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2019

Test 2216: Kubota M7-172

Nebraska Tractor Test Laboratory

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NEBRASKA OECD TRACTOR TEST 2216—SUMMARY 1163

KUBOTA M7-172 DIESEL

30 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—1053 rpm)						
126.74 (94.51)	2099	8.24 (31.19)	0.454 (0.276)	15.38 (3.03)	0.26 (1.00)	Fuel used during active exhaust regeneration-0.27 gal (1.03 l) (see note 1, p.2)
Standard Power Take-off Speed (1000 rpm)						
142.91 (106.57)	1995	8.77 (33.21)	0.429 (0.261)	16.29 (3.21)	0.31 (1.18)	
Maximum Power (1 hour)						
147.26 (109.81)	1900	8.70 (32.95)	0.413 (0.251)	16.92 (3.33)	0.32 (1.20)	

VARYING POWER AND FUEL CONSUMPTION

126.74 (94.51)	2099	8.24 (31.19)	0.454 (0.276)	15.38 (3.03)	0.26 (1.00)	Air temperature
109.33 (81.53)	2128	7.44 (28.15)	0.475 (0.289)	14.70 (2.90)	0.20 (0.76)	70°F (21°C)
83.06 (61.94)	2155	6.23 (23.60)	0.525 (0.319)	13.32 (2.62)	0.17 (0.65)	Relative humidity
55.93 (41.71)	2180	5.08 (19.25)	0.635 (0.386)	11.00 (2.17)	0.08 (0.29)	20%
28.47 (21.23)	2206	3.73 (14.12)	0.916 (0.557)	7.63 (1.50)	0.05 (0.19)	Barometer
2.60 (1.94)	2227	2.71 (10.25)	7.270 (4.422)	0.96 (0.19)	0.04 (0.15)	28.91" Hg (97.89 kPa)

Maximum torque - 459 lb.-ft. (622 Nm) at 1500 rpm

Maximum torque rise - 44.6%

Torque rise at 1680 engine rpm - 39%

Power increase at 1900 engine rpm - 16.2%

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		D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing dry med	Barom. inch Hg (kPa)	
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)				
Power at Rated Engine Speed—10th (C1) Gear										
118.70 (88.51)	8881 (39.50)	5.01 (8.06)	2100	3.0	0.469 (0.285)	14.89 (2.93)	0.021 (0.013)	168 (75)	41 (5)	29.00 (98.21)
75% of Pull at Rated Engine Speed—10th (C1) Gear										
91.68 (68.37)	6668 (29.66)	5.16 (8.30)	2144	2.1	0.512 (0.311)	13.66 (2.69)	0.021 (0.013)	166 (74)	48 (9)	28.92 (97.93)
50% of Pull at Rated Engine Speed—10th (C1) Gear										
62.62 (46.70)	4465 (19.86)	5.26 (8.47)	2172	1.4	0.608 (0.370)	11.50 (2.27)	0.019 (0.011)	165 (74)	49 (9)	28.92 (97.92)
75% of Pull at Reduced Engine Speed—14th (C3) Gear										
91.55 (68.27)	6635 (29.51)	5.18 (8.33)	1547	2.0	0.430 (0.262)	16.24 (3.20)	0.027 (0.016)	165 (74)	49 (9)	28.90 (97.87)
50% of Pull at Reduced Engine Speed—14th (C3) Gear										
62.55 (46.64)	4460 (19.84)	5.26 (8.47)	1562	1.3	0.485 (0.295)	14.41 (2.84)	0.031 (0.019)	162 (72)	49 (9)	28.90 (98.87)

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

Dates of tests: October 31 to November 8, 2019

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)** 0.8394 **Fuel weight** 6.989 lbs/gal (0.837 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:** 22.0 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.** 3KA0182 **Crankshaft** lengthwise **Rated engine speed** 2100 **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: 59.5 - 61.9 lb/h (27.0 - 28.1 kg/h) **High idle:** 2200 - 2250 rpm **Turbo boost:** nominal 13.8 - 16.7 psi (95 - 115 kPa) as measured 15.7 psi (108 kPa)

CHASSIS: Type front wheel assist with duals **Serial No.** M7172P10381* **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 partial (6) range operator controlled power shift **Nominal travel speeds mph (km/h)** first 1.90 (3.07) second 2.25 (3.61) third 2.65 (4.27) fourth 3.12 (5.03) fifth 3.41 (5.49) sixth 3.69 (5.94) seventh 4.02 (6.46) eighth 4.34 (7.00) ninth 4.74 (7.63) tenth 5.13 (8.26) eleventh 5.58 (8.98) twelfth 6.04 (9.73) thirteenth 6.60 (10.63) fourteenth 7.14 (11.49) fifteenth 7.77 (12.51) sixteenth 8.42 (13.54) seventeenth 8.68 (13.97) eighteenth 9.95 (16.01) nineteenth 10.12 (16.27) twentieth 11.71 (18.85) twenty-first 12.02 (19.33) twenty-second 14.04 (22.58) twenty-third 14.65 (23.56)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED - 2100 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)
3rd(A3) Gear										
105.19 (78.44)	17033 (75.76)	2.32 (3.73)	2117	14.9	0.523 (0.318)	13.35 (2.63)	0.023 (0.014)	168 (75)	46 (8)	28.98 (98.14)
4th(A4) Gear										
115.81 (86.36)	14669 (65.25)	2.96 (4.76)	2100	6.2	0.481 (0.292)	14.54 (2.86)	0.021 (0.013)	171 (77)	49 (9)	28.96 (98.07)
5th(B1) Gear										
117.69 (87.76)	13528 (60.17)	3.26 (5.25)	2100	5.1	0.473 (0.288)	14.78 (2.91)	0.019 (0.012)	171 (77)	51 (11)	28.94 (98.00)
6th(A5) Gear										
114.88 (85.66)	12123 (53.92)	3.55 (5.71)	2100	4.4	0.485 (0.295)	14.42 (2.84)	0.021 (0.013)	172 (78)	50 (10)	28.95 (98.04)
7th(B2) Gear										
116.46 (86.84)	11251 (50.05)	3.88 (6.24)	2100	3.9	0.479 (0.291)	14.59 (2.88)	0.022 (0.013)	173 (78)	51 (11)	28.94 (98.00)
8th(A6) Gear										
113.52 (84.65)	10079 (44.83)	4.22 (6.79)	2100	3.4	0.490 (0.298)	14.25 (2.81)	0.022 (0.014)	166 (74)	41 (5)	28.97 (98.10)
9th(B3) Gear										
118.66 (88.48)	9646 (42.91)	4.61 (7.42)	2100	3.3	0.471 (0.286)	14.85 (2.93)	0.022 (0.013)	164 (73)	42 (6)	28.99 (98.15)
10th(C1) Gear										
118.70 (88.51)	8881 (39.50)	5.01 (8.06)	2100	3.0	0.469 (0.285)	14.89 (2.93)	0.021 (0.013)	168 (75)	41 (5)	29.00 (98.21)
11th(B4) Gear										
116.56 (86.92)	8001 (35.59)	5.46 (8.79)	2100	2.8	0.476 (0.290)	14.68 (2.89)	0.021 (0.013)	167 (75)	41 (5)	29.00 (98.21)
12th(C2) Gear										
115.78 (86.34)	7320 (32.56)	5.93 (9.54)	2099	2.5	0.480 (0.292)	14.55 (2.87)	0.020 (0.012)	168 (75)	42 (6)	29.01 (98.24)
13th(B5) Gear										
112.90 (84.19)	6521 (29.01)	6.49 (10.44)	2100	2.1	0.493 (0.300)	14.17 (2.79)	0.021 (0.013)	166 (74)	42 (5)	29.00 (98.21)
14th(C3) Gear										
116.14 (86.60)	6194 (27.55)	7.03 (11.31)	2100	2.0	0.478 (0.291)	14.63 (2.88)	0.021 (0.013)	169 (76)	40 (4)	29.03 (98.31)
15th(B6) Gear										
110.09 (82.09)	5377 (23.92)	7.68 (12.35)	2100	1.8	0.507 (0.308)	13.79 (2.72)	0.021 (0.013)	163 (73)	40 (4)	29.02 (98.27)
16th(C4) Gear										
110.80 (82.62)	5001 (22.25)	8.31 (13.37)	2100	1.5	0.502 (0.305)	13.92 (2.74)	0.024 (0.014)	176 (80)	44 (7)	29.00 (98.21)

twenty-fourth 16.69 (26.84) twenty-fifth 17.27 (27.78) twenty-sixth 19.60 (31.52) twenty-seventh 20.40 (32.80) twenty-eighth 24.04 (38.72) twenty-ninth 24.86 (40.00) thirtieth 24.86 (40.00) electronically limited reverse 2.05 (3.30), 2.85 (4.59), 3.67 (5.90), 3.97 (6.39), 5.10 (8.21), 5.52 (8.89), 7.10 (11.43), 7.69 (12.37), 9.31 (14.98), 10.70 (17.22), 12.94 (20.83), 15.87 (25.54), 16.78 (27.00), 16.78 (27.00) 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** 17535 lb (7954 kg)

NOTE 1: The manufacturer declares that the average time between active regenerations is 30 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. The manufacturer's remote hydraulic flow claim of 21 GPM (80 l/min) with fixed displacement pump 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. **2216**, Nebraska Summary 1163, January 8, 2020.

Roger M. Hoy
Director

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

Horizontal distances of drawbar hitch point behind rear wheel axis - 30.8"(782 mm), 33.5"(852 mm), 36.7"(932 mm)

TIRES AND WEIGHT

Rear Tires - No., size, ply & psi(kPa)
Front Tires - No., size, ply & psi(kPa)
Height of Drawbar
Static Weight with operator - Rear
- Front
- Total

Tested Without Ballast

Four 480/80R42;***;12(85)
Two 420/85R28;***;14(95)
18.0 in (455 mm)
10930 lb (4958 kg)
6780 lb (3075 kg)
17710 lb (8033 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 1900 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)
3rd(A3) Gear										
105.25 (78.48)	17036 (75.78)	2.32 (3.73)	2116	14.9	0.524 (0.319)	13.35 (2.63)	0.023 (0.014)	170 (76)	47 (8)	28.98 (98.12)
4th(A4) Gear										
122.03 (91.00)	16486 (73.33)	2.78 (4.47)	2042	9.6	0.480 (0.292)	14.56 (2.87)	0.021 (0.013)	169 (76)	50 (10)	28.96 (98.07)
5th(B1) Gear										
130.05 (96.97)	16112 (71.67)	3.03 (4.88)	2002	7.7	0.459 (0.279)	15.22 (3.00)	0.022 (0.013)	169 (76)	51 (11)	28.94 (98.00)
6th(A5) Gear										
130.92 (97.62)	15651 (69.62)	3.14 (5.05)	1902	7.1	0.452 (0.275)	15.47 (3.05)	0.013 (0.008)	172 (78)	51 (11)	28.95 (98.04)
7th(B2) Gear										
134.38 (100.20)	14584 (64.87)	3.46 (5.56)	1900	5.7	0.440 (0.268)	15.88 (3.13)	0.020 (0.012)	172 (78)	51 (11)	28.94 (97.99)
8th(A6) Gear										
132.76 (99.00)	13171 (58.59)	3.78 (6.08)	1900	4.3	0.446 (0.271)	15.67 (3.09)	0.023 (0.014)	167 (75)	42 (6)	28.97 (98.10)
9th(B3) Gear										
137.69 (102.75)	12490 (55.56)	4.13 (6.65)	1900	4.2	0.430 (0.262)	16.24 (3.20)	0.020 (0.012)	167 (75)	42 (5)	29.00 (98.19)
10th(C1) Gear										
137.61 (102.62)	11478 (51.06)	4.50 (7.24)	1900	3.7	0.430 (0.262)	16.25 (3.20)	0.021 (0.013)	166 (74)	41 (5)	29.00 (98.21)
11th(B4) Gear										
136.28 (101.62)	10418 (46.34)	4.91 (7.89)	1900	3.4	0.434 (0.264)	16.11 (3.17)	0.020 (0.012)	168 (75)	41 (5)	29.00 (98.21)
12th(C2) Gear										
135.38 (100.95)	9524 (42.36)	5.33 (8.58)	1900	3.1	0.437 (0.266)	15.99 (3.15)	0.020 (0.012)	168 (75)	41 (5)	29.01 (98.24)
13th(B5) Gear										
133.41 (99.48)	8570 (38.12)	5.84 (9.40)	1900	2.7	0.443 (0.269)	15.79 (3.11)	0.021 (0.013)	168 (76)	42 (6)	29.01 (98.22)
14th(C3) Gear										
135.81 (101.27)	8053 (35.82)	6.33 (10.18)	1900	2.5	0.434 (0.264)	16.12 (3.18)	0.022 (0.014)	168 (76)	40 (4)	29.03 (98.31)
15th(B6) Gear										
131.01 (97.69)	7113 (31.64)	6.91 (11.12)	1900	2.3	0.451 (0.274)	15.50 (3.05)	0.023 (0.014)	168 (75)	40 (4)	29.03 (98.31)
16th(C4) Gear										
132.73 (98.97)	6653 (29.59)	7.49 (12.05)	1900	2.0	0.444 (0.270)	15.73 (3.10)	0.022 (0.014)	174 (79)	44 (7)	28.99 (98.17)
17th(D1) Gear										
132.72 (98.97)	6465 (28.76)	7.70 (12.39)	1900	1.9	0.443 (0.270)	15.77 (3.11)	0.020 (0.012)	174 (79)	46 (8)	28.97 (98.10)
18th(C5) Gear										
128.39 (95.74)	5419 (24.10)	8.89 (14.30)	1901	1.6	0.460 (0.280)	15.19 (2.99)	0.024 (0.014)	173 (78)	45 (7)	28.98 (98.14)

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)
138.25 (103.09)	1600	7.70 (29.13)	0.389 (0.237)	17.97 (3.54)	0.32 (1.22)
103.73 (77.35)	1602	6.12 (23.16)	0.412 (0.251)	16.96 (3.34)	0.27 (1.02)
69.04 (51.48)	1601	4.46 (16.87)	0.451 (0.274)	15.49 (3.05)	0.20 (0.74)
34.38 (25.64)	1598	2.95 (11.17)	0.600 (0.365)	11.66 (2.30)	0.06 (0.22)
2.32 (1.73)	1603	1.60 (6.05)	4.806 (2.924)	1.45 (0.29)	0.02 (0.08)

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)
138.18 (103.04)	1995	8.48 (32.10)	0.429 (0.261)	16.30 (3.21)	0.31 (1.16)
103.58 (77.24)	1999	6.68 (25.28)	0.451 (0.274)	15.51 (3.05)	0.21 (0.79)
68.99 (51.45)	1996	5.14 (19.47)	0.521 (0.317)	13.41 (2.64)	0.14 (0.55)
34.46 (25.69)	1995	3.53 (13.38)	0.717 (0.436)	9.75 (1.92)	0.06 (0.24)
2.24 (1.67)	1994	2.15 (8.15)	6.711 (4.082)	1.04 (0.21)	0.03 (0.11)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 9th (B3) gear	70.8	69.7
Bystander in 28th (E4) gear		83.1

HYDRAULIC PERFORMANCE

CATEGORY: 3

Quick Attach: None

OECD Static test

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

i) Maximum observed pressure: 2889 psi (199 bar)

three outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 29.5 GPM (111.5 l/min)

iii) Pump delivery rate at maximum hydraulic power: 27.6 GPM (104.6 l/min)
 Delivery pressure: 2711 psi (187 bar)
 Power: 43.7 HP (32.6 kW)

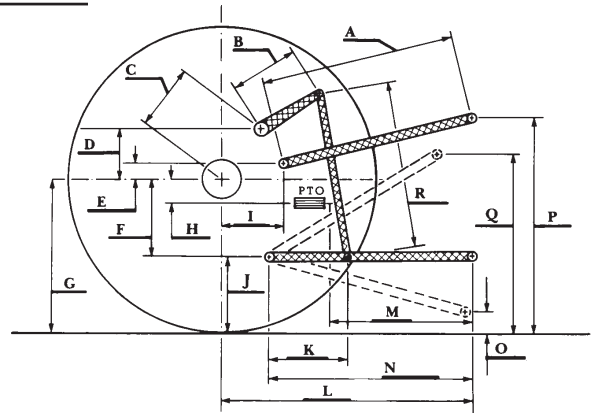
single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 26.3 GPM (99.4 l/min)

iii) Pump delivery rate at maximum hydraulic power: 25.5 GPM (96.7 l/min)
 Delivery pressure: 2580 psi (178 bar)
 Power: 38.4 HP (28.7 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



RECOMMENDED CITATION FORMAT:

NTTL.(2020). Nebraska OECD tractor test 2216 for Kubota M7-172 Diesel.

Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



KUBOTA M7-172 DIESEL

Institute of Agriculture and Natural Resources
 University of Nebraska–Lincoln