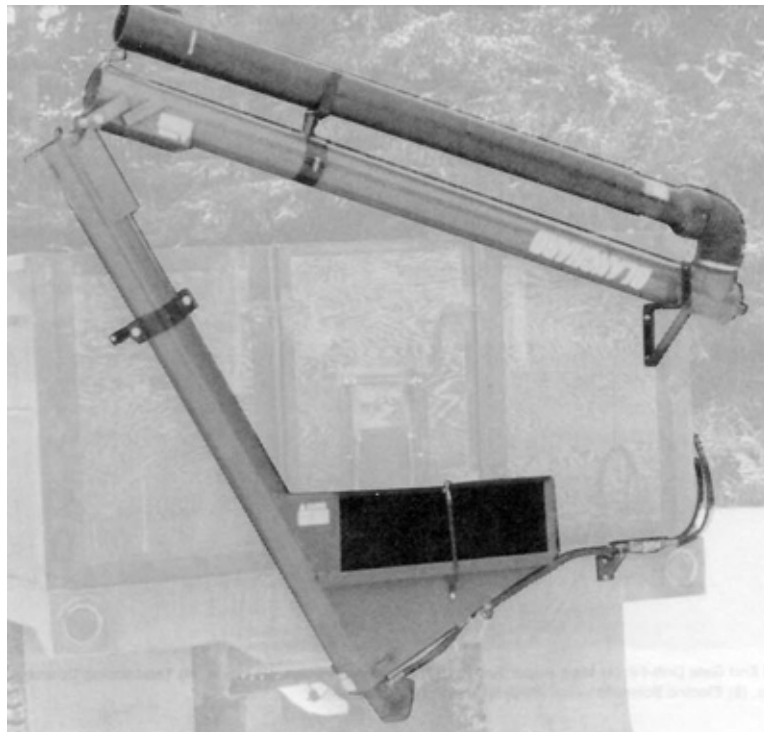


Evaluation Report 419



Blanchard End Gate Drill-Fill

A Co-operative Program Between



ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE



PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

BLANCHARD END GATE DRILL-FIL

MANUFACTURER:

Blanchard
 P.O. Box 1444
 Saskatoon, Saskatchewan

RETAIL PRICE: \$810.00 (February 1985, f.o.b. Portage la Prairie, Manitoba) 14'-9" x 6" (4.5 m x 152 mm) folding auger with telescoping downspout, electric solenoid control, lever for folding and unfolding.

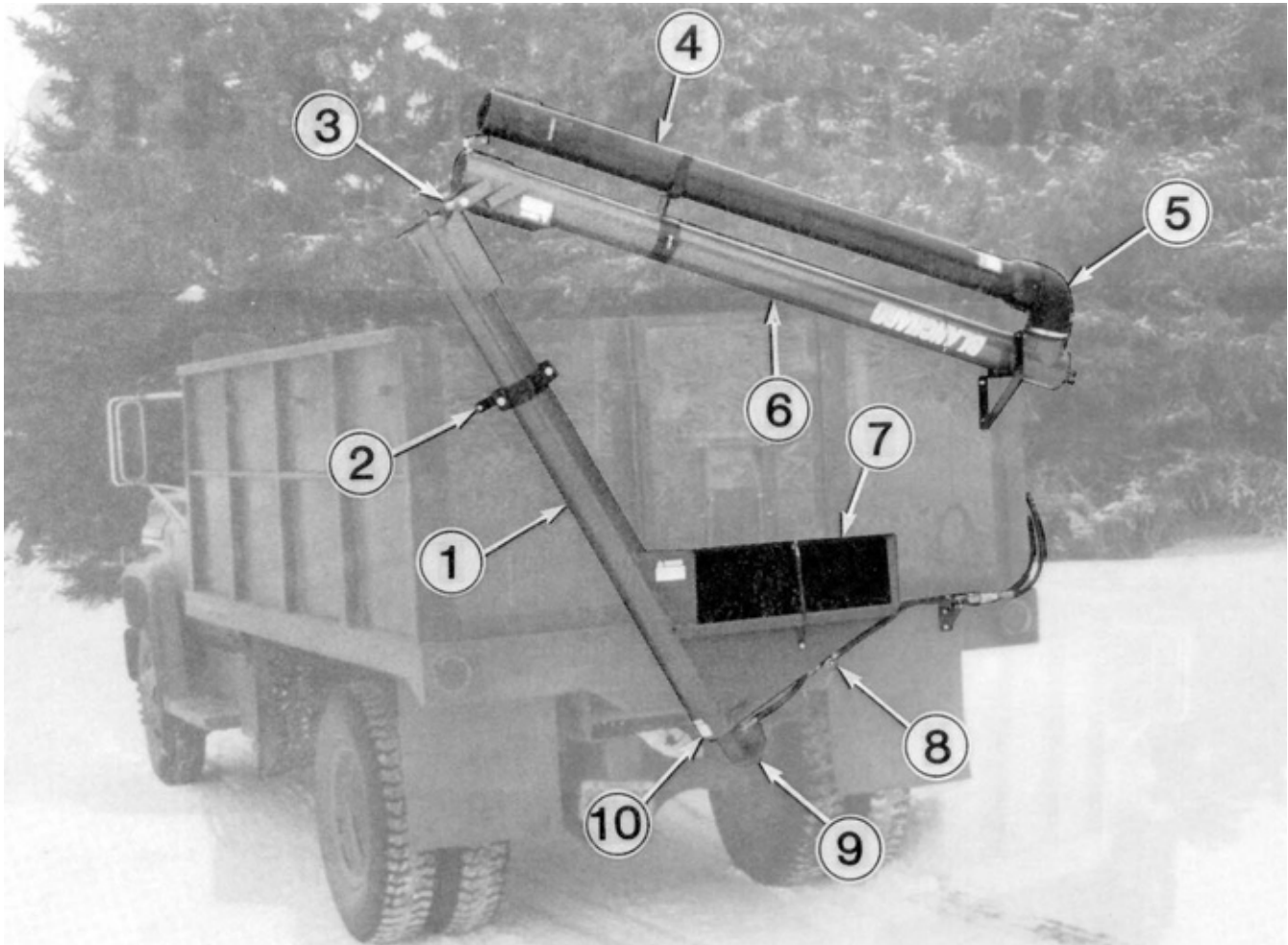


FIGURE 1. Blanchard End Gate Drill-Fih (1) Main Auger Section, (2) Mounting Bracket, (3) Hinge, (4) Telescoping Downspout, (5) Flexible Coupling, (6) Folding Auger Section, (7) Removable Hopper, (8) Electric Solenoid Valve, (9) Orbit Motor, (10) Cleanout.

SUMMARY

Rate of Work: At a truck box angle of 30° and a maximum flighting speed of 922 rpm, corresponding to the manufacturer's recommended hydraulic fluid flow rates of 12 gpm (US) (45.4 L/min), capacities were 708 bu/h (18.6 t/h) in wheat, 680 bu/h (11.4 t/h) in oats, 765 bu/h (18.2 t/h) in canola, and 9.9 tons/h (9.0 t/h) in fertilizer, 503 bu/h (13.1 t/h) in peas.

Power Requirements: The power requirement ranged from 2.5 to 5.1 hp (1.8 kW to 3.8 kW) in dry grain at a flighting speed of 922 rpm with the truck box tilted to 30°.

Ease of Operation and Adjustment: The Blanchard could be installed on a truck box by two men in about two hours. The size and weight made installation difficult for one person. Convenient folding and unfolding for operators less than 6 ft (1.8 m) in height required that the truck box be elevated. The downspout was adequate to fill a 20 ft (6.1 m) seedbox.

Quality of Work: Damage to dry wheat was less than 0.03% for each pass through the drill fill. Damage to peas, however, was 23% for the first pass through the drill fill.

Operator Safety: The Blanchard was safe to operate if normal precautions were observed.

Operator's Manual: The operator's manual contained adequate

instructions for assembly, installation, and operation of the drill fill.

Durability: No mechanical problems were encountered during the test period.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the folding lever to improve its convenience for operators less than 6 ft (1.8 m) to operate.
2. Modifications that would reduce the amount of damage to large seeds, such as peas, lentils, etc.

Station Manager: G.M. Omichinski

Project Technologist: R.K. Harris

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. The manufacturer agrees to examine the folding mechanism of the drill-fill.
2. An optional bristle flighting is available for conveying peas, lentils, and other large seeds.

GENERAL DESCRIPTION

The Blanchard End Gate Drill-Fill (FIGURE 1) is a 6 in (152 mm) diameter, 15 ft (4.6 m) long, folding screw type conveyor that mounts behind and below the end gate of a grain truck. Power for the auger is supplied by a 9 hp (6.8 kW) hydraulic orbit motor. It has a 14 ft (4.2 m) telescoping downspout of 0.16 in (4 mm) wall thickness and a flexible coupling section which attaches to the outlet of the auger.

A built-in hopper at the inlet end is used to catch & contain grain spilling from the truck end gate. The hopper is also used to attach the auger to the truck. A hinge point is located 6.5 ft (1.9 m) from the bottom of the auger to allow folding of the auger for transport or storage. A 5 ft (1.5 m) lever with a socket wrench on the end is provided to fold or unfold the auger and tighten the lock nut.

The exposed flighting inside the hopper does not have an adjustable gate to control grain entering the auger, but does have a guard to protect the operator from the flighting. The test machine was equipped with an electric solenoid hydraulic control.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The Blanchard End Gate Drill-Fill was operated for about 12 hours in the laboratory and field, while conveying wheat, oats, canola, peas, and fertilizer at a truck box angle of 30°. It was also operated in a standard test material² for about one hour. It was evaluated for rate of work, power requirements, ease of operation and adjustment, quality of work, operator safety and suitability of the operator manual.

RESULTS AND DISCUSSIONS

RATE OF WORK

Capacity: The capacities quoted are maximum under standard test conditions.

The standard truck box angle of 30° was selected to give adequate downspout reach to fill a 20 ft (6.1 m) seed box. At this truck box angle, the resultant angle of the drill fill auger tube was 50° from the horizontal. The capacities would be greater, if the truck box was tilted more than 30° and less if the box was less than 30°.

The maximum capacities at a 30° box angle (50° auger angle) were 708 bu/h (18.6 t/h) in wheat, 680 bu/h (11.7 t/h) in oats, 765 bu/h (18.2 t/h) in canola and 503 bu/h (13.1 t/h) in peas, 19.9 ton/h (18.4 t/h) in fertilizer, 16.2 ton/h (14.7 t/h) in standard test material.

These capacities were recorded at a flighting speed of 922 rpm (corresponding to a maximum continuous flow of 12 gpm (US) (45.4 L/min)).

It took 2.5 to 3.5 minutes to fill a 25 bu seed box with test material.

TABLE 1. Capacity, Specific Capacity and Power Requirements of the Blanchard End Gate Drill-Fill in Various Materials at a 30° Box Elevation and a Flighting Speed of 922 rpm. (Corresponding to Maximum Continuous Flow of 12 gpm (US) (45.4 L/min)).

MATERIAL	CAPACITY bu/h (t/h)	SPECIFIC CAPACITY		POWER INPUT		TIME REQUIRED TO FILL A 25 BU SEED BOX (MIN)
		ton hp-h	(t) (kW-h)	hp	(kW)	
Wheat	708 (18.6)	5.0	(6.1)	4.1	(3.06)	2.0
Oats	681 (11.4)	3.8	(4.6)	3.3	(2.47)	2.2
Canola	765 (18.2)	4.8	(5.8)	4.2	(3.14)	1.7
Peas	503 (13.1)	3.3	(4.0)	4.4	(3.28)	3.0
Fertilizer	tons/h 19.3 (18.4)	4.0	(4.9)	5.1	(3.79)	2.3
Standard Material	16.2 (14.7)	4.7	(5.7)	3.5	(2.59)	

Specific Capacity: Specific capacity is the amount of grain moved per unit of power. A high specific capacity indicates an efficient use of energy. In general, specific capacity decreases

(less grain moved per horsepower hour) with increasing flighting speed and elevation angle. Specific capacity, at a 30° box angle, ranged from 2.7 to 9.2 tons/hp-h (3.2 to 11.1 t/kW-h) in wheat, oats, canola, fertilizer and the standard material for various flighting speeds. See TABLE 1.

POWER REQUIREMENTS

Power requirements are given in TABLE 1 for the Blanchard End Gate Drill-Fill in wheat, oats, canola, peas, fertilizer and the standard material for a truck box angle of 30°. Power requirements for maximum capacity ranged from 2.5 to 5.1 hp (1.8 to 3.8 kW).

Hydraulic Requirements: The manufacturer recommends a system flow rate of at least 8 gpm (US) (30.3 L/min) with a continuous pressure of 1500 psi (30.3 MPa). The auger flighting was connected directly to the shaft of the hydraulic motor.

EASE OF OPERATION AND ADJUSTMENT

Installation: It required two people to install the Blanchard End Gate, complete with downspout, electrical control and hydraulic lines. It took about two hours.

The hopper end of the drill fill was bolted to the rear of the truck box frame directly under the end gate, so that when the end gate was opened the hopper filled with grain. A support bracket with an auger clamp was bolted to the rear gate and to the auger tube, slightly below the hinge point, to provide support at the pivot point. Another bracket was bolted to the rear of the truck, in a position that would provide support for the folded portion of the auger when in the transport (storage) position. Electrical and hydraulic hook-ups were simple and straight forward. General rating for installation was good.³

Operation: The telescoping downspout and flexible hose section made filling of a grain or fertilizer box very easy for one person. The on-off electrical switch (FIGURE 2), positioned in the handle on the downspout, was convenient and easy to use. It did not have to be held in the on position for continuous operation. Ample wire was provided to connect to most truck batteries.

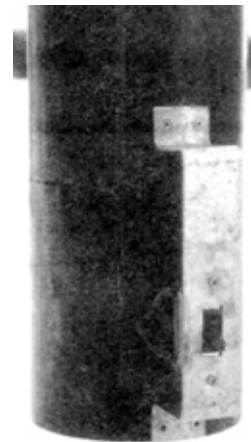


FIGURE 2. On-off Electrical Switch.

A flow control gate was not provided on the Blanchard, however, grain flow was easily controlled by the truck spill gate.

The drill fill would not completely empty a truck box without some shoveling.

During the course of the test, crops had to be changed and the removable portion of the hopper, allowed dumping the contents of the box without having to remove the drill fill or run the remaining material through the auger (FIGURE 3).

A hinged gate at the bottom of the main auger tube provided for quick and easy clean-out. When the drill-fill was in use, an over centre latch held the clean-out gate tight against the outside of the auger tube. No leakage occurred throughout the test (FIGURE 4). General rating for operation was very good.

¹See APPENDIX III for Test Material Densities.

²The Standard test material is a high density granular polyethylene. The material is consistent and not subject to change in physical properties.

³See rating table provided in APPENDIX II.

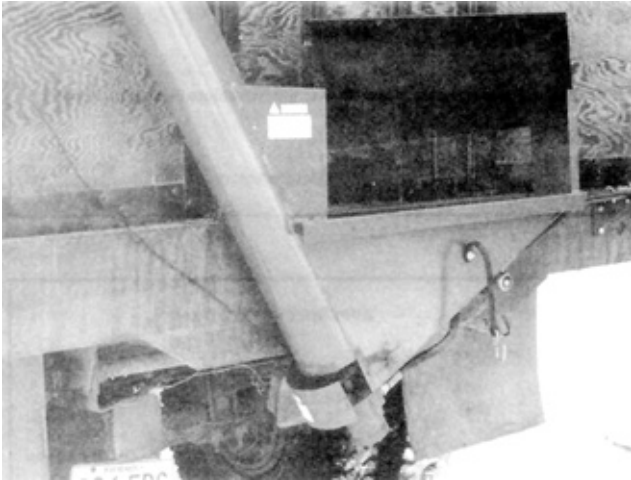


FIGURE 3. Removable Hopper Section.

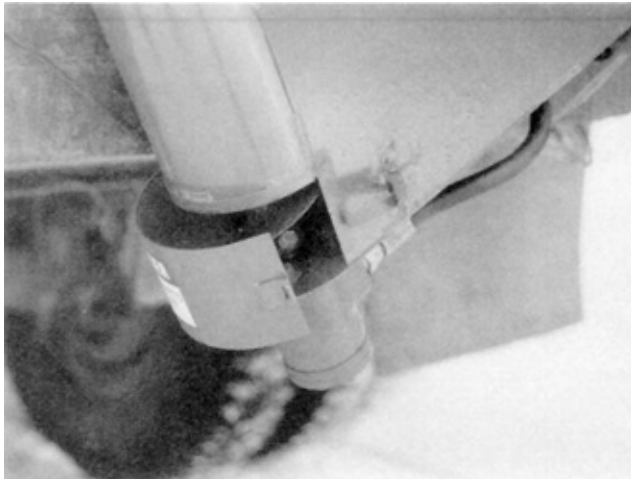


FIGURE 4. Auger Clean-out Gate.

Transport: To place the auger in transport position, reaching the folding lever was difficult for an operator less than 6 ft (1.8 m) in height unless the truck box was tilted to at least a 30° truck box angle (FIGURE 5).

It is recommended that the manufacturer consider modifying the folding lever to improve its convenience for operators less than 6 ft (1.8 m) in height. General rating for transport was fair.



FIGURE 5. Folding Lever Difficult to Reach.

Spout Reach: The length of seed box that could be filled using the telescoping downspout of the Blanchard depended upon the distance it was away from the seedbox, and the angle at which the downspout was held. The downspout had to be held at an angle

of at least 20° for dry grain to flow, and greater than 20° for treated grain. The downspout was adequate to fill a 20 ft (6.1 m) grain box. General rating for spout reach was very good.

QUALITY OF WORK

Grain Damage: Damage in 13.1% M.C. wheat was negligible (0.03%). Grain at higher moisture contents would have less damage. Damage to peas was considerably higher, about 23%. It is recommended that peas not be conveyed in this type of auger flighting.

OPERATOR SAFETY

The Blanchard End Gate Drill-Fil was safe to operate if normal precautions were observed. The inlet was guarded in accordance with safety standards.

OPERATOR'S MANUAL

The operator's manual included instructions on set-up, operation, adjustment, electrical and hydraulic requirements, maintenance, storage, warranty and safety. It was well written and illustrated and contained much useful information. General rating for operator's manual was very good.

MECHANICAL PROBLEMS

The Blanchard End Gate Drill-Fil was operated for about 12 hours in laboratory and field tests. The intent of the test was evaluation of the overall performance. An extended durability evaluation was not conducted. No mechanical problems occurred during testing.

APPENDIX I

SPECIFICATIONS

MAKE:	Blanchard	
MODEL:	End Gate Drill-Fil	
DIMENSIONS:		
-- overall length	14.5 ft.	(4.3 m)
DRIVE:		
-- type	hydraulic orbit motor	
-- flow rate (at 1500 psi)		
-- maximum	12 gpm (US)	(45.4 L/min)
-- minimum	8 gpm (US)	(30.3 L/min)
-- motor to flighting ratio	1:1	
AUGER TUBE:		
-- outside diameter	6in	(152 mm)
-- material thickness	0.60 in	(1.5 mm)
-- outlet diameter	6in	(152 mm)
DOWNSPOUT:		
-- length maximum	14 ft	(4.2 m)
FLIGHTING:		
-- flighting diameter	5.5 in	(140 mm)
-- flighting material thickness		
-- at core	0.110 in	(2.8 mm)
-- at outer edge	0.050 in	(1.2 mm)
-- core diameter	1.375 in	(35 mm)
-- core material thickness	0.125 in	(3 mm)
-- maximum exposed length	9.750 in	(248 mm)
INLET SAFETY GUARD:		
-- material dimensions	0.325 dia	(8.25 mm)
-- grill openings	2.5 x 9.5 x 2	(64 x 240 x 50 mm)
-- angle covered by inlet guard	360°	
WEIGHTS:		
-- with downspout	229 lb	(104 kg)
-- without downspout	216 lb	(98 kg)
OPTIONS:	bristle flighting	

APPENDIX II

MACHINE RATINGS

The following rating scale is used in Machinery Institute Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

APPENDIX III

Densities of Test Crops and Materials:

Wheat	58.2 lb/bu	(26.4 kg/bu)
Canola	52.7 lb/bu	(23.9 kg/bu)
Oats	37.0 lb/bu	(16.8 kg/bu)
Peas	63.2 lb/bu	(28.7 kg/bu)
Standard Material	48.9 lb/bu	(22.2 kg/bu)
Fertilizer (11-51-0)	60.0 lb/ft ³	(27 kg/ft ³)

SUMMARY CHART

BLANCHARD END GATE DRILL-FIL

RETAIL PRICE:	\$810.00 (February 1985, f.o.b. (Portage la Prairie)
EASE OF OPERATION:	
Installation	Good (two people, two hours)
Operation	Very Good
Transport	Fair (folding was inconvenient in some circumstances)
Spout Reach	Very Good
RATE OF WORK:	
Capacity:	
Wheat (dry)	708 bu/h (18.6 t/h)
Standard Material	16.2 tons/hr (8.5 t/h)
POWER REQUIREMENTS:	
Dry Grain	2.5 to 5.1 hp (1.8 kW to 3.8 kW)
QUALITY OF WORK:	
Dry Grain	Less than 0.03% damage per pass
OPERATOR SAFETY:	Guarded in accordance with safety standards
OPERATOR'S MANUAL:	Very Good
MECHANICAL HISTORY:	No durability problem occurred during test



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