

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

January 2006

## Nebraska Summary 559: Massey Ferguson 5470 DYNA 4 Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

---

Nebraska Tractor Test Lab, "Nebraska Summary 559: Massey Ferguson 5470 DYNA 4 Diesel 16-Speed" (2006). *Nebraska Tractor Tests*. 2107.

<https://digitalcommons.unl.edu/tractormuseumlit/2107>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# SUMMARY OF OECD TESTS 2358 & 2359—NEBRASKA SUMMARY 559

## MASSEY FERGUSON 5470 DYNA 4 DIESEL

### 16 SPEED

#### POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1100 rpm)					
108.0 (80.5)	2200	6.25 (23.66)	0.413 (0.251)	17.26 (3.40)	
Standard Power Take-off Speed(1000 rpm)					
110.5 (82.4)	2000	6.01 (22.75)	0.387 (0.236)	18.38 (3.62)	
Maximum Power (1 hour)					
110.6 (82.5)	1980	5.98 (22.65)	0.385 (0.234)	18.48 (3.64)	

#### VARYING POWER AND FUEL CONSUMPTION

108.0 (80.5)	2200	6.25 (23.66)	0.413 (0.251)	17.26 (3.40)	Air temperature
92.9 (69.3)	2240	5.57 (21.08)	0.426 (0.259)	16.70 (3.29)	66°F (19°C)
71.6 (53.4)	2284	4.69 (17.77)	0.466 (0.284)	15.27 (3.01)	Relative humidity
47.9 (35.7)	2304	3.49 (13.23)	0.519 (0.316)	13.71 (2.70)	53%
24.5 (18.3)	2356	2.55 (9.67)	0.739 (0.450)	9.63 (1.90)	Barometer
--	2399	1.74 (6.57)	--	--	30.1" Hg (101.8 kPa)

Maximum Torque - 346.4 lb.-ft. (469.7 Nm) at 1150 rpm  
Maximum Torque Rise - 34.4%  
Torque rise at 1750 engine rpm - 26%

#### DRAWBAR PERFORMANCE

(Unballasted - Front Drive Engaged)

#### FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—9th(3A) Gear									
88.5 (66.0)	5775 (25.7)	5.75 (9.25)	2200	5.7	0.510 (0.310)	13.91 (2.74)	183 (84)	57 (14)	29.8 (100.8)
75% of Pull at Maximum Power—9th(3A) Gear									
69.6 (51.9)	4315 (19.2)	6.05 (9.73)	2280	4.3	0.552 (0.336)	12.84 (2.53)	183 (84)	57 (14)	29.8 (100.8)
50% of Pull at Maximum Power—9th(3A) Gear									
47.1 (35.1)	2865 (12.8)	6.16 (9.91)	2290	3.0	0.635 (0.386)	11.17 (2.20)	183 (84)	57 (14)	29.8 (100.8)
75% of Pull at Reduced Engine Speed—10th(3B) Gear									
69.1 (51.5)	4295 (19.1)	6.03 (9.71)	1858	4.7	0.512 (0.312)	13.85 (2.73)	181 (83)	57 (14)	29.8 (100.8)
50% of Pull at Reduced Engine Speed—10th(3B) Gear									
47.5 (35.4)	2880 (12.8)	6.18 (9.94)	1881	3.6	0.624 (0.379)	11.37 (2.24)	181 (83)	57 (14)	29.8 (100.8)

**Location of tests:** Groupement d'Antony, Parc de Touvoie, BP 44 Antony, Cedex, France 92163  
**Dates of tests:** May, 2006

**Manufacturer:** AGCOS.A. BP 307, Avenue Blaise Pascal, 60026 Beauvais, France

**FUEL and OIL:** Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.855  
**Fuel weight** 7.12 lbs/gal (0.853 kg/l) **Oil SAE** 15W40 **API service classification** CH4  
**Transmission and hydraulic lubricant** BP Terrac Tractan 9 fluid **Front axle lubricant** API GL5 - SAE 85W140

**ENGINE:** Make Sisu Diesel **Type** four cylinder vertical with turbocharger and air to air intercooler  
**Serial No.** P07427 **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.252" x 4.724" (108.0 mm x 120.0 mm) **Compression ratio** 18.5 to 1 **Displacement** 268 cu in (4397 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat and variable speed fan

**CHASSIS:** **Type** 2WD and FWA **Serial No.** M299101 **Tread width** rear 60.6" (1640 mm) to 82.0" (2083 mm) front 2WD - 53.7" (1363 mm) to 85.5" (2172 mm), FWA - 69.6" (1769 mm) to 83.9" (2132 mm) **Wheelbase** 2WD - 97.4" (2474 mm) FWA - 97.4" (2474 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.22 (1.96) second 1.50 (2.42) third 1.83 (2.95) fourth 2.25 (3.62) fifth 2.90 (4.66) sixth 3.56 (5.73) seventh 4.34 (6.99) eighth 5.34 (8.60) ninth 5.88 (9.46) tenth 7.23 (11.64) eleventh 8.82 (14.19) twelfth 10.85 (17.46) thirteenth 13.56 (21.82) fourteenth 16.68 (26.84) fifteenth 20.34 (32.74) sixteenth 25.02 (40.27) reverse 1.22 (1.96), 1.50 (2.42), 1.83 (2.95), 2.25 (3.62), 2.90 (4.66), 3.56 (5.73), 4.34 (6.99), 5.34 (8.60), 5.88 (9.46), 7.23 (11.64), 8.82 (14.19), 10.85 (17.46), 13.56 (21.82), 16.68 (26.84), 20.34 (32.74), 25.02 (40.27) **Clutch** multiple wet disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1980 engine rpm or 1000 rpm at 2000 engine rpm **Unladen tractor mass** 2WD - 9545 lb (4330 kg), FWA - 10385 lb (4710 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted - Front Drive Engaged)**  
**MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
52.4 (39.1)	9510 (42.3)	2.07 (3.32)	2282	14.8	4th(1D)Gear 0.654 (0.398)	10.85 (2.14)	181 (83)	55 (13)	29.7 (100.7)
67.5 (50.3)	9420 (41.9)	2.69 (4.32)	2279	13.7	5th(2A)Gear 0.566 (0.344)	12.54 (2.47)	181 (83)	57 (14)	29.8 (100.8)
80.9 (60.3)	9060 (40.3)	3.35 (5.39)	2218	10.0	6th(2B)Gear 0.534 (0.325)	13.29 (2.62)	181 (83)	57 (14)	29.8 (100.8)
90.1 (67.2)	8560 (38.1)	3.95 (6.35)	2134	9.5	7th(2C) Gear 0.499 (0.303)	14.22 (2.80)	181 (83)	57 (14)	29.8 (100.8)
91.2 (68.0)	7440 (33.1)	4.60 (7.40)	1978	9.0	8th(2D) Gear 0.477 (0.290)	14.87 (2.93)	183 (84)	57 (14)	29.8 (100.8)
91.5 (68.2)	6665 (29.6)	5.15 (8.28)	1979	6.2	9th(3A) Gear 0.477 (0.290)	14.87 (2.93)	183 (84)	57 (14)	29.8 (100.8)
89.7 (66.9)	5245 (23.3)	6.41 (10.32)	1981	5.3	10th(3B)Gear 0.485 (0.295)	14.62 (2.88)	183 (84)	57 (14)	29.8 (100.8)
88.6 (66.1)	4205 (18.7)	7.90 (12.71)	1980	4.3	11th(3C)Gear 0.489 (0.297)	14.52 (2.86)	185 (85)	57 (14)	29.8 (100.8)
83.5 (62.3)	3285 (14.6)	9.54 (15.35)	1981	5.8	12th(3D)Gear 0.514 (0.312)	13.81 (2.72)	183 (84)	59 (15)	29.8 (100.8)

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD test procedures. The manufacturer's optional remote hydraulic flow claim of 23.6 GPM (89.7 lpm) was not verified. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **2358 & 2359**, Nebraska Summary 559, December 15, 2006.

Roger M. Hoy  
Director

M.F. Kocher  
V.I. Adamchuk  
J.A. Smith  
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	2WD dB(A)	Front Wheel Drive Engaged dB(A)
At no load in 7th (2C) gear	75.0	75.0
Bystander in 16th (4D) gear	--	--

Tested without ballast		
TIRES AND WEIGHT	Front Wheel Assist	2WD
Rear tires - No., size, ply & psi (kPa)	Two 18.4R38; **, 16 (110)	Two 18.4R38; **, 16 (110)
Front tires - No., size, ply & psi (kPa)	Two 14.9R28; **, 15 (100)	Two 10.00-16; 8; 30 (210)
Height of Drawbar	22.8 in (580 mm)	31.5 in (800 mm)
Static Weight with operator- Rear	6305 lb (2860 kg)	6260 lb (2840 kg)
- Front	4245 lb (1925 kg)	3450 lb (1565 kg)
- Total	10550 lb (4785 kg)	9710 lb (4405 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted - 2WD)**  
**FUEL CONSUMPTION CHARACTERISTICS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F cool- ing med	Temp. °C Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—10th(3B) Gear</b>									
82.7 (61.7)	4415 (19.6)	7.02 (11.30)	2201	6.3	0.538 (0.327)	13.20 (2.60)	185 (85)	66 (19)	30.0 (101.7)
<b>75% of Pull at Maximum Power—10th(3B) Gear</b>									
65.4 (48.8)	3310 (14.7)	7.41 (11.93)	2277	4.4	0.579 (0.352)	12.24 (2.41)	185 (85)	66 (19)	30.0 (101.7)
<b>50% of Pull at Maximum Power—10th(3B) Gear</b>									
44.1 (32.9)	2195 (9.8)	7.54 (12.14)	2284	3.0	0.704 (0.428)	10.07 (1.98)	183 (84)	66 (19)	30.0 (101.7)
<b>75% of Pull at Reduced Engine Speed—11th(3C) Gear</b>									
65.3 (48.7)	3305 (14.7)	7.41 (11.92)	1873	5.1	0.546 (0.332)	12.99 (2.56)	183 (84)	66 (19)	30.0 (101.7)
<b>50% of Pull at Reduced Engine Speed—11th(3C) Gear</b>									
44.0 (32.8)	2180 (9.7)	7.57 (12.17)	1883	3.6	0.637 (0.387)	11.14 (2.19)	181 (83)	66 (19)	30.0 (101.7)
<b>MAXIMUM POWER IN SELECTED GEARS</b>									
<b>4th(1D) Gear</b>									
40.8 (30.4)	7440 (33.1)	2.06 (3.31)	2287	15.2	0.719 (0.437)	9.86 (1.94)	181 (83)	63 (17)	30.0 (101.7)
<b>5th(2A) Gear</b>									
51.4 (38.3)	7215 (32.1)	2.67 (4.30)	2285	14.3	0.638 (0.388)	11.12 (2.19)	181 (83)	63 (17)	30.0 (101.7)
<b>6th(2B) Gear</b>									
64.2 (47.9)	7105 (31.6)	3.39 (5.45)	2281	11.4	0.582 (0.354)	12.18 (2.40)	183 (84)	64 (18)	30.0 (101.7)
<b>7th(2C) Gear</b>									
75.5 (56.3)	6900 (30.7)	4.10 (6.60)	2231	10.1	0.542 (0.329)	13.10 (2.58)	183 (84)	64 (18)	30.0 (101.7)
<b>8th(2D) Gear</b>									
83.8 (62.5)	6225 (27.7)	5.05 (8.12)	2188	9.7	0.534 (0.325)	13.29 (2.62)	185 (85)	66 (19)	30.0 (101.7)
<b>9th(3A) Gear</b>									
87.6 (65.3)	6250 (27.8)	5.26 (8.46)	2075	8.6	0.506 (0.308)	14.01 (2.76)	183 (84)	66 (19)	30.0 (101.7)
<b>10th(3B) Gear</b>									
88.0 (65.6)	5305 (23.6)	6.22 (10.01)	1972	7.3	0.485 (0.295)	14.62 (2.88)	185 (85)	66 (19)	30.0 (101.7)
<b>11th(3C) Gear</b>									
86.6 (64.6)	4205 (18.7)	7.73 (12.44)	1979	6.2	0.491 (0.299)	14.45 (2.85)	185 (85)	66 (19)	30.0 (101.7)
<b>12th(3D) Gear</b>									
82.3 (61.4)	3180 (14.2)	9.71 (15.62)	1988	5.1	0.519 (0.316)	13.65 (2.69)	187 (86)	68 (20)	30.0 (101.7)

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range: 8405 lbs (37.4 kN)

i) Opening pressure of relief valve: NA

Sustained pressure of the open relief valve: one outlet set 2770 psi (191 bar) two outlet sets combined 2770 psi (191 bar)

ii) Pump delivery rate at minimum pressure: 14.9 GPM (56.4 l/min) 16.1 GPM (61.0 l/min)

iii) Pump delivery rate at maximum

hydraulic power: 14.6 GPM (55.2 l/min) 14.1 GPM (53.3 l/min)

Delivery pressure: 2235 psi (154 bar) 2320 psi (160 bar)

Power: 19.0 hp (14.2 kW) 19.0 Hp (14.2 kW)

### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar) 2770 (191)

Location: lift cylinder

Hydraulic oil temperature: °F (°C) 152 (67)

Location: hydraulic valve

Category: II

Quick attach: none

#### SAE Static Test—System pressure 2490 psi (172 Bar)

Hitch point distance to ground level in. (mm) 10.2 (259) 15.0 (381) 22.0 (559) 29.0 (737) 36.0 (914)

Lift force on frame lb 18747 15849 14310 12789 11421

" " " " " (kN) (83.4) (70.5) (63.7) (56.9) (50.8)

### HITCH DIMENSIONS AS TESTED—NO LOAD

	SAE test		OECD test	
	inch	mm	inch	mm
A	24.8	629	25.8	655
B	11.6	295	11.6	295
C	13.9	353	13.9	353
D	13.0	330	13.0	330
E	7.9	200	7.9	200
F	10.2	260	10.2	260
G	30.3	770	32.5	825
H	1.4	35	1.4	35
I	16.2	413	16.2	413
J	20.1	510	22.3	565
K	24.2	615	21.4	544
L	41.2	1046	41.2	1046
M	22.5	571	22.5	571
N	37.2	946	37.2	946
O	8.0	203	7.7	196
P	40.2	1020	46.3	1175
Q	33.5	850	34.5	876
R	29.0	737	28.3	720

