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January 1997

## Test 1743: Belarus 9345, 9011, 9045 and 9311 Diesel 14-Speed

Nebraska Tractor Test Lab

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# NEBRASKA OECD TRACTOR TEST 1743—SUMMARY 243

## BELARUS 9345 DIESEL

### ALSO BELARUS 9011, 9045 and 9311 DIESEL

### 14 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed (PTO speed—1076 rpm)</b>					
93.33 (69.59)	1800	5.79 (21.93)	0.437 (0.266)	16.11 (3.17)	
<b>Standard Power Take-off speed (1000 rpm)</b>					
88.77 (66.20)	1673	5.37 (20.33)	0.426 (0.259)	16.53 (3.26)	

#### VARYING POWER AND FUEL CONSUMPTION

93.33 (69.59)	1800	5.79 (21.93)	0.437 (0.266)	16.11 (3.17)	Air temperature
84.47 (62.99)	1911	5.20 (19.67)	0.433 (0.264)	16.26 (3.20)	75°F (24°C)
63.77 (47.55)	1934	4.47 (16.93)	0.494 (0.301)	14.26 (2.81)	Relative humidity
42.77 (31.90)	1952	3.07 (11.61)	0.505 (0.307)	13.95 (2.75)	37%
21.74 (16.21)	1969	1.62 (6.13)	0.524 (0.319)	13.43 (2.65)	Barometer
1.13 (0.85)	1992	1.53 (5.80)	9.525 (5.794)	0.74 (0.15)	28.72"Hg (97.26 kPa)

Maximum Torque 292 lb.-ft. (396 Nm) at 1400 rpm

Maximum Torque Rise 7.2%

Torque rise at 1400 engine rpm – 7%

#### DRAWBAR PERFORMANCE (Unballasted—Front Drive in Automatic mode) 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)
<b>Maximum Power—10th (6L) Gear</b>									
81.37 (60.68)	4182 (18.60)	7.30 (11.74)	1802	3.66	0.505 (0.307)	13.95 (2.75)	193 (89)	60 (16)	28.34 (95.97)
<b>75% of Pull at Maximum Power—10th (6L) Gear</b>									
64.02 (47.74)	3135 (13.94)	7.66 (12.33)	1876	2.89	0.506 (0.308)	13.92 (2.74)	180 (82)	45 (7)	28.87 (97.77)
<b>50% of Pull at Maximum Power—10th (6L) Gear</b>									
43.75 (32.63)	2091 (9.30)	7.85 (12.63)	1906	2.11	0.554 (0.377)	12.71 (2.50)	178 (81)	47 (8)	28.88 (97.80)
<b>75% of Pull at Reduced Engine Speed—11th(5H) Gear</b>									
63.98 (47.71)	3154 (14.03)	7.61 (12.24)	1670	2.89	0.470 (0.286)	15.00 (2.95)	179 (82)	46 (8)	28.88 (97.80)
<b>50% of Pull at Reduced Engine Speed—11th(5H) Gear</b>									
43.77 (32.64)	2074 (9.22)	7.92 (12.74)	1721	1.95	0.509 (0.310)	13.84 (2.73)	177 (81)	48 (9)	28.89 (97.83)

**Location of Test:** Tractor Testing Laboratory,  
University of Nebraska, Lincoln, Nebraska 68583-0832

**Dates of Test:** October 28-November 7, 1997

**Manufacturer:** Minsk Tractor Works, 29  
Dolgobrodskaya Minsk, Belarus 220668

**FUEL OIL AND TIME:** Fuel No. 2 Diesel  
**Cetane No.** 50.6 **Specific gravity converted to 60°/60° F (15°/15°C)** 0.8459 **Fuel weight** 7.043 lbs/gal (0.844 kg/l) **Oil SAE** 10W-30 **API service classification** SH, CG-4 **To motor** 2.671 gal (10.110 l) **Drained from motor** 1.885 gal (7.137 l) **Transmission and final drive lubricant** SAE 80W90 gear lubricant **Front axle lubricant** SAE 80W90 gear lubricant **Hydraulic lubricant** SAE 10 **Total time engine was operated** 32.0 hours.

**ENGINE:** Make MTZ Diesel **Model** D-245.5  
**Type** four cylinder vertical with turbocharger **Serial No.** 013495 **Crankshaft** lengthwise **Rated rpm** 1800 **Bore and stroke** (as specified) 4.331" × 4.921" (110.0 mm × 125.0 mm) **Compression ratio** 16.0 to 1 **Displacement** 290 cu in (4750 ml) **Starting system** 24 volt **Lubrication** pressure **Air cleaner** oil bath and precleaner **Oil filter** full flow centrifugal **Oil cooler** radiator for crankcase oil **Fuel filter** one paper element and one cleanable screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

**ENGINE OPERATING PARAMETERS: fuel rate:** 37.0-41.9 lb/h (16.8-19.0 kg/h) **high idle:** 1950-2000 rpm **Turbo boost** nominal 13.1-15.2 psi (90-105 kPa) as measured 14.7 psi (102 kPa)

**CHASSIS: Type** front wheel assist **Serial No.** 400342 **Tread width** rear 60.0" (1524 mm) to 82.7" (2100 mm) front 60.0" (1524 mm) to 70.9" (1800 mm) **Wheel base** 96.5" (2450 mm) **Hydraulic control system** direct engine drive with throwout lever (engaged during test) **Transmission** selective gear fixed ratio **Nominal travel speeds mph (km/h)** first 1.29 (2.08) second 1.72 (2.76) third 2.21 (3.55) fourth 2.91 (4.69) fifth 3.75 (6.04) sixth 4.44 (7.15) seventh 4.96 (7.98) eighth 5.87 (9.45) ninth 6.39 (10.28) tenth 7.56 (12.17) eleventh 8.46 (13.61) twelfth 9.98 (16.06) thirteenth 14.09 (22.68) fourteenth 18.60 (29.94) reverse 2.73 (4.39), 3.60 (5.80), 4.64 (7.46), 6.14 (9.88) **Clutch** single dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1628 engine rpm or 1000 rpm at 1667 engine rpm **Unladen tractor mass** 8646 lb (3922 kg).

**DRAWBAR PERFORMANCE**  
(Unballasted—Front Drive in Automatic mode)  
**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)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th(3L) Gear									
74.40 (55.48)	8275 (36.81)	3.37 (5.43)	1900	14.80	0.559 (0.340)	12.61 (2.48)	181 (83)	48 (9)	28.82 (97.60)
6th(4L) Gear									
78.35 (58.42)	7192 (31.99)	4.09 (6.57)	1804	8.17	0.522 (0.318)	13.49 (2.66)	196 (91)	67 (19)	28.34 (95.97)
7th(3H) Gear									
78.51 (58.54)	6524 (29.02)	4.51 (7.26)	1805	9.20	0.521 (0.317)	13.51 (2.66)	197 (91)	66 (19)	28.33 (95.94)
8th(4H) Gear									
80.71 (60.18)	5467 (24.32)	5.54 (8.91)	1801	5.68	0.506 (0.308)	13.93 (2.74)	201 (94)	64 (18)	28.32 (95.90)
9th(5L) Gear									
81.23 (60.57)	5001 (22.24)	6.09 (9.80)	1801	4.57	0.505 (0.307)	13.95 (2.75)	192 (89)	58 (14)	28.35 (96.00)
10th(6L) Gear									
81.37 (60.68)	4182 (18.60)	7.30 (11.74)	1802	3.66	0.505 (0.307)	13.95 (2.75)	193 (89)	60 (16)	28.34 (95.97)
11th(5H) Gear									
82.95 (61.85)	3812 (16.95)	8.16 (13.13)	1801	3.35	0.494 (0.300)	14.27 (2.81)	193 (89)	61 (16)	28.33 (95.94)

**REPAIRS AND ADJUSTMENTS:** The engine side panels were removed during the testing sequence to prevent overheating.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 166° F (75° C). The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor No. **1743**, Summary 243, November 20, 1997.

LOUIS I. LEVITICUS  
Engineer-in-Charge

L.L. BASHFORD  
R.D. GRISIO  
M.F. KOCHER  
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	2WD dB(A)	Automatic dB(A)
At 75% load in 8th(4H) Gear	88.3	88.4
Bystander in 14th(7H) Gear	87.8	—

**TIRES AND WEIGHT**

**Rear Tires**—No., size, ply & psi (kPa)  
**Front Tires**—No., size, ply & psi (kPa)

**Tested Without Ballast**

Two 16.9R38; \*\*, 16 (110)  
Two 360/70R20; \*\*, 18 (125)

**Height of Drawbar**

20.0 in (510 mm)

**Static Weight with Operator**—Rear  
—Front  
—Total

5930 lb (2690 kg)  
2882 lb (1307 kg)  
8812 lb (3997 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted—Front Drive Disengaged)**  
**FUEL CONSUMPTION CHARACTERISTICS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
<b>Maximum Power—9th(5L) Gear</b>									
81.81 (61.01)	5049 (22.46)	6.08 (9.78)	1803	5.06	0.502 (0.306)	14.02 (2.76)	192 (89)	57 (14)	28.36 (96.04)
<b>75% of Pull at Maximum Power—9th(5L) Gear</b>									
65.86 (49.11)	3789 (16.85)	6.52 (10.49)	1902	3.47	0.504 (0.307)	13.97 (2.75)	180 (82)	43 (6)	28.89 (97.83)
<b>50% of Pull at Maximum Power—9th(5L) Gear</b>									
45.16 (33.68)	2526 (11.24)	6.70 (10.79)	1936	2.46	0.553 (0.337)	12.73 (2.51)	177 (81)	44 (7)	28.88 (97.80)
<b>75% of Pull at Reduced Engine Speed—11th(5H) Gear</b>									
65.88 (49.13)	3788 (16.85)	6.52 (10.50)	1440	3.47	0.458 (0.279)	15.36 (3.03)	183 (84)	44 (7)	28.88 (97.80)
<b>50% of Pull at Reduced Engine Speed—11th(5H) Gear</b>									
45.12 (33.64)	2533 (11.27)	6.68 (10.75)	1458	2.46	0.465 (0.283)	15.14 (2.98)	178 (81)	45 (7)	28.87 (97.77)
<b>MAXIMUM POWER IN SELECTED GEARS</b>									
<b>6th(4L) Gear</b>									
75.22 (56.09)	7050 (31.36)	4.00 (6.44)	1897	14.47	0.556 (0.338)	12.67 (2.50)	183 (84)	49 (9)	28.82 (97.60)
<b>7th(3H) Gear</b>									
78.82 (58.78)	6533 (29.06)	4.52 (7.28)	1805	9.04	0.520 (0.316)	13.55 (2.67)	194 (90)	65 (18)	28.32 (95.90)
<b>8th(4H) Gear</b>									
80.98 (60.38)	5473 (24.35)	5.55 (8.93)	1805	5.79	0.504 (0.307)	13.96 (2.75)	200 (93)	63 (17)	28.32 (95.90)
<b>9th(5L) Gear</b>									
81.81 (61.01)	5049 (22.46)	6.08 (9.78)	1803	5.06	0.502 (0.306)	14.02 (2.76)	192 (89)	57 (14)	28.36 (96.04)
<b>10th(6L) Gear</b>									
81.52 (60.79)	4210 (18.72)	7.26 (11.69)	1799	3.93	0.503 (0.306)	13.99 (2.76)	188 (86)	59 (15)	28.35 (96.00)
<b>11th(5H) Gear</b>									
82.83 (61.76)	3799 (16.90)	8.18 (13.16)	1803	3.40	0.496 (0.302)	14.21 (2.80)	191 (88)	61 (16)	28.33 (95.94)

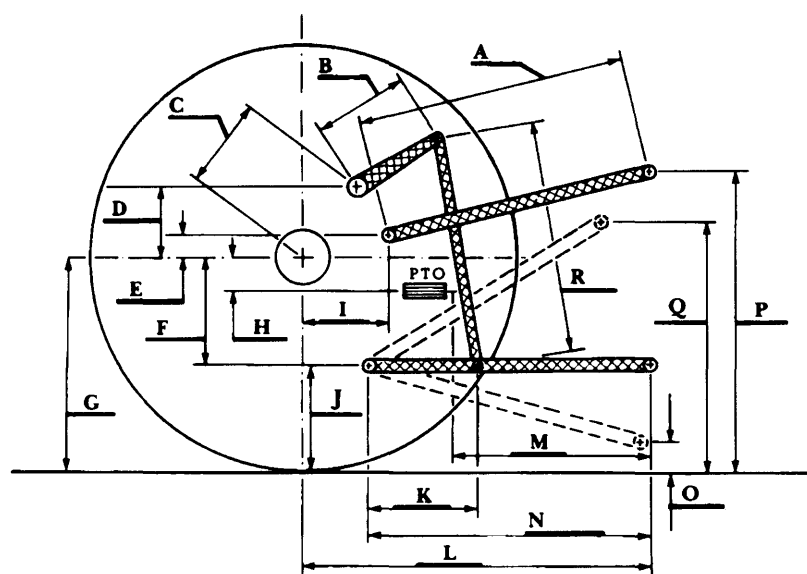
## THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum Force Exerted Through Whole Range:	4536 lbs	(20.2 kN)
i) Opening pressure of relief valve:	NA	
Sustained pressure of the open relief valve:	2720 psi	(187 bar)
ii) Pump delivery rate at minimum pressure:	11.9 GPM	(45.0 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	10.6 GPM	(40.1 l/min)
Delivery pressure:	2480 psi	(171 bar)
Power:	15.3 HP	(11.4 kW)

### HITCH DIMENSIONS AS TESTED—NO LOAD



	inch	mm
A	21.8	552
B	10.2	266
C	17.3	439
D	10.6	270
E	6.0	152
F	10.4	264
G	31.3	795
H	4.8	122
I	19.0	483
J	20.9	531
K	18.2	462
L	38.9	988
M	22.5	572
N	31.7	805
O	8.0	203
P	45.0	1141
Q	32.1	816
R	20.8	527



**Belarus 9345 Diesel**

Agricultural Research Division  
Institute of Agriculture and Natural Resources  
University of Nebraska-Lincoln  
Darrell Nelson, Dean and Director