

Evaluation Report

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New Holland 28 Forage Blower

A Co-operative Program Between



NEW HOLLAND MODEL 28 FORAGE BLOWER

MANUFACTURER:

Sperry New Holland
New Holland, Pennsylvania
U.S.A. 17557

DISTRIBUTOR:

Sperry New Holland
Box 777
Winnipeg, Manitoba
R3C 2L4

Box 1907
Regina, Saskatchewan
S4N 2S3

Box 1616
Calgary, Alberta
T2P 2M7

RETAIL PRICE:

\$2653.00. (November, 1979, f.o.b. Portage la Prairie, Manitoba, with quick-connect pipe clamp).

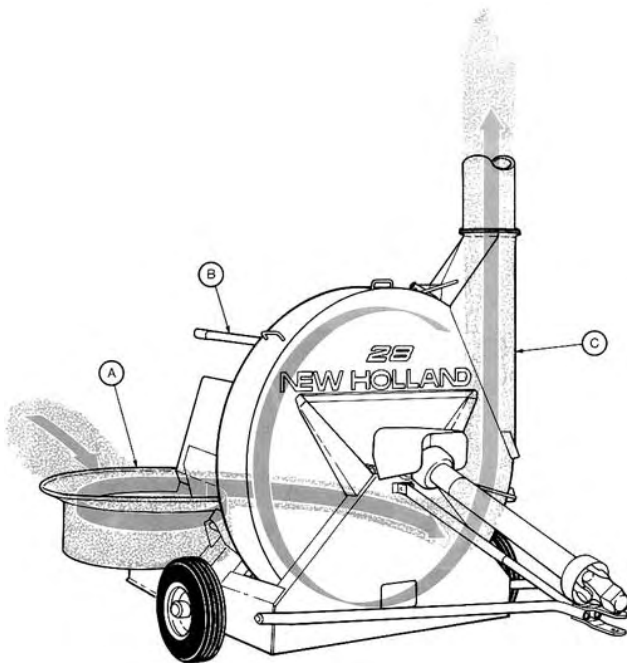


FIGURE 1. New Holland 28: (A) Feed Rotor Hopper, (B) Clutch Lever, (C) Blower Fan.

SUMMARY AND CONCLUSIONS

Overall functional performance of the New Holland 28 was excellent in clover, alfalfa and corn silage. Ease of operation was excellent.

At 540 rpm power take-off speed, typical conveying rates into a 25 m (80 ft) high silo varied from 28 to 33 t/h (31 to 36 ton/h) in clover at 32% moisture and from 24 to 27 t/h (26 to 30 ton/h) in corn at 60% moisture. Conveying rates higher than 33 t/h (36 ton/h) at 540 rpm could not be maintained without the risk of clogging. Conveying rates could be increased an average of 20%, by increasing the power take-off speed to 620 rpm.

A 40 kW (54 hp) tractor should have sufficient power to operate the New Holland 28 at maximum capacity in most conditions. The most efficient power use occurred when conveying at maximum rates. Crop type had little effect on power requirements or maximum conveying rates. Introducing water to the band housing increased the conveying rate.

The New Holland 28 was convenient to position next to a silo. Levelling and stabilizing were easy. Blower pipe sections were

convenient to join.

The New Holland 28 transported well. Servicing and adjusting were convenient.

The New Holland 28 was safe to operate if the manufacturer's safety recommendations were closely followed, however the feeder clutch was difficult to operate. The operator's manual was very good, providing useful information on operation, servicing and safety.

Two minor mechanical problems occurred during the test: The rotor feed bevel drive gear required realignment and the drive key was worn.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the rotor feed drive clutch to reduce the operating force.

Chief Engineer -- E. O. Nyborg

Senior Engineer -- J. C. Thauberger

Project Engineer -- R.R. Hochstein

THE MANUFACTURER STATES THAT

With regard to the recommendation:

1. "Need for changes to the rotor drive clutch will be reviewed. The present design is not considered to be inconvenient or unsafe. We have found that improper adjustments can increase operating force required."

Note: This report has been prepared using SI units of measurement. A conversion table is given in APPENDIX III.

GENERAL DESCRIPTION

The New Holland 28 (FIGURE 1) is a 540 rpm, power take-off driven forage blower. It is equipped with a horizontal feed rotor in a circular hopper, and a six-blade blower, mounted on a two wheel transport trailer.

A clean-out door and a water inlet connection with shut-off valve are provided on the blower housing.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The New Holland 28 was operated for 65 hours while conveying about 300 t alfalfa, 350 t clover and 490 t corn, into silos ranging in height from 25 to 28 m.

It was evaluated for rate of work, power requirements, ease of operation and adjustment, operator safety and suitability of the operator's manual. Power and capacity measurements were conducted using standard 230 mm blower pipe while conveying crops into a 25 m silo. Crops were chopped by a John Deere 3800 forage harvester with 50 mm recutter screen and set at 6 mm length of cut setting.

RESULTS AND DISCUSSION

RATE OF WORK

The conveying rate depended on blower speed, silo height, feeding uniformity and blower pipe configuration. Typical conveying rates into a 25 m high silo, when operating at the recommended 540 rpm blower speed, varied from 28 to 33 t/h in clover at 32% moisture content. Typical conveying rates when operated at the same speed and height, in corn at 60% moisture content, varied from 24 to 27 t/h. When operated at 620 rpm blower speed, in the same conditions, conveying rates varied from 30 to 40 t/h in clover, and from 30 to 33 t/h in corn, representing an average 20% increase in capacity. Conveying rates higher than 33 t/h at 540 rpm, and higher than 40 t/h at 620 rpm could not be maintained without the risk of clogging. Uniform feeding was essential in reducing the possibility of clogging at high feedrates.

Using the 10 degree tilt pipe attachment on the blower discharge outlet, to aid in blower pipe alignment, caused a reduction in the conveying rate, into a 25 m silo, by as much as 50%. Use

of elbows and similar attachments should be avoided. Introducing water to the band housing, particularly when working with legume crops, was effective in preventing gum buildup in the band housing and blower pipe, thereby improving performance.

POWER REQUIREMENTS

Tractor Size: Peak power take-off input, at 40 t/h maximum conveying rate into a 25 m silo, was 29 kW in both clover and corn. A tractor with 40 kW power take-off rating was used during testing and had sufficient power to operate the New Holland 28 at maximum capacity.

Specific Capacity: Specific capacity is a measure of how efficiently a machine performs a task. A high specific capacity indicates efficient energy use, while a low specific capacity indicates less efficient operation. Specific capacity for the New Holland 28 was about 1.4 t/kWh in corn and ranged from 1.2 to 1.5 t/kWh in clover when blowing into a 25 m high silo. Specific capacity was greatest at maximum feeding rates. Increasing the blower speed from 540 to 620 rpm did not appreciably change the specific capacity due to a corresponding increase in power input.

EASE OF OPERATION AND ADJUSTMENT

Positioning: The New Holland 28 was equipped with an adjustable hitch to aid in levelling the blower. No hitch jack was supplied, however, due to low hitch weight, one was not required. Hitch height adjustment range was 575 mm. Opening or closing the telescopic hitch support (FIGURE 2) to adjust the hitch height, took about one minute. No stabilizer stands were required due to the smooth operation of the machine.

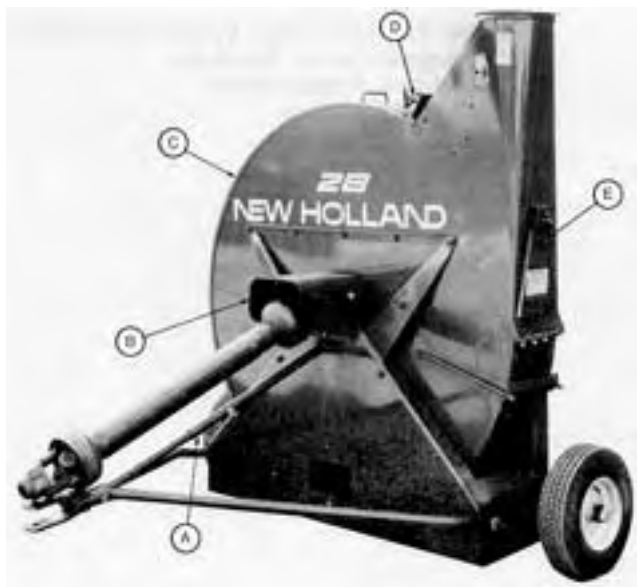


FIGURE 2. Blower Front View: (A) Telescoping Hitch Support, (B) Drive Shield, (C) Housing Band, (D) Band Tightener, (E) Clean-out Door.

Blower height was adjusted by locating the wheels at one of two heights or, by removing them, lowering the machine frame directly onto the ground. For safety, the hitch should not be disconnected from the tractor during operation.

A quick-connect pipe clamp, at the blower outlet, made it easy to install the standard 230 mm blower pipe.

Hopper: The hopper dimensions complied with recommended industry practice.* As a result the New Holland 28 was compatible with most types of forage unloading equipment.

Feed Rotor: The feed rotor effectively conveyed forage to the blower fan. Information was provided on feed rotor speed adjustment for operating speeds below 540 rpm.

Clutch Lever: The feed rotor could be stopped with the clutch lever (FIGURE 1) if clogging was imminent. It took about 360 N force to operate the clutch. A lower force requirement would have improved safety and convenience.

Transporting: The New Holland 28 trailed well at road transport

speeds. A properly sized hitch pin, with spacers to prevent vertical hitch movement, was needed for safe transport. A suitable safety chain should also be used when transporting on public roads.

Removable Blower Housing Band: The blower housing band could be rotated, to facilitate pipe coupling, by loosening the band tightener. A clean-outdoor provided for easy cleaning when the blower clogged.

Shear Bolts: The convenient shear bolt location, beneath the rear power take-off shield, made replacement easy. It took about 5 minutes to replace a shear bolt.

Adjustments: Few adjustments were needed during normal operation. Easy removal of the blower housing band made checking and adjustment of fan blade clearance convenient. Lowering the hitch to the ground with the hitch in its highest position, provided easy access to the rotor feed drive under the circular hopper.

Servicing: The New Holland had eleven pressure grease fittings requiring daily lubrication and one fitting requiring weekly lubrication. The five hopper drive fittings were on an easily accessible bank. Lubricating the rear universal joint on the power take-off drive required the removal of the drive shield (FIGURE 2). Daily lubrication and maintenance took about 5 minutes.

OPERATOR SAFETY

The New Holland 28 was safe to operate if normal safety procedures were observed. All moving parts were adequately shielded. The clutch lever, enabling emergency disengagement of the rotor feed drive, was difficult to operate, as it required a 360 N force to disengage. It is recommended that the manufacturer modify the clutch to allow easier disengagement.

OPERATOR'S MANUAL

The operator's manual was clear and well written and contained much useful information on operation, servicing, adjustment and safety procedures.

DURABILITY RESULTS

TABLE 1 outlines the mechanical history of the New Holland 28 during 65 hours operation while conveying about 1140 t of chopped forage. The intent of the test was evaluation of functional performance. The following failures represent those that occurred during functional testing. An extended durability evaluation was not conducted.

TABLE 1. Mechanical History

Item	Hours
The feed rotor bevel gear drive required realignment to improve meshing at	30
The feed rotor bevel gear drive key was worn requiring replacement at	30

DISCUSSION OF MECHANICAL PROBLEMS

Feed Rotor Drive: Gear alignment was achieved by removal of three shims. Drive key wear was probably caused by gear misalignment during initial assembly resulting in hammering of the gear teeth during operation.

*American Society of Agricultural Engineers. Standard S328.1, "Dimensions for Compatible Operation of Forage Harvesters, Forage Wagons, and Forage Blowers", December 1978.

**APPENDIX I
SPECIFICATIONS**

Make:	New Holland
Model:	28
Serial No.:	3 10553
Overall Dimensions:	
-- width	2040 mm
-- length	
-hitch extended	2765 mm
-hitch folded	1825 mm
-- height (without pipe attachments and wheels in upper position)	1735 mm
-- wheel tread	1610 mm
Hopper:	
-- type	cylindrical
-- height	
-with wheels in lower position	670 mm
-with wheels in upper position	645 mm
-with wheels removed	415 mm
-- diameter	
-top	1125 mm
-bottom	915 mm
-- horizontal clearance	780 mm
Feed Rotor Conveyor:	
-- type	centrifugal feed rotor, 6 vanes
-- rotor speed	240 rpm
Fan:	
-- number of fan blades	6
-- fan diameter	1420 mm
-- fan blade clearance adjustment	12 mm
-- fan speed at 540 rpm power take-off	540 rpm
-- width of fan blades	190 mm
-- fan housing water inlet size	19 mm
Blower Pipe Diameter:	
	230 mm
Tires:	
	two, 4.8 x 8, 2-ply
Total Weight:	
	476 kg
Lubrication Points:	
-- 10 h interval	11
-- 50 h interval	1
-- beginning and end of season	2
Hitch Height:	
-- minimum	0 mm
-- maximum	575 mm
Optional Equipment:	
-- 10° tilt pipe attachment	
-- rigid 45° elbow	
-- small grain kit	
-- rotor speed kit (speed adjustment for low operating speeds)	
-- telescoping pipe section	
-- blower pipe	

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:

(a) excellent	(d) fair
(b) very good	(e) poor
(c) good	(f) unsatisfactory

**APPENDIX III
CONVERSION TABLE**

1 metre (m)	= 3.3 feet (ft)
1 kilowatt (kW)	= 1.3 horsepower (hp)
1 tonne (t)	= 2200 pounds mass (lb)
1 newton (N)	= 0.2 pounds force (lb)
1 tonne/kilowatt hour (t/kWh)	= 0.8 ton/horsepower hour (ton/hph)



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