

Evaluation Report

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Vicon MP800 Baler

A Co-operative Program Between



VICON MP800 BALER

MANUFACTURER:

Vicon B.V.
P.O. Box 1000, 2150 BA
Nieuw Vennep, Holland

DISTRIBUTOR:

Vicon Manufacturing Inc.
131 Sheldon Drive
Cambridge, Ontario N1R 6S2
Phone: (519) 622-2800

RETAIL PRICE:

\$71,400 (March 1990, f.o.b. Portage la Prairie, MB).

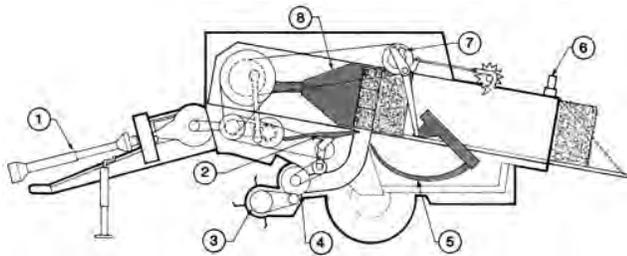


FIGURE 1. Vicon MP800 Baler: (1) Power Take-off Shaft, (2) Packer Fingers, (3) Pickup, (4) Auger, (5) Twine Needles, (6) Hydraulic Density Control Cylinders, (7) Knotters, (8) Plunger.

SUMMARY AND CONCLUSIONS

Rate of Work: The typical rate of work varied from 8.1 to 21.2 ton/h (7.3 to 19.2 t/h) in alfalfa and from 7.9 to 8.3 ton/h (7.2 to 7.5 t/h) in straw. Peak work rate was 21.2 ton/h (19.2 t/h) in alfalfa. The rate of work was limited by the performance of the pickup and feeding mechanism.

Quality of Work: Bale quality was very good. Bale quality was reduced in very light windrows. Average bale density varied from 13.0 to 16.1 lb/ft³ (208 to 258 kg/m³) in alfalfa. Leaf and stem losses were less than 2%. Knotter performance was very good.

Ease of Operation: The automatic tying of the bales allowed for continuous operation of the baler. The electric remote controls worked well and allowed the operator to adjust bale density from the tractor.

Feeding of the pickup and augers was positive and aggressive in all crops. Ease of hitching was fair and ease of transporting was good.

Ease of Adjustment: A special wrench, which was not supplied, was required to adjust the pickup and auger slip clutches. Adjustment of the knotters was very good. The lubrication guide was incomplete, making adequate lubrication difficult. Bale length was very easy to adjust.

Power Consumption: A tractor with a minimum power take-off rating of 90 hp (68 kW) would have sufficient power to operate the Vicon MP800 on flat, firm fields.

Operator Safety: Four safety concerns were evident during the evaluation. Otherwise the baler was safe to operate and maintain if normal safety precautions were observed.

Operator's Manual: The operator's manual was fair. It lacked a lubrication guide and detailed drawings were not clear.

Mechanical History: A few minor mechanical problems occurred during the evaluation.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the power take-off shaft shield to comply with industry standards.
2. Modifications to allow the pickup to be locked in the highest position for transport.
3. Supplying a wrench for adjusting auger and pickup slip clutches.
4. Modifications to eliminate dust collection near the auger slip clutches.

5. Locating the chain lubricating valve to allow operation without opening the safety shield.
6. Supplying a slow moving vehicle sign and a safety tow chain as standard equipment.
7. Revising the operator's manual to include a complete lubrication guide including hourly time intervals for lubrication, improved detailed drawings, and specifications.

Station Manager: B. H. Allen

Project Engineer: C. W. Chapman

THE MANUFACTURER STATES THAT

With regards to the recommendations:

1. The front shield of the power take-off shaft will be specified so that it will fit on all tractors and allow normal hitching, without removal of the shielding.
2. The pickup will have a transport lock position with the MP865 model.
3. A wrench will be provided with the baler in the MP865 model.
4. The MP865 will address the dust collection near the auger slip clutches.
5. The MP865 will incorporate this design change.
6. A slow moving vehicle sign and a safety tow chain will be provided with all Vicon MP800's in 1990 season of use.
7. An insert will be provided to the existing operator's manuals and this will be incorporated in the operator's manual.

MANUFACTURER'S ADDITIONAL COMMENTS

The MP800's will be wired with a 7 pole socket which conforms to SAE (J560 b) and will be compatible with the standard use on North American tractors. This will allow the attaching of the brake, signal and clearance lights, which the MP800 comes equipped with.

The MP865 will be for sale in the spring of 1991.

GENERAL DESCRIPTION

The Vicon MP800 is a pull-type, centre feed, 1000 rpm power takeoff driven automatic twine tie large square baler.

Material is fed into the bottom of the 32 x 32 in (800 x 800 mm) bale chamber by a floating drum pickup, a split auger and a set of packer fingers. The material is compacted and the bales are formed by a slicing plunger that operates at 46 strokes per minute. The bales are automatically tied with four strands of twine. Bale density is controlled hydraulically by three cylinders and can be adjusted from the tractor using the electric remote controls.

Detailed specifications are given in APPENDIX I, while FIGURE 1 shows the location of the major components.

SCOPE OF TEST

The Vicon MP800 was operated in a variety of crops, as shown in TABLE 1, for 115 hours and produced 2644 bales. It was evaluated for rate of work, quality of work, ease of operation, ease of adjustment, power requirements, operator safety, and suitability of the operator's manual. In addition, mechanical problems were monitored throughout the test.

TABLE 1. Operating Conditions

Crop	Operating Hours	Number of Bales
Alfalfa-Grass	31	780
Alfalfa	34	766
Grass Hay	29	585
Rye Greenfeed	4	96
Oats Greenfeed	2	75
Straw	15	342
Total	115	2644

RESULTS AND DISCUSSION

RATE OF WORK

The rate of work depended upon windrow size, uniformity of crop, crop type, and field conditions. Typical average daily rates of work for various crops are shown in TABLE 2. These values are based upon average work rates for daily operation.

TABLE 2. Typical Average Rates of Work

Crop	Crop Yield		Daily Average Throughput	
	ton/ac	t/ha	ton/h	t/h
Alfalfa	1.2	2.7	11.5	10.4
	0.8	1.8	8.1	7.3
	2.0	4.5	21.2	19.2
Alfalfa-Grass	0.9	2.0	10.4	9.4
	1.8	4.0	19.1	17.3
Oat Straw	1.0	2.2	7.9	7.2
Wheat Straw	1.1	2.5	8.3	7.5

Peak work rates varied from 16.6 to 21.2 ton/h (15.1 to 19.2 t/h) in alfalfa. These work rates were measured in heavy uniform alfalfa windrows and do not take into account the time required for turning or field irregularities. In most crops the rate of work was limited by windrow size and pickup feeding performance.

Field speed depended upon field roughness, pickup performance and operator skill. Ground speed was limited to 9 mph (14 km/h) in light windrows.

The automatic tying allowed for continuous operation of the baler.

QUALITY OF WORK

Bale Quality: Bale quality was very good. The Vicon MP800 produced dense uniform bales with square ends in most hay crops and field conditions. Average alfalfa bales weighed 760 to 950 lb (345 to 432 kg) with the baler set to produce a 96 in (2.5 m) bale. Average bale densities varied from 13.0 to 16.1 lb/ft³ (208 to 258 kg/m³).

Bale quality was reduced in very light windrows. Two or more light windrows were required to be raked together to assure good bale quality and to maintain baler capacity. The baler produced dense, uniform straw bales even with crop that had been threshed with a rotary combine.

Average straw bales weighed 500 to 600 lbs (225 to 275 kg). The baler could be adjusted to produce bales from 32 to 102 in (0.8 to 2.6 m) long.

Since the baler formed high density bales, alfalfa and other hay crops should be allowed to dry thoroughly before baling to avoid heating of the bales.

Leaf and Stem Loss: Total leaf and stem losses were very good. They were less than 2% in alfalfa yielding 1.6 ton/ac (3.6 t/ha) and 15% moisture content. Total leaf and stem losses were acceptable (less than 5%) in one alfalfa crop, which had been damaged by several rains.

Pickup losses were insignificant in most crops, unless windrows were light or poorly formed, or field speed was greater than 7 mph (11 km/h). Minimum leaf loss occurred when the Vicon was operated in heavy conditioned windrows or in windrows that were formed by raking two or more conditioned windrows together.

Knotter Performance: The Vicon MP800 was equipped with four conventional knotters. These required twine with a minimum knot strength of 300 lb (1300 N).

Knotter performance was very good, provided the knotters were properly adjusted. Knotter adjustment was clearly outlined in the operator's manual.

Provided the proper twine was used, only a few bales broke during the evaluation. Broken bales usually resulted from rough handling. At the time of testing, only synthetic twine was available. However sisal twine should be available by the 1990 season.

Twine size and strength was not outlined in the operator's manual.

Bale Length Variation: Bale length variation was dependent upon the uniformity of the windrow and the feed rate. When set to produce a bale 106 in (2.7 m) long, bales varied in length from 102 to 109 in (2.6 to 2.8 m).

Non-uniform windrows usually resulted in the largest variation of bale length. High feed rates resulted in longer bales and low feed rates in shorter bales.

The variation in bale length did not affect handling of the bales.

Bale Handling and Storage: The bales produced by the Vicon MP800 were easily handled with a front-end loader equipped with forks or bucket and grapple. The rectangular shape of the bales allowed for easy stacking of the bales for both transporting and

storage. The bales can be easily stored in a hay shed or covered outside.

Short bales could be easily moved with a small tractor or skid steer loader allowing in barn feeding. Since each plunger stroke contained three layers of material the bales could be easily flaked apart for feeding.

EASE OF OPERATION

Hitching: Ease of hitching was fair. The Vicon MP800 required a tractor with a 1000 rpm power take-off. In addition, one remote hydraulic outlet was required for raising the pickup.

The power take-off shaft was equipped with a front constant velocity joint.

However, to be able to hitch the baler to some tractors used during the evaluation, the plastic front constant velocity joint safety shield had to be removed. It is recommended that the manufacturer modify the power take-off shaft shield to comply with industry standards.

The baler was provided with a hitch pin bushing to reduce the hitch pin hole size for use with some tractors.

The jack stand was easily removed and a location was provided for storage during field operation. However, the storage location was located on the right side of the baler, making access inconvenient since most tractors have access only on the left side.

Transporting: Ease of transporting was good. The pickup was raised hydraulically and a locking pin installed. The locking pin did not fit in the highest position, thus reducing pickup ground clearance. It is recommended that the manufacturer consider modifications to allow the pickup to be locked in the highest position for transport.

The hinged bale chute was raised and chained for transport.

Caution should be used when transporting because of the 11,022 lb (5010 kg) weight of the baler. The Vicon MP800 was equipped with a rope operated brake system, which would apply the brakes if the baler became disconnected from the tow vehicle. A safety tow chain was not provided.

Bale Forming: Ease of bale forming was very good. Feeding was smooth flowing in most crops, and plugging occurred infrequently. The pickup was wide enough to cleanly pick all windrows encountered during the evaluation.

The split augers plugged several times due to slipping of the auger slip clutches. Adjustment to the clutches eliminated plugging.

The packing fingers were aggressive in all crops and did not plug. These fingers loaded the bale chamber with three layers of material between each plunger stroke, as shown in Figure 2. The slicing plunger was aggressive in all crops and plugging did not occur.

Bale density was controlled by three hydraulic cylinders, which were operated from the tractor by means of electric controls.

Weaving along the windrow was not necessary, unless the windrow was very light. Centring the tractor on the windrow resulted in centre feeding of the baler.

If an overload condition occurred the baler automatically released bale density hydraulic pressure to allow the overload condition to pass. The baler then returned to the preset baler density after 2 or 3 plunger strokes.

Electric Controls: Ease of operation of the electric controls was very good. The control box was located at a convenient position near the operator and wired to the tractor battery.

The controls adjusted the pressure of the integral baler hydraulic system, which in turn adjusted bale density. The electric controls also warned the operator by means of a light and buzzer if an overload condition occurred, the knotter shear bolt broke or the twine needles malfunctioned. The controls also tallied the number of bales formed.

Twine Threading: Ease of twine threading was very good. The operator's manual clearly outlined the procedure for twine threading. Access to twine storage was convenient. The Vicon MP800 held 16 balls of 4000 ft (1230 m) twine. This was sufficient to tie approximately 675 - 8 ft (2.5 m) bales.

EASE OF ADJUSTMENT

Drives: Ease of drive adjustment was good. Most drives were easy to check and adjust. Shear bolt replacement was easy. Adjusting the split auger and pickup slip clutches was difficult because a spanner wrench was required and not supplied with the machine.

It is recommended that the manufacturer supply a wrench to adjust the auger and pickup slip clutches, as this tool is not common in farm shops.

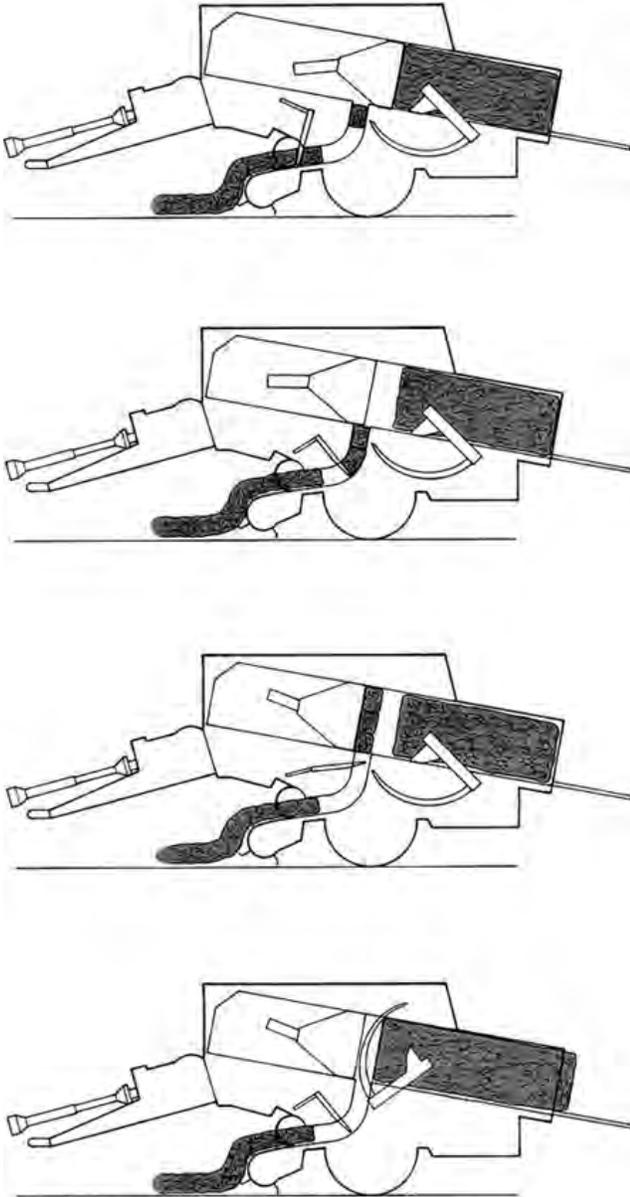


FIGURE 2. Packing Fingers and Plunger Sequence.

Feeding System: Adjustment to the pickup, auger and packing fingers was not necessary during the 115 hour test. A comprehensive section was included in the operator's manual on timing of the packing fingers. Timing jigs were included with the test machine.

Knotters: Ease of adjustment of the knotters was very good. Only one adjustment was necessary to the knotters during the test. Access to the knotters was convenient. A comprehensive section was included in the operator's manual on knotter adjustment.

Bale Length: Bale length adjustment was very good. Bale length settings could be varied from 32 to 102 in (0.8 to 2.6 m). A lined scale next to the bale length adjustment allowed for easy setting.

Lubrication: Ease of lubrication was poor. The operator's manual did not indicate all the available grease fittings. For example, the manual indicated that there were two grease fittings for each knotter when in fact there were six per knotter. A time interval guide for lubrication was not included.

The Vicon MP800 was equipped with an oil reservoir, valve, tubing and brushes for lubrication of the main drive chain. With the machine running the operator could open the valve and allow oil to drain from the reservoir and lubricate the chain.

POWER CONSUMPTION

Power Requirements: FIGURE 3 shows the typical power takeoff and power requirements for the Vicon MP800. The peak power requirements are a result of the plunger action. In a typical alfalfa crop average power requirements varied from 30 to 40 hp (23 to 30 kW) while the instantaneous peak power requirement was 130 hp (98 kW).

Average drawbar power requirements varied from 7 to 11 hp (5 to 8 kW) and peaked at 26 hp (20 kW) in soft or hilly fields.

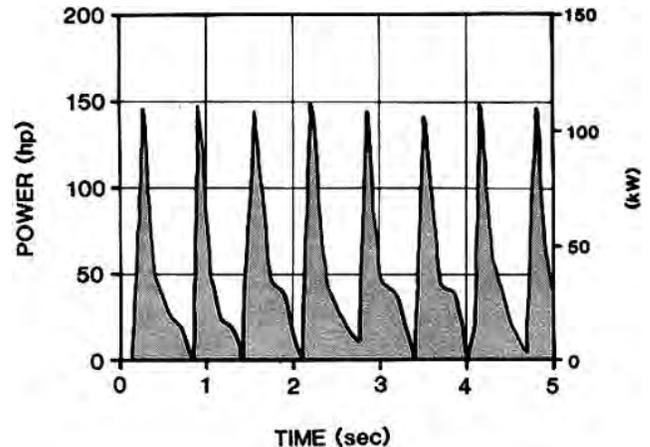


FIGURE 3. Power Requirements

Tractor Size: To fully utilize baler capacity, PAMI recommends a tractor with a minimum power take-off rating of 90 hp (68 kW). A tractor with a 110 hp (83 kW) power take-off rating would be required in hilly conditions.

Specific Capacity: Specific capacity is a measurement of machine efficiency, with a high number indicating a greater efficiency.

In a typical alfalfa crop which yielded 1.6 ton/ac (3.6 t/ha) specific capacity varied from 0.465 to 0.587 ton/hp-h (0.567 to 0.723 t/kW-h). In comparison, a typical round baler has a specific capacity of 0.500 ton/hp-h (0.608 t/kW-h) and a conventional small square baler has a specific capacity of 0.700 ton/hp-h (0.851 t/kW-h).

OPERATOR SAFETY

Operator safety was good.

During the test, dust and chaff collected on the safety shields covering the auger's slip clutches. Plugging of the augers caused the clutches to slip and heat to the combustion point of the dust and chaff.

It is recommended that the manufacturer make modifications to eliminate dust collection near the auger slip clutches. It was necessary to open the right hand drive shield to operate the chain lubrication valve. Since the machine should be running to allow distribution of the lubricant it is recommended that the manufacturer consider locating the valve at a position which would allow operation without opening the drive shield.

The Vicon MP800 was not equipped with a slow moving vehicle sign or a safety tow chain. It is recommended the manufacturer supply a slow moving vehicle sign and a safety tow chain as standard equipment.

The Vicon MP800 was equipped with tail and turn signal lights. However, a connector was not available to connect the lights to the standard seven conductor electrical connector found on most modern farm tractors.

Otherwise, the Vicon MP800 was safe to operate and maintain. All shields were hinged and opened for easy access.

The Vicon MP800 was equipped with cable operated brakes. A rope could be connected to the tractor and in the event of drawpin failure the brakes would be automatically applied.

OPERATOR'S MANUAL

The operator's manual was fair. It lacked a lubrication guide and the detailed drawings were not clear. A guideline for type, size and strength of twine were not given. It is recommended that the manufacturer revise the operator's manual to include a lubrication guide, improved detailed drawings and twine specifications.

MECHANICAL HISTORY

The Vicon MP800 was operated for 115 hours and produced 2644 bales. The intent of the test was an evaluation of the functional performance and an extended durability evaluation was not conducted. TABLE 3 outlines the problems, which occurred during the functional evaluation.

TABLE 3. Mechanical History

Item	Operating Hours	Number of Bales
-The electrical connector at the control box was damaged at	Start of test Throughout the test Throughout the test	
-Auger slip clutch was adjusted at		
-Several pickup teeth broke and were replaced at		
-The drive link for the twine needle was adjusted at	27	671
-The bale length trip arm broke and was repaired at	41	899
-The hydraulic pump drive stud broke and was repaired at	43	931
-A knotter securing bolt was lost and replaced at	67	1520

DISCUSSION OF MECHANICAL PROBLEMS

All the mechanical problems that occurred during the functional evaluation were considered to be minor.

**APPENDIX I
SPECIFICATIONS**

MAKE:	Vicon	
MODEL:	MP800	
SERIAL NUMBER:	8811 MP800	
DIMENSIONS:	<u>Transport Position</u>	<u>Field Position</u>
-- width	7.6 ft (2.3 m)	9.3 ft (2.8 m)
-- height	8.1 ft (2.5 m)	8.1 ft (2.5 m)
-- length	21.7 ft (6.6 m)	27.1 ft (8.3 m)
-- ground clearance	8 in (200 mm)	
WEIGHT:		
-- left wheel	4774 lb (2170 kg)	
-- right wheel	4752 lb (2160 kg)	
-- hitch	1496 lb (680 kg)	
TOTAL	11022 lb (5010 kg)	
TIRES:		
-- undercarriage	Two, 16.0/70-20	
-- pickup	Two, 4.80/4.00-8	
PICKUP:		
-- type	Floating cylindrical drum with spring teeth	
-- height adjustment	Pin in frame, seven positions	
-- width	70 in (1740 mm)	
-- number of bars	4	
-- number of teeth	96	
-- tooth spacing	3 in (75 mm)	
-- speed	125 rpm	
FEED MECHANISM		
-- type	Augers (two)	
-- diameter	14 in (360 mm)	
-- speed	230 rpm	
BALE CHAMBER		
-- width	31.5 in (800 mm)	
-- height	31.5 in (800 mm)	
-- density control	Hydraulic	
PLUNGER		
-- speed	46 strokes/minute	
-- stroke	25 in (625 mm)	
KNOTTERS		
-- number	4	
-- twine capacity	16 balls	
DRIVES		
-- number of chain drives	13	
-- number of gear boxes	2	
LUBRICATION:		
-- grease fittings	51	
-- oil	Gear boxes - 2 @ 50 hrs Chains - daily	

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

SUMMARY CHART

VICON MP800 BALER

RETAIL PRICE:	\$71,400.00 (March 1990, f.o.b. Portage la Prairie, MB)
RATE OF WORK:	8.1 to 21.2 ton/h (7.3 to 19.2 t/h) in alfalfa
QUALITY OF WORK:	
Bale Quality	Very Good; Bale density 13.0 to 16.1 lb/ft ³ (208 to 258 kg/m ³) in alfalfa.
Leaf Loss	Very Good; Less than 2% in alfalfa
Knotters	Very Good; Automatic
EASE OF OPERATION:	
Hitching	Fair; Some improvements required
Transporting	Good; Caution required when transporting
Bale Forming	Very Good; Continuous baling, tying and discharge
Electric Controls	Very Good; Allowed operator to adjust bale density
Twine Threading	Very Good; Storage for 16 balls of twine
EASE OF ADJUSTMENT:	
Drives	Good; Special wrench required for slip clutches
Knotters	Very Good; Only one adjustment required
Bale Length	Very Good; Bale lengths of 32 to 102 in (0.8 to 2.6 m)
Lubrication	Poor; Improvements to lubrication guide required
POWER CONSUMPTION:	
Tractor Size	90 hp (68 kW) on firm, flat fields
Specific Capacity	0.465 to 0.587 ton/hp-h (0.567 to 0.723 t/kW-h)
OPERATOR SAFETY:	Good; Well shielded
OPERATOR'S MANUAL:	Fair; Improvements required
MECHANICAL HISTORY:	Only minor mechanical problems



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>

Prairie Agricultural Machinery Institute

Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0
Telephone: (306) 682-2555

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