

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

2016

Test 2155: Kubota M6-141

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, 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, "Test 2155: Kubota M6-141" (2016). *Nebraska Tractor Tests*. 2610.
<https://digitalcommons.unl.edu/tractormuseumlit/2610>

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.

NEBRASKA OECD TRACTOR TEST 2155—SUMMARY 1036

KUBOTA M6-141 DIESEL

24 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption Gal/hr (l/h)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—596 rpm)						
125.37 (93.49)	2200	7.86 (29.75)	0.439 (0.267)	15.95 (3.14)	0.12 (0.47)	Fuel used during active exhaust regeneration-0.11 gal (0.43 l) (see note 1, p.2)
Standard Power Take-off Speed (540 rpm)						
125.22 (93.37)	1994	7.43 (28.13)	0.416 (0.253)	16.85 (3.32)	0.15 (0.55)	
Maximum Power (1 hour)						
126.58 (94.39)	1850	7.33 (27.74)	0.406 (0.247)	17.27 (3.40)	0.14 (0.51)	

VARYING POWER AND FUEL CONSUMPTION

125.37 (93.49)	2200	7.86 (29.75)	0.439 (0.267)	15.95 (3.14)	0.12 (0.47)	Air temperature
108.50 (80.91)	2240	7.11 (26.90)	0.459 (0.279)	15.27 (3.01)	0.11 (0.43)	74°F (24°C)
82.44 (61.47)	2270	6.11 (23.12)	0.519 (0.316)	13.50 (2.66)	0.09 (0.36)	Relative humidity
55.85 (41.65)	2305	5.01 (18.98)	0.629 (0.383)	11.14 (2.19)	0.18 (0.68)	40%
28.27 (21.08)	2336	3.76 (14.24)	0.932 (0.567)	7.52 (1.48)	0.11 (0.42)	Barometer
1.42 (1.06)	2374	2.48 (9.38)	12.257 (7.456)	0.57 (0.11)	0.07 (0.28)	28.81" Hg (97.55 kPa)

Maximum torque - 405 lb.-ft. (548 Nm) at 1252 rpm

Maximum torque rise - 35.2%

Torque rise at 1761 engine rpm - 25%

Power increase at 1850 engine rpm - 1.0%

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Power at Rated Engine Speed—15th(H1) Gear										
106.08 (79.10)	6698 (29.79)	5.94 (9.56)	2200	3.2	0.516 (0.314)	13.58 (2.68)	0.012 (0.007)	194 (90)	81 (27)	28.68 (97.12)
75% of Pull at Rated Engine Speed—15th (H1) Gear										
82.17 (61.27)	5023 (22.34)	6.13 (9.87)	2252	2.3	0.561 (0.341)	12.50 (2.46)	0.013 (0.007)	194 (90)	83 (28)	28.68 (97.12)
50% of Pull at Rated Engine Speed—15th (H1) Gear										
56.10 (41.83)	3354 (14.92)	6.27 (10.09)	2285	1.5	0.702 (0.427)	9.99 (1.97)	0.011 (0.006)	192 (89)	83 (29)	28.69 (97.16)
75% of Pull at Reduced Engine Speed—19th (H3) Gear										
82.33 (61.39)	5039 (22.41)	6.13 (9.87)	1525	2.3	0.467 (0.284)	15.02 (2.96)	0.013 (0.008)	191 (88)	85 (30)	28.67 (97.09)
50% of Pull at Reduced Engine Speed—19th (H3) Gear										
56.33 (42.00)	3365 (14.97)	6.28 (10.11)	1550	1.5	0.529 (0.322)	13.24 (2.61)	0.009 (0.005)	189 (87)	84 (29)	28.68 (97.12)

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

Dates of tests: June 1 - 16, 2016

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

CONSUMABLE FLUIDS, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8417 **Fuel weight** 7.008 lbs/gal (0.840 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 10W40 API service classification** CJ-4 **Transmission and hydraulic lubricant** Kubota Super UDT 2 fluid **Front axle lubricant** Kubota Super UDT 2 fluid **Total time engine was operated:** 25.0 hours

ENGINE: Make Kubota **Diesel Type** four cylinder vertical with turbocharger, air to air intercooler and D.E.F.(diesel exhaust fluid) exhaust treatment **Serial No.** *3FU1034* **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 **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 52.7 - 56.2 lb/h (23.9 - 25.5 kg/h) **High idle:** 2350 - 2400 rpm **Turbo boost:** nominal 10.9 - 12.3 psi (75 - 85 kPa) as measured 11.5 psi (80 kPa)

CHASSIS: Type front wheel assist **Serial No.** M6-141-10802 **Tread width** rear 62.6" (1590 mm) to 82.3" (2090 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 0.52 (0.84) second 0.63 (1.01) third 0.76 (1.23) fourth 0.93 (1.50) fifth 1.08 (1.74) sixth 1.31 (2.11) seventh 1.59 (2.56) eighth 1.94 (3.12) ninth 2.20 (3.54) tenth 2.67 (4.30) eleventh 3.24 (5.22) twelfth 3.96 (6.37) thirteenth 4.58 (7.37) fourteenth 5.56 (8.95) fifteenth 6.08 (9.79) sixteenth 6.75 (10.87) seventeenth 7.38 (11.88) eighteenth 8.23 (13.24) nineteenth 8.97 (14.43) twentieth 10.93 (17.59) twenty-first 12.65 (20.36) twenty-second 15.36 (24.72) twenty-third 18.65 (30.01) twenty-fourth 22.73 (36.58)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED - 2200 ENGINE 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)	Hp.hr/gal (kW.h/l)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
11th (M3) Gear										
80.63 (60.13)	10625 (47.26)	2.85 (4.59)	2237	14.7	0.623 (0.379)	11.25 (2.22)	0.011 (0.006)	195 (90)	77 (25)	28.50 (96.51)
12th (M4) Gear										
98.45 (73.41)	10013 (44.54)	3.69 (5.94)	2201	7.8	0.555 (0.337)	12.64 (2.49)	0.012 (0.007)	196 (91)	79 (26)	28.50 (96.51)
13th(M5) Gear										
104.36 (77.82)	8904 (39.60)	4.40 (7.07)	2200	5.3	0.525 (0.320)	13.34 (2.63)	0.010 (0.006)	195 (91)	77 (25)	28.48 (96.44)
14th(M6) Gear										
104.36 (77.82)	7229 (32.15)	5.41 (8.71)	2200	3.6	0.524 (0.318)	13.38 (2.64)	0.011 (0.007)	195 (90)	78 (26)	28.68 (97.12)
15th(H1) Gear										
106.08 (79.10)	6698 (29.79)	5.94 (9.56)	2200	3.2	0.516 (0.314)	13.58 (2.68)	0.012 (0.007)	194 (90)	81 (27)	28.68 (97.12)
16th (M7) Gear										
102.61 (76.51)	5808 (25.83)	6.63 (10.66)	2200	2.7	0.535 (0.325)	13.10 (2.58)	0.013 (0.008)	195 (91)	79 (26)	28.69 (97.15)
17th (H2) Gear										
104.24 (77.73)	5383 (23.94)	7.26 (11.68)	2200	2.5	0.524 (0.319)	13.37 (2.63)	0.014 (0.009)	194 (90)	82 (28)	28.68 (97.12)
18th(M8) Gear										
96.42 (71.90)	4450 (19.79)	8.13 (13.08)	2200	2.1	0.567 (0.345)	12.36 (2.43)	0.013 (0.008)	195 (91)	81 (27)	28.50 (96.51)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED - 1850 ENGINE 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)	Hp.hr/gal (kW.h/l)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
11th (M3) Gear										
80.71 (60.19)	10611 (47.20)	2.86 (4.59)	2237	14.5	0.622 (0.379)	11.26 (2.22)	0.010 (0.006)	195 (90)	77 (25)	28.51 (96.55)
12th (M4) Gear										
98.59 (73.52)	10036 (44.64)	3.69 (5.93)	2201	7.9	0.555 (0.338)	12.63 (2.49)	0.011 (0.007)	195 (91)	78 (25)	28.47 (96.41)
13th(M5) Gear										
103.31 (77.04)	9327 (41.49)	4.16 (6.69)	2100	6.0	0.515 (0.313)	13.61 (2.68)	0.012 (0.007)	195 (90)	80 (27)	28.50 (96.51)
14th(M6) Gear										
105.42 (78.61)	8814 (39.20)	4.49 (7.23)	1850	5.0	0.485 (0.295)	14.44 (2.85)	0.012 (0.007)	193 (89)	79 (26)	28.70 (97.19)
15th(H1) Gear										
106.85 (79.68)	8107 (36.06)	4.94 (7.95)	1850	4.3	0.477 (0.290)	14.69 (2.89)	0.012 (0.007)	193 (89)	81 (27)	28.69 (97.16)
16th (M7) Gear										
105.27 (78.50)	7137 (31.75)	5.53 (8.90)	1850	3.5	0.483 (0.294)	14.51 (2.86)	0.012 (0.007)	193 (89)	80 (27)	28.70 (97.19)
17th (H2) Gear										
107.29 (80.01)	6634 (29.51)	6.07 (9.76)	1850	3.2	0.476 (0.290)	14.71 (2.90)	0.012 (0.007)	193 (89)	83 (28)	28.69 (97.16)
18th (M8) Gear										
103.70 (77.33)	5724 (25.46)	6.79 (10.93)	1850	2.7	0.490 (0.298)	14.30 (2.82)	0.012 (0.007)	194 (90)	80 (27)	28.49 (96.48)
19th (H3) Gear										
105.77 (78.87)	5350 (23.80)	7.41 (11.93)	1850	2.5	0.483 (0.294)	14.50 (2.86)	0.012 (0.007)	194 (90)	80 (27)	28.50 (96.51)
20th (H4) Gear										
101.14 (75.42)	4172 (18.56)	9.09 (14.63)	1850	1.9	0.504 (0.307)	13.90 (2.74)	0.012 (0.007)	194 (90)	80 (27)	28.50 (96.51)

reverse 0.52 (0.84), 0.63 (1.02), 0.77 (1.24), 0.94 (1.52), 1.09 (1.75), 1.32 (2.13), 1.61 (2.59), 1.96 (3.15), 2.22 (3.57), 2.70 (4.34), 3.27 (5.27), 3.99 (6.42), 4.62 (7.43), 5.61 (9.03), 6.13 (9.87) 6.81 (10.96), 7.45 (11.99), 8.30 (13.36), 9.04 (14.55), 11.02 (17.74), 12.76 (20.53), 15.49 (24.93), 18.81 (30.27) 22.93 (36.90) **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** 11125 lb (5046 kg)

NOTE 1: The manufacturer declares that the average time between active regenerations is 12 hours.

REPAIRS AND ADJUSTMENTS: The DEF injector was replaced following the PTO tests. Testing continued after repair.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. The manufacturer's 3 point lift of claims of 6834 lbs (3100 kg) with 2 x 70 mm lift cylinders and 9447 lbs (4285 kg) with 2 x 80 mm lift cylinders as per SAE testing standards were not verified. The performance figures on this summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2155**, Nebraska Summary 1036, July 1, 2016.

Roger M. Hoy
Director

M.F. Kocher
P.J. Jasa
J.D. Luck
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED - 1850 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		D.E.F Consumption	Temp. °F(°C)	Barom.
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	lb/hp.hr (kg/kW.h)	cool- ing med bulb	inch dry Hg (kPa)
10th(M2) Gear									
87.63 (65.35)	13990 (62.23)	2.35 (3.77)	2227	14.2	0.601 (0.366)	11.66 (2.30)	0.012 (0.007)	194 (90)	28.56 (96.72)
11th(M3) Gear									
99.25 (74.01)	13027 (57.94)	2.86 (4.59)	2078	7.8	0.531 (0.323)	13.20 (2.60)	0.013 (0.008)	195 (90)	28.55 (96.68)
12th(M4) Gear									
102.12 (76.15)	12139 (53.99)	3.16 (5.08)	1850	6.2	0.498 (0.303)	14.07 (2.77)	0.013 (0.008)	194 (90)	28.55 (96.68)
13th(M5) Gear									
106.07 (79.10)	10729 (47.72)	3.71 (5.97)	1850	4.8	0.479 (0.291)	14.63 (2.88)	0.013 (0.008)	194 (90)	28.57 (96.75)
14th(M6) Gear									
106.91 (79.72)	8772 (39.02)	4.57 (7.35)	1850	3.4	0.479 (0.291)	14.63 (2.88)	0.012 (0.007)	193 (89)	28.53 (96.61)
15th(H1) Gear									
108.40 (80.83)	8112 (36.08)	5.01 (8.06)	1850	3.0	0.472 (0.287)	14.86 (2.93)	0.012 (0.007)	193 (89)	28.54 (96.65)
16th (M7) Gear									
105.69 (78.81)	7094 (31.56)	5.59 (9.00)	1850	2.6	0.484 (0.294)	14.48 (2.85)	0.013 (0.008)	193 (89)	28.55 (96.68)
17th (H2) Gear									
107.07 (79.84)	6559 (29.17)	6.12 (9.85)	1850	2.4	0.476 (0.290)	14.71 (2.90)	0.014 (0.008)	193 (89)	28.54 (96.65)
18th(M8) Gear									
103.75 (77.37)	5686 (25.29)	6.84 (11.01)	1850	2.1	0.492 (0.299)	14.25 (2.81)	0.013 (0.008)	193 (89)	28.55 (96.68)
19th(H3) Gear									
104.42 (77.87)	5245 (23.33)	7.47 (12.02)	1849	1.9	0.488 (0.297)	14.35 (2.83)	0.013 (0.008)	193 (89)	28.52 (96.58)
20th(H4) Gear									
98.50 (73.45)	4040 (17.97)	9.15 (14.72)	1850	1.4	0.517 (0.314)	13.57 (2.67)	0.014 (0.008)	193 (89)	28.55 (96.68)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 13th (M5) gear	75.8	75.6
Bystander in 24th (H8) gear		82.2

TIRES, BALLAST AND WEIGHT	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Two 520/70R38;***;16(110)	Two 520/70R38;***;12(85)
Ballast - Liquid (total)	1765 lb (801 kg)	None
- Cast Iron (total)	695 lb (315 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 420/70R24;***;17(120)	Two 420/70R24;***;12(85)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	1750 lb (794 kg)	None
Height of Drawbar	24.0 in (610 mm)	24.0 in (610 mm)
Static Weight with operator - Rear	9075 lb (4116 kg)	7080 lb (3211 kg)
- Front	6435 lb (2919 kg)	4220 lb (1914 kg)
- Total	15510 lb (7035 kg)	11300 lb (5125 kg)

HYDRAULIC PERFORMANCE

CATEGORY: II

Quick attach: None

OECD Static test

Maximum force exerted through whole range: 6734 lbs (30.0 kN) (2 x 70 mm) lift cylinders
8613 lbs (38.3 kN) (2 x 80 mm)

i) Sustained pressure of the open relief valve: 2797 psi (193 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 20.7 GPM (78.2 l/min)

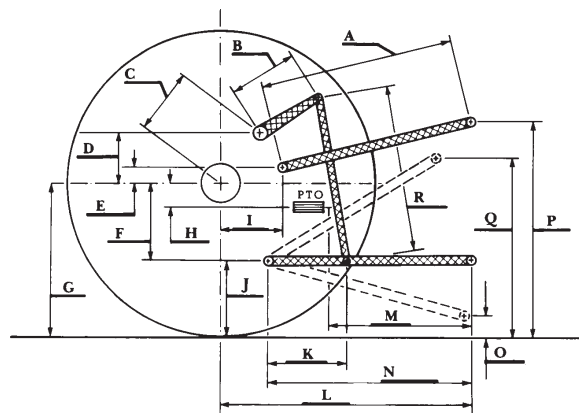
iii) Pump delivery rate at maximum hydraulic power: 19.0 GPM (71.8 l/min)

Delivery pressure: 2398 psi (165 bar)

Power: 26.5 HP (19.8 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	29.7	755
B	11.8	300
C	17.1	434
D	16.7	425
E	13.6	346
F	6.9	176
G	30.3	770
H	1.0	25
I	10.7	273
J	23.4	594
K	18.4	468
L	40.0	1015
M	23.4	594
N	35.4	900
O	9.1	230
P	49.4	1254
Q	34.6	880
R	28.9	735



KUBOTA M6-141 DIESEL

Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln