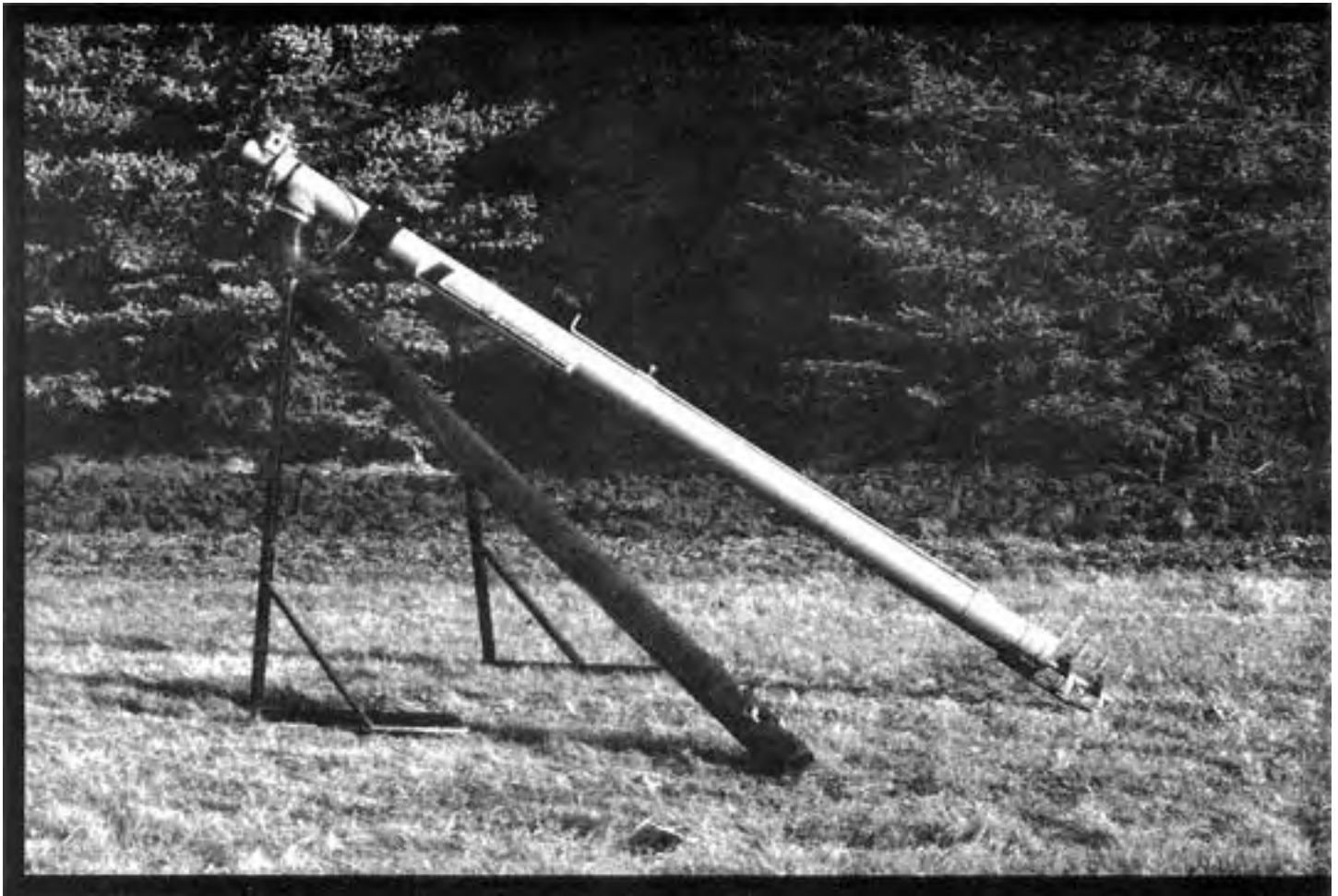


EVALUATION REPORT

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Brandt 5 X 15 Drill Fill

A Co-operative Program Between



BRANDT 5 X 15 DRILL FILL

MANUFACTURER:

Brandt Industries Ltd.
705 Toronto Street
Regina, Saskatchewan
S4R 8G1

DISTRIBUTORS:

Alberta
Federated Co-op Ltd.
United Farmers of Alberta
Oliver Agriculture Supply

Saskatchewan
Federated Co-op Ltd.
Brandt Ind. Ltd.
Sask. Wheat Pool

Manitoba
Federated Co-op
Brandt Ind. Ltd.

RETAIL PRICE:

\$665.00 (December 1983, f.o.b. Portage la Prairie, Manitoba)
5 in x 15 ft (0.125 x 4.6 m) with telescoping downspout and electric solenoid control.

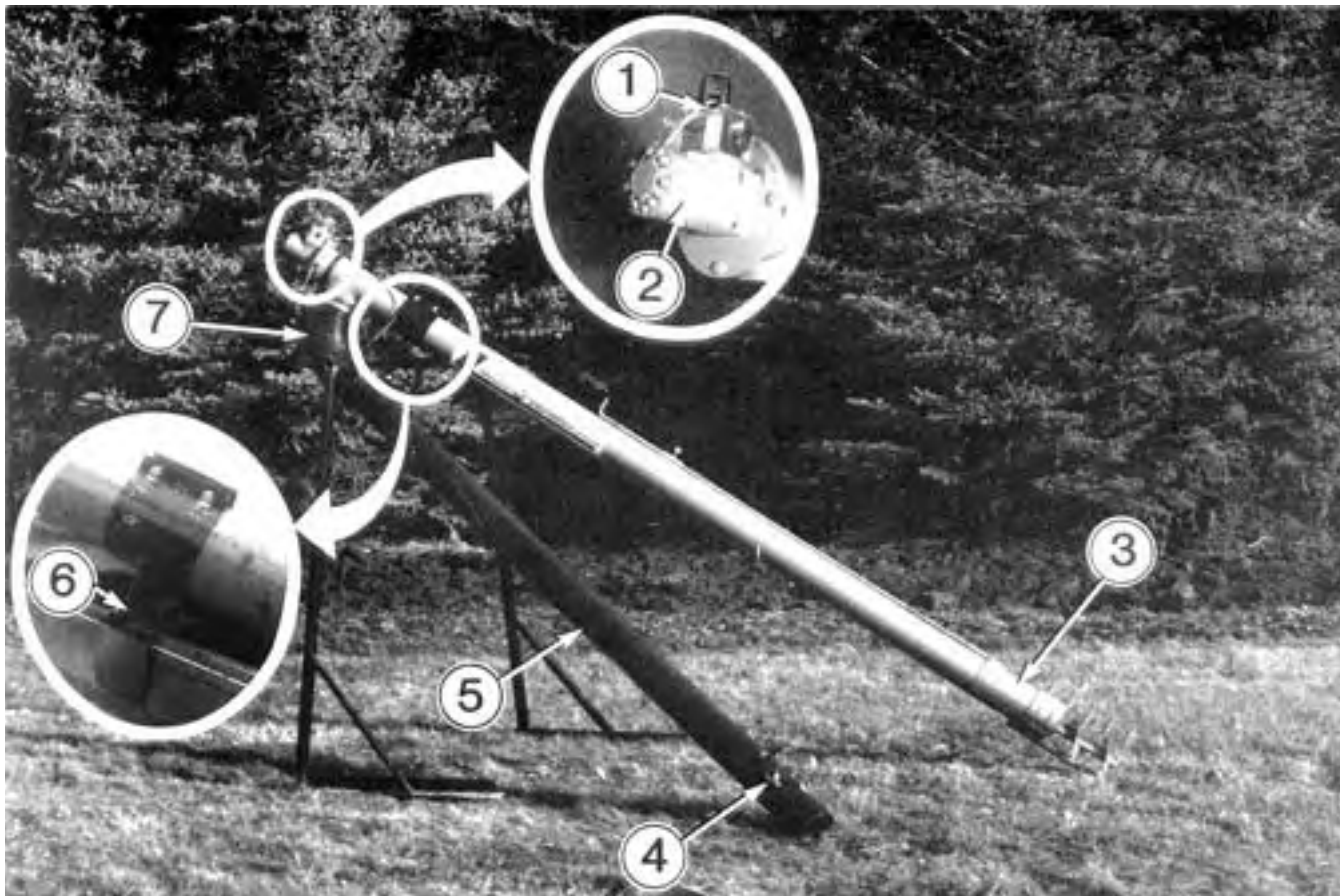


FIGURE 1. Brandt 5 x 15 Drill Fill: (1) Electric Solenoid and Hydraulic Valve Control, (2) Hydraulic Motor, (3) Adjustable Inlet Gate, (4) Solenoid Control Switch, (5) Telescoping Downspout, (6) Truck Clamp, (7) Flexible Elbow.

SUMMARY AND CONCLUSIONS

Overall Performance: The performance of the Brandt 5 x 15 Drill Fill was good.¹

Rate of Work: At a 30° elevation angle and a flighting speed of 620 rpm, corresponding to the manufacturer’s recommended hydraulic fluid flow rates of 12 gal (US)/min (45.4 L/min), capacities were 740 bu/h (20.3 t/h) in wheat, 1050 bu/h (15.3 t/h) in oats, 510 bu/h (11.5 t/h) in rapeseed, and 9.9 ton/h (9.0 t/h) in fertilizer.

Power Requirements: The power requirement ranged from 2.2 to 3.3 hp (1.7 to 2.5 kW) in dry grain at a flighting speed of 620 rpm and a 30° elevation angle.

Ease of Operation and Adjustment: The Brandt could be installed on a truck box by two men in about one hour. The Brandt’s size and weight made installation difficult for one person but once in place it was easily operated by one person. With the outlet at a suitable position, the reach of the downspout was adequate to fill a 20 ft (6.1 m) seedbox.

Quality of Work: Damage to dry wheat was less than 0.3% for each pass through the drill fill.

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

Operator Manual: The operator manual contained adequate instructions for operating the machine.
Durability: The top weld on the flighting broke due to plugging of the downspout.

RECOMMENDATIONS
It is recommended that the manufacturer consider:
1. Including a section in the operator manual warning against holding the downspout at too shallow an angle.
Senior Engineer -- G.M. Omichinski
Project Engineer -- D.J. May

THE MANUFACTURER STATES THAT
With regard to the recommendation:
1. An update to the operation instructions warning against holding the downspout at too shallow an angle was made in late 1983.

GENERAL DESCRIPTION
The Brandt 5 x 15 Drill Fill (FIGURE 1) is a 5 in (125 mm)

¹See rating table provided in APPENDIX II.
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diameter, 15 ft (4.6 m) long, screw type conveyor with a 9 hp (6.7 kW) hydraulic motor. It has a 14.5 ft (4.4 m) telescoping downspout with a flexible upper end and a universal truck mounting bracket. An adjustable inlet gate can be positioned to vary the length of exposed flighting. The 5 in (125 mm) model is also available in 11 and 21 ft (3.4 and 6.4 m) lengths. The test machine was equipped with an electric solenoid hydraulic control.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST²

The Brandt Drill Fill was operated for about 10 hours in the laboratory and field, while conveying wheat, oats, rapeseed and fertilizer (11-51-0) at various angles. It was also operated in a standard test material³ 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 DISCUSSION

RATE OF WORK

Capacity: The maximum capacities at 30° were 785, 1189, and 506 bu/h (21.4, 17.3 and 11.5 t/h) in wheat, oats and rapeseed respectively; 9.9 and 17.4 tons/h (9.0 and 15.8 t/h) in fertilizer and standard test material respectively. Higher capacities can be expected at lower angles and lower capacities at big her angles. In general, maximum capacities occurred at flighting speeds ranging from 650 to 850 rpm. The inlet gate had to be used to prevent plugging the drill fill for some materials. See TABLE 1 and FIGURE 3, APPENDIX IV.

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 ranged from 16.4 to 2.3 tons/hp-h (19.5 to 2.7 t/kW-h) in wheat, oats, rapeseed, fertilizer and the standard material for various flighting speeds at the 30° elevation. See TABLE 1.

TABLE 1. Capacity, Specific Capacity and Power Requirements of the Brandt 5 x 15 Drill Fill in Various Materials at 30° Elevation and a Flighting Speed of 748 rpm (Corresponding to Maximum Continuous Flow)

Material	Capacity		Specific Capacity		Power Input	
	bu/h	t/h	ton/hp•h	t/kW•h	hp	kW
Wheat	777	21.1	5.2	6.3	4.5	3.4
Oats	1156	16.8	4.9	6.0	3.8	2.8
Rapeseed	500	11.3	4.4	5.4	2.9	2.1
	ton/h	t/h				
Fertilizer	9.7	8.8	2.7	3.3	3.6	2.7
Standard Material	17.0	15.4	5.6	6.7	3.1	2.3

POWER REQUIREMENTS

TABLE 1 gives the power requirements for the Brandt in wheat, oats, rapeseed, fertilizer and the standard material at a 30° elevation angle. Power requirements for maximum capacity ranged from 2.4 to 4.0 hp (1.8 to 3.0 kW).

Hydraulic Requirements: The manufacturer recommends a system flow rate of 12 gal (US)/min (45.5 L/min) with a continuous pressure of 1400 psi (9.7 MPa). The flighting was connected directly to the shaft of the hydraulic motor making the flighting speed dependent upon the flow of hydraulic fluid through the motor.

EASE OF OPERATION AND ADJUSTMENT

Installation: The Brandt's size and weight made installation on a truck box very difficult for one person. Two people could install the Brandt complete with downspout, electrical control and hydraulic lines (not provided) in about one hour. The truck box mounting bracket made installing the Brandt convenient on most truck boxes. The bottom end of the drill fill should be bolted to the truck box for stability, unless the truck box mounting bracket is kept near the top end of the drill fill. The angle of the auger should be kept to a minimum for efficient operation, while at the same time keeping the outlet end of the auger high enough to utilize the full reach of the downspout.

Operation: The telescoping downspout and flexible hose section, made filling of most seed boxes convenient. There is adequate wiring to connect both to the truck battery and to mount the on-off push button near the handle on the downspout, where it was convenient for the operator. The switch which had to be held in the 'on' position for continuous operation proved to be a failsafe item in the event that the operator should accidentally let go of the downspout.

The inlet gate lever was of ample length to be visible above the grain level, and had a setscrew to keep it in place during operation of the drill fill.

The auger will not completely empty a truck box without a certain amount of shovelling. This is obviously minimized if a truck hoist or hopper is used.

Spout Reach: The length of seed box that can be filled using the telescoping downspout of the Brandt, depends upon the distance it is away from the seedbox, and the angle at which the downspout is held. The downspout had to be held at an angle of at least 20° (to the horizontal) for dry grain to flow, and greater than 20° for treated grain.

With the auger outlet centred in relation to the seeder box and with the outlet at a suitable height, the reach of the spout was adequate to fill a 20 ft (6.1 m) long seedbox. On trucks equipped with hoists, and where practical, the auger should be mounted so that the outlet is approximately above the pivot point of the box. This will minimize the change in height of the drill fill outlet as the box is raised.

QUALITY OF WORK

Grain Damage: Damage in dry wheat was less than 0.3% for each pass through the drill fill. This is considered insignificant. The moisture content of the wheat was 13.1%. Grain at higher moisture contents would have less damage.

OPERATOR SAFETY

The Brandt was safe to operate if normal precautions were observed. A good inlet safety guard was provided (FIGURE 2) and kept in place during testing. The Machinery Institute strongly recommends that safety equipment be kept in place at all times.

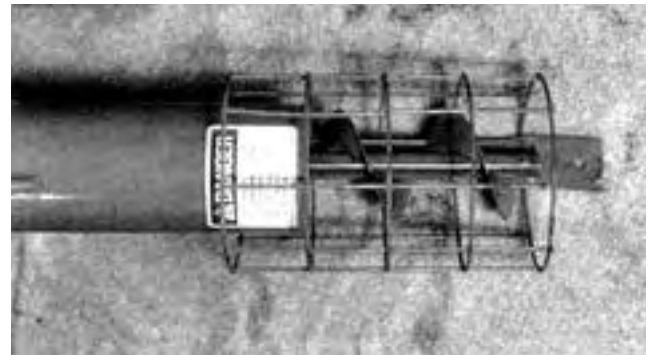


FIGURE 2. Inlet Guard.

OPERATOR MANUAL

The operator manual included instructions on assembly, operation, hydraulic flow requirements and safety. It was well written and illustrated.

DURABILITY RESULTS

The Brandt was operated for about 10 hours in lab and field tests. The intent of the test was evaluation of overall performance. An extended durability evaluation was not conducted. The top weld on the flighting broke, due to holding the downspout at an angle that was too shallow, thus plugging it. It is recommended that the manufacturer consider including a section in the operator manual warning against holding the downspout at too shallow an angle.

²Prairie Agricultural Machinery Institute Detailed Test Procedures for Drill Fills.

³The standard test material is a high density granular polyethylene. The material is consistent and not subject to change in physical properties as are grains.

**APPENDIX I
SPECIFICATIONS**

MAKE:	Brandt
MODEL:	5 x 15
DIMENSIONS:	
-- overall length	15.2 ft (4.6 m)
-- inlet to outlet	13.8 ft (4.2 m)
DRIVE:	
-- type	9 hp (6.7 kW) hydraulic motor
-- flow rate	
-- maximum (748 rpm)	15 gal (US)/min (56.8 L/min)
-- minimum (572 rpm)	11 gal (US)/min (41.6 L/min)
-- motor to fighting ratio	1:1
AUGER TUBE:	
-- outside diameter	5 in (127 mm)
-- material thickness	0.12 in (3.0 mm)
-- outlet diameter	6 in (152 mm)
DOWNSPOUT:	
-- length	
-- maximum	14.5 ft (4.4 m)
-- minimum	8.7 ft (2.6 m)
FLIGHTING:	
-- fighting diameter	4.5 in (114 mm)
-- fighting material thickness	
-- at core	0.105 in (2.7 mm)
-- at outer edge	0.05 in (1.3 mm)
-- core diameter	1.0 in (25 mm)
-- core material thickness	0.11 in (2.8 mm)
-- maximum exposed length	9.5 in (241 mm)
INLET SAFETY GUARD:	
-- material dimensions	0.13 in (3.2 mm)
-- grill openings	
-- maximum open area	7.2 in ² (46.4 cm ²)
-- maximum open dimensions	3.9 in (98.4 mm)
-- angle covered by inlet guard	360°
WEIGHTS:	
-- with downspout	128 lb (58 kg)
-- without downspout	114 lb (52 kg)
OPTIONS:	
-- electric solenoid control	

**APPENDIX II
MACHINE RATINGS**

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

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

**APPENDIX III
CONVERSION TABLE**

Acre (ac) x 0.40	= Hectare (ha)
Foot (ft) x 0.305	= Metre (m)
Inches (in) x 25.4	= Millimetres (mm)
Horsepower (hp) x 0.75	= Kilowatt (kW)
Miles/Hour (mph) x 1.61	= Kilometre/Hour (km/h)
Pounds Force (lb) x 4.45	= Newton (N)
Pounds Force/Foot (lb/ft) x 14.6	= Newton/Metre (N/m)
Pounds Force-Feet (lb-ft) x 1.36	= Newton-Metre (N-m)
Pounds Force/Square Inch (psi) x 6.89	= Kilopascal (kPa)
Pounds Mass (lb) x 0.454	= Kilogram (kg)
Tons Mass (ton) x 0.91	= Tonnes (t)

APPENDIX IV

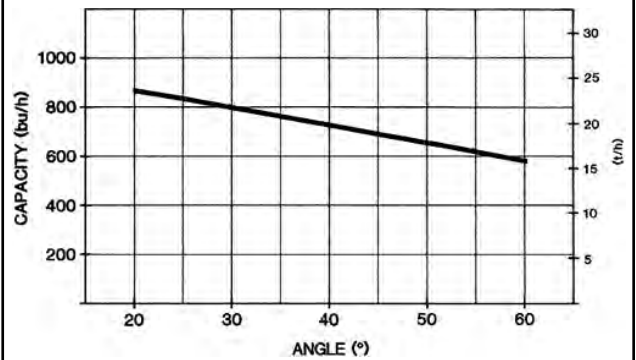


FIGURE 3. Capacity of Brandt in Wheat at the Recommended Fighting Speed and Various Angles.

SUMMARY CHART

BRANDT 5 X 15 DRILL FILL

RETAIL PRICE:	\$665.00 (December 1983, f.o.b. Portage la Prairie, 5 in x 15 ft (0.125 x 4.9 m) with telescoping downspout and electric solenoid control.)		
	<u>Evaluation</u>		<u>Comments</u>
RATE OF WORK			
Capacity			
-- wheat	777 bu/h	(21.1 t/h)	at 30° and 748 rpm.
-- fertilizer	9.7 tons/h	(8.8 t/h)	
Specific Capacity	<u>tons/hp-h</u>	<u>(t/kW-h)</u>	
-- wheat	5.2	(6.3)	at 30° and 748 rpm.
-- fertilizer	2.7	(3.3)	
Power Input	<u>hp</u>	<u>(kW)</u>	
-- wheat	4.5	(3.4)	at 30° and 748 rpm.
-- fertilizer	3.6	(2.7)	
Hydraulic Requirements			12 gal (US)/min (45.5 L/min) at 1400 psi (9.7 MPa) recommended by the manufacturer.
EASE OF OPERATION AND ADJUSTMENT			
Installation	Good		took two people about one hour.
Operation	Very Good		push button operation with electric solenoid control.
Spout Reach	Very Good		suitable for filling 20 ft (6.1 m) seed box.
QUALITY OF WORK			
Grain Damage	Very Good		less than 0.3% for each pass through.
OPERATOR SAFETY			
	Very Good		if normal precautions were observed.
OPERATOR MANUAL			
	Excellent		very clear, concise and well illustrated.
CAUTION			
This summary chart is not intended to represent all of the final conclusions of the evaluation report. The relevance of the ratings is secondary to the information provided in the full text of the report. It is not recommended that a purchase decision be based only on the summary chart.			

 <p>ALBERTA FARM MACHINERY RESEARCH CENTRE</p>	<p>Prairie Agricultural Machinery Institute Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0 Telephone: (306) 682-2555</p>		
<p>3000 College Drive South Lethbridge, Alberta, Canada T1K 1L6 Telephone: (403) 329-1212 FAX: (403) 329-5562 http://www.agric.gov.ab.ca/navigation/engineering/afmrc/index.html</p>	<table style="width: 100%;"> <tr> <td style="width: 50%;"> Test Stations: P.O. Box 1060 Portage la Prairie, Manitoba, Canada R1N 3C5 Telephone: (204) 239-5445 Fax: (204) 239-7124 </td> <td style="width: 50%;"> P.O. Box 1150 Humboldt, Saskatchewan, Canada S0K 2A0 Telephone: (306) 682-5033 Fax: (306) 682-5080 </td> </tr> </table>	Test Stations: P.O. Box 1060 Portage la Prairie, Manitoba, Canada R1N 3C5 Telephone: (204) 239-5445 Fax: (204) 239-7124	P.O. Box 1150 Humboldt, Saskatchewan, Canada S0K 2A0 Telephone: (306) 682-5033 Fax: (306) 682-5080
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