PAMI

OECD No. 1125

Date of Approval: January 29, 1988

REPORT OF TEST IN ACCORDANCE WITH OECD STANDARD CODE

CASE INTERNATIONAL 9110
and
STEIGER PUMA 1000
4WD Articulated Tractors





Manufactured by: J. I. CASE COMPANY
700 State Street
Racine, Wisconsin 53404 USA

Date of test: April and June of 1987

Prairie Agricultural Machinery Institute

Test Station: P.O. Box 1060
Portage la Prairie, Manitoba
CANADA R1N 3C5
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* ************************************************************
* The Case International 9110 is identical to the Steiger Puma  *
* 1000 except with regard to color and model designation.       *
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Manufacturer's name and address:	J.I. Case Company 3101 1st Avenue North Fargo, North Dakota 58102 USA
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with agreement of the test station
Place of running-in:	J.I. Case; Fargo, North Dakota
Duration of running-in:	75 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	Case-IH
Model:	9110; also Steiger PUMA 1000
Type:	4 wheel drive, articulated
Serial No.:	17900793
First Serial No.:	Case IH 9110; 17900793 Steiger Puma 1000; JCB 001652

Engine:

Make:	Consolidated Diesel Company
Model:	6CT8.3
Type:	Diesel, turbo charged
Serial No.:	44191697
Cylinders:	
Number and disposition:	6, in-line, vertical
Bore:	114 mm (4.49 in)
Stroke:	135 mm (5.32 in)
Capacity:	8268.7 cm^3 (504.5 in^3)
Compression ratio:	17.3 - 1
Arrangement of valves:	Overhead
Liners:	Wet, replaceable

Engine (cont'd):

Fuel System:

Feed system:	Engine Driven Transfer Pump
Make, type and model of filters:	Fleetguard, spin-off, two FF5038 & FF5052
Tank capacity:	435.2 L (115 gal)
Make, type and model of injection pump:	Robert Bosch, PESGA multiple in-line,
Injection pump Serial No.:	64613958
Manufacturer's production setting of injection pump:	30.7 - 32.0 kg/h (67.6 - 70.4 lb/n) at 2100 rev/min engine speed, and full load, 25°C (77°F) temperature, using fuel of 0.85 specific gravity at 15.6°C (60°F)
Make/type/model of injectors:	Robert Bosch, 17 mm, P/N J908507
Injection pressure:	20.5 MPa (202.2 atm)
Injection pump delivery starts:	22° before T.D.C.

Governer:

Make and type:	Robert Bosch, Mechanical, RSV
Governed range of engine speed:	700 rev/min to 2350 rev/min
Rated engine speed:	2100 rev/min

Air Cleaner:

Make and type:	Nelson, dry with safety element
Model:	71055-N
Oil Capacity:	
Position:	Above engine, intake in front of radiator
Maintenance indicator type/model:	Sight glass at engine compartment, Donaldson RBX00-2252

Pre-Cleaner:

Make and type:	Nelson, aspirating
Position:	Integral with air cleaner

Turbo-charger:

Make and type:	Holset, H2E, exhaust gas driven
Intake manifold pressure:	131 to 152 kPa (19 to 22 lb/in^2) at rated engine speed

Lubrication system:

Type of feed and pump:	Full pressure positive displacement
Type of filter:	Fleetguard LF734
Total oil capacity including filter(s):	22.4 L (47.3 pt)
Recommended oil:	S.A.E. 15W40*, viscosity 10 cSt at 100°C (210°F)
M.I.L. standard:	2104 C
Oil change period:	250 hours
Filter change period:	250 hours

Cooling System:

Coolant:	Liquid
Type of pump:	Centrifugal, belt driven
Fan diameter	609.6 mm (24 in)
Number of fan blades:	6
Type of temperature control:	2 thermostats
Coolant capacity:	33.1 L (70 pt)
System pressure:	48.3 kPa (7 lb/in^2)

Starting System:

Make, type and model:	Delco 42 MT, type 400 Electric motor
Starter motor power rating:	7.46 kW (10 hp)
Safety features:	Electrical lock-out on gear shift control
Cold starting aid:	In-block coolant heater and ether spray in intake manifold.

* 10W30 can be used for ambient temperature below -5°C (23° F).

Exhaust sytem:

Make and construction:	102 mm (4 in) diameter pipe
Dimensions of expansion chamber:	NA
Position:	Vertical at right, front side of cab, outlet directed to right side

Electrical system:

Voltage:	12
Earth polarity:	Negative
Make and type of generator:	Delco 15SI
Output:	105 A at 2100 engine rev/min
Make and type of battery:	GNB low maintenance (2 per tractor)
Rating:	90 Ah at 20 hours/battery 625 cold crank amp/battery 160 min. reserve capacity/battery (per SAE J537)

Transmission:

Clutch:

Make and type:	FTK, multi-plate, oil cooled
Diameter of plates:	Main 228.6 mm (9 in) PTO 177.8 mm (7 in)
Method of Operation:	Hydraulic

Gearbox:

Make and type:	FTK, Full Power Shift
Number of speeds:	12 forward and 2 reverse
Arrangement:	Counter shaft

Rear and Front Axle and Final Drives:

Make and type:	Z-F in-board planetary, bar type
Type of differential lock and method of engagement:	Limited slip, self-engaging
Driven From:	Transmission

Transmission oils

	Gearbox	Front & Rear axles/final drives
Recommended oil:	Case IH Hytran Plus	SAE 80W-90
Capacity:	34 L (71.8 pt)	30.2 L (64 pt)
Viscosity at 100°C (210°F)	6.2 cSt	15.2 cSt
MIL standard	NA	L-2105 C
Oil change period	1000 hours	500 hours
Filter change period	500 hours	--

Gear	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for rev/min rated engine speed* km/h	(mile/h)
Forward			
1	200.55	3.1	1.9
2	167.18	3.7	2.3
3	135.85	4.7	2.9
4	110.91	5.6	3.5
5	92.46	6.7	4.2
6	75.12	8.2	5.1
7	63.08	9.9	6.2
8	52.59	11.9	7.4
9	42.72	14.6	9.1
10	34.88	18.0	11.2
11	29.06	21.5	13.4
12	23.63	26.5	16.5
Reverse			
1	153.37	4.0	2.5
2	84.81	7.4	4.6

* Calculated with a tire radius of 812 mm (32.0 in)

Power take-off

Number of shafts/speeds and position:	One at rear of tractor in vertical centre plane
Height above ground:	756.9 mm (29.8 in)
Distance behind rear axle:	686 mm (27 in)
Diameter:	44.45 mm (1.75 in)
Number of splines:	20 (ISO 500)
Method of engagement:	Hydraulic clutch operated by hand lever, independant of main clutch
Speed at rated engine speed:	1000.9 rev/min
Engine speed at standard pto speed of 1000 rev/min:	2099 rev/min
Engine/PTO speed ratio:	2.09797:1

Direction of rotation (viewed facing driving end): Clockwise

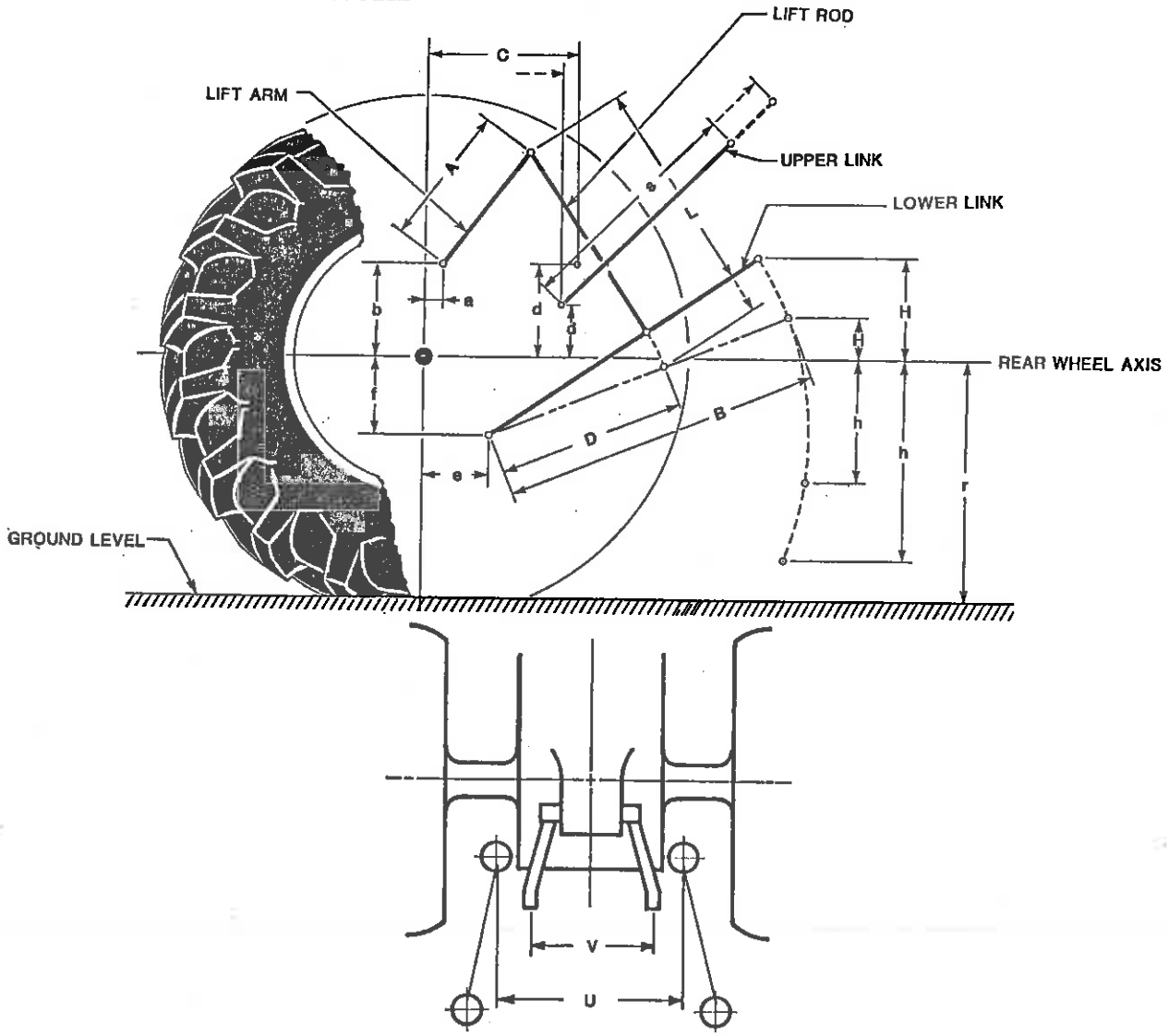
Power lift

Type of hydraulic system:	Closed centre, load sensing
Make and type of pump:	Cessna axial piston, pressure & flow compensated.
Filters:	Cannister type oil filter, one replaceable element, cleanable suction screen inside resevoir
Nominal working pressure:	17.237 MPa (2500 lb/in^2)
Number and type of cylinders:	Two, single acting
Pump drive:	Direct drive on transmission
Oil supplied from:	Hydraulic reservoir via charge pump
Type, number and position of external tappings:	4 pairs of ISO standard lever type couplers at rear of tractor
Resevoir oil capacity:	68.1 L (18 US gal), 22.7 L (6 US gal) available to external cylinders
Linkage category:	SAE III; ISO 3 except for horizontal distance PTO to hitch points of horizontal lower links: 652 mm (25.7 in)
Controls:	Position control, electrical/hydraulic, adjustable lower rate
Cylinder safety valve opening pressure:	20.7 MPa (3000 psi)

Drawbar

Type:	Swinging
Vertical height above ground to centre of clevis:	Max. 552 mm (21.75 in) Min. 425 mm (16.75 in)
Changed by:	Inverting drawbar
Distance behind rear axle centre:	1196 mm (47.1 in)
Horizontal distance behind PTO:	509 mm (20 in)
Vertical distance below PTO:	203 and 330 mm (8.0 and 13.0 in)
Lateral adjustment:	82 mm (3.25 in)
Pivot position relative to rear axle:	1295 mm (51 in) forward
Drawbar pin hole diameter:	39.6 mm (1.56 in)

Implement linkage:



Dimensions of rear implement linkage (projected lengths in mm (in), underlined dimensions are valid for power lift measurements (page 17)

Rear tires	radius index	(r)	820	(32.3)
Front tires	radius index	(r')	820	(32.3)
Length of lift arms		(A)	533	(21.0)
Length of lower links		(B)	1067	(42.0)
Distance of lift arm pivot points from rear wheel centre	horizontal	(a)	143	(5.6)
	vertical	(b)	638	(25.1)
Horizontal distance between lower link pivot points		(u)	627	(24.7)
Horizontal distance between lift arm end points		(v)	719	(28.3)
Length of upper link		(s)	747 (29.4) to 847 (33.3), <u>762 (30)</u>	
Distance of upper link pivot point from rearwheel centre	horizontal	(c)	591(23.3), <u>566 (22.3)</u>	
	vertical	(d)	289(11.4), <u>187 (7.4)</u>	
Distance of lower link pivot point from rearwheel centre	horizontal	(e)	271 (10.7)	
	vertical	(f)	251 (9.9)	
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	584 (23.0)	
Length of lift rods		(L)	864 (34.0) to 941 (37.0) <u>902 (35.5)</u>	

Height of lower link hitch points relative to rearwheel center line (situated 820 mm (32.3 in) above ground), these data are valid for unloaded power lift:

		Lift Test		
<u>Length of lift rods</u>	<u>(L)</u>	<u>902 (35.5)</u>	<u>864 (34.0)</u>	<u>941 (37.0)</u>
<u>Lowest position</u>	<u>(h)</u>	<u>604 (23.8)</u>	<u>533 (21.0)</u>	<u>704 (27.7)</u>
<u>Highest and transport position</u>	<u>(H)</u>	<u>213 (8.4)</u>	<u>261 (10.3)</u>	<u>39 (1.5)</u>

Type of transport lock: Hydraulic

Steering

Make and type:	Eaton hyrostatic steering control unit operated by hand wheel
Make and type of pump:	Cessna piston pressure and flow compensated
Oil supplied from:	Hydraulic resevoir
Working pressure:	15.9 MPa (2300 lb/in^2), maximum
Recommended oil:	CASE IH Hytran Plus, 6.2 cSt min at 100°C (210°F)
MIL/API standard:	Not available
Oil change period:	1000 hours
Filter change period:	500 hours

Brakes

Make and type:	Kelsey Hayes, caliper, dry disc
Position:	On transmission rear output shaft
Method of operation:	Manual/hydraulic operated with foot pedal
Type of parking brake:	Disc
Method of operation:	Mechanical operated with hand lever
Trailer braking take-off:	None

Wheels

Make and size:	Goodyear, Dyna Torque, 18.4 x 38
Type:	Bias-ply, 8 ply rating
Rated maximum load at rated pressure of each tire:	2550 kg (5630 lb) at 124 kPa (18 lb/in^2)
Track width:	1524 mm (60 in) to 3302 mm (130 in)
Changed by:	Adjustable clamping wedges on bar axle

Wheelbase

3058 mm (120.4 in)

Seat

Make and type:	Grammer air ride with swivel
Suspension:	Air ride, lateral isolator, weight adjustment, hydraulic damping
Range of adjustment:	Longitudinal 150 mm (5.9 in) Vertical 60 mm (2.36 in)

Safety Cab

Make/model:	Case IH, 4CSF-2
CSS No.:	076/9, Case IH 9110 076/10, Steiger Puma 1000
Description:	4 post ROPS with Charpy V-notch certified material

Lighting

Unrestricted beam angle of headlight in plan view 100°

	Height above ground of centre mm (in)	Size mm (in)	Distance from outside edge of tractor at 2775 mm (109.2 in) outer wheel track, to centre mm (in)
Headlights	1702 (67.00)	102x152 (4.00x6.00)	1418 (55.8)
Stop and tail lights	1848 (72.75)	51x165 (2.00x6.50)	785 (30.9)
Reflectors: front	1334 (52.50)	48x111 (1.88x4.38)	1253 (49.3)
rear	1854 (73.00)	48x111 (1.88x4.38)	1039 (40.9)

Number of grease points

Whole tractor: 33 (includes 17 for PTO and three point hitch)

Overall dimensions

	Length,		Width				Maximum height, to top of exhaust	
			max		min			
	m	(in)	m	(in)	m	(in)	m	(in)
Single wheels	6.21	(245)	3.76	(148)	3.04	(119.5)	3.29	(129)
Dual wheels	6.21	(245)	3.76	(148)	3.24	(127.7)	3.29	(129)

Minimum ground clearance 368 mm (14.5 in) to underside of linkage restraints

CONDITIONS DURING TEST

Masses

Tractor (without driver ballast but with tanks full)

	Front, kg (lb)	Rear, kg (lb)	Total kg (lb)
Single wheels, unballasted	4730 (10430)	4410 (9730)	9140 (20160)
Dual wheels, ballasted	6100 (13440)	4660 (10280)	10760 (23720)

Track setting during tests

	Inner	Outer
Front:	1524 mm (60.0 in)	2774 mm (109.2 in)
Rear:	1524 mm (60.0 in)	2774 mm (109.2 in)

FUEL AND LUBRICANTS USED IN TESTS

Fuel	Diesel oil to S.A.E. J313 Grade 2-D, specific gravity for pto tests 0.859 at 15°C (59°F), for drawbar tests 0.869 at 15°C (59°F), viscosity 2.0 - 4.27 cSt at 38°C (100°F) Centane No. 40 min.
Oil	
Engine:	Texaco URSA SP, SAE 15W-40, viscosity: 10 cSt at 100°C (210°F), API class CD
Transmission:	Case IH Transmission Oil 02-7408T1 viscosity 7 cSt at 100°C (210°F), MIL and API not available
Hydraulic power lift and steering:	Texaco Rando HD46 SAE 10W viscosity 6.6 cSt at 100°C (210°F), MIL and API not available

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 4th APRIL 1987, Fargo, North Dakota,USA

Type of dynamometer: Eaton, Eddy Current

Power	Speed, rev/min		Fuel Consumption			
kW (hp)	Engine	PTO	l/h (USgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	KWh/l (hph/USgal)
MAXIMUM POWER 2 hour test						
125.6 (168.4)	2099	1000	37.0 (9.8)	31.8 (70.1)	0.253 (0.416)	3.39 (17.22)
PART LOADS						
(1) Manufacturer's rated engine speed						
125.6 (168.4)	2099	1000	37.0 (9.8)	31.8 (70.1)	0.253 (0.416)	3.39 (17.22)
(2) 85% of the torque obtained at rated speed						
109.0 (146.2)	2146	1023	33.3 8.8	28.7 (63.2)	0.263 (0.432)	3.27 (16.59)
(3) 75% of the torque defined in (2)						
82.9 (111.2)	2173	1036	27.2 (7.2)	23.4 (51.5)	0.282 (0.464)	3.05 (15.46)
(4) 50% of the torque defined in (2)						
55.9 (75.0)	2200	1048	21.6 (5.7)	18.6 (40.9)	0.332 (0.546)	2.59 (13.13)
(5) 25% of the torque defined in (2)						
28.3 (38.0)	2224	1060	16.0 (4.2)	13.8 (30.4)	0.487 (0.801)	1.76 (8.95)
(6) Unloaded						
2.0 (2.7)	2266	1080	11.2 (3.0)	9.6 (21.3)	4.841 7.962	0.18 (0.90)

Power	Speed, rev/min		Fuel Consumption			
kW (hp)	Engine	PTO	l/h (USgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	KWh/l (hph/Usgal)
Part loads, the governor lever in the position corresponding to the standard pto speed at full load (1000 rev/min).						
(1) Maximum Power, rated engine speed						
125.6 (168.4)	2099	1000	37.0 (9.8)	31.8 (70.1)	0.253 (0.416)	3.39 (17.22)
(2) 85% of the torque obtained at rated speed						
109.0 (146.2)	2146	1023	33.3 (8.8)	28.7 (63.2)	0.263 (0.432)	3.27 (16.59)
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55.9 (75.0)	2200	1048	21.6 (5.7)	18.6 (40.9)	0.332 (0.546)	2.59 (13.13)
(5) 25% of the torque defined in (2)						
28.3 (38.0)	2224	1060	16.0 (4.2)	13.8 (30.4)	0.487 (0.801)	1.76 (8.95)
(6) Unloaded						
2.0 (2.7)	2266	1080	11.2 (3.0)	9.6 (21.3)	4.841 (7.962)	0.18 (0.90)

Standard specific fuel consumption, kg/kWh (lb/hph)

0.263 (0.432) / 0.332 (0.546) / 0.263 (0.432) / 0.332 (0.546)

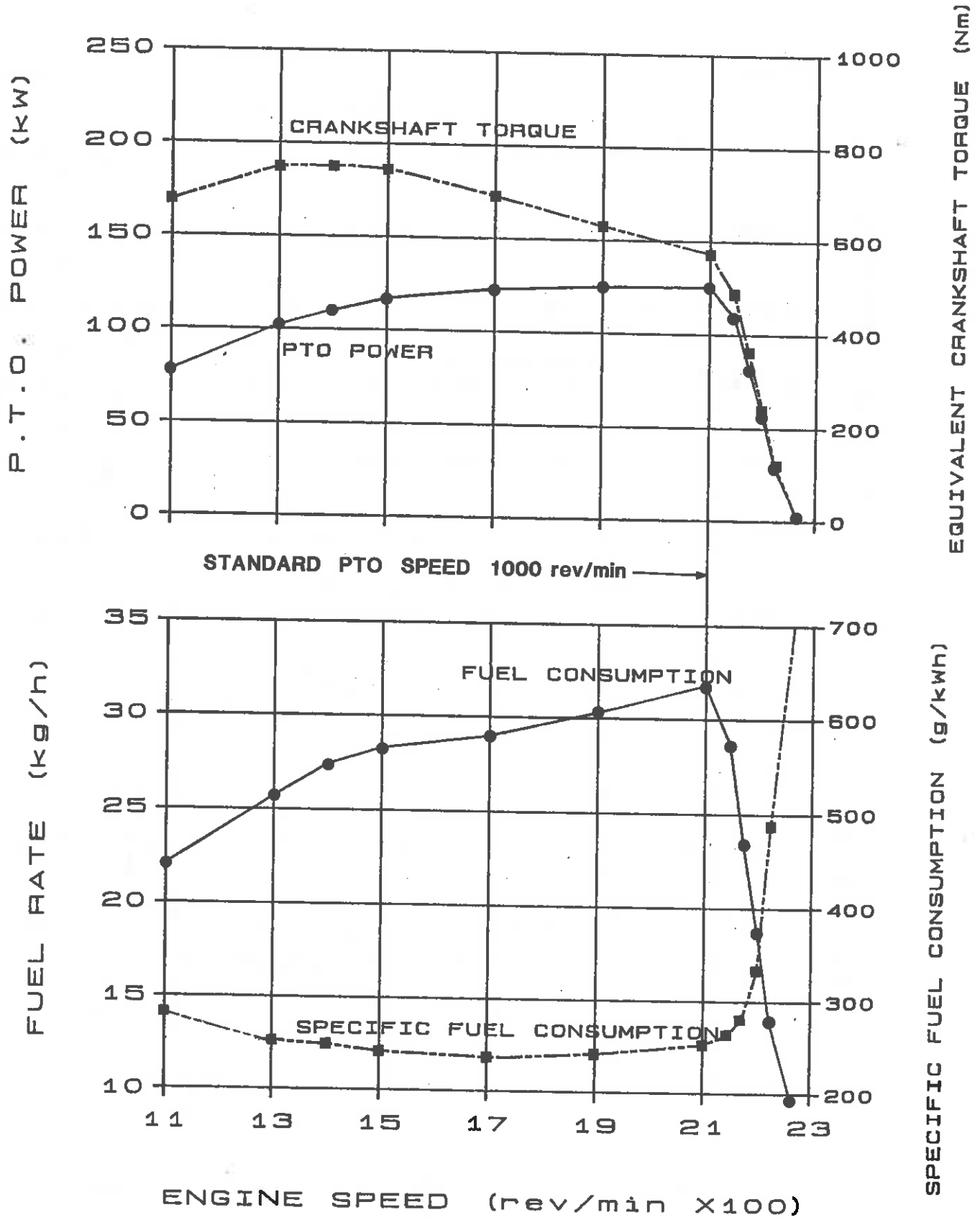
No load, maximum engine speed 2266 rev/min

Equivalent crankshaft torque at maximum power 570.8 Nm (421.0 lb ft)

Maximum equivalent crankshaft torque 751.6 Nm (554.4 lb ft) at 1400 rev/min engine speed

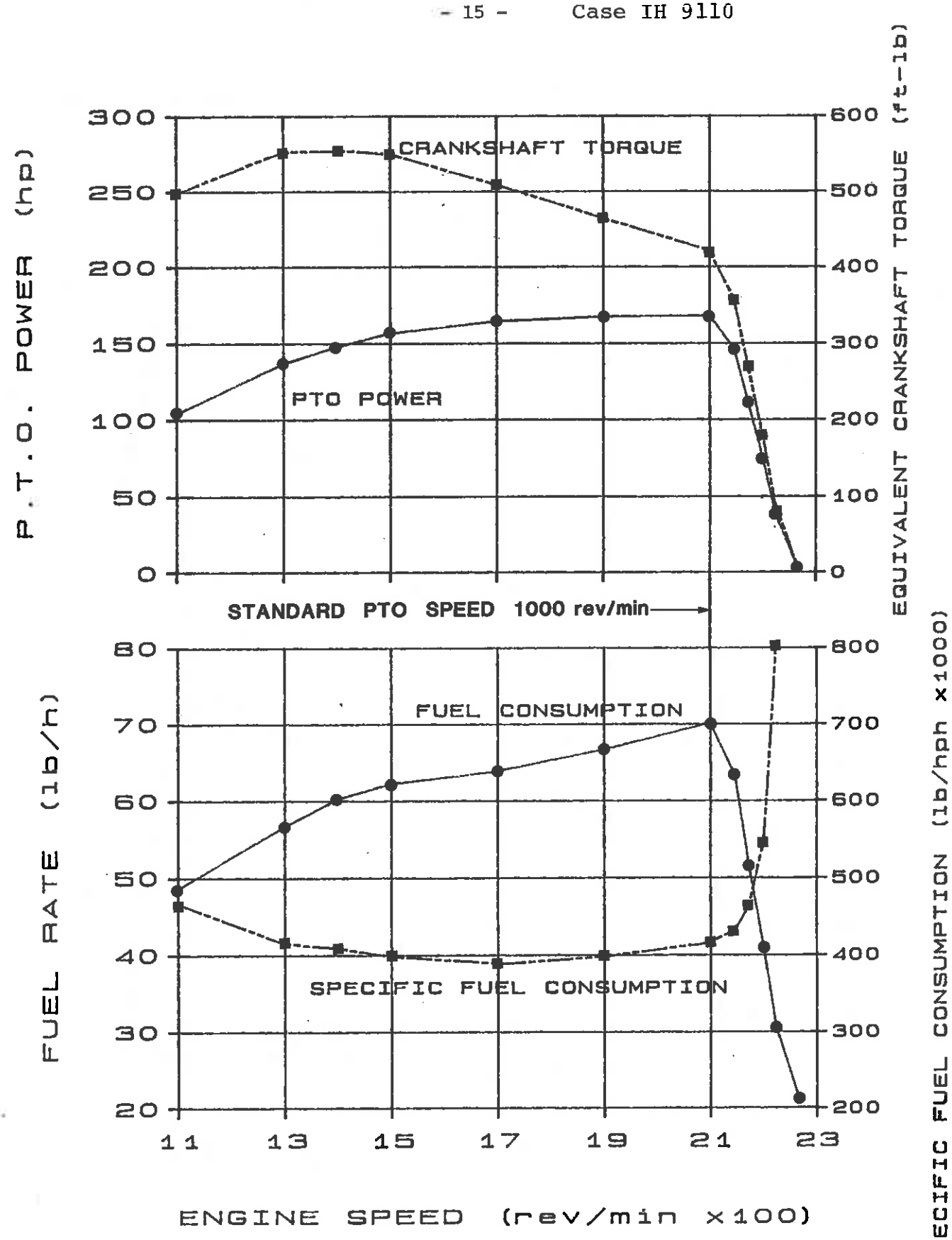
Mean atmospheric conditions temperature 24°C (75°F)
pressure 1026 m bar (30.29 in Hg)
relative humidity 20%

Maximum temperature coolant 89°C (192°F)
engine oil 113°C (235°F)
fuel 43°C (109°F)
air intake 31°C (88°F)



(Metric units)

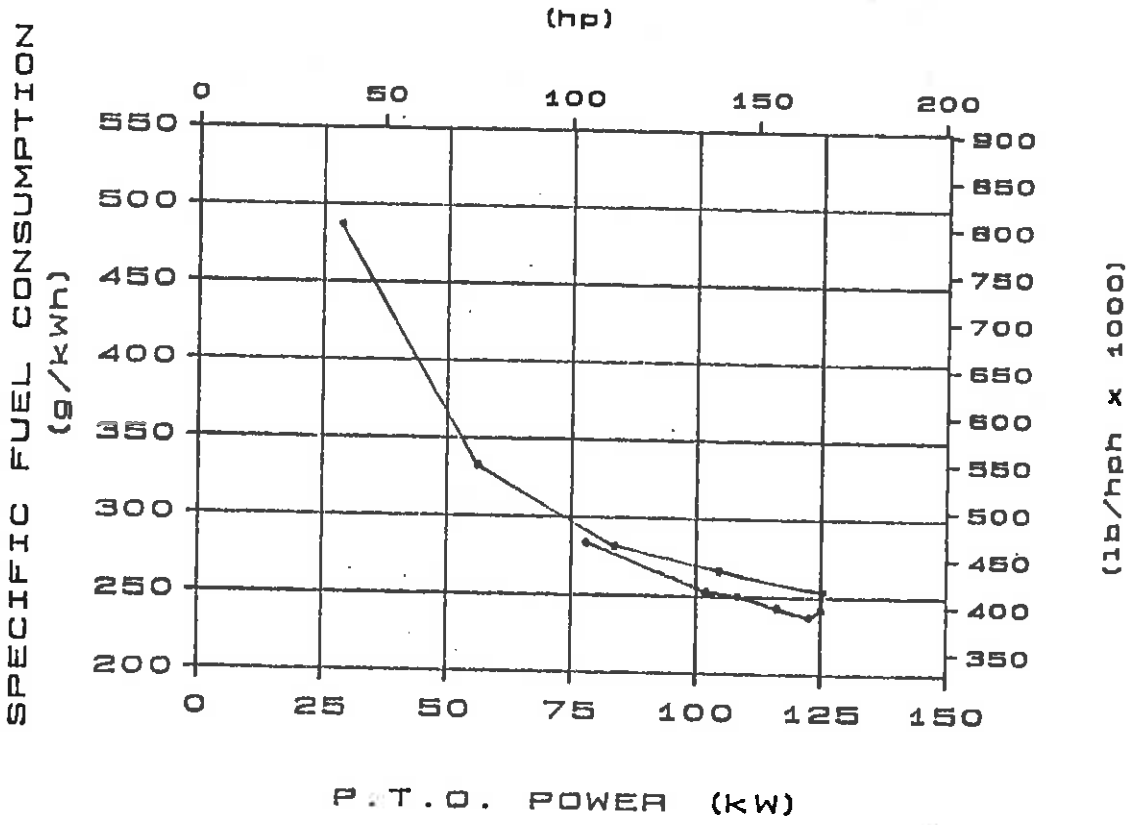
POWER TAKE-OFF TEST



POWER TAKE-OFF TEST

(English units)

POWER TAKE-OFF PERFORMANCE 9110



2. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: July 1987; Fargo, North Dakota; USA

Hydraulic pump performance

i) Maximum pressure at rated flow: 14.1 MPa (2050 lb/in^2)
Sustained pressure at compensator cutoff: 17.5 MPa (2540 lb/in^2)

ii) Pump delivery rate at minimum pressure and rated engine speed: 107.1 l/min (28.3 gal/min)

iii)

Pump delivery rate	at maximum power	at 90% of compensator cut off pressure
	94.6 L/min (25 gal/min US)	68.1 L/min (18.0 gal/min US)
Delivery Pressure:	14.0 MPa (2030 lb/in^2)	15.8 MPa (2290 lb/in^2)
Power:	22.1 kW (29.6 hp)	17.9 kW (24.0 hp)

Power Lift

Power Lift, Metric Units

	Height of lower hitch point above ground in down position mm	Vertical Movement mm	Maximum force exerted through full range kN	Corresponding pressure of hydraulic fluid MPa	Moment about rear axle kNm	Max. tilt angle of mast over range of lift degrees
At hitch points	216	817	45.8	14.0	58.6	-
On the frame	221	918	50.0		93.2	9.5 *

Temperature of hydraulic fluid at start of test 65°C
*Tilt angle of mast from vertical position to uppermost position 10°

Lifting heights relative to horizontal lower links											
mm	-350	-300	-200	-100	0	100	200	300	400	450	480
Lifting forces corresponding to 90% of maximum pressure; 15.8 MPa - at hitch points											
kN	51.5	54.3	59.8	63.7	66.9	69.5	71.8	73.3	76.5	77.0	
- at test frame											
kN	57.2	62.3	60.0	61.4	61.7	61.4	59.8	62.2	56.9		56.2
Lifting forces corresponding to pressure at maximum hydraulic power; 14.0 MPa - at hitch points											
kN	45.8	48.3	53.2	56.7	59.5	61.7	63.8	65.2	68.0	68.5	
- at test frame											
kN	50.9	55.4	53.2	54.5	54.8	54.5	53.1	55.3	50.6		50.0

Power Lift, English Units

	Height of lower hitch point above ground in down position in	Vertical Movement in	Maximum force exerted through full range lb	Corresponding pressure of hydraulic fluid lb/in^2	Moment about rear axle lbft	Max. tilt angle of mast over range of lift degrees
At hitch points	8.5	32.2	10300	2030	43220	-
On the frame	8.7	36.1	11230		68720	9.5 *

Temperature of hydraulic fluid at start of test 65°C (149°F)
*Tilt angle of mast from vertical position to uppermost position 10°

Lifting heights relative to horizontal lower links											
in	-13.8	-11.8	-7.9	-3.9	0	3.9	7.9	11.8	15.7	17.7	18.9
Lifting forces corresponding to 90% of maximum pressure; 2290 lb/in^2 - at hitch points											
lb	11590	12200	13450	14330	15050	15620	16140	16490	17190	17320	
- at test frame											
lb	12870	14000	13500	13800	13870	13800	13440	13990	12790		12640
Lifting forces corresponding to pressure at maximum hydraulic power; 2030 lb/in^2 - at hitch points											
lb	10300	10850	11960	12740	13380	13880	14350	14660	15280	15400	
- at test frame											
lb	11440	12450	12000	12260	12330	12260	11940	12430	11370		11230

3. DRAWBAR PERFORMANCE, SI Units

Date of Tests: June 1987
Type of Track: Concrete

Gear	Speed km/h	Power kW	Drawbar Pull kN	Engine Speed rpm	Wheel Slip %	Specific Fuel Consumption kg/kWh	Specific Fuel Consumption kWh/l	Temperature C Fuel	Temperature C Coolant	Temperature C Oil	Atmospheric Conditions Temperature C	Atmospheric Conditions Relative Humidity %	Atmospheric Conditions Barometric Pressure mbar
(i) MAXIMUM POWER (unballasted, single wheels) Tire inflation pressure: 124 kPa Height of drawbar above ground: 375 mm													
1	2.83	65.62	83.36	2166	14.87	0.351	2.48	34	82	107	22	44	1008
2	3.37	77.32	82.57	2153	15.15	0.345	2.53	35	83	106	23	44	1008
3	4.09	94.26	82.89	2125	14.99	0.329	2.65	37	84	108	23	44	1008
4	5.06	106.62	75.88	2053	11.35	0.304	2.87	37	85	107	20	42	1008
5	6.29	110.25	63.14	2059	8.62	0.292	2.98	37	84	108	22	42	1008
6	7.92	107.59	48.92	2053	5.77	0.287	3.03	44	85	113	25	42	1008
7	9.48	108.60	41.23	2051	5.10	0.285	3.05	43	84	110	24	40	1008
8	11.58	109.83	34.15	2051	3.72	0.284	3.06	42	84	109	24	40	1008
9	14.38	109.32	27.36	2050	2.79	0.285	3.05	38	84	110	23	40	1008
(ii) MAXIMUM POWER (ballasted,dual wheels) Tire inflation pressure: inner 96 kPa, outer 82 kPa Height of drawbar above ground: 398 mm													
1	2.85	80.77	102.01	2147	14.88	0.337	2.58	36	82	108	26	32	1032
2	3.39	101.48	107.69	2114	14.48	0.309	2.81	37	85	107	24	32	1032
3	4.30	108.38	90.82	2051	8.50	0.288	3.02	39	85	110	26	32	1032
4	5.39	110.20	73.65	2051	7.02	0.283	3.07	40	84	108	28	32	1032
5	6.53	110.26	60.81	2051	4.41	0.286	3.04	40	85	110	27	30	1032
6	8.27	111.27	48.43	2051	3.66	0.277	3.14	41	85	109	29	30	1032
7	9.93	111.31	40.34	2050	2.56	0.268	3.24	42	84	109	29	30	1032
8	11.97	110.02	33.08	2052	2.24	0.266	3.26	43	86	111	29	30	1032
9	14.66	107.12	26.30	2048	0.85	0.274	3.17	41	85	110	27	30	1032
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
7	10.46	88.07	30.32	2140	1.92	0.303	2.87	43	85	112	28	30	1032
(iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
2	3.51	-	107.78	-	-	-	-	42	84	112	28	56	1023

Total oil consumption during ten hours duration of tests (iii) and (iv) 66 g/h.

Test (iv) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance.

3. DRAWBAR PERFORMANCE, English Units

Date of Tests: June 1987
Type of Track: Concrete

Gear	Speed mph	Power hp	Drawbar Pull lb	Engine Speed rpm	Wheel Slip %	Specific Fuel Consumption lb/hph	Specific Fuel Consumption hph/USgal	Temperature F Fuel	Temperature F Coolant	Temperature F Oil	Atmospheric Conditions Temperature F	Atmospheric Conditions Relative Humidity %	Atmospheric Conditions Barometric Pressure in Hg
(i) MAXIMUM POWER (unballasted, single wheels) Tire inflation pressure: 18 psi Height of drawbar above ground: 14.8 in													
1	1.76	87.96	18740	2166	14.87	0.578	12.59	93	180	224	72	44	29.78
2	2.10	103.65	18560	2153	15.00	0.567	12.84	95	181	223	73	44	29.78
3	2.54	126.36	18630	2125	14.99	0.541	13.45	99	180	226	73	44	29.78
4	3.14	142.92	17060	2053	11.35	0.500	14.57	99	185	224	68	42	29.78
5	3.91	147.79	14190	2059	8.62	0.480	15.13	99	183	226	72	42	29.78
6	4.92	144.22	11000	2053	5.77	0.472	15.38	111	185	235	77	42	29.78
7	5.89	145.57	9270	2051	5.10	0.469	15.48	109	183	230	75	40	29.78
8	7.19	147.23	7680	2051	3.72	0.468	15.53	108	183	228	75	40	29.78
9	8.94	146.54	6150	2050	2.79	0.469	15.48	100	183	230	73	40	29.78
(ii) MAXIMUM POWER (ballasted, dual wheels) Tire inflation pressure: inner 14 psi, outer 12 psi Height of drawbar above ground: 15.7 in													
1	1.77	108.28	22930	2147	14.88	0.555	13.10	97	180	226	79	32	30.50
2	2.11	136.04	24210	2114	14.48	0.509	14.26	99	185	228	75	32	30.50
3	2.67	145.28	20420	2051	8.50	0.474	15.33	102	185	230	79	32	30.
4	3.35	147.72	16560	2051	7.02	0.466	15.58	104	183	226	82	32	30.50
5	4.06	147.80	13670	2051	4.41	0.470	15.43	104	185	230	81	30	30.50
6	5.14	149.16	10890	2051	3.66	0.456	15.94	106	185	228	84	30	30.50
7	6.17	149.21	9070	2050	2.56	0.441	16.45	108	183	228	84	30	30.50
8	7.40	147.48	7440	2052	2.24	0.438	16.55	109	187	232	84	30	30.50
9	9.11	143.60	5910	2048	0.85	0.450	16.09	106	185	230	81	30	30.50
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
7	6.50	118.05	6820	2140	1.92	0.498	14.57	109	185	234	82	30	30.50
(iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
2	2.18	-	24230	-	-	-	-	108	183	234	82	56	30.23

Total oil consumption during ten hours duration of tests (iii) and (iv) 0.145 lb/h.

Test (iv) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance.

4. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: As in specification, without ballast

		Inner	Outer
Track of wheels:	Front	1524 mm (60.0 in)	2774 mm (109.2)
	Rear	1524 mm (60.0 in)	2774 mm (109.2)

	Single Wheels		Dual Wheels	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	5.85 (230)	6.00 (236)	6.15 (242)	6.28 (247)
Radius of turning circle, m (in)	5.10 (200)	5.24 (206)	5.86 (231)	5.99 (236)

5. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	1158 mm (45.6 in)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	1582 mm (62.3 in)
Distance from the median plane of the tractor, mm (in)	0

6. BRAKING

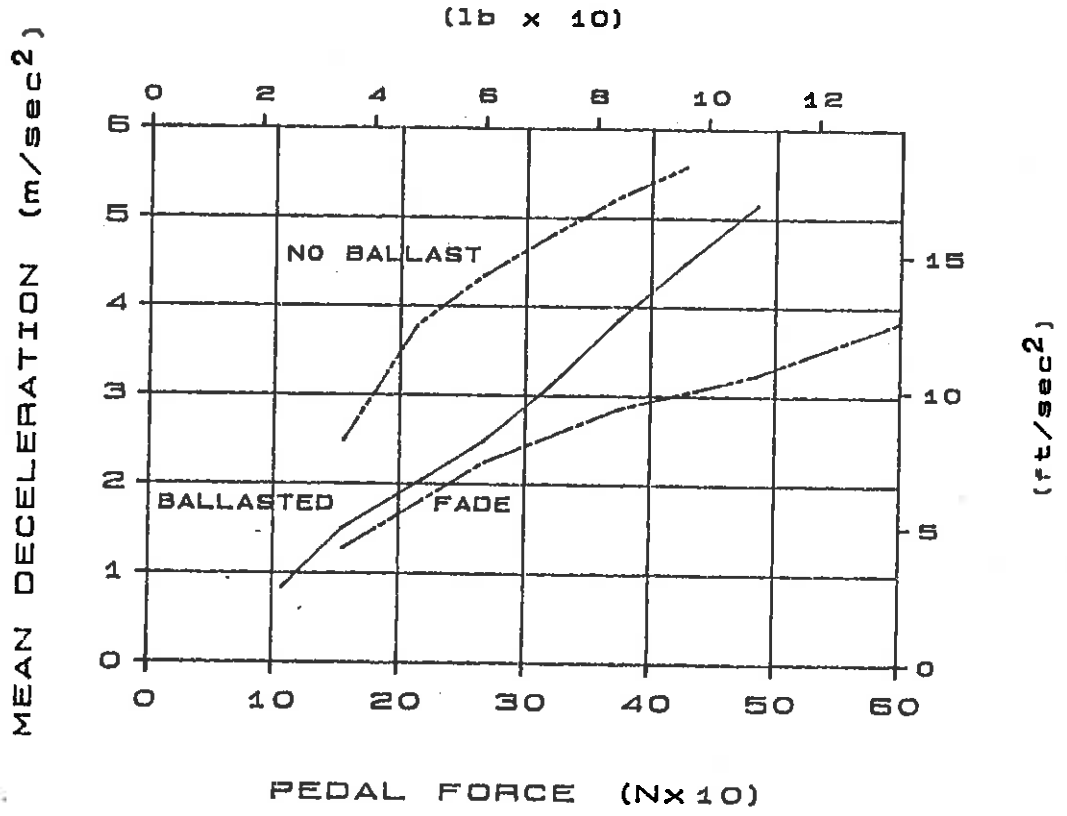
Date of tests: 3rd JUNE 1987

Type of track: Concrete

Masses during brake tests

	Front		Rear		Total	
	kg	(lb)	kg	(lb)	kg	(lb)
Ballasted	6195	(13660)	4700	(10360)	10895	(24020)
Unballasted	4735	(10440)	4410	(9720)	9145	(20160)

A) Service brakes



Travelling speed before application of brakes, 28.9 km/h (17.9 mile/h)

Brakes-heating: Actuating of brakes for 1 km (0.62 mi) at 80% of maximum speed with pedal force corresponding to 1 m/s^2 (3.3 ft/s^2)

Comments on deviation and vibration: None

B) Parking brake

	Ballasted tractor on slope of 18%		Unballasted tractor on 12% slope with trailer of 7070 kg (15600 lb)	
	Up	Down	Up	Down
Pull on handbrake N (lb)	44 (10)	49 (11)	44 (10)	49 (11)

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests:	3rd JUNE 1987
Type of sound level meter:	Bruel and Kjaer 2218
Type of track:	Concrete

Results of tests:

Gear:	12
Travelling speed before acceleration:	21.7 km/h (13.4 mile/h)
Sound level:	94 dBA

OPTIONAL TESTS

8. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests:	JUNE 1987
Type of sound level meter:	Bruel and Kjaer 2218
Type of track:	Concrete
Cab fitted:	Yes

Results of tests:

Gear	Drawbar pull at which the tractor develops maximum sound level, kN (lb)	Measured travelling speed, km/h (mile/h)	Sound level, dBA
5*	56.6 (12730)	6.57 (4.08)	80.0
5*	6.4 (1440)	7.38 (4.59)	77.5
12	No load	28.9 (17.9)	78.0

*The 5th gear corresponds to the nominal travelling speed nearest to 7.5 km/h (4.7 mile/h).

Details of materials used for sound proofing the protective structures

Interior padding:	
. Roof	vinyl covered polyester safety foam, 50 mm (2.0 in) above operator 13 mm (0.50 in) ahead of operator; plastic outer cab top lined with urethane foam, 25 mm (1.0 in)
. Door	glass, as below
. Floor	polyethylene foam, 10.4 mm (0.40 in) ribbed, rubber floor mat , 7.4 mm (0.30)
. Front panel	glass, as below
. Rear and lower right panel	vinyl covered polyester urethane safety foam with accoustical barrier, 25 mm (1.0 in)
. Instrument panel and steering column	ABS plastic shroud 4 mm (0.16 in) thick polyethylene foam with acoustical barrier 12 mm (0.5 in)
Draught proofing:	rubber moulding
Glass:	tinted, tempered, safety glass, 5.6 mm (0.22 in)
Windscreen wipers:	United Technologies Electro Systems Model 1927328 MO 12WC
Direction indicators:	lever on steering column operating blinking lights
Heaters and air conditioner:	located on front console, constant flow cab pressurization, aspirated cab air intake filtration system.

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

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Test carried out by: R.R. Hochstein, Senior Development Engineer
K.A. Carmichael, C.E.T.

Signed: Head of Test Station

for the Director

Date: 10 September 1987