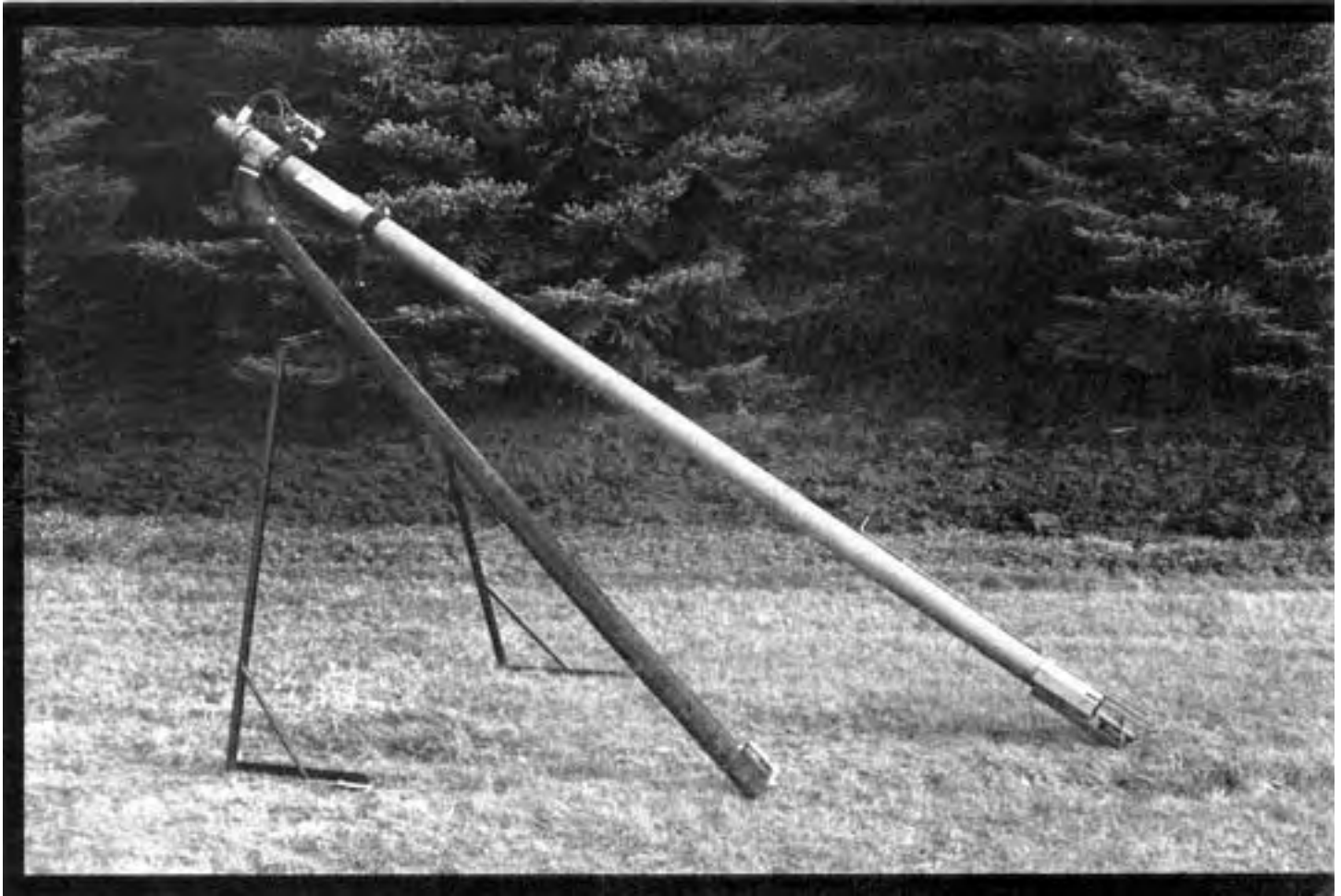


EVALUATION REPORT

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Blanchard 5 x 16 Drill-Fil

A Co-operative Program Between



BLANCHARD 5 x 16 DRILL-FIL

MANUFACTURER AND DISTRIBUTOR:

Blanchard
Box 1444
Millar Avenue & 46th Street
Saskatoon, Saskatchewan
S7K 3P7

RETAIL PRICE:

\$512.00 (December, 1983, f.o.b. Portage la Prairie, Manitoba) 5 in x 16 ft (0.125 x 4.9 m) with telescoping downspout and electric solenoid control.

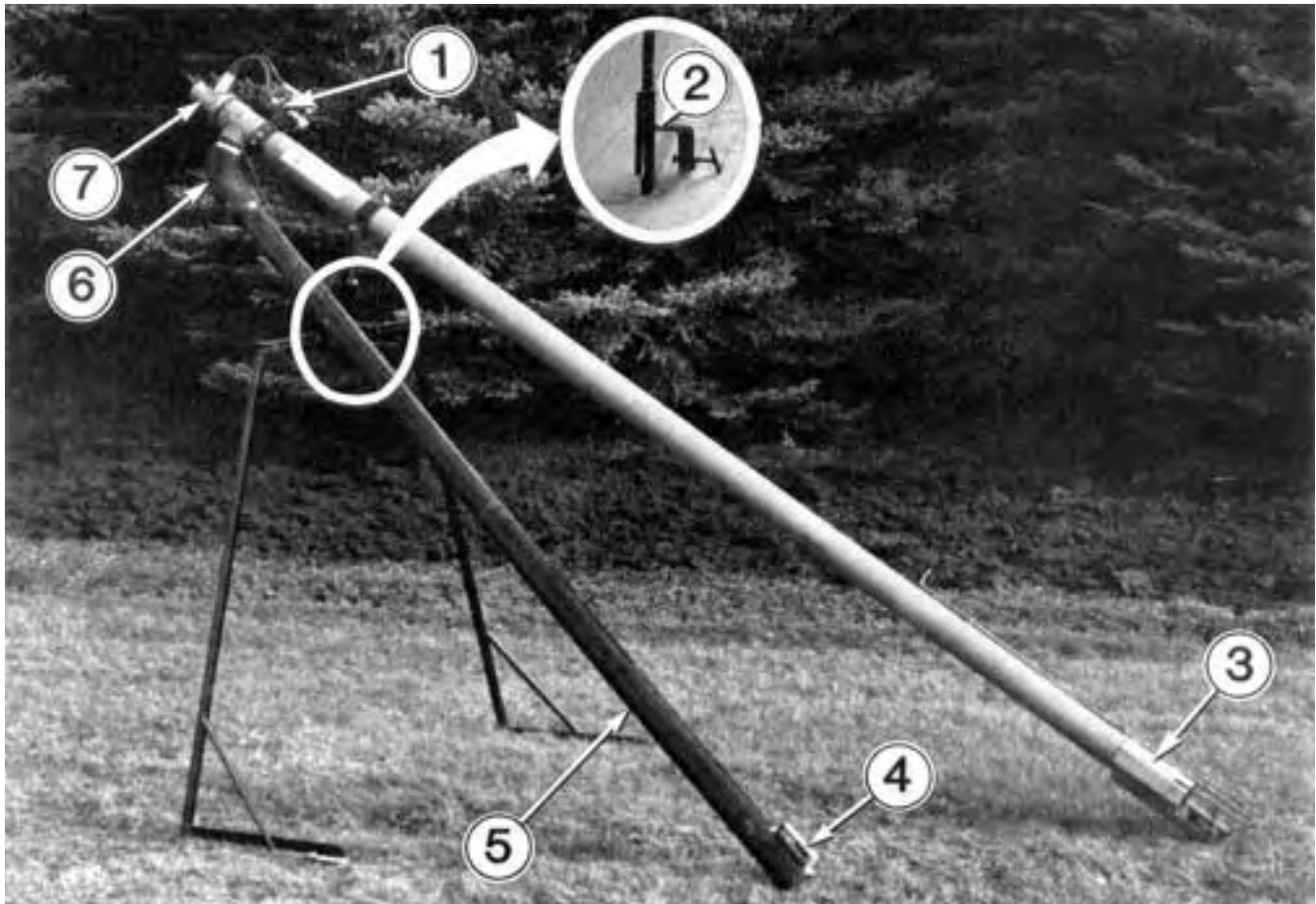


FIGURE 1. Blanchard 5 x 16 Drill Fil: (1) Electric Solenoid and Hydraulic Valve Control, (2) Truck Clamp, (3) Adjustable Inlet Gate, (4) Solenoid Control Switch, (5) Telescoping Downspout, (6) Flexible Elbow, (7) Hydraulic Motor.

SUMMARY AND CONCLUSIONS

Overall Performance: The performance of the Blanchard 5 x 16 Drill-Fil was good.¹

Rate of Work: At a 30° elevation angle and a fighting speed of 700 rpm, corresponding to the manufacturer's recommended hydraulic fluid flow rates of 9 gal (US)/min (34.1 L/min), capacities were 533 bu/h (14.5 t/h) in wheat, 660 bu/h (9.6 t/h) in oats, 550 bu/h (12.4 t/h) in rapeseed, and 9.8 tons/h (8.9 t/h) in fertilizer.

Power Requirements: The power requirement ranged from 0.3 to 2.8 hp (0.2 to 2.1 kW) in dry grain at a fighting speed of 700 rpm and a 30° elevation angle.

Ease of Operation and Adjustment: The Blanchard could be installed on a truck box by two men in about one hour. The Blanchard'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 in dry wheat was less than 0.4% for each pass through the drill fill.

Operator Safety: The inlet guard was inadequate as the openings were too large to prevent hands and feet from entering.

Operator Manual: Operating instructions comprised only of

wiring and hydraulic line diagrams.

Durability: The adjustable inlet gate lever bent before the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the method of fastening the auger clamp to the angle support.
2. Providing a retainer to hold the inlet gate lever in place during operation of the drill fill.
3. Reducing the size of the inlet guard openings to make the guard safer.
4. Providing an operator manual with instructions on operation, maintenance, assembly, hydraulic flow requirements and safety.

Senior Engineer: G.M. Omichinski

Project Engineer: D.J. May

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. We will redesign the clamp assembly for the 5" auger.
2. The inlet gate control rod is arched so that shut-off stays in place automatically without the operator having to use some

¹See rating table shown in APPENDIX II.

other means. The rod on this particular unit must have been damaged in shipping.

3. We agree to modify the inlet guard opening to make the units safer.
4. We will provide a more complete operator manual in the near future.

GENERAL DESCRIPTION

The Blanchard 5 x 16 Drill-Fil (FIGURE 1) is a 5 in (125 mm) diameter, 16 ft (4.9 m) long, screw type conveyor with a 9 hp (6.7 kW) hydraulic motor. It has a 13.4 ft (4.1 m) telescoping downspout with a flexible upper end and a universal truck clamp. An adjustable inlet gate can be positioned to vary the length of exposed flighting. The 5 in (125 mm) model is also available in 12 and 14 ft (3.7 and 4.3 m) lengths. The test machine was equipped with an electric solenoid hydraulic control.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST²

The Blanchard Drill-Fil 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 570, 656 and 632 bu/h (15.5, 9.6 and 14.4 t/h) in wheat, oats and rapeseed respectively; 11.2 and 11.7 tons/h (10.2 and 10.6 t/h) in fertilizer and standard test material respectively. Higher capacities can be expected at lower angles and lower capacities at higher angles. In general, maximum capacities occurred at flighting speeds ranging from 750 to 850 rpm. The inlet gate had to be used to prevent plugging the drill fill for some materials. See TABLE 1 and FIGURE 4, 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 19.1 to 2.7 tons/hp-h (23.0 to 3.1 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 Blanchard 5 x 16 Drill-Fil in Various Materials at 30° Elevation and a Flighting Speed of 885 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	537	14.6	3.8	4.6	4.2	3.2
Oats	656	9.5	12.0	15.8	0.9	0.7
Rapeseed	608	13.8	10.7	13.0	1.4	1.1
	ton/h	t/h				
Fertilizer	11.1	10.1	2.9	3.6	3.8	2.8
Standard Material	11.7	10.6	3.7	4.6	3.2	2.4

POWER REQUIREMENTS

TABLE 1 gives the power requirements for the Blanchard in wheat, oats, rapeseed, fertilizer and the standard material at a 30° elevation angle. Power requirements for maximum capacity ranged from 0.5 to 4.1 hp (0.4 to 3.1 kW).

Hydraulic Requirements: The manufacturer recommends a system flow rate of at least 8 gal (US)/min (30.3 L/min) with a continuous pressure of 1500 psi (30.3 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 Blanchard's size and weight made installation on a truck box very difficult for one person. Two people could install the Blanchard complete with downspout, electrical control and hydraulic lines (not provided) in about one hour.

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.

The method of fastening the auger clamp to the angle support caused the auger to be unstable (FIGURE 2). It is recommended that a better method of fastening the auger clamp to the angle support be used.



FIGURE 2. Truck mount (auger clamp fastened to the angle support shown in inset) The truck box clamp made installing the Blanchard simple on most truck boxes.

Operation: The telescoping downspout and flexible hose section made filling of most seed boxes convenient. The on-off switch located on the handle at the end of the downspout was thumb operated, and made actual operation and filling of seed boxes very easy for one person. The switch did not have to be held in the 'on' position for continuous operation. There was ample wire to connect to most truck batteries.

The inlet gate lever had a scale at the top to indicate the gate position. The lever was long enough to be visible above the grain level in a truck box, however, there was no means of retaining the lever at any setting. It slid down due to the vibrating action of the auger tube. It is recommended that the manufacturer consider providing a retainer to hold the inlet gate lever 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 and hopper are used.

Spout Reach: The length of seed box that can be filled using the telescoping downspout of the Blanchard, 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° 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 0.4% for each pass through the drill fill. This is considered insignificant. The moisture content of the wheat was 13.1%. Grain at a higher moisture content would have less damage.

OPERATOR SAFETY

The inlet guard was inadequate due to the excessively large guard openings (FIGURE 3). It is recommended that the manufacturer consider reducing the size of the inlet guard openings to make the

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.

guard safer. The Machinery Institute strongly recommends that safety equipment be kept in place at all times.

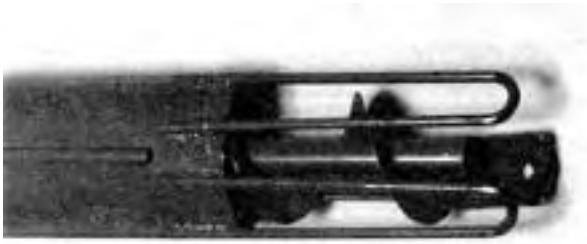


FIGURE 3. Inlet Guard.

OPERATOR MANUAL

Only hydraulic line and wiring diagrams were provided with the Blanchard Drill-Fil. It is recommended that a more complete operator manual be provided, including instructions on operation, maintenance, assembly, hydraulic flow requirements and safety.

DURABILITY RESULTS

The Blanchard 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 adjustable inlet gate lever bent during shipping before the test, and was straightened.

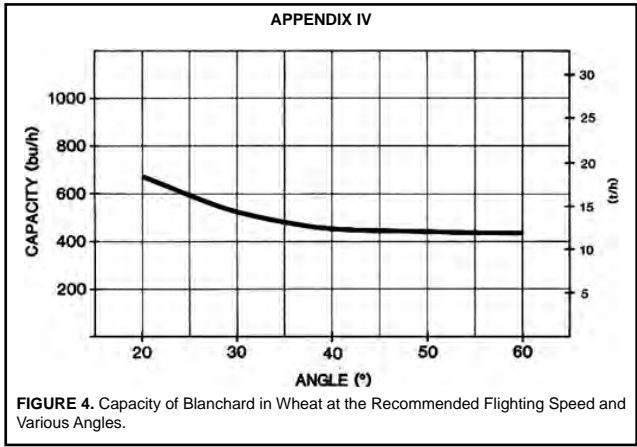
**APPENDIX II
MACHINE RATINGS**

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 I
SPECIFICATIONS**

MAKE:	Blanchard
MODEL:	5 x 16
DIMENSIONS:	
-- overall length	16.3 ft (5.0 m)
-- inlet to outlet	14.8 ft (4.5 m)
DRIVE:	
-- type	9 hp (6.7 kW) hydraulic motor
-- flow rate	
--maximum(885 rpm)	12 gal (US)/min (45.4 L/min)
--minimum(624 rpm)	8 gal (US)/min (30.3 L/min)
-- motor to flying ratio	1:1
AUGER TUBE:	
-- outside diameter	5 in (127 mm)
-- material thickness	0.12 in (3.0 mm)
-- outlet diameter	5 in (127 mm)
DOWNSPOUT:	
--length	
--maximum	13.4 ft (4.1 m)
--minimum	8.4 ft (2.6 m)
FLIGHTING:	
-- diameter	4.4 in (112 mm)
-- pitch	4.9 in (125 mm)
-- material thickness	0.06 in (1.5 mm)
-- core diameter	1.3 in (33 mm)
-- material thickness	0.14 in (3.6 mm)
-- exposed length	7.5 in (190 mm)
INLET SAFETY GUARD:	
-- material dimensions	0.44 in (11 mm)
-- grill openings	
--maximum open area	13.5 in ² (46.4 cm ²)
--maximum open dimensions	9.0 in (230 mm)
-- angle covered by inlet guard	
WEIGHTS:	
-- with downspout	145 lb (66 kg)
-- without downspout	132 lb (60 kg)
OPTIONS:	
-- electric solenoid control	

SUMMARY CHART

BLANCHARD 5 X 16 DRILL-FIL

RETAIL PRICE:	\$512.00 (December, 1983, f.o.b. Portage la Prairie, 5 in x 16 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	537 bu/h	(14.6 t/h)	at 30° and 885 rpm.
-- fertilizer	11.1 tons/h	(10.1 t/h)	
Specific Capacity	<u>tons/hp-h</u>	<u>(t/kW-h)</u>	
-- wheat	3.8	(4.6)	at 30° and 885 rpm.
-- fertilizer	2.9	(3.6)	
Power Input	<u>hp</u>	<u>(kW)</u>	
-- wheat	4.2	(3.2)	at 30° and 885 rpm.
-- fertilizer	3.8	(2.8)	
Hydraulic Requirements (minimum)			8 gal (US)/min (30.3 L/min) at 1500 psi (10.3 MPa) recommended by the manufacturer.
EASE OF OPERATION AND ADJUSTMENT			
Installation	Good		took two people about one hour
Operation	Very Good		thumb operated switch 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 0.4% for each pass through.
OPERATOR SAFETY			
	Fair		inlet openings too large.
OPERATOR MANUAL			
	Poor		only hydraulic line and wiring diagrams supplied.
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%;"> <p>Test Stations: P.O. Box 1060 Portage la Prairie, Manitoba, Canada R1N 3C5 Telephone: (204) 239-5445 Fax: (204) 239-7124</p> </td> <td style="width: 50%;"> <p>P.O. Box 1150 Humboldt, Saskatchewan, Canada S0K 2A0 Telephone: (306) 682-5033 Fax: (306) 682-5080</p> </td> </tr> </table>	<p>Test Stations: P.O. Box 1060 Portage la Prairie, Manitoba, Canada R1N 3C5 Telephone: (204) 239-5445 Fax: (204) 239-7124</p>	<p>P.O. Box 1150 Humboldt, Saskatchewan, Canada S0K 2A0 Telephone: (306) 682-5033 Fax: (306) 682-5080</p>
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