How Our Stone Wool material is Made

1. Raw Materials of Basalt

- The main ingredient is **basalt**, a volcanic rock that is abundant in nature.
- Other minerals, such as dolomite, may be added to achieve the right balance.
- **Recycled stone wool** and by-products from other industries are also used, reducing waste and saving natural resources.
- The raw materials are often **sourced locally**, close to the production sites, to minimize transport emissions.

2. Raw Materials of the Natural Binder

- **Sugar source**: The binder is made from plant-based sugars, which can come from different sources such as sugar beet, sugar cane, or starch. The exact source depends on availability.
- **Side stream**: The sugars are mainly derived as a **side stream of the sugar industry**.
- **Quality**: Depending on the source, it can be food-grade sucrose or a technical by-product. Most of it is food-grade quality.
- This sugar is not the refined type you buy in stores, but a sustainable by-product stream.

3. The Natural Binder

- The natural binder is an innovative technology used in stone wool production.
- It replaces traditional petrochemical binders (phenol and formaldehyde) with a **renewable, plant-based alternative**.
- It is made from **modified plant sugars (carbohydrates)** and other bio-based components.
- It contains **no added artificial dyes, phenols, or formaldehyde**.
- The natural sugars give the wool its characteristic **brown color**, reduced odor, and a **lower environmental footprint**.

4. How the Sugar-Based Binder is Made

1. **Raw material – plant-based sugars**
   - Sugars from biomass (e.g., starch, glucose, sucrose) are used.
   - These sugars are rich in hydroxyl groups (–OH), which makes them reactive.
2. **Chemical modification**
   - Through a polycondensation process, sugars react with organic acids or other bio-based ingredients.
   - This creates long polymer chains that are heat- and moisture-resistant.
3. **Fiber coating**
   - During stone wool production, the molten fibers are sprayed with this sugar-based resin.
   - In the curing oven (around 200 °C), the polymers crosslink and harden, forming a strong, flexible binder.
4. **Result**
   - Fibers are firmly bonded without petrochemical resins.
   - The brown color comes from the natural sugars (a caramelization effect).

👉 **Simple comparison**: It is similar to making caramel – sugars are heated and transformed into a tough, durable substance. In this case, the chemistry is carefully controlled to create a professional-grade binder.

5. Production of the natural rock wool:

Melting

- The mineral mix is heated in a **furnace at 1,400–1,500 °C** until it melts into a lava-like liquid.

Fiber Formation

- The molten rock is spun into thin **fibers**, similar to how Cotton Candy is made.

Natural Binder

- The **natural, bio-based binder** is applied to the fibers.
- This binder contains no added formaldehyde and is made from renewable materials, making the product safer and more sustainable.

Curing

- The fibers with the natural binder are passed through a **curing oven**, where the binder hardens and gives the material strength and stability.

Cutting and Packaging

- The finished rockwool is cut into rolls, slabs, or boards.
- It is **compressed and packed** efficiently for transport.
- The final stone wool products from Agra Wool International are manufactured in the **Netherlands**.
- All production complies with strict **EU labor and safety standards**.

5. Why It's Sustainable

- **Natural resources**: Made mainly from abundant volcanic rock.
- **Recycled content**: Incorporates recycled stone wool and industrial by-products.
- **Natural binder**: Uses a bio-based binder without added formaldehyde.
- **Efficient transport**: Local raw materials and compression technology reduce CO_2 emissions.
- **Circular**: Fully recyclable at the end of its life.

5. Benefits in Horticulture, Agriculture and Floriculture

1. **Healthier for people and plants**
    - Free from formaldehyde, phenol, or acrylic → lower emissions and safer handling.
    - Less skin, eye, and respiratory irritation for workers.
    - Neutral odor (no chemical smell).
2. **More sustainable**
    - Made from renewable, plant-based raw materials.
    - Lower CO_2 footprint than traditional binders.
    - Easier to recycle in circular systems.
3. **Better growing environment**
    - Natural brown surface improves water distribution and air porosity.
    - Promotes faster, more uniform root development.
    - Growers often observe more stable pH and EC values.
4. **Ease of use**
    - Generates less dust during handling.

- Softer, more natural texture – pleasant for hands.
- No added dyes – the brown color is 100% natural.

7. Summary

Our stone wool with a natural, sugar-based binder offers the **same technical performance** as conventional stone wool (strength, structure, insulation), but is **safer, more sustainable, and more pleasant to work with**. It also provides extra benefits for root growth and water management in horticulture.

Comparison: Traditional Stone Wool vs. Natural Stone Wool

Aspect	Traditional stone wool	Stone wool with natural binder
Binder composition	Phenol-formaldehyde (petrochemical)	Plant-based sugars (bio-based)
Health & safety	May cause irritation	Formaldehyde-free, safer to handle
Environmental impact	Higher CO_2 footprint, oil-based	Lower CO_2 footprint, renewable
Water & air distribution	Good, but less uniform	Very uniform, improved
Root development	Stable, slower growth	Faster and stronger growth
Dust generation	More dust when handled	Less dust, easier to use
Color & odor	Yellow/light, chemical odor	Natural brown, neutral odor
Certifications	Limited eco-labels	Suitable for eco-labels (e.g. MPS, PlanetProof, LEED)

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