



# ROHINI

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

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## DEPARTMENT OF AGRICULTURAL ENGINEERING

### AI3601 POST- HARVEST TECHNOLOGY

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## UNIT III: CLEANING AND GRADING

**CO3:** To recognize the working principle of grain cleaning and grading devices and able to select suitable equipment for cereal grains, oilseeds and pulses.

### Spiral Separator

A spiral separator is a simple, gravity-based machine used to separate round seeds from flat or irregularly shaped materials. It works by allowing round seeds to roll quickly down a spiral track while flatter or broken pieces slide more slowly, separating them into different collection channels.

#### **Characteristics:**

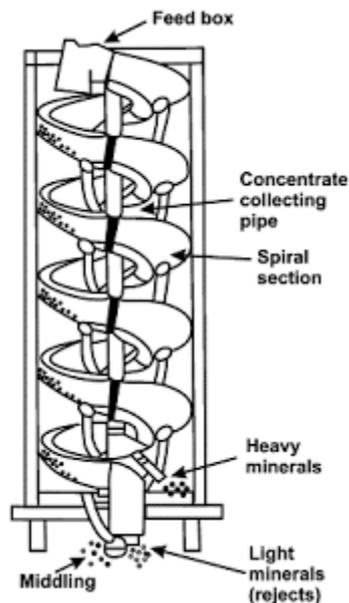
- It has a tall, open spiral track (like a slide) that turns around a central pole.
- It works without electricity, only gravity makes seeds roll down.
- Round seeds roll fast down the track.
- Flat or broken seeds slide slowly.
- At the bottom, fast-rolling seeds fly outward into one bin.
- Slow-sliding seeds fall inward into another bin.
- It is simple, cheap, and easy to clean.
- Best for separating round seeds (like peas, beans) from flat trash or broken pieces.

#### **Main parts of a Spiral separator:**

- Feed hopper: for feeding the grains
- Spiral channels: helically shaped metallic or plastic paths
- Frame or stand: to support the system
- Collection outlets: to collect the separated grains
- The spiral channels are arranged vertically or in a slightly inclined position.

### Working principle:

- ❖ Round and flat seeds are poured in at the top of the spiral track.
- ❖ The seeds slide down the smooth, sloped track by gravity.
- ❖ Round seeds roll quickly and pick up speed as they go down.
- ❖ Flat or broken seeds slide slowly and stay closer to the inside.



- ❖ At the bottom, the fast, round seeds fly outward into an outer collection channel.
- ❖ The slow, flat seeds fall inward into an inner collection channel.
- ❖ No motor or fan are needed; it works only with gravity and shape.
- ❖ The angle and smoothness of the track can be adjusted for different seeds.

### Advantages of Spiral separator:

- Simple design with no moving parts or motors, making it durable and easy to maintain.
- Low energy requirement since it operates entirely on gravity, reducing operating costs.
- Effective at separating round seeds from flat or broken materials based on rolling speed.
- Easy to clean and adjust for different seed types by changing the slope or surface of the spiral track.

**Limitations of Spiral separator:**

- Only works well for round vs. flat materials; not effective for size- or density-based separation.
- May be slow for large volumes compared to mechanical or vibrating separators.
- Requires careful adjustment of slope and feed rate for optimal separation.
- Not suitable for sticky, wet, or very light seeds that may not roll or slide properly.

**Applications of Spiral separator:**

- Separating round grains and seeds like peas, beans, lentils, and soybeans from flat impurities.
- Cleaning cereal grains by removing broken kernels and flat weed seeds.
- Used in seed processing plants, food mills, and grain elevators for pre-grading.
- Suitable for organic and small-scale farming due to its simplicity and low cost.