

**Diagrams depicting seed holes**

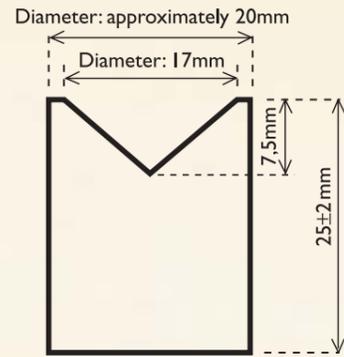


Figure 1: Conical shape.

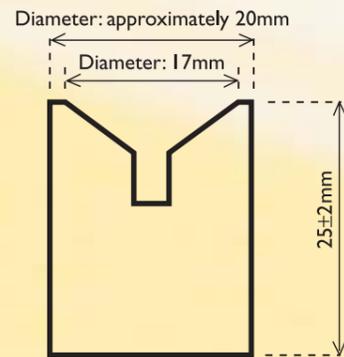


Figure 2: Deeper seed hole.

**Precision-drilled shape of plug**

The automatic sorting and transplanting of plants requires plugs that are fixed and precise in shape. The refined drilling technique in the Grodan production line generates plugs, which meet these requirements. Each plug, therefore, has the same volume and the same amount of available water. Loose fibres that are released during production are almost completely removed. This eliminates residue in the plugs and produces a seed hole free of loose fibres. In this way, surface sealing cannot disturb germination.

**Root growth throughout the entire plug**

The homogeneous Grodan plugs have a predominantly vertical fibre structure providing equal resistance to each root. As a result, the root grows throughout the entire plug. Please note that the type of tray, and whether or not the plug is directly in contact with the lower surface of the tray, is also influential. For example, with regard to root growth and the

effects of humidity and air. Advice on this aspect is available from Grodan.

**Grodan plugs with their homogeneity, shape and strength provides the perfect basis for optimum germination and uniform seedling results.**

**What can Grodan offer you**

- A clean, hygienic and inert substrate
- Up-to-date advice for users
- Supply of plugs in new trays

**Product specifications**

- Suitable for germinating vegetable and ornamental crops
- Available in various types of trays
- Seed hole available in 2 variants
- Pores are evenly distributed, meaning that air is not a limiting factor
- Predominantly vertical fibre structure
- Suitable for manual and automatic processing

**More information**

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**Grodan® Plugs**

*Uniformity for optimum germination*

# Uniformity for optimum germination

Grodan provides cultivation solutions that comprise advice, service and a clean and controllable substrate forming the basis for cultivating safe, healthy and high-quality products. Advanced production techniques guarantee the best cultivation products. Grodan plugs ensure homogeneity and reliability, providing the basis for automatic processing, uniform germination and a crop that can be transplanted successfully.

Successful cultivation depends upon the germination phase, thus Grodan has improved its manufacture of high quality plugs, resulting in a product that yields a maximum number of usable and homogeneous seedlings. The shape and strength of the plug is considerably enhanced which simplifies both manual and automatic processes. The new Grodan plug offers homogeneity during both the germination and the transplanting processes.

#### Improved homogeneity

A fundamental aspect of the germination process is homogeneity. It determines whether or not an even batch of plants is produced. Technical developments in our production process have resulted in the production of plugs of a similar shape. This means that differences between plugs and batches are minimal. Each Grodan plug is

#### Benefits for cultivation:

- Improved homogeneity
- Optimum strength and flexibility
- Ideal air/water balance
- Consistent shape of the seed hole
- Identically shaped plugs
- Root growth throughout the entire plug



practically identical in density, strength and fibre structure. The distribution of water, nutrients and pH is equal, resulting in positive germination results and time saved whilst sorting out the plants.

#### Optimum strength and flexibility

The fibre structure of the new Grodan plugs is strong and flexible, resulting in the protection of the roots preventing damage during (automatic) sorting and transplanting. The plugs, however, must not be too firm in order that germination and initial root growth are not inhibited. Increased uniformity has solved the problem of plugs that are 'too soft' or 'too hard'. Grodan's new drilling technique leaves the structure of the stonewool around the seed hole intact, therefore

retaining the flexibility of the fibres. The predominantly vertical layering of the fibres gives the plugs the correct resistance, which is a practical advantage when transplanting. The plugs retain their shape, making optimum contact with the block and therefore stimulate fast growth.

#### Ideal air/water balance

The correct balance between the small and large pores in the stonewool ensures an optimum ratio of air to water in the plugs. When watered for the first time, the water seeps easily downwards and the plug becomes optimally saturated. Furthermore, the equivalent of 3 to 4 times the water content of the plugs is sprayed across the area of the tray. The fibre structure provides a balanced distribution of nutrient solution

throughout the entire plug and good airflow is guaranteed due to the large pores.

#### Consistent shape of the seed hole

The seeding process can be done in a variety of systems. Grodan has developed the optimum seed holes to match these systems. The standard one is the conical seed hole that is depicted in figure 1 overleaf; where the seed rolls to the bottom. A ring of stonewool surrounds the hole so the seed cannot roll over the edge and out of the plug. The holes are uniform in depth to ensure there is always sufficient and equal seed depth. In addition, there is enough space for the roots to develop. In addition to the standard conical shape, Grodan has introduced a plug with a groove in the centre of the hole, shown in figure 2. The seeds can nestle deeper and 'more firmly' in the stonewool plug. This variant is ideal when increased depth is required and the seeds have to be put under increased pressure. This plug has slightly less space for the roots at the bottom of the hole.

