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Test 1980: Kubota M135X

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NEBRASKA OECD TRACTOR TEST 1980—SUMMARY 755

KUBOTA M135X 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—596 rpm)					
121.99 (90.97)	2201	7.63 (28.87)	0.437 (0.266)	16.00 (3.15)	
Maximum Power (1 hour)					
123.20 (91.87)	2149	7.56 (28.60)	0.429 (0.261)	16.31 (3.21)	
Standard Power Take-off Speed (540 rpm)					
120.74 (90.03)	1994	7.17 (27.14)	0.415 (0.253)	16.84 (3.32)	

VARYING POWER AND FUEL CONSUMPTION

121.99 (90.97)	2201	7.63 (28.89)	0.437 (0.266)	16.00 (3.15)	Air temperature
105.77 (78.87)	2244	6.86 (25.98)	0.454 (0.276)	15.41 (3.04)	74°F (23°C)
80.04 (59.69)	2268	5.79 (21.92)	0.506 (0.308)	13.82 (2.72)	Relative humidity
54.22 (40.43)	2301	4.79 (18.12)	0.618 (0.376)	11.33 (2.23)	15%
27.68 (20.64)	2344	3.64 (13.77)	0.919 (0.559)	7.61 (1.50)	Barometer
0.81 (0.60)	2377	2.39 (9.03)	20.663 (12.569)	0.34 (0.07)	28.62 Hg (96.92 kPa)

Maximum torque - 396 lb.-ft. (537 Nm) at 1200 rpm
 Maximum torque rise - 35.9%
 Torque rise at 1802 engine rpm - 16%

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 (H2) Gear									
103.87 (77.45)	7445 (33.11)	5.23 (8.42)	2196	5.5	0.516 (0.314)	13.55 (2.67)	191 (88)	49 (9)	29.21 (98.92)
75% of Pull at Maximum Power—9th (H2) Gear									
81.63 (60.87)	5606 (24.93)	5.46 (8.79)	2250	3.7	0.538 (0.327)	13.01 (2.56)	190 (88)	58 (14)	29.22 (98.95)
50% of Pull at Maximum Power—9th (H2) Gear									
55.67 (41.51)	3718 (16.54)	5.62 (9.04)	2282	2.4	0.672 (0.408)	10.42 (2.05)	190 (88)	60 (16)	29.22 (98.95)
75% of Pull at Reduced Engine Speed—11th (H3) Gear									
81.51 (60.78)	5603 (24.92)	5.46 (8.78)	1791	3.9	0.482 (0.293)	14.51 (2.86)	187 (86)	62 (17)	29.22 (98.95)
50% of Pull at Reduced Engine Speed—11th (H3) Gear									
55.66 (41.50)	3725 (16.57)	5.61 (9.02)	1813	2.6	0.559 (0.340)	12.52 (2.47)	181 (83)	61 (16)	29.22 (98.95)

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

Dates of tests: October 27 - November 4, 2010

Manufacturer: Kubota Corporation, Sakai Plant, 64, Ishizu-Kitamachi, Sakai-ku, Sakai-City, Osaka, Japan

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8402 Fuel weight 6.996 lbs/gal (0.838 kg/l) Oil SAE 10W-30 API service classification CF-4 Transmission and hydraulic lubricant Kubota Super UDT 2 fluid Front axle lubricant Kubota Super UDT 2 fluid Total time engine was operated: 21.0 hours

ENGINE: Make Kubota Diesel **Type** four cylinder vertical with turbocharger and air to air intercooler **Serial No.** *AN0111* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.646 x 5.512" (118.0 mm x 140.0 mm) **Compression ratio** 17.5 to 1 **Displacement** 374 cu in (6124 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 and prestrainer **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 49.8 - 55.0 lb/h (22.6 - 24.9 kg/h) **High idle:** 2350 - 2400 rpm **Turbo boost:** nominal 9.4 - 10.9 psi (65-75 kPa) as measured 10.3 psi (71 kPa)

CHASSIS: Type front wheel assist **Serial No.** 51227 **Tread width** rear 62.8" (1595 mm) to 82.1" (2085 mm) front 69.9" (1775 mm) to 73.8" (1875 mm) **Wheelbase** 105.9" (2690 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (8) range operator controlled power shift **Nominal travel speeds mph (km/h)** first 1.24 (1.99) second 1.57 (2.52) third 1.96 (3.16) fourth 2.63 (4.24) fifth 3.03 (4.87) sixth 3.83 (6.16) seventh 4.32 (6.95) eighth 4.81 (7.74) ninth 5.47 (8.80) tenth 6.45 (10.38) eleventh 6.87 (11.05) twelfth 9.21 (14.82) thirteenth 10.58 (17.02) fourteenth 13.38 (21.54) fifteenth 16.80 (27.04) sixteenth 22.54 (36.27) reverse 1.25 (2.01), 1.58 (2.54), 1.98 (3.19), 2.66 (4.28), 3.05 (4.91), 3.87 (6.22), 4.36 (7.01), 4.85 (7.81), 5.52 (8.88), 6.51 (10.47), 6.93 (11.15), 9.29 (14.95), 10.67 (17.17), 13.50 (21.72), 16.95 (27.28), 22.73 (36.58)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 2200 RPM
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)	Temp. °F (°C)	Barom. inch Hg (kPa)		
6th(L6) Gear									
97.79 (72.92)	10311 (45.87)	3.56 (5.73)	2231	9.9	0.525 (0.319)	13.33 (2.63)	189 (87)	47 (8)	29.09 (98.51)
7th(H1) Gear									
104.10 (77.62)	9692 (43.11)	4.03 (6.49)	2200	8.5	0.507 (0.308)	13.80 (2.72)	191 (88)	51 (11)	29.07 (98.44)
8th(L7) Gear									
103.34 (77.06)	8499 (37.81)	4.56 (7.34)	2200	6.7	0.514 (0.312)	13.62 (2.68)	191 (89)	53 (12)	29.21 (98.92)
9th(H2) Gear									
103.87 (77.45)	7445 (33.11)	5.23 (8.42)	2196	5.5	0.516 (0.314)	13.55 (2.67)	191 (88)	49 (9)	29.21 (98.92)
10th(L8) Gear									
102.23 (76.23)	6119 (27.22)	6.27 (10.08)	2199	4.5	0.521 (0.317)	13.44 (2.65)	191 (88)	51 (11)	29.21 (98.92)
11th(H3) Gear									
103.95 (77.52)	5828 (25.92)	6.69 (10.76)	2200	4.3	0.510 (0.310)	13.73 (2.70)	192 (88)	56 (13)	29.22 (98.95)
12th(H4) Gear									
99.93 (74.52)	4127 (18.36)	9.08 (14.61)	2200	3.1	0.531 (0.323)	13.17 (2.59)	191 (88)	57 (14)	29.22 (98.95)

Clutch wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1994 engine rpm or 1000 rpm at 2050 engine rpm **Unladen tractor mass** 10305 lb (4674 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

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 fuel pump inlet was maintained at 117°F (47°C). The performance figures on this summary were taken from a test conducted under the OECD Code 2 test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1980**, Nebraska Summary 755, December 6, 2010.

Roger M. Hoy
 Director

M.F. Kocher
 D.R. Keshwani
 J.A. Smith
 Board of Tractor Test Engineers

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 2150 RPM
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)	Temp. °F (°C)	Barom. inch Hg (kPa)		
6th(L6) Gear									
98.01 (73.08)	10351 (46.04)	3.55 (5.71)	2231	9.9	0.526 (0.320)	13.30 (2.62)	189 (87)	47 (8)	29.09 (98.51)
7th(H1) Gear									
103.54 (77.21)	9809 (43.63)	3.96 (6.37)	2167	8.5	0.504 (0.307)	13.88 (2.73)	191 (88)	49 (9)	29.08 (98.48)
8th(L7) Gear									
104.14 (77.66)	8774 (39.03)	4.45 (7.16)	2150	6.7	0.499 (0.303)	14.03 (2.76)	191 (88)	53 (12)	29.06 (98.41)
9th(H2) Gear									
104.49 (77.92)	7655 (34.05)	5.12 (8.24)	2148	5.5	0.512 (0.311)	13.68 (2.69)	190 (88)	48 (9)	29.21 (98.92)
10th(L8) Gear									
102.41 (76.37)	6275 (27.91)	6.12 (9.85)	2151	4.6	0.527 (0.320)	13.28 (2.62)	191 (88)	52 (11)	29.21 (98.92)
11th(H3) Gear									
104.40 (77.85)	5986 (26.63)	6.54 (10.53)	2153	4.3	0.503 (0.306)	13.92 (2.74)	191 (88)	56 (13)	29.22 (98.95)
12th(H4) Gear									
99.86 (74.46)	4223 (18.78)	8.87 (14.27)	2149	3.1	0.525 (0.319)	13.33 (2.63)	191 (88)	58 (14)	29.22 (98.95)

DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED - 2150 RPM
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)	Temp. ^o F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
4th(L4) Gear									
90.53 (67.50)	14102 (62.73)	2.41 (3.87)	2235	12.3	0.553 (0.336)	12.65 (2.49)	188 (87)	43 (6)	29.21 (98.92)
5th(L5) Gear									
101.29 (75.53)	13505 (60.08)	2.81 (4.52)	2226	10.1	0.519 (0.316)	13.49 (2.66)	190 (88)	47 (8)	29.21 (98.92)
6th(L6) Gear									
105.00 (78.30)	11078 (49.28)	3.56 (5.72)	2151	6.5	0.496 (0.302)	14.10 (2.78)	190 (88)	49 (9)	29.20 (98.88)
7th(H1) Gear									
106.08 (79.10)	9792 (43.56)	4.06 (6.53)	2152	5.5	0.493 (0.300)	14.20 (2.80)	191 (88)	50 (10)	29.19 (98.85)
8th(L7) Gear									
104.84 (78.18)	8642 (38.44)	4.55 (7.32)	2150	4.5	0.496 (0.302)	14.10 (2.78)	191 (88)	52 (11)	29.19 (98.85)
9th(H2) Gear									
105.38 (78.58)	7597 (33.80)	5.20 (8.37)	2147	3.7	0.494 (0.301)	14.15 (2.79)	191 (88)	51 (11)	29.19 (98.85)
10th(L8) Gear									
102.06 (76.11)	6184 (27.51)	6.19 (9.95)	2152	3.0	0.511 (0.311)	13.70 (2.70)	191 (88)	52 (11)	29.19 (98.85)
11th(H3) Gear									
102.63 (76.53)	5834 (25.95)	6.60 (10.61)	2153	2.8	0.510 (0.310)	13.72 (2.70)	191 (88)	53 (12)	29.18 (98.82)
12th(H4) Gear									
97.35 (72.59)	4095 (18.21)	8.92 (14.36)	2149	2.2	0.534 (0.325)	13.10 (2.58)	191 (88)	55 (13)	29.18 (98.82)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 8th (7L) gear	73.1	73.1
Bystander in 16th (8H) gear		83.2

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Two 520/70R38;***;18(125)	Two 520/70R38;***;18(125)
Ballast - Liquid (total)	1725 lb (782 kg)	None
- Cast Iron (total)	700 lb (318 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 420/70R24;***;20(140)	Two 420/70R24;***;20(140)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	1500 lb (680 kg)	None
Height of Drawbar	18.0 in (455 mm)	18.0 in (455 mm)
Static Weight with operator - Rear	8935 lb (4053 kg)	6745 lb (3060 kg)
- Front	5470 lb (2481 kg)	3735 lb (1694 kg)
- Total	14405 lb (6534 kg)	10480 lb (4754 kg)

HYDRAULIC PERFORMANCE

CATEGORY: II

Quick attach: None

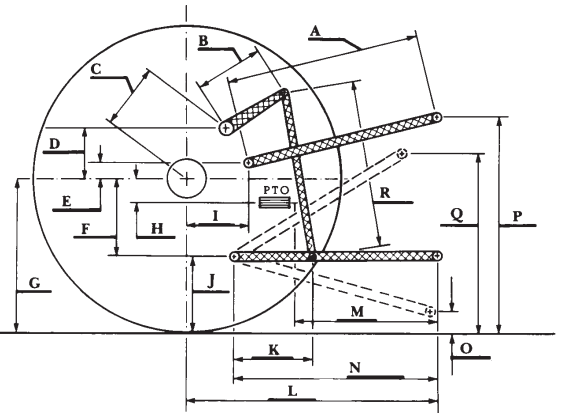
OECD Static test

Maximum force exerted through whole range: 4041 lbs (18.0 kN)
7344 lbs (32.7 kN) (with 2 assist cylinders)

i) Sustained pressure of the open relief valve: 2799 psi (193 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 20.8 GPM (78.7 l/min)

iii) Pump delivery rate at maximum hydraulic power: 20.0 GPM (75.9 l/min)
Delivery pressure: 2224 psi (153 bar)
Power: 26.0 HP (19.4 kW)



THREE POINT HITCH PERFORMANCE (SAE Static test)

Observed maximum pressure psi. (bar) 2800 (193)
Location: lift cylinder
Hydraulic oil temperature: °F (°C) 166 (74)
Location: hydraulic sump
Category: II
Quick attach: none

SAE Static Test—System pressure 2520 psi (174 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	6264	5643	5279	5602	5211
" " " " " " (kN)	(27.9)	(25.1)	(23.5)	(24.9)	(23.2)

SAE Static Test—System pressure 2520 psi (174 Bar) (2 assist cylinders)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (913)
Lift force on frame lb	12420	10688	10116	10764	9702
" " " " " " (kN)	(55.2)	(47.5)	(45.0)	(47.9)	(43.2)

HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	mm	inch	mm
A	30.0	763	29.6	752
B	9.8	250	9.8	250
C	12.2	310	12.2	310
D	11.9	302	11.9	302
E	11.2	285	11.2	285
F	6.9	176	6.9	176
G	32.3	820	32.3	820
H	0.8	20	0.8	20
I	10.8	274	10.8	274
J	25.4	644	25.4	644
K	20.0	508	20.0	508
L	40.0	1015	40.0	1015
M	23.4	594	23.4	594
N	35.4	900	35.4	900
O	7.9	200	7.9	200
P	49.4	1254	44.4	1127
Q	33.1	840	33.1	840
R	27.8	705	27.8	705



KUBOTA M135X DIESEL

Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln