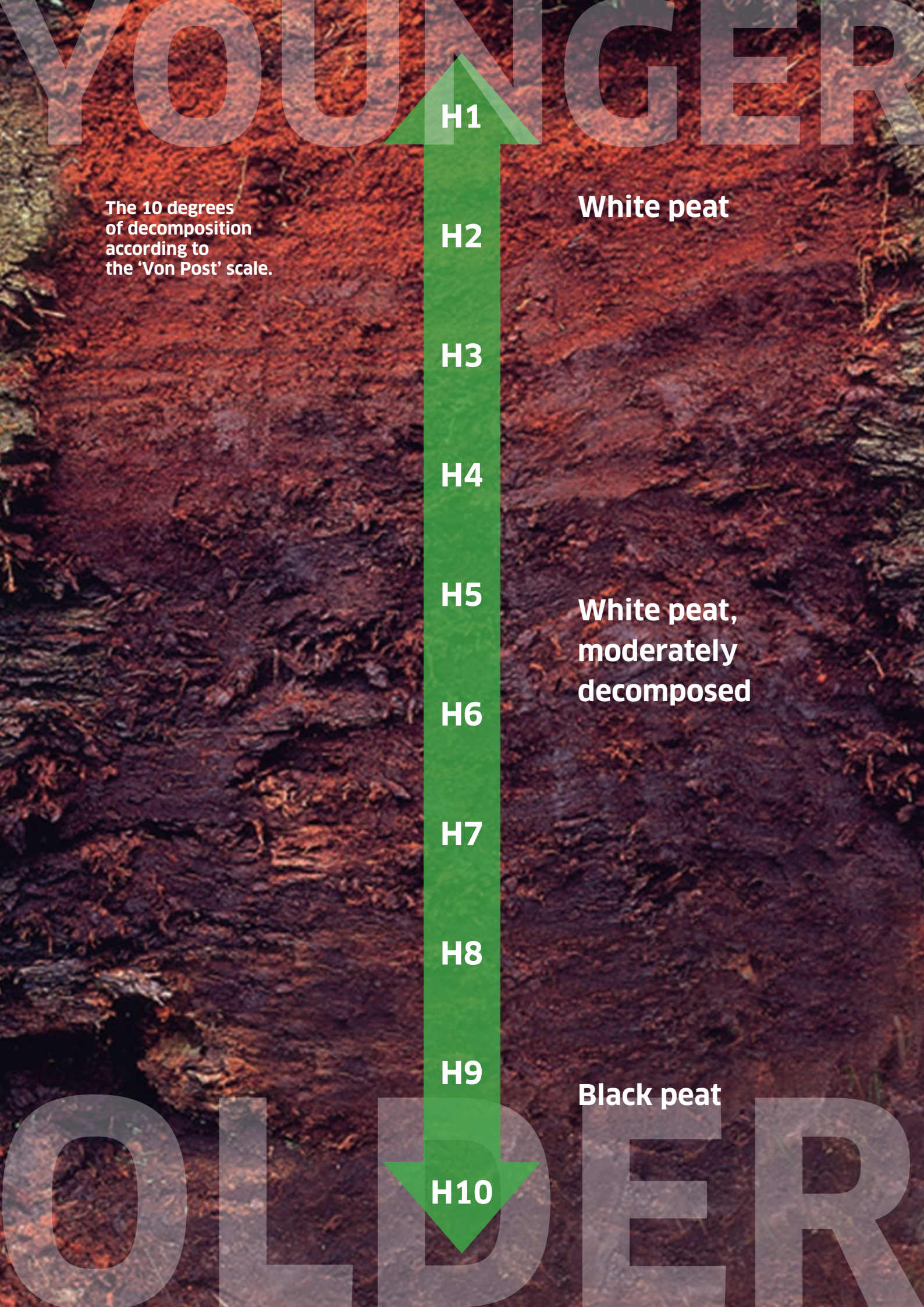
Substrates based on sphagnum peat moss – the base for success

Sphagnum peat has a very high porosity: pores filled with water and air make up more than 90% of its volume. Its structure is very stable over time to keep this porosity. All physical, chemical and biological parameters make sphagnum peat moss a unique and indispensable constituent for use in premium growing media.

- constant chemical properties
- precise adjustment of pH and nutrients
- ideal air-water ratio
- high water retention and low weight (from 160 kg/m^3 for white peat fractions up to 400 kg/m^3 for black peat)
- free from pathogens and phytotoxic substances
- almost free from weeds
- long-term availability
- economical efficiency
- unique technical performance

Physical properties of different peat types





The 10 degrees of decomposition according to the 'Von Post' scale.

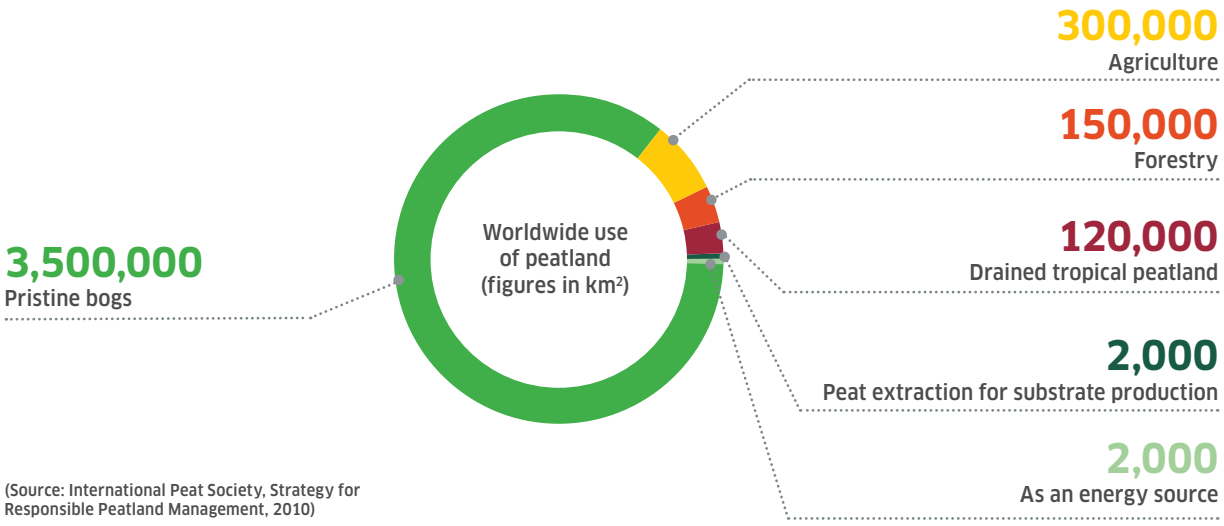
White peat

White peat, moderately decomposed

Black peat

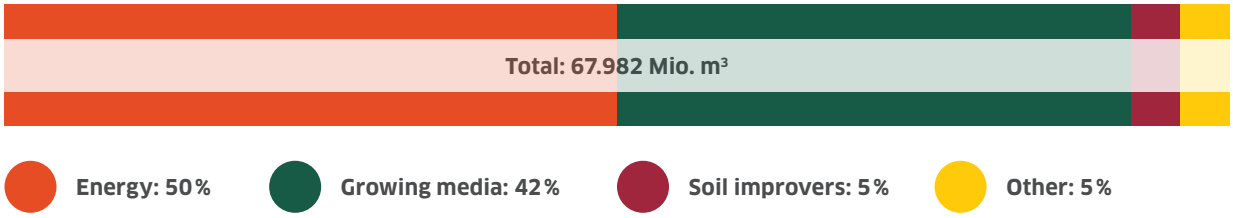
Worldwide use of peatlands and peat

Globally, peatlands cover an estimated area of 4,074,000 km² which is approximately 3 % of the Earth's land surface. Most of it is situated in the northern hemisphere with extensive peatland zones in Canada, Russia and Northern Europe, especially the Baltics and Scandinavia. 86 % of which (about 3,500,000 km²) are pristine bogs.



(Source: International Peat Society, Strategy for Responsible Peatland Management, 2010)

Just under 10 % of peat bogs have been drained in recent decades, particularly for agriculture or forestry use. The resulting peat extraction areas cover some 2,000 km² (about 0.05 % of the world's total area of peatlands). Extracted peat is used for different purposes.



source: EPAGMA www.epagma.eu/default/home.aspx, January 2014

Growing Media Europe

Peat – a major raw material for professional substrates in modern horticulture

Over decades raised bog peat has proven to be the constituent with the most beneficial properties for use in growing media. Its biological, physical and chemical properties as well as the high economical efficiency and homogeneity make it the first choice in modern professional horticulture.

A recent evaluation in Germany has shown that 93.4 % of all growing media are based on black and white peat. Other constituents have a share of only 6.6 % in substrates used for special applications. Premium quality raised bog peat will remain the most important raw material for growing media in future. Further infomation and data can be found on www.growing-media.eu.

It’s not all about peat

Alternative constituents

Our target is that, by 2020, the proportion of alternative constituents will increase to at least 15 % of our total substrate production. Calculating this percentage involves comparing the used volumes (in m^3) of our wood fibre product GreenFibre,® our green compost TerrAktiv,® and all other bulking non-peat raw materials with the total quantity of growing media (in m^3) produced by the Klasmann-Deilmann Group.

Food sector

We wish, in future years, to step up our supplies to the fruit and vegetable growing sector. To document our progress here, we compare sales figures achieved for this area with total sales of growing media (in m^3 in both cases).

Emissions

As well as reducing our overall emissions, a further priority for us is optimising emission levels per product unit. We therefore calculate the ratio between our corporate group’s total emissions (in t CO_2e) and our total production volume (in m^3).

READ MORE

- Sustainability report
- The use of peat in commercial horticulture

Committed to substrate quality from harvest onwards

The difference: Klasmann-Deilmann works its own peat bogs.

The Klasmann-Deilmann Group extracts raised bog peat in Germany, Lithuania, Latvia and Ireland. Harvesting peat with different and complementary properties in different climatic zones ensures that we can produce substrates of consistent quality throughout the year. For more than 100 years the company has been developing its specific expertise regarding the extraction of peat. The methods of harvesting and processing are tailored to the required quality of modern professional horticulture.

New methods are frequently introduced, such as most recently the covering of sod peat stockpiles. This method was introduced in order to ensure that harvested sod peat is less affected by unfavourable weather conditions. Latest experience shows, that it has a tremendous effect in terms of safeguarding supplies of substrates to growers throughout the year.

Timetable for working in the peat fields of Klasmann-Deilmann

MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN

White sod peat
(Extraction technique: cutting of sods)

White sod peat (Drying period, up to 12 months)
Target: moisture content 40 – 45 % of weight

White peat
(Extraction technique: surface milling)

Black peat (Turning to improve the effect of frost)

Black peat
(Drying and stock piling)

Black peat (Extraction technique: digging and exposure to frost)

All actions depend directly on the climatic conditions (rain, wind, temperature).

White sod peat – a state-of-the-art extraction technique

To achieve white sod peat, the peat is extracted in blocks (so-called “peat sods”) from May to September. After this, the sods are turned upside down several times for uniform drying. During the summer of the following year, as soon as the humidity of the sods has reached between 40 % and 45 % of weight, the sods are stockpiled. After transport into the factory, the sods are crushed and screened into four different sod peat fractions:

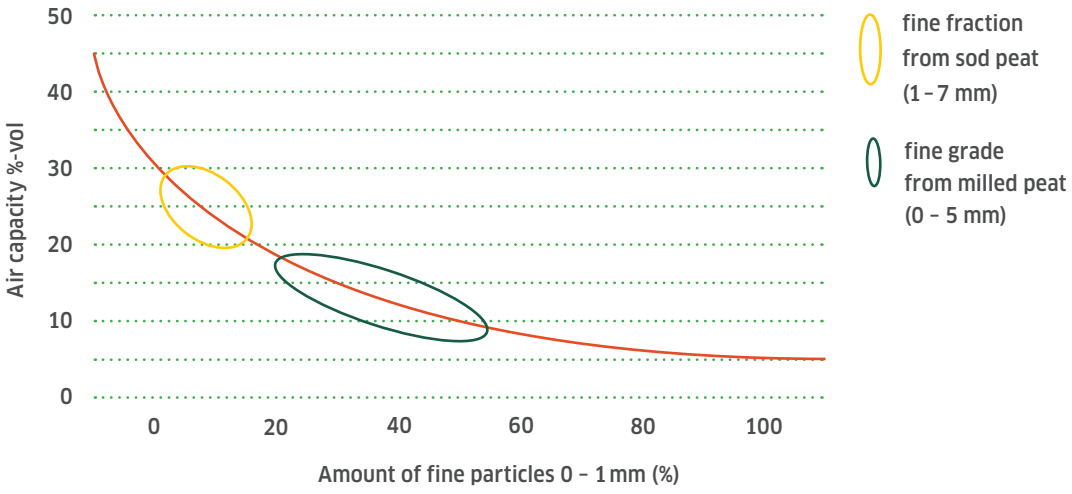
Fraction	Particle size	Usage
Fraction 0	1 – 7 mm (fine)	used for propagation substrates in trays and small pots
Fraction 1	5 – 15 mm (fine / medium)	used for bedding and pot plant substrates in small and medium sized pots and trays
Fraction 2	10 – 25 mm (medium)	used for potting substrates in medium sized pots
Fraction 3	25 – 45 mm (coarse)	used for container substrates

Extraction of peat sods is the optimal method for preserving the peat’s structure and thus to ensure the aeration properties when used in a substrate. Peat derived from sods has a very low proportion of fine particles (< 1 mm). It is mainly used in substrates for plants or growing situations with high requirements for air capacity and drainage. Therefore, sod peat is a major component in potting and container substrates for green plants, flowering plants, shrubs and trees as well as hanging baskets.

Physical characteristics of sod peat and milled peat in comparison

	White sod peat, fraction 2 (10 – 25 mm)	White peat, surface milled (0 – 25 mm)
Air capacity	25 – 30 vol.-%	10 – 15 vol.-%
Water capacity	60 – 65 vol.-%	75 – 80 vol.-%
Total pore volume	91 vol.-%	91 vol.-%
Dry matter	9 vol.-%	9 vol.-%

Air capacity at pF 1.0 in relation to the amount of fine particles (0 - 1mm)



White peat – surface milling technique

In addition to the sod peat cutting, other white peat materials are extracted in the field by milling the surface of the peat bog. Following this, a drying process begins in the field using wind and sun to reach an optimal moisture content of 50 to 60 % of weight. This is an important quality assurance for quick and efficient re-wetting in the nursery.

Depending on the climate, the duration of the drying process can vary from a few hours to over one week. Afterwards, the stockpiles are covered in order to maintain this moisture level for several months prior to transportation into the factories.

White peat extracted by milling technique is suitable for substrates to be used in trays, small pots and packs. The flowability of this raw material aids rapid filling and thus is ideal for use in automated filling lines.

Important work in the course of peat storage

- Temperature of the stockpiles is checked weekly.
- Stockpiles are turned when temperature exceeds setpoint limits to ensure aeration.
- A further method also allows control of the temperature by continuous monitoring using automatic transponder systems with WLAN connections.
- Temperature checks are recorded for traceability.
- Compliance with these important rules is a key to guarantee the highest quality of peat raw materials and the final substrate.

Frozen through black peat

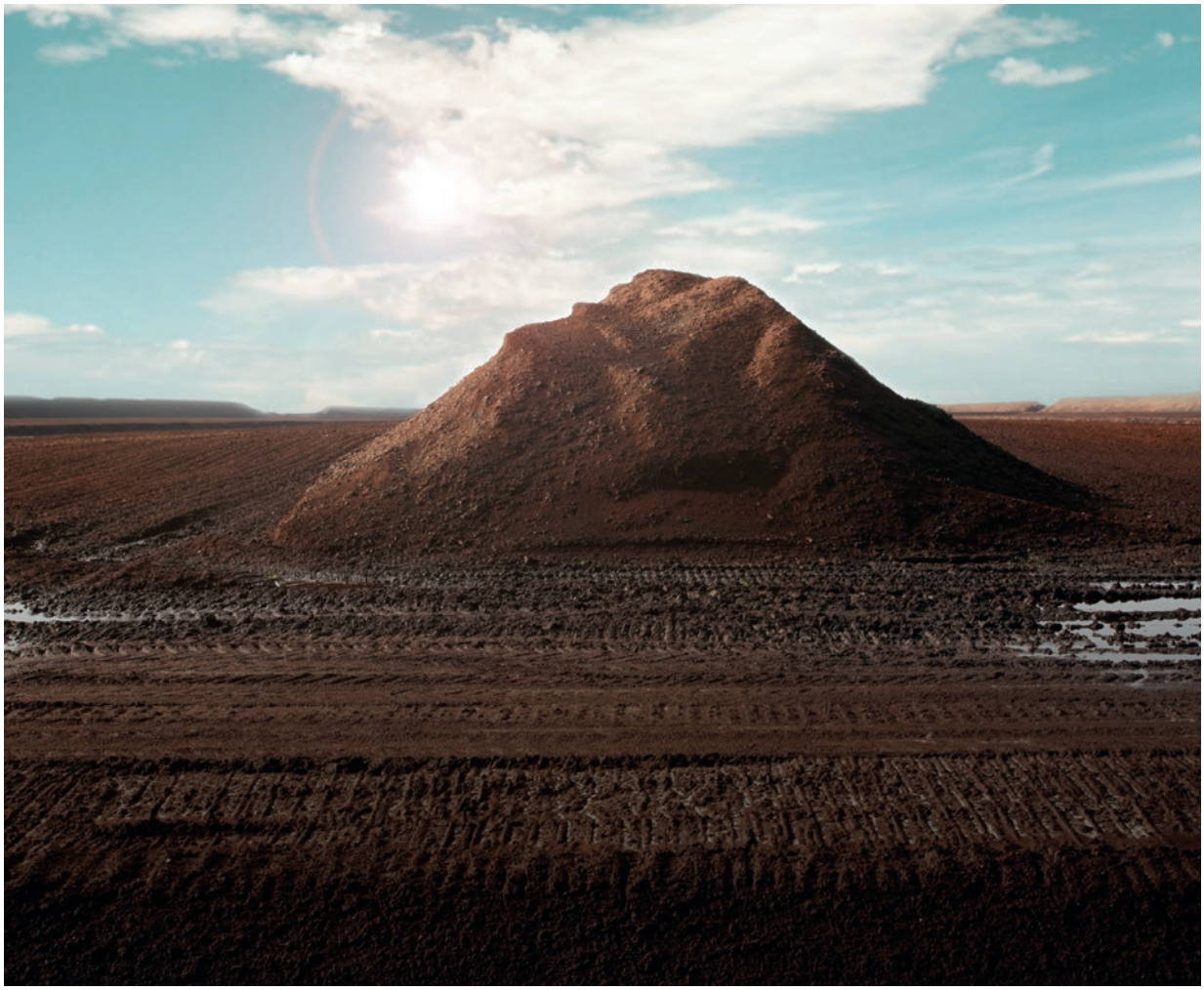
Black peat is appreciated by growers because of its high water capacity. It extends irrigation intervals and therefore can optimise cultivation, especially under warm climatic conditions. It is an important raw material for propagation substrates and for the specific blocking substrate technology.

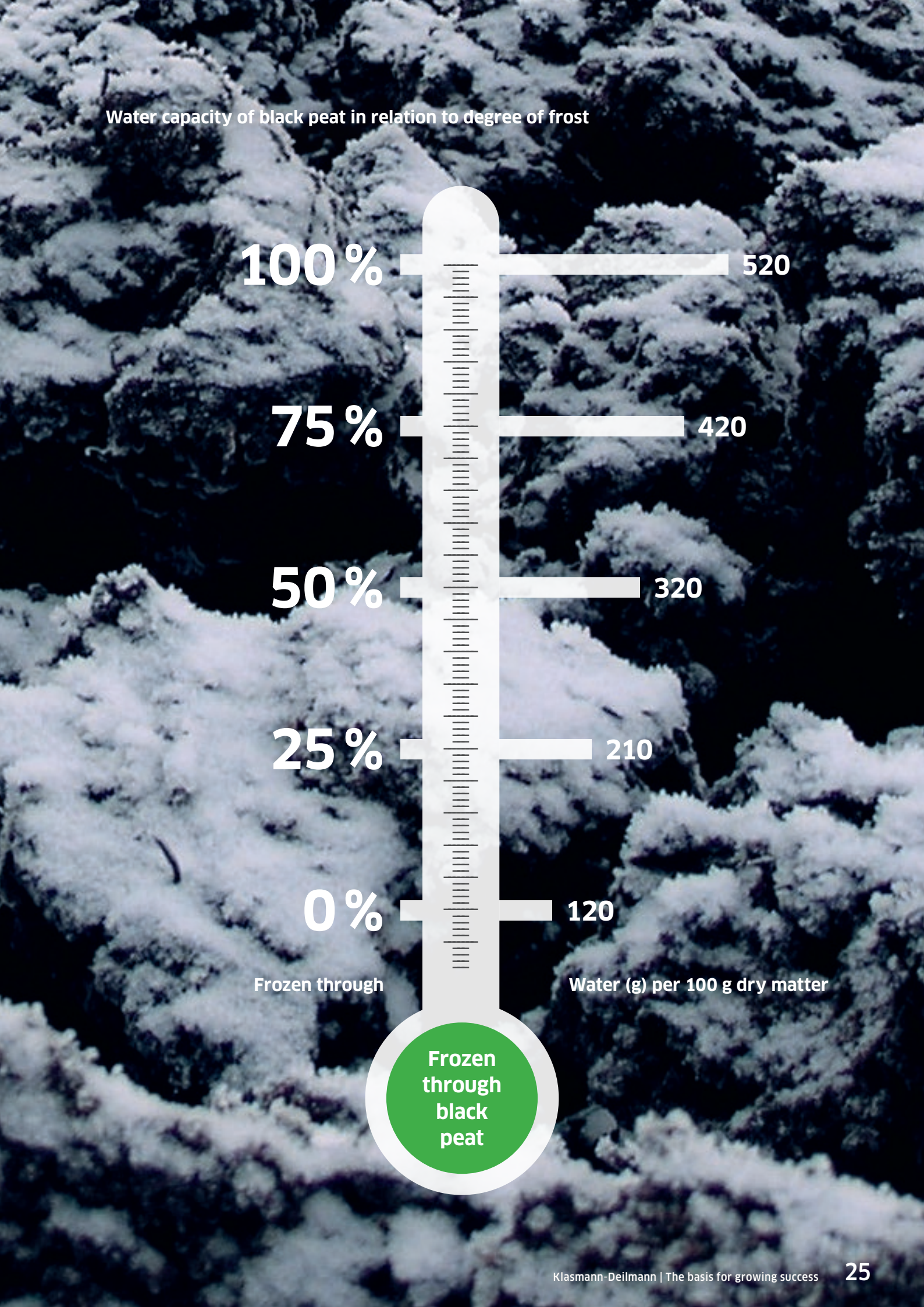
The effect of frost is crucial for this raw material as it allows black peat to acquire properties much desired for horticultural use such as high water retention, re-wetting of the black peat and aeration. Frost action stabilises the humic acids content in the black peat which optimises the buffering capacity for nutrients and has a stimulating effect on root development.

However, winter temperatures differ from year to year. For this reason, to ensure that our own resources of black peat are consistently of optimum quality, we continuously work with blends of frozen black peat collected over three successive years. Black peat is classified according to its water retention, shrinkage and dry density.

Also the water uptake characteristic (WOK, from Dutch: “wateropname karakteristiek”) is part of the classification of peat raw materials. It is determined with a new method, developed in cooperation with the Dutch foundation RHP*, and provides an important parameter for most homogeneous peat raw materials.

* **Stichting RHP = Regeling Handels Potgronden, The Netherlands: The most important and strictest quality scheme for professional growing media worldwide (www.rhp.nl)**




Water capacity of black peat in relation to degree of frost
100 %
520
75 %
420
50 %
320
25 %
210
0 %
120
Frozen through
Water (g) per 100 g dry matter
Frozen through black peat


SICK

Why peat?

Chemical properties

- ideal pH value
- optimum nutrient levels
- good nutrient buffering
- free from harmful substances

Biological properties

- almost free from weeds
- free from pathogens

Economical properties

- long-term availability
- uniform characteristics
- quality that meets the requirements of a wide range of plants

Physical properties

- high structural stability
- optimum ratio between air and water capacity
- good wettability

Constituents and additives for any required application

No other raw material can compare with peat as the main constituent for substrates in terms of consistent quality, crop safety and efficient irrigation management. Nevertheless, Klasmann-Deilmann combines peat with other constituents or additives for two reasons:

- specific technical modifications of the physical, chemical or biological properties of peat
- addressing specific requirements for the use of alternative constituents and for improving sustainability of the final substrate

For technical reasons, these other constituents are incorporated to a level between 10 % and 30 % of volume. Higher ratios can create unforeseeable risks, for example in terms of reduced water retention and shelf life, unfavourable salt and nutrient levels, and nutrient fixations. Additionally, the limited availability of high-quality constituents has to be considered.

Materials other than peat are in short supply

- The available quantities of alternative constituents are not nearly sufficient to produce growing media without peat in the required quantities – neither for Germany nor Europe or the rest of the world.
- Important materials such as wood fibre and green compost will be in short supply and go up in price as these raw materials become more attractive for energy recovery.
- In Germany alone, several million m^3 of growing media and potting soils are produced every year. However, the quantity of constituents such as wood fibre, green compost, coir, bark etc. is completely inadequate to replace peat in total.
- The production of certain alternative constituents such as coir involves high input of energy, chemicals and labour. Moreover, some of these materials must then be transported over long distances which contradicts with sustainability goals.

Examples for the application of constituents and additives

Modification of physical properties

- increase of aeration and drainage: GreenFibre,® perlite, coco fibre, bark
- improvement of water uptake: clay, GreenFibre,® TerrAktiv® green compost, K Hydro-S® wetting agent, coco fibre, coir
- increase of water retention: TerrAktiv® green compost, water-retaining agent (Hydro-Gel)

Alteration of chemical properties

- tailoring pH: As raised bog peat is naturally acidic, adding lime (calcium and magnesium carbonate) means that the pH can be adjusted to the specific needs of any crop and growing condition. Additionally, calcium and magnesium supply is safeguarded by using a reactive high-quality lime.
- plant nutrition: Peat has a low level of nutrients. A water-soluble base fertiliser providing macro- and micronutrients is indispensable for the optimal start of plant growth. On grower‘s request a range of organic or mineral fertilisers as well as controlled release fertilisers can be incorporated to promote continuous growth.

Comparison of peat raw materials and constituents

Additives	Air capacity	Drainage	Structural stability	Capillary action	Water capacity	Wettability	Buffering	Accumulation/exchange capacity of nutrients	Durability of plants
Clay granules				●	●	●	●	●	●
Milled clay				●	●	●	●	●	●
Clay powder				●	●	●	●	●	●
Sand (washed)						●			
Pumice (volcanic stone)	●	●	●						
Perlite	●	●	●						
Vermiculite (expanded)	●								
Wood fibres	●	●		●		●			
Coco fibres	●	●	●	●		●			
Coir, buffered	●	●		●	●	●			
Pine bark	●	●	●						
Green compost				●		●	●		●
Black peat				●	●	●	●	●	●
White peat	●	●	●	●	●	●	●	●	●

Premium constituents made by Klasmann-Deilmann

For several years now Klasmann-Deilmann has been producing its own constituents such as TerrAktiv® green compost and the special wood fibre GreenFibre®. The demand for high-quality constituents in modern horticulture is on the increase. Thus, safeguarding optimal manufacturing processes for these constituents is crucial to avoid disadvantages for the grower.

Therefore, all manufacturing processes are fully focused on the horticultural requirements of these materials which benefit from our internal quality controls and also from external RHP certification. These constituents are approved for use in organic cultivation**.

Furthermore, they support the safeguarding of specific peat raw materials and are part of Klasmann-Deilmann's environmental initiative to increase sustainability of processes and products according to the environmental standard ISO 14001.

Market leader for organic substrates

Organic substrates are a segment in which Klasmann-Deilmann has become the market leader due to innovative constituents and product development. The entire production process involved in composting and in creating organic substrates is monitored by independent certification bodies and established in line with defined criteria. Thus, our organic substrates conform to the regulations and requirements of the associations for organic plant cultivation in various countries.

Klasmann-Deilmann belongs to Ökoring Niedersachsen e.V. (Lower Saxony's advisory organization for ecological growers).

** Substrate suitable for use in organic cultivation conforming to the European Organic Regulations (EU) no. 2018/848 and 2021/1165. Controlled by Ecocert F-32600.

RAW MATERIALS TerrAktiv®

TerrAktiv® is a high-quality green compost enriched during the composting process by biodynamic preparations which ensure that micro-organism activity is stimulated. Specially added predator mites support the biological suppression of sciarids in the greenhouse. TerrAktiv® complies with RAL criteria as well as the requirements of the RHP foundation and EU organic standards.

TerrAktiv®

- is biologically active
- suppresses root diseases
- increases shelf life of potted herbs
- conforms to guidelines laid down by Dutch RHP foundation
- is a slow releasing source of nutrients (especially P, K, Mg and trace elements)
- has a high buffering effect on nutrients
- enhances re-wettability
- improves the release of nitrogen from organic fertiliser

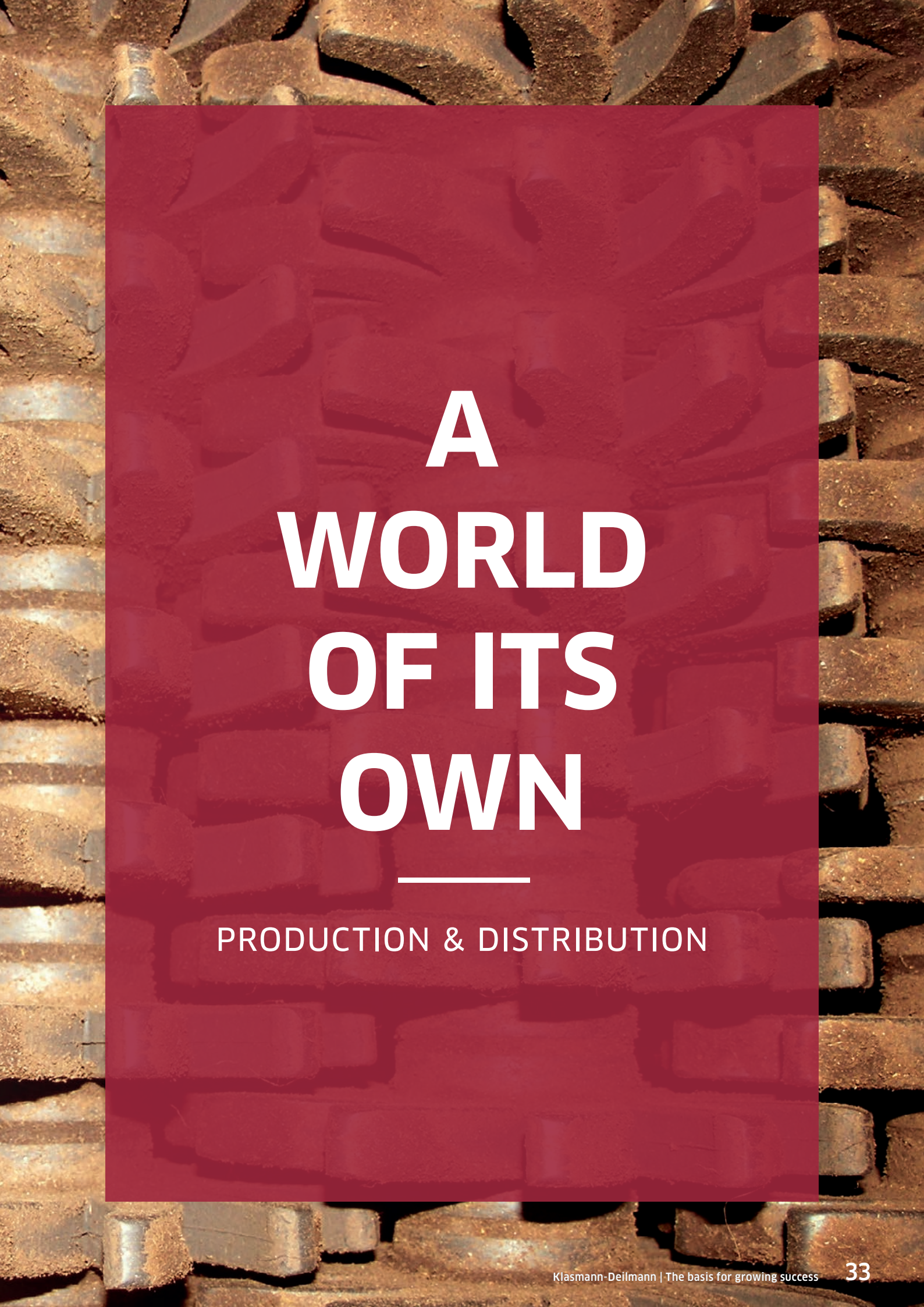
RAW MATERIALS GreenFibre®

Essential advantages of GreenFibre®

- encourages healthy and fast root development
- increases drainage
- increases air capacity and ensures long-term structural stability
- different structures optimised for any application
- reduces transport costs due to its low weight
- ensures a straight forward feeding regime of the crop due to a stable nitrogen balance
- Suitable for use in organic cultivation conforming to the European Organic Regulations (EU) no. 2018/848 and 2021/1165. Controlled by Ecocert F-32600.

READ MORE

- Product leaflet “TerrAktiv®”
- Product leaflet “GreenFibre®”
- GreenNotes “GreenFibre® in substrates for pot plants”
- GreenNotes “Potgrond H GreenFibre®”
- Product leaflet „International Organic Module Concept“



A WORLD OF ITS OWN

PRODUCTION & DISTRIBUTION

Our annual production quantities

> 3,400,000 m³
Substrates

Our extraction and production sites

Activities / Country	White peat extraction	Black peat extraction	Compos-ting	Wood fibre production	Growing media production	Potting soil production	Energy peat production	Biomass from SRCP
Germany		✓	✓	✓	✓	✓		✓
Lithuania	✓	✓			✓		✓	✓
Latvia	✓	✓						
Ireland	✓	✓		✓	✓			
The Netherlands				✓	✓			
Belgium					✓			

~ 3,000,000 m³
Peat raw materials

> 200,000 m³
Wood fibre

~ 100,000 m³
Green compost

> 30,000 m³
Containermulch

~ 300,000 m³
Potting soils
for consumers

Peat processing in the factory

Processing of white peat

All white peat raw materials are processed in specific facilities centrally within the factory before they are used for manufacturing the final substrate. All raw materials have to meet a technical specification in terms of structure, moisture content and weight. The use of specifically developed star screens ensures a very gentle processing of the peat raw materials. Different grades of white peat raw material are achieved using this procedure.

White peat, surface milled:
- extra fine: 0 – 5 mm
- fine: 0 – 10 mm
- medium: 0 – 25 mm

White sod peat:
- fraction 0: 1 – 7 mm, fine
- fraction 1: 5 – 15 mm, fine/medium
- fraction 2: 10 – 25 mm, medium
- fraction 3: 25 – 45 mm, coarse

Processing of black peat

Black peat raw materials need to be processed carefully using specific milling technologies. Subsequently, the black peat is screened depending on its intended use.

Black peat:
- extra fine: 0 – 5 mm
- fine: 0 – 7 mm

Processing of peat fibres

During the screening process of white and black peat, the peat fibres remain on the screen as a raw material. They are separated from the screened peat and are cut into 30 mm and 70 mm lengths. These are two other important raw materials for medium as well as coarse potting and container substrates since they provide aeration and water transport capabilities.

Peat fibres:
- 0 – 30 mm
- 0 – 70 mm


VOLVO

The production of a substrate

The mixing lines are fully computer controlled. Filling capacities as well as fresh weight of raw materials and substrates are controlled continuously throughout the production process. After finishing the production process, each batch is controlled in own on site laboratories according the respective product specification.

1. Peat is transported to the screening lines

2. Raw material hoppers

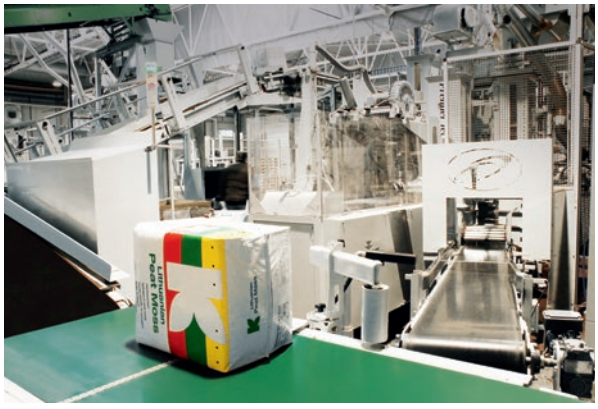
3. Computerised control of production in real time, each substrate has its specific recipe filed in the control computer

4. Peat raw materials and constituents are carefully dosed in controlled ratios onto the transportation belt.

5. Addition of lime and fertiliser, weighing hoppers for exact dosing of fertilisers

6. Mixing drum for final mixing

7. Overview mixing line



8. Filling of bags or bales

9. Just in time production and delivery to minimise storage times

Tailor-made from S to XXL

For all growing media manufactured by Klasmann-Deilmann, the volume is measured in accordance with the European Standard EN 12580 (“Soil improvers and growing media – Determination of quantity”). The standard lays down the procedure to be used for measuring the volume of growing media and other peat products which are supplied in bulk or as packaged products. The quantity indication generally relates to the quantity at the time of production.

Unit / Country	70-litre-bags	200-litre-bales	Big Bales	Loose bulk
Germany	✓		✓	✓
Lithuania	✓	✓	✓	
Ireland			✓	✓
The Netherlands			✓	✓
Belgium				✓
Latvia			✓	

Big Bales

- from 2.5 – 6.0 m³
- most efficient bale size for transport, storage and an economical filling process
- bale breaker system required

Loose bulk

- efficient supply for high demand
- supplied with specific walking floor trailers

200-litre-bales

- optimised and innovative bale size
- improved loading capacities on pallets and in containers
- easier handling in the nursery

70-litre-bags

- reduced weight for best manual handling

Water before rail before road

Our factory in Schiedam, which is located very close to the harbour of Rotterdam, is a best practice example of our fundamental principle 'water before rail before road'. In implementing this principle, however, we repeatedly come up against the limits of what is feasible and commercially viable. For deliveries overseas, we make exclusive use of container transport. Within Western Europe, we make use of the opportunities provided by domestic waterway shipping and railway transport.

Every year, Klasmann-Deilmann uses on average of:

100 Ships

2,300 Wagons

40,000 Trucks

8,800 Containers

WE KEEP AN EYE ON QUALITY

QUALITY MANAGEMENT

Efficient quality management systems

Substrates by Klasmann-Deilmann: subject to strict controls

Prior to substrate production, each raw material used by Klasmann-Deilmann (peat as well as other constituents and additives) is subject to internal and external controls conducted by specialised laboratories.

The samples from final substrates are automatically taken from the production lines and sent to internal laboratories for immediate analysis. The Klasmann-Deilmann laboratories carry out controls on all manufactured products prior to delivery:

- **physically:** Structure and composition
- **chemically:** Salt level and pH-value

About 50,000 samples per year are checked in own and associated laboratories. Every sample is labelled with its date of production and kept in stock for six months:

- 3 litres sealed and kept cool at 3 °C
- 8 litres kept at room temperature

Traceability

Every batch of substrate can be traced efficiently by the printed label on the bag, big bale or bale. Analysis of the retained samples can be carried out upon customer's request. All production data are kept in line with ISO 9001 regulations.

Certified raw materials for substrates

All our raw materials are continuously tested for suitability before their use in substrate production. We also conduct vegetation trials to ensure the physical, chemical and biological properties of our growing media. To document the consistent high quality of our growing media, we have the complete value chain, from the raw materials to the production sites and the finished products, audited for conformity with the rigorous, internationally recognised guidelines of RHP (Regeling Handels Potgronden, www.rhp.nl).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RHP quality mark for horticultural substrates

The Dutch Stichting RHP (Regeling Handels Potgronden) has been the European knowledge centre for growing media since 1963. It has established important technical requirements for horticultural growing media, raw materials, constituents and additives.

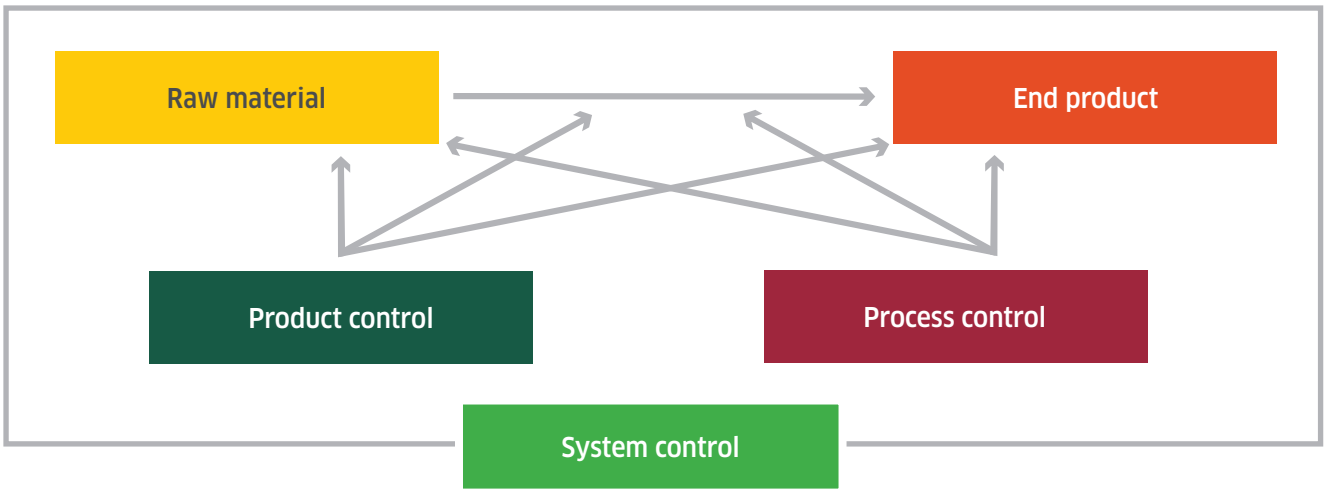
Substrates by Klasmann-Deilmann benefit from the RHP quality scheme, which sets the strictest technical and qualitative standards (chemical, physical and phytosanitary) for growing media:

- ensures full process and product control by external auditors and laboratories
- controls peat bog management
- lays down strict guidelines for harvesting, storage, monitoring of temperatures and treatment of peat raw material
- requires laboratory tests of all raw materials before their use
- requires inspection of all substrates when ready to use
- all additives (e.g. fertilisers, wetting agents) and constituents need RHP approval
- retained sample of each delivery to be stored under specific conditions
- specific RHP developed standards and methods (e.g. water uptake characteristic WOK, press pot stability, respiration method, potting density …)
- chemical and physical specification of each particular recipe to be predefined (ensuring maximum homogeneity of each delivery)

Free of contamination

All substrates produced by Klasmann-Deilmann under the RHP quality mark are subject to stringent hygiene measures and of course are tested for pests and diseases, heavy metals, radioactivity, human pathogens and nematodes. Based on these regular internal and independent external controls, we are able to declare that our substrates are free from plant pathogenic diseases (e.g. Rhizoctonia, Pythium, Phytophthora, Thielaviopsis, Fusarium species, others) and free from plant pathogenic nematodes as well as human pathogens. Moreover, substrates produced under the RHP scheme can be declared as almost free from weeds according to the RHP standards.

Scheme of the RHP system control



Further certifications in detail

Our company being certified to the ISO 9001 and ISO 14001 standards, the verification of our climate footprint to ISO 14064, and our reporting in compliance with Global Reporting Initiative (GRI Standards), amongst others, are the benchmarks we use to gauge how seriously we take our responsibility for humankind, the environment and future generations. Our environmental protection measures include the re-wetting of several thousand hectares of former peat extraction areas.

ISO 9001
This international standard guarantees an increased and consistent quality level for products and services. It controls the internal organisation as well as the quality management system. It also includes a continuous improvement system and requires filing of production data and order records for traceability.

ISO 14001

ISO 14001 is an international environmental standard. Klasmann-Deilmann was the first manufacturer of growing media to be certified according to ISO 14001. This certification shows our commitment to an environmental policy of sustainable management based on controllable processes.

- ISO 9001
- ISO 14001
- FSC
- PEFC
- ISO 14064
- (EU) 2018/848
- RHP
- GRI Standards

Research and product development – meeting tomorrow's demands today

Our specialists around the world and our network of sales partners ensure that our expertise in the field of growing media is unparalleled. Together we embrace important developments in cultivation techniques, plant breeding and environmental demands, and respond to changing needs. This results in innovations that yield significant advantages for individual nurseries and are geared towards long-term benefits. In many cases, our innovations are developed with specific uses in mind, based on demands or ideas supplied by our customers.

The R&D department of Klasmann-Deilmann is deeply involved in research and product development of growing media, and continuously improves its raw materials and substrates. The department owns a specialised laboratory, and a research greenhouse where all raw materials and new additives are tested under practical conditions.

Moreover, Klasmann-Deilmann runs research projects in its own facilities as well as in cooperation with horticultural research stations all over Europe. Fundamental research projects are initiated in working groups with horticultural universities.

Current important aspects for research and product development are:
- substrates with reduced weight to optimise transport costs
- improved re-wetting of substrates, including organic substrates
- analytical methods for determination of press pot stability and water uptake capacity
- improvement of microbial life and suppressive effects
- organic and mineral fertilisation concepts
- new substrate constituents

Customers of Klasmann-Deilmann benefit from the company's strong international technical network.

CONSISTENT, DOWN TO THE SMALLEST DETAIL

SUSTAINABILITY

Respecting the value of nature

Sustainability

Our benchmark is sustainability across all our corporate activities. We integrate economy, ecology and social action in a holistic strategy that paves the way for the future.

A company will no longer be measured solely by profits and job security. It will increasingly be viewed in terms of its societal role, assessed by the extent to which it is committed to addressing the ecological and social aspects of its own actions, keeping future generations in mind. Our corporate guiding principles (which are binding throughout the group) have already been geared towards tenets of sustainability for many years.

By means of a systematic improvement process at all corporate levels, we continuously enhance the sustainability of our company and our products. Our actions in this context embrace the responsible use of our natural resources and goal-oriented activities to protect the environment. They include an affirming and appreciative approach to relations with staff, customers and suppliers, also incorporating social concerns and our company's economic health.

Our strategic focus extending to 2025 closely integrates the company's existing lines of business in commercial horticulture with the field of renewable energy and resources, and places increasingly sustainable practices at the heart of all it does. We are convinced that Klasmann-Deilmann is very much on track in terms of retaining, into the long-term future, the mandate – repeatedly given by policy makers and the public – to pursue entrepreneurial activity.

ISO 14064

Klasmann-Deilmann has been the first substrate producer publishing a corporate carbon footprint. Verified to ISO 14064 the climate footprint also leads to product carbon footprints. The aim is to reduce emissions at corporate and product levels, especially from peat extraction and transport. Therefore Klasmann-Deilmann will e.g. increase the proportion of alternative constituents to 15% (by volume) of the annual production total by 2020. Other action includes measures relating to renewable resources – either to avoid the use of fossil fuels or enable direct carbon capture. These include photovoltaic installations, afforestation, the management of woodland and short-rotation coppice (SRC) plantations, as well as production of heat energy from corporate-owned SRC plantations.

GRI Standards

Klasmann-Deilmann's sustainability reports comply with the internationally accepted guidelines of the "Global Reporting Initiative" (GRI), which specify the publication of highly diverse information. The company's 2016 report implemented the latest generation GRI Standards.

The commitments of the Klasmann-Deilmann group

Efforts taken in terms of raw materials and renewable energies:

- production of our own wood fibre from sustainable sources (GreenFibre®)
- composting of green residues, thus reintegrating it into the natural cycle (TerrAktiv®)
- short-rotation plantations as sources of wood chips for renewable heating systems

Efforts taken in terms of environmental protection:

- Our methods of peat extraction follow the highest environmental standards
- We strictly follow the legal extraction and restoration requirements in each country
- We restore peat bogs once extraction has finished with the aim of creating new biotopes and reverting peat bogs back to their natural state
- We support and take part in research projects to further optimise the restoration process
- Land management and raw material extraction practises adhere to the principles of Responsible Peatland Management as laid down by the International Peatland Society (IPS), and the Code of Practice by the association Growing Media Europe
- Klasmann-Deilmann supports the creation of the European certification system for ‘Responsibly Produced Peat’ (RPP), which stipulates binding and verifiable criteria for these activities

Klasmann-Deilmann commits to ‘Responsibly Produced Peat’

The goal of the ‘Certification Scheme for Responsibly Produced Peat’ (RPP) is to ensure that peat used as a constituent for growing media originates solely from responsible sources. Responsibly Produced Peat aims at achieving the following benefits:

- maximising peat production from degraded peatlands, leaving natural peatlands with high ecological biodiversity untouched
- securing the best possible development after completion of peat production, with preference for restoration
- assuring the long-term availability of peat as a highly valuable growing media constituent

The normative umbrella of these principles and criteria is the ‘Strategy for Responsible Peatland Management’ (International Peatland Society 2010). Certified companies and extraction sites take the following strategic objectives into account:

- biodiversity
- hydrology
- climate change

This is considered during the entire production chain from developing and operating extraction sites until and during after-use. This process will ensure that peatlands will be used, managed and restored in a responsible way, generating optimal social, cultural, economic and ecological benefits.

RPP certificates available from Klasmann-Deilmann

Klasmann-Deilmann received the first certification for German and Lithuanian extraction sites in 2016. In 2018, already 75.9 % of the company's peat resources came from RPP certified extraction sites. This includes all sites in Lithuania as well as many important sites in Latvia and Germany. All RPP criteria were met for these sites.

responsibly produced peat

READ MORE

- http://klasmann-deilmann.com/en/sustainability/climate-footprint/
- http://www.responsiblyproducedpeat.org/

Measures following cessation of peat extraction in Germany

8,442
ha

Total restored peat-extraction sites

Depending on the extraction technique used, raw-material production on a particular site may continue for several decades. After peat extraction has ceased, sites are covered with residual peat to at least the legally required depth. There are essentially four options for their subsequent use, and which of these is implemented in a given case is stipulated by the relevant authorities in the permit documents issued prior to commencement of raw-material extraction.

The most important form of after-use in Germany is re-wetting. Its aim is to establish peat moss (Sphagnum) and other typical peatland plants, such as cotton grass. In the re-wetted areas, the presence of standing water will lead to the former hydrological conditions being restored, resulting in bog-like vegetation (e.g. rehabilitation) or even typical bogland vegetation (e.g. regeneration), and these sites can become CO_2 sinks when the peat body begins to grow again.

In this way, a re-wetted area can contribute to the biodiversity typical of peatland – in this case, to the variety of ecosystems present – and again become a characteristic feature of the landscape.

Because local geological and hydrological situations differ, not all areas can be returned to nature in this way once peat extraction comes to an end. Instead, some former production areas are afforested or prepared for agricultural after-use. In some cases, buffer zones are also established between differently used areas and left to the process of natural succession.

Responsibility for implementing these measures generally rests with Klasmann-Deilmann. Over a several-year period, the effectiveness of the measures carried out is monitored by the relevant authorities and – in line with its voluntary commitment to the Code of Practice – by Klasmann-Deilmann itself. In certain cases, our after-use projects go beyond the official requirements, a major reason for this being to apply new knowledge of how to return peatlands to nature.

Following cessation (to 2017)

Agricultural after-use

Nowadays, preparation for agricultural after-use takes place only in rare cases. This involves former extraction areas being turned to create soil with a ratio of around one-third residual peat to two-thirds underlying minerals. The water-impermeable hardpan layer is broken up at the same time. This results in the typical sand mix in Northern Germany or deep plough cultivation.

4,040 ha

194 ha

Afforestation

Former extraction areas are prepared in the same way as for agricultural after-use, namely by deep ploughing or inversion. These sites are then planted with a mixture of indigenous trees and woody plants. Afforestation makes a major contribution towards nature conservation, especially in sparsely wooded areas.

Re-wetting

After peat production has ceased, the former extraction areas are levelled, and the drainage ditches filled in. Stepped dykes are built to create polders of 5 – 10 ha in size which are used to regulate the level of rainwater. The aim is to encourage colonisation by peat moss (Sphagnum) and other characteristic peatland plants (such as cotton-grass), thereby re-establishing a typical bog landscape.

Notes

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we make it grow

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