

Introduction to Baler for Hay Handling

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ARTICLE ID: 18

Introduction

Baling and cubing or wafering are essential packaging operations performed to facilitate handling, transport and storing. Baler machine helps collect the straws and packs them into bundles so that it can be easily handled and transported. Conventional field balers typically make bales having masses from 20 to 70 kg.



Densities of baled hay generally range from 130 kg/m³ to 225 kg/m³. Cubes generally have a bulk density of 400 to 480 kg/m³. Field baling is a high capacity, flexible, one-man operation with relatively low harvest losses. Cubing requires a large investment in equipment and is most expensive of all hay handling systems.



Field Baling



Cubing

Types and Sizes of conventional baler machine

- Conventional field balers are automatic tying machines with reciprocating plungers that produce bales having rectangular cross section.
- Conventional Balers are commonly identified as to size by number of wires or twins placed around each bale.
- Most balers now have 36×46 cm or 41×46 cm bale chamber cross sections and make bales 91 to 102 cm long with 2 wires or 2 twins per bale.
- Few models have 41×58 cm or 43×56 cm bale chambers and produce 3 wire bales 114 to 122 cm long.
- Most field balers are pull type machines; self-propelled machines are also available.

Functional Components

- **Pickup Unit:** Most field balers employ cylinder-type units with spring teeth on cam-controlled tooth bars. The pickup is centrally positioned in front of the baler to evenly feed the pre forming chamber, allowing the use of an extra-wide pickup. The low-profile design means the crop doesn't have to be lifted as high, minimizing crop disturbance, again saving leaves.
- **Floating Windguard:** The floating Windguard holds the crop down on the pickup wrappers to ensure positive feeding in all crop conditions. The Windguard is especially useful in light crops and windy conditions. The floating Windguard increases productivity by allowing the operator to work in most crop and wind conditions.
- **Pickup lift:** The pickup is lowered to field position and raised for transport with a simple hand crank. The crank allows infinite adjustment of the pickup height in the working range.

When the optional hydraulic pickup lift is installed, the crank is only used to set the working height, with the hydraulic cylinder used to raise and lower the pickup.

- **Bale Chamber:** The crop is moved from the pickup directly into the pre-forming chamber.

The crop continues in a straight line, assuring the leaves will be distributed evenly throughout the bale. There the hay is preformed and pre-compressed into a slice before it enters the bale chamber. The stuffer then pushes the pre formed flake into the bale chamber.

The plunger, timed to the stuffer, collects the crop, and further compresses it into the bale.

- **High Speed Plunger:** The plunger operates at 65-80 cycles per minute. The plunger has segmented knives fitted to the bottom.
- **Knotter:** The twine is carried on spools and fed through two curved needles that are timed to miss the cycle of the plunger. After the twine is in place, a gear mechanism called a Knotter ties the knot and cuts the twine free of the supply spool.
- **Flotation Tires:** Flotation tires are used to reduce ground compaction in the field.
- **Bale Thrower:** The bale thrower uses two diamond tread belts to throw the bales to a towed wagon. The thrower is powered by its own hydraulic system driven directly off the baler flywheel. Throwing distance can easily be controlled for uniform loading of the bale wagon by the tractor mounted electronic variable speed control.

Baler Capacity

Some machine characteristics that affect capacity of the baler are

- The size of the bales
- The number of plunger strokes per minute
- Capacity limitations of pickup and feed mechanisms
- The amount of power available
- Durability and reliability of machine

Some Operating factors that affect capacity of the baler are

- Size and uniformity of windrows
- Condition of field surface

- Condition of hay
- Density of bales
- Skill of operator

Overload Protection

Protection is needed for the plunger and drive system because of possibility of occasional extreme overloads from picking up foreign objects or slugs of hay, variations in hay moisture content, careless operation, or other factors. A common arrangement is a shear bolt in the drive between the flywheel and the plunger. An automatic plunger latch is desirable to stop the plunger on its compression stroke if some malfunction causes. A PTO- driven baler needs a friction slip clutch between the PTO shaft and the flywheel. The pickup cylinder drive is usually protected by a slip clutch.