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2017

Test 2189: Kubota M7-151

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2189—SUMMARY 1091

KUBOTA M7-151 DIESEL

24 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption	D.E.F. Consumption		Mean Atmospheric Conditions	
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)		Gal/hr (l/h)
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1103 rpm)						
140.07 (104.45)	2201	9.13 (34.54)	0.456 (0.277)	15.35 (3.02)	0.21 (0.81)	Fuel used during active exhaust regeneration-0.18 gal (0.67 l) (see note 1, p.2)
Standard Power Take-off Speed (1000 rpm)						
144.59 (107.82)	1995	8.89 (33.66)	0.430 (0.262)	16.26 (3.20)	0.20 (0.76)	
Maximum Power (1 hour)						
144.59 (107.82)	1995	8.89 (33.66)	0.430 (0.262)	16.26 (3.20)	0.20 (0.76)	

VARYING POWER AND FUEL CONSUMPTION

140.07 (104.45)	2201	9.13 (34.54)	0.456 (0.277)	15.35 (3.02)	0.21 (0.81)	Air temperature
121.54 (90.63)	2247	8.22 (31.11)	0.473 (0.288)	14.79 (2.91)	0.19 (0.71)	
92.27 (68.80)	2276	6.84 (25.91)	0.519 (0.316)	13.48 (2.66)	0.17 (0.64)	Relative humidity
62.17 (46.36)	2302	5.92 (22.43)	0.667 (0.405)	10.49 (2.07)	0.13 (0.51)	46%
31.52 (23.50)	2331	4.47 (16.91)	0.991 (0.603)	7.05 (1.39)	0.14 (0.54)	Barometer
3.45 (2.57)	2347	3.17 (12.00)	6.425 (3.908)	1.09 (0.21)	0.08 (0.29)	28.68" Hg (97.12 kPa)

Maximum torque - 482 lb.-ft. (654 Nm) at 1202 rpm

Maximum torque rise - 44.2%

Torque rise at 1760 engine rpm - 23%

Power increase at 1995 engine rpm - 3.2%

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 dry med	Air bulb	Barom. inch Hg (kPa)
Power at Rated Engine Speed—7th (B3) Gear										
122.69 (91.49)	7839 (34.87)	5.87 (9.45)	2200	2.5	0.480 (0.292)	14.57 (2.87)	N/A (N/A)	196 (91)	53 (12)	28.90 (97.87)
75% of Pull at Rated Engine Speed—7th (B3) Gear										
95.50 (71.21)	5893 (26.21)	6.08 (9.78)	2261	1.7	0.526 (0.320)	13.30 (2.62)	0.017 (0.010)	191 (88)	52 (11)	28.90 (97.87)
50% of Pull at Rated Engine Speed—7th (B3) Gear										
64.80 (48.32)	3918 (17.43)	6.20 (9.98)	2295	1.1	0.660 (0.402)	10.60 (2.09)	0.027 (0.016)	186 (86)	52 (11)	28.90 (97.87)
75% of Pull at Reduced Engine Speed—10th (C2) Gear										
95.15 (70.95)	5888 (26.19)	6.06 (9.75)	1682	1.8	0.453 (0.275)	15.45 (3.04)	0.018 (0.011)	186 (86)	52 (11)	28.91 (97.90)
50% of Pull at Reduced Engine Speed—10th (C2) Gear										
64.26 (47.91)	3915 (17.41)	6.16 (9.91)	1699	1.2	0.516 (0.314)	13.56 (2.67)	0.015 (0.009)	184 (81)	52 (11)	28.91 (97.90)

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

Dates of tests: November 14 - 17, 2017

Manufacturer: Kubota Farm Machinery Europe, SAS Route de Socx, 59380 Bierne France

CONSUMABLE FLUIDS, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8400 **Fuel weight** 6.994 lbs/gal (0.838 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil** SAE 10W30 **API service classification** CJ-4 **Transmission and hydraulic lubricant** Kubota Super UDT2 fluid **Front axle lubricant** Kubota Super UDT2 fluid **Total time engine was operated:** 19.0 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.** *3FJ0228* **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 and aspirator **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:** 63.1 - 65.7 lb/h (28.6 - 29.8 kg/h) **High idle:** 2350 - 2400 rpm **Turbo boost:** nominal 14.5 - 17.4 psi (100 - 120 kPa) as measured 16.1 psi (111 kPa)

CHASSIS: **Type** front wheel assist **Serial No.** M7151P10117 **Tread width** rear 60.0" (1524 mm) to 120.0" (3048 mm) front 60.0" (1524 mm) to 76.5" (1942 mm) **Wheelbase** 107.1" (2720 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled power shift **Nominal travel speeds mph (km/h)** first 2.29 (3.68) second 2.75 (4.42) third 3.28 (5.28) fourth 3.94 (6.34) fifth 4.12 (6.63) sixth 4.94 (7.95) seventh 5.92 (9.52) eighth 6.61 (10.64) ninth 7.09 (11.41) tenth 7.92 (12.75) eleventh 9.48 (15.26) twelfth 9.96 (16.03) thirteenth 11.37 (18.30) fourteenth 11.94 (19.21) fifteenth 13.70 (22.04) sixteenth 14.29 (23.00) seventeenth 16.42 (26.42) eighteenth 17.14 (27.58) nineteenth 19.65 (31.62) twentieth 20.95 (33.72) twenty-first 22.56 (37.92) twenty-second 24.86 (40.00) twenty-third 24.86 (40.00) twenty-fourth 24.86 (40.00) electronically limited

UNBALLASTED - FRONT DRIVE ENGAGED - 2200 ENGINE RPM
MAXIMUM POWER IN SELECTED GEARS

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 6th (B2) gear	71.7	70.7
Bystander in 21st (E4) gear		82.5

TIRES AND WEIGHT

Tested Without Ballast

reverse 2.61 (4.20), 3.12 (5.03), 3.57 (5.75), 4.29 (6.90), 4.70 (7.56), 5.63 (9.06), 6.44 (10.36), 7.53 (12.12), 7.72 (12.42), 9.03 (14.53), 10.33 (16.62), 11.35 (18.26), 12.38 (19.93), 13.61 (21.90), 15.57 (25.05) 15.61 (25.12), 18.66 (30.03), 18.71 (30.11), 21.40 (34.44), 23.89 (38.44), 24.86 (40.00), 24.86 (40.00), 24.86 (40.00) 24.86 (40.00) electronically limited **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 2005 or 1608 engine rpm and 1000 rpm at 1995 or 1600 engine rpm **Unladen tractor mass** 15670 lb (7108 kg)

NOTE 1: The manufacturer declares that the average time between active regenerations is 13 hours.

NOTE 2: This tractor has a power management system that provides an engine power increase when the PTO is engaged and for travel speeds of 12 mph (20 km/h) and higher.

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. This tractor fell 4.5% short of meeting the manufacturer's remote hydraulic flow claim of 29.1 GPM (*110 l/min*) with the closed center system. The manufacturer's remote hydraulic flow claim of 21 GPM (*80 l/min*) with open center system was 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. **2189**, Nebraska Summary 1091, December 11, 2017.

Roger M. Hoy
Director

M.F. Kocher
S.K. Pitla
J.D. Luck
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 1995 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)
1st(A1) Gear					0.560 (0.341)	12.48 (2.46)	0.017 (0.011)	188 (87)	46 (8)	28.86 (97.73)
2nd(A2) Gear					0.544 (0.331)	12.86 (2.53)	0.019 (0.012)	195 (91)	44 (7)	28.87 (97.77)
3rd(A3) Gear					0.482 (0.293)	14.50 (2.86)	0.018 (0.011)	195 (90)	47 (8)	28.83 (97.63)
4th(A4) Gear					0.463 (0.282)	15.09 (2.97)	0.018 (0.011)	195 (91)	50 (10)	28.78 (97.46)
5th(B1) Gear					0.454 (0.276)	15.42 (3.04)	0.017 (0.011)	195 (90)	50 (10)	28.78 (97.46)
6th(B2) Gear					0.464 (0.282)	15.08 (2.97)	0.018 (0.011)	195 (90)	53 (12)	28.90 (97.87)
7th(B3) Gear					0.454 (0.276)	15.40 (3.03)	0.018 (0.011)	194 (90)	53 (12)	28.90 (97.87)
8th(C1) Gear					0.450 (0.274)	15.53 (3.06)	0.017 (0.010)	195 (91)	53 (12)	28.89 (97.83)
9th(B4) Gear					0.460 (0.280)	15.20 (2.99)	0.017 (0.010)	194 (90)	53 (12)	28.90 (97.87)
10th(C2) Gear					0.459 (0.279)	15.23 (3.00)	0.018 (0.011)	195 (91)	53 (12)	28.90 (97.87)
11th(C3) Gear					0.459 (0.279)	15.23 (3.00)	0.018 (0.011)	196 (91)	53 (12)	28.90 (97.87)

Shiftable PTO Performance

Economy mode

1000 PTO rpm @ 1600 engine rpm

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption	
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Gal/hr (l/h)
132.64 (98.91)	1600	7.63 (28.89)	0.402 (0.245)	17.38 (3.42)	0.20 (0.85)
99.49 (74.19)	1599	5.94 (22.50)	0.418 (0.254)	16.74 (3.30)	0.16 (0.62)
66.53 (49.61)	1606	4.41 (16.69)	0.463 (0.282)	15.09 (2.97)	0.08 (0.29)
33.17 (24.74)	1602	2.95 (11.17)	0.622 (0.378)	11.24 (2.21)	0.04 (0.13)
2.94 (2.19)	1600	1.53 (5.81)	3.649 (2.220)	1.92 (0.38)	0.02 (0.09)

Normal mode

1000 PTO rpm @ 1995 engine rpm

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption	
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Gal/hr (l/h)
132.81 (99.04)	2000	8.16 (30.89)	0.430 (0.261)	16.28 (3.21)	0.20 (0.77)
99.78 (74.41)	2001	6.46 (24.46)	0.453 (0.276)	15.44 (3.04)	0.14 (0.53)
66.42 (49.53)	1999	5.08 (19.23)	0.535 (0.325)	13.07 (2.58)	0.07 (0.25)
33.08 (24.67)	1995	3.55 (13.45)	0.751 (0.457)	9.31 (1.83)	0.04 (0.15)
2.95 (2.20)	2002	2.03 (7.68)	4.809 (2.925)	1.45 (0.29)	0.03 (0.10)

HYDRAULIC PERFORMANCE with closed center system

CATEGORY: 3

Quick Attach: None

OECD Static test

Lift cylinders

Maximum force exerted through whole range: 14372 lbs (63.9 kN) 2 x 100 mm

i) Maximum observed pressure: 2779 psi (192 bar)

three outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 27.8 GPM (105.4 l/min)

iii) Pump delivery rate at maximum hydraulic power: 27.0 GPM (102.3 l/min)

Delivery pressure: 2684 psi (185 bar)

Power: 42.3 HP (31.6 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 27.4 GPM (103.6 l/min)

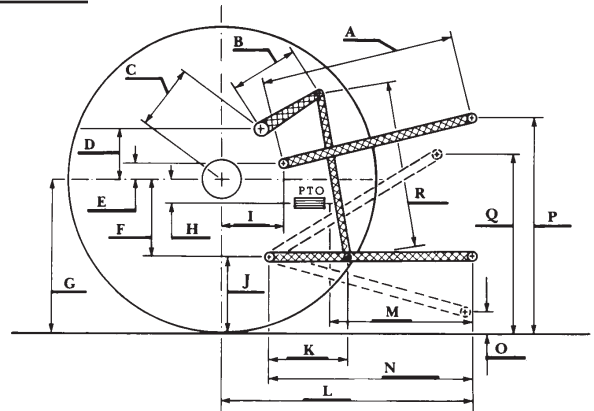
iii) Pump delivery rate at maximum hydraulic power: 26.4 GPM (100.0 l/min)

Delivery pressure: 2457 psi (169 bar)

Power: 37.9 HP (28.2 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.7	730
B	12.9	328
C	19.4	492
D	17.5	445
E	13.0	330
F	9.1	230
G	34.5	875
H	9.8	249
I	16.6	422
J	25.4	645
K	18.7	475
L	46.4	1178
M	25.0	635
N	38.5	978
O	9.1	230
P	52.4	1330
Q	38.8	985
R	32.9	835



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