

Seed Conditioning

- After harvest, seed must be cleaned: a process known as seed conditioning or processing
- Ultimate goal is to obtain the maximum percentage pure seed with maximum germination potential
- Pure Live Seed:
 - Pure Seed X Germination = Pure Live Seed
 - 95% X 93% = 88.35%

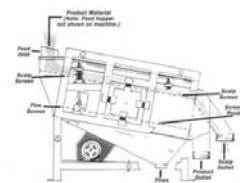
Seed Conditioning

- Objectives
 - Complete separation
 - Minimization of seed loss
 - Upgrading
 - Efficiency
 - Minimization of labor

Seed Conditioning

- Preconditioning
 - A precleaning operation
 - Commonly done by a scalper
 - Enough trash is removed to permit conditioning
 - Seeds feed more evenly through equipment
 - High moisture, green material is removed decreasing time and cost of drying
 - Removal of bulk of trash permits finer top screens to be used resulting in precise separations
 - Cleaning machines are more efficient

Seed Conditioning



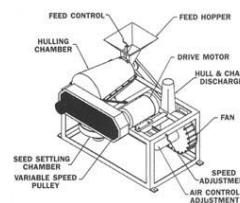
- Scalper
 - Vibrating screen eliminates oversized materials – “scalped off”
 - Correct sized seed passes through screen
 - Fine material passes through the bottom screen

Seed Conditioning

- Precleaning
 - **Debeaders**
 - Seeds with awns, hairs or other chaffy appendages reduce flowability in cleaning equipment.
 - Debeaders remove these unwanted appendages with rotary and beating arms



Seed Conditioning



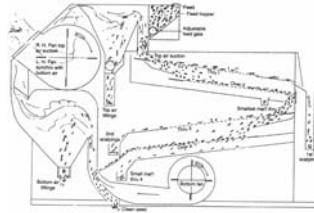
- Precleaning
- Huller-Scarifier
 - Removes hulls or pods and scarifies hard seeds
 - Throws seed against sandpaper or rubber concaves
 - Harsh process with potential for seed damage

Seed Conditioning



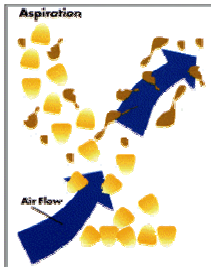
- Conditioning
 - Components must differ in some physical characteristic
 - Seed separations usually made on two characteristics
 - Seed size
 - Seed weight

Seed Conditioning



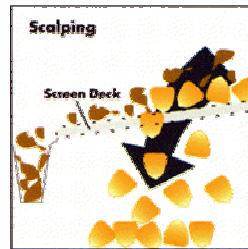
- Air-screen cleaner
 - Basic cleaner in most plants
 - Uses
 - Airflow
 - Perforated screens

Seed Conditioning



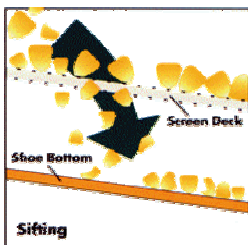
- Air-screen machine
 - Performs three operations
 - Aspiration – light material is removed from the seed by air flow

Seed Conditioning



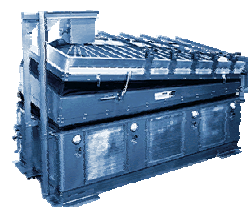
- Air-screen machine
 - Performs three operations
 - Aspiration
 - Scalping – good seeds are dropped through screen openings, larger material carried over screen

Seed Conditioning



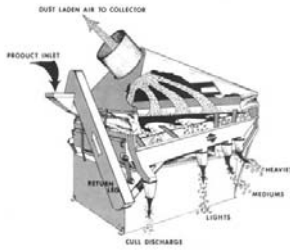
- Air-screen machine
 - Performs three operations
 - Aspiration
 - Scalping
 - Sifting – good seeds ride over screens while small seeds drop through screen and moved to separate spout by shoe bottom

Seed Conditioning



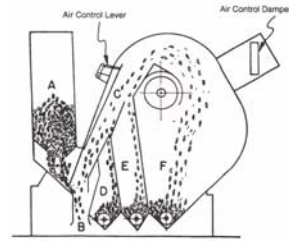
- Gravity Separator
 - Second most used equipment
 - Originally used in mining for gold
 - Best machine for upgrading seed quality
 - Removes deteriorated, moldy seeds similar in size to good seed

Seed Conditioning



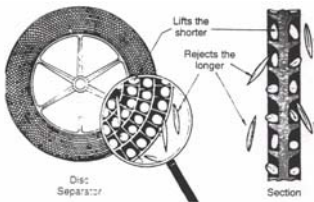
- Gravity Separator
 - Employs a flotation and oscillation principle
 - Dense seeds walk to the top
 - Light seeds float to the bottom
 - Operation is sophisticated
 - Air flow
 - Oscillation rate

Seed Conditioning



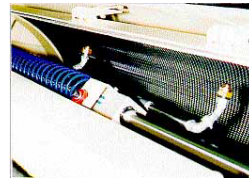
- Fractionating Aspirator
 - Separates seeds based on buoyancy in air flow
 - Seeds are separated into four fractions by air, hence the name

Seed Conditioning



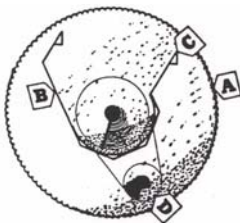
- Dimensional Sizing Equipment
 - Length separators
 - Indent disk
 - Uses a series of indent disks
 - Disks are rotated in a cylinder with seeds
 - Seeds are lifted out from contaminating seeds or vice versa

Seed Conditioning



- Dimensional Sizing Equipment
 - Length separators
 - Indent cylinder
 - Indentations are inside cylinder housing
 - Lifts out undesirable seed as it rotates

Seed Conditioning

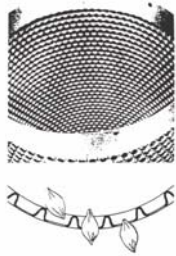


- Dimensional Sizing Equipment
 - Length separators
 - Indent cylinder
 - Cylinder tilted so seed flows to lower end
 - Both disk and cylinders used for free-flowing, heavier seeds such as grasses and legumes

Seed Conditioning

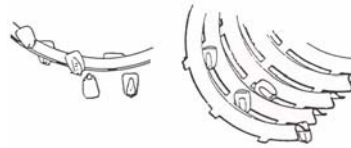
- Dimensional Sizing Equipment
 - Width and thickness separators
 - Called graders or sizers
 - Used for separating maize into different size and shape graders

Seed Conditioning



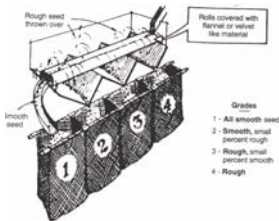
- Dimensional Sizing Equipment
 - Width and thickness separators
 - Indent width separator. Seeds move over seated openings
 - Round seeds fall through
 - Separates round from flat seeds

Seed Conditioning



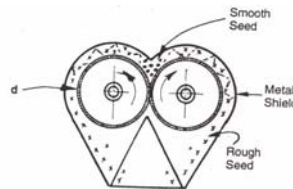
- Dimensional Sizing Equipment
 - Width and thickness separators
 - Indent ribs
 - Ribbed screens with oblong openings
 - Flat seeds pass through
 - Flat seeds separated from round seeds

Seed Conditioning



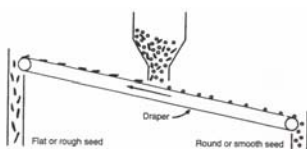
- Texture Separators
- Roll Mill
 - Two inclined velvet-covered cylinders
 - Cylinders roll in opposite directions

Seed Conditioning



- Texture Separators
- Roll Mill
 - Rough seeds cling to velvet, tossed out
 - Smooth seeds stay in center and collected
 - Used for dodder in alfalfa

Seed Conditioning



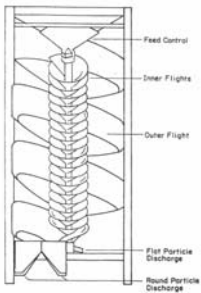
- Surface Separators
- Inclined Draper
 - Separates on seed's ability to roll
 - Inclined belt moves upward
 - Round seeds fall and flat seeds stay on belt
 - Separates clover from grass seed

Seed Conditioning



- Surface Separators
- Spiral Separator
 - Separates on shape and ability to roll
 - Open screw conveyor

Seed Conditioning



- Surface Separators
- Spiral Separator
 - Round seeds move faster than flat seeds and are thrown from the spiral
 - Important in soybeans

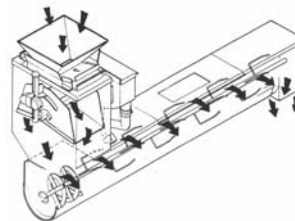
Seed Conditioning

- Seed Treatments
 - Applying chemicals to control seed pathogens
 - Specialized operation, expensive, considered cheap insurance
 - Usually last step in conditioning sequence
 - Can be applied as a slurry (mixture of powder and water), liquid or dust
 - Slurry method most common

Seed Conditioning

- Ideal seed treatment chemical must be
 - Highly effective against pathogens
 - Relatively non-toxic to plants
 - Harmless to humans and livestock
 - Stable for long periods during seed storage
 - Easy to apply
 - Economically competitive

Seed Conditioning



- All seed treaters have four components
 - Feed control mechanism
 - Chemical reservoir delivery system
 - Measuring system
 - Blending or mixing system

Seed Conditioning

- State and federal laws require that treated seed be identified in two ways
 - By incorporating a dye into the treatment to give the seed a contrasting color
 - By a statement that the seed has been treated and the name of the chemical(s) used
 - Ensures that humans recognize the seed has been treated and should not be used for animal consumption

Seed Conditioning



- Increasingly, seed treatments are moving away from slurries
- Today, film coating is increasingly popular
- Film minimizes dust, provides hard coating, increases flowability and is attractive