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## Test 1443: Yanmar YM276D and YM276 Diesel 12-Speed

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1443 — YANMAR YM276D DIESEL ALSO YANMAR YM276 DIESEL 12 SPEED

## POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)	
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—622 rpm)									
23.00 (17.15)	2600	1.664 (6.299)	0.504 (0.307)	13.82 (2.723)	195 (90.4)	64 (17.7)	75 (23.9)	28.903 (97.602)	
* Standard Power Take-off Speed (540 rpm)—One Hour									
22.82 (17.02)	2258	1.590 (6.019)	0.486 (0.296)	14.35 (2.828)	203 (94.8)	63 (17.2)	74 (23.4)	28.905 (97.608)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
19.96 (14.88)	2656	1.467 (5.553)	0.513 (0.312)	13.60 (2.680)	186 (85.3)	64 (17.5)	75 (23.9)	..... .....	
0.00 (0.00)	2802	0.572 (2.165)	..... .....	..... .....	162 (72.2)	64 (17.5)	75 (23.9)	..... .....	
10.27 (7.66)	2732	0.972 (3.679)	0.660 (0.402)	10.56 (2.082)	169 (76.1)	63 (17.2)	75 (23.9)	..... .....	
23.28 (17.36)	2600	1.682 (6.367)	0.504 (0.307)	13.84 (2.727)	193 (89.4)	64 (17.5)	76 (24.4)	..... .....	
5.20 (3.88)	2764	0.774 (2.930)	1.039 (0.632)	6.71 (1.324)	166 (74.2)	64 (17.5)	76 (24.7)	..... .....	
15.19 (11.33)	2694	1.213 (4.592)	0.557 (0.339)	12.52 (2.467)	170 (76.7)	63 (17.2)	74 (23.6)	..... .....	
Av Av	12.32 (9.19)	2708	1.114 (4.217)	0.631 (0.384)	11.06 (2.179)	174 (79.0)	63 (17.4)	75 (24.1)	28.903 (97.602)

## DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 10th (3-1) Gear											
17.68 (13.19)	1146 (5.10)	5.79 (9.32)	2599	7.24	1.595 (6.039)	0.629 (0.383)	11.08 (2.183)	193 (89.2)	64 (17.8)	82 (27.5)	28.865 (97.473)
75% of Pull at Maximum Power—Ten Hours 10th (3-1) Gear											
14.75 (11.00)	921 (4.10)	6.00 (9.66)	2643	5.38	1.395 (5.279)	0.659 (0.401)	10.57 (2.083)	175 (79.4)	61 (16.1)	76 (24.6)	28.950 (97.760)
50% of Pull at Maximum Power—Two Hours 10th (3-1) Gear											
10.21 (7.61)	615 (2.73)	6.23 (10.03)	2700	3.98	1.147 (4.343)	0.784 (0.477)	8.90 (1.753)	168 (75.6)	65 (18.3)	76 (24.2)	28.945 (97.743)
50% of Pull at Reduced Engine Speed—Two Hours 11th (3-2) Gear											
10.19 (7.60)	614 (2.73)	6.23 (10.03)	2035	3.65	0.986 (3.732)	0.675 (0.410)	10.34 (2.036)	169 (76.1)	68 (20.0)	78 (25.6)	28.955 (97.777)
MAXIMUM POWER IN SELECTED GEARS											
14.11 (10.52)	2412 (10.73)	2.19 (3.53)	2659	14.87	7th (2-1) Gear			169 (75.8)	57 (13.9)	64 (17.8)	28.960 (97.794)
16.98 (12.66)	2218 (9.87)	2.87 (4.62)	2599	13.88	8th (2-2) Gear			177 (80.3)	58 (14.4)	67 (19.4)	28.960 (97.794)
17.88 (13.34)	1711 (7.61)	3.92 (6.31)	2600	10.94	9th (2-3) Gear			190 (87.5)	63 (17.2)	78 (25.6)	28.870 (97.490)
18.93 (14.11)	1228 (5.46)	5.78 (9.30)	2600	7.39	10th (3-1) Gear			188 (86.4)	63 (17.2)	76 (24.4)	28.870 (97.490)
18.22 (13.59)	875 (3.89)	7.81 (12.57)	2599	5.35	11th (3-2) Gear			190 (87.8)	63 (17.2)	80 (26.7)	28.870 (97.490)
LUGGING ABILITY IN 10th (3-1) GEAR											
Crankshaft Speed rpm				2600	2345	2084	1818	1560	1291		
Pull—lbs (kN)				1228 (5.46)	1342 (5.97)	1418 (6.31)	1363 (6.06)	1347 (5.99)	1319 (5.87)		
Increase in Pull %				0	9	15	11	10	7		
Power—Hp (kW)				18.93 (14.11)	18.49 (13.78)	17.27 (12.88)	14.55 (10.85)	12.30 (9.17)	9.98 (7.44)		
Speed—Mph (km/h)				5.78 (9.30)	5.17 (8.31)	4.57 (7.35)	4.00 (6.44)	3.42 (5.51)	2.84 (4.57)		
Slip %				7.39	8.27	8.79	8.27	8.62	8.53		

Department of Agricultural Engineering

Dates of Test: June 12-24, 1982

Manufacturer: YANMAR DIESEL ENGINE CO., LTD, 1-32, Chayamachi, Kita-ku, Osaka, Japan

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 46.6 (rating taken from oil company's inspection data) Specific gravity converted to 60°/60° (15°/15°) 0.8375 Fuel weight 6.973 lbs/gal (0.836 kg/l) Oil SAE 30 API service classification SE/SF-CC/CD To motor 1.036 gal (3.921 l) Drained from motor 0.893 gal (3.380 l) Transmission and hydraulic lubricant J.D. 303 fluid or equivalent Front axle lubricant SAE 90 Total time engine was operated 52.5 hours.

**ENGINE:** Make Yanmar Diesel Type three cylinder vertical Serial No. 3T84H-200347 Crankshaft lengthwise Rated rpm 2600 Bore and stroke 3.31" × 3.35" (84 mm × 85 mm) Compression ratio 20 to 1 Displacement 86.2 cu in (1413 ml) Starting system 12 volt Lubrication pressure Air cleaner one paper element with centrifugal precleaner Oil filter one full flow cartridge Fuel filter one paper element Muffler vertical Cooling medium temperature control one thermostat.

**CHASSIS:** Type front wheel assist Serial No. 276D-40365 Tread width rear 43.1" (1094 mm) to 54.9" (1394 mm) front 39.4" (1000 mm) Wheel base 64.0" (1625 mm) Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26.6" (675 mm) Vertical distance above roadway 28.3" (718 mm) Horizontal distance from center of rear wheel tread 0.1" (2.5 mm) to the left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (3) range operator controlled powershift Advertised speeds mph (km/h) first 0.2 (0.3) second 0.2 (0.4) third 0.3 (0.5) fourth 0.8 (1.3) fifth 1.1 (1.8) sixth 1.4 (2.3) seventh 2.6 (4.2) eighth 3.5 (5.6) ninth 4.6 (7.4) tenth 6.5 (10.5) eleventh 8.6 (13.9) twelfth 11.4 (18.4) reverse 0.2 (0.3), 1.1 (1.7) 3.4 (5.5) 8.4 (13.5) Clutch single plate dry disc operated by foot pedal Brakes drum and shoe operated by two foot pedals which can be locked together Steering mechanical Turning radius (on concrete surface with brake applied) right 93.7" (2.38 m) left 93.7" (2.38 m) (on concrete surface without brake) right 101.6" (2.58 m) left 101.6" (2.58 m) Turning space diameter (on concrete surface with brake applied) right 201" (5.10 m) left 201" (5.10 m) (on concrete surface without brake) right 216.5" (5.50 m) left 216.5" (5.50 m) Power take-off 540 rpm at 2258 engine rpm.

**REPAIRS and ADJUSTMENTS:** The air cleaner to manifold gasket was discovered to be missing during preliminary PTO tests. A new gasket was installed and test continued.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB (A)
Maximum Available Power—Two Hours	90.0	90.5
75% of Pull at Maximum Power—Ten Hours		90.0
50% of Pull at Maximum Power—Two Hours		92.0
50% of Pull at Reduced Engine Speed—Two Hours		90.0
Bystander in 12th (3-3) gear		77.0

### DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

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)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb		
<b>Maximum Available Power—Two Hours 10th (3-1) Gear</b>												
16.84 (12.56)	1037 (4.61)	6.09 (9.81)	2600	4.66	1.595 (6.039)	0.661 (0.402)	10.56 (2.079)	192 (88.6)	66 (18.6)	84 (28.6)	28.820 (97.321)	

### MAXIMUM POWER IN SELECTED GEARS

9.98 (7.44)	2973 (13.22)	1.26 (2.03)	2707	14.78	6th (1-3) Gear			168 (75.3)	60 (15.6)	71 (21.7)	28.950 (97.760)
18.07 (13.47)	1626 (7.23)	4.17 (6.71)	2600	7.51	9th (2-3) Gear			192 (88.9)	63 (17.2)	79 (26.1)	28.870 (97.490)
19.06 (14.21)	1181 (5.25)	6.05 (9.74)	2600	5.23	10th (3-1) Gear			189 (87.2)	63 (17.2)	75 (23.9)	28.870 (97.490)

### TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
<b>Rear Tires</b>	—No., size, ply & psi (kPa)	Two 11.2-24; 4; 14 (95)	Two 11.2-24; 4; 14 (95)
<b>Ballast</b>	—Liquid (each)	152 lb (69 kg)	None
	—Cast Iron (each)	350 lb (159 kg)	None
<b>Front Tires</b>	—No., size, ply & psi (kPa)	Two 7-14; 4; 26 (180)	Two 7-14; 4; 26 (180)
<b>Ballast</b>	—Liquid (each)	None	None
	—Cast Iron (each)	200 lb (91 kg)	None
<b>Height of Drawbar</b>		13.5 in (345 mm)	13.5 in (345 mm)
<b>Static Weight with Operator—Rear</b>		2650 lb (1202 kg)	1645 lb (746 kg)
	—Front	1460 lb (662 kg)	1060 lb (481 kg)
	—Total	4110 lb (1864 kg)	2705 lb (1227 kg)

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 136°F (57.7°C). Five gears were chosen between 15% slip and 10 mph (16.1 km/h)..

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1443**.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers



**Yanmar YM276D Diesel**

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University of Nebraska—Lincoln  
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