PAMI

OECD No. 1129

Date of Approval: January 29, 1988.

REPORT OF TEST IN ACCORDANCE WITH OECD STANDARD CODE

CASE INTERNATIONAL 9180
and
STEIGER LION 1000
4WD Articulated Tractors



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

Date of test: April and July 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 9180 is identical to the Steiger Lion *
* 1000 (Cummins powered) except with regard to color and model *
* designation. *
****

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:	78 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	Case International
Model:	9180
Type:	4 wheel drive, articulated
Serial No.:	17900712
First Serial No.:	Case IH 9180; 17900670 Steiger Lion 1000; 17900259

Engine:

Make:	Cummins
Model:	NTA-855-A
Type:	Diesel, turbo charged, after cooled
Serial No.:	11385474
Cylinders:	
Number and disposition:	6, in-line, vertical
Bore:	140 mm (5.5 in)
Stroke:	152 mm (6.0 in)
Capacity:	14013 cm^3 (855 in^3)
Compression ratio:	14.0:1
Arrangement of valves:	Overhead
Liners:	Wet, replaceable

Engine (cont'd):

Fuel System:

Feed system:	Engine Driven Transfer Pump
Make, type and model of filters:	(2) Case IH, spin-on, 28-035
Tank capacity:	948 L (250 gal)
Make, type and model of injection pump:	Cummins Type G, Model PT, Non AFC variable speed governor, gear pump supplies pressure for PT system
Injection pump Serial No.:	0929944
Manufacturer's production setting of injection pump:	60.3-63.1 kg/h (133 - 139 lb/h) 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:	Cummins PTD, DFF P/N 3047991
Injection pressure:	103.4 MPa (1020.6 atm)
Rail Pressure:	998-1110 kPa (145-161 lb/in^2)
Injection pump delivery starts:	19° before T.D.C.

Governor:

Make and type:	Centrifugal flyweight, integral to fuel pump
Governed range of engine speed:	850 rev/min to 2350 rev/min
Rated engine speed:	2100 rev/min

Air Cleaner:

Make and type:	Donaldson, dry with safety element
Model:	EGB14-0160
Position:	Mounted on front left fender
Maintenance indicator:	Sight glass at engine compartment, Donaldson RBX 00-2252

Pre-Cleaner:

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

Turbo-charger:

Make and type:	Cummins, T46B, exhaust gas driven
Intake manifold pressure:	149 ± 13.5 kPa (21.6 ± 2 lb/in^2) at rated speed

Lubrication system:

Type of feed and pump:	Full pressure positive displacement
Type of filter:	Full Flow and bypass, spin on
Total oil capacity including filters:	39.8 L (84.0 pt)
Recommended oil:	SAE 15W40, temperatures greater than -10°C (14°F)* API Classification CC/CD viscosity 10 cSt at 100°C (210°F)
MIL standard:	L-2104C
Oil and filter change period:	250 hours

Cooling System:

Coolant:	Liquid
Type of pump:	Centrifugal
Fan diameter	813 mm (32 in)
Number of fan blades:	8
Type of temperature control:	Thermostat
Coolant capacity:	62.5 L (132 pt)
System pressure:	48.3 kPa (7 lb/in^2)

Starting System:

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

* 10W30 can be used for ambient temperature -25° to 35° C (-13° to 95°F)

Exhaust sytem:

Make and construction:	Donaldson
Dimensions of expansion chamber:	229 mm dia x 1372 mm long (9 in dia x 54 in long)
Position:	Mounted vertically on right, front fender with outlet directed to right front

Electrical system:

Voltage:	12
Earth polarity:	Negative
Make and type of generator:	Delco Remy 30SI Alternator
Output:	90 A at 2100 engine rev/min
Make and type of battery:	GNB low maintenance (3 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 Pressure, foot pedal

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:	Raba 598, outboard planetary
Type of different lock and method of engagement:	Optional Eaton no-spin, self engaging (front only)
Driven From:	Transmission

Transmission oils

	Gearbox	Front and rear axles/final drives
Recommended oil:	Case IH Hytran Plus	SAE 80W-90
Capacity:	34 L (71.8 pt)	21.4 L (45 pt)
Viscosity at 100°C (210°F)	6.2 cSt	15.2 cSt
MIL standard	NA	L-2105C
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 2100 rev/min rated engine speed* km/h	(mile/h)
Forward			
1	195.67	3.5	2.2
2	163.11	4.2	2.6
3	132.54	5.3	3.3
4	108.21	6.4	4.0
5	90.20	7.7	4.8
6	73.29	9.6	6.0
7	61.55	11.4	7.1
8	51.31	13.7	8.5
9	41.68	16.9	10.5
10	34.03	20.6	12.8
11	28.35	24.8	15.4
12	23.05	30.6	19.0
Reverse			
1	149.63	4.7	2.9
2	82.74	8.5	5.3

* Calculated with a tire radius of 889 mm (35.0 in)

Power take-off

Number of shafts/speeds and position:	One, at rear of tractor in vertical centre plane
Height above ground:	815 mm (32.1 in)
Distance behind rear axle:	635 mm (25.0 in)
Diameter:	44.4 mm (1.75 in)
Number of splines:	20 (ISO 500)
Method of engagement:	Hydraulic clutch operated by hand lever, independent of main clutch
Speed at rated engine speed:	1000.5 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

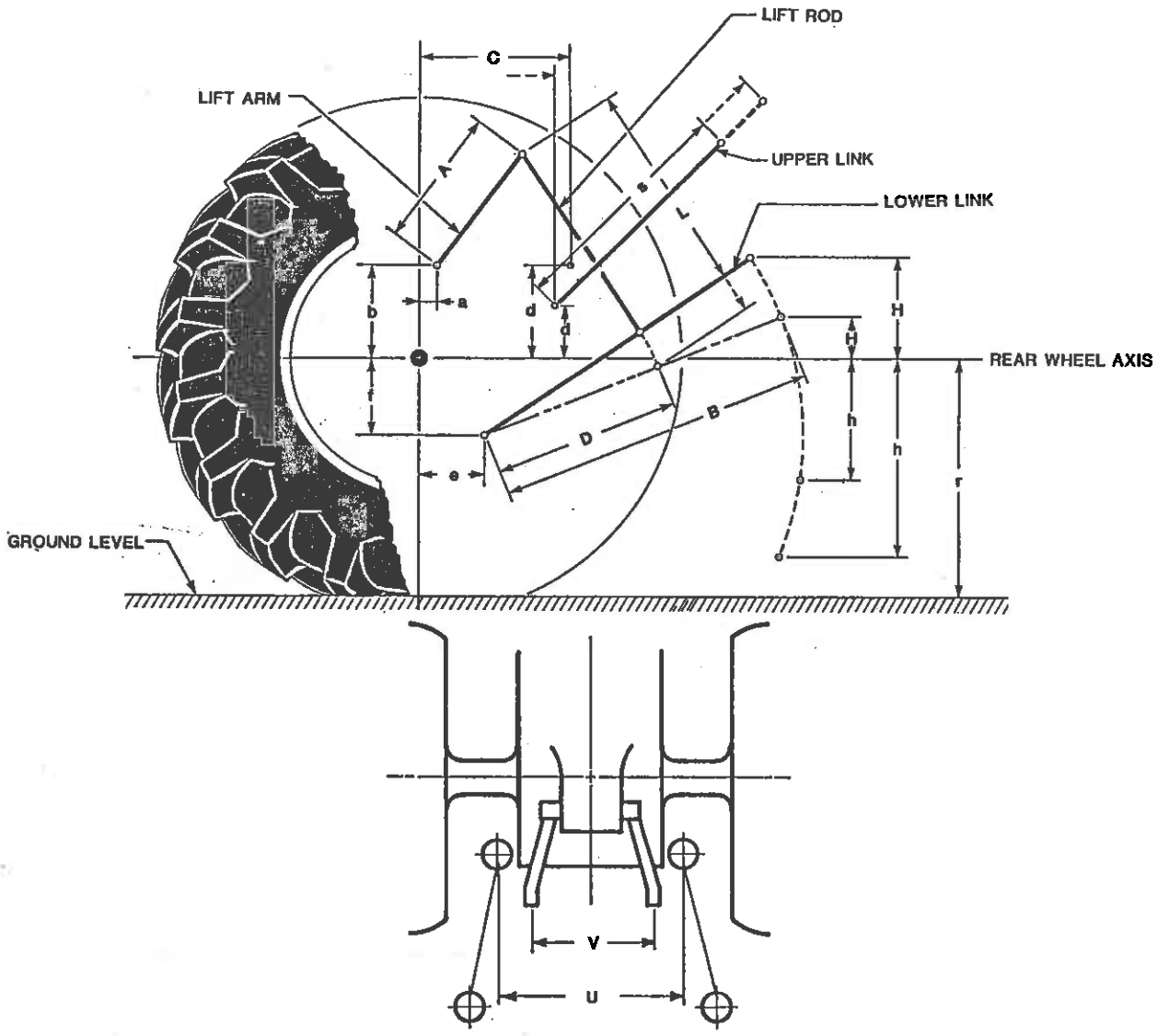
Power lift

Type of hydraulic system:	Closed centre, load sensing
Make and type of pump:	Cessna, axial piston, pressure & flow compensated
Filters:	Dual cannister with replaceable elements, cleanable suction screen inside reservoir
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:	ISO standard lever type couplers 4 pairs at rear of tractor
Reservoir oil capacity:	98.4 L (26 US gal), 34 L (9 US gal) available to external cylinders
Linkage category:	SAE IV-N; ISO 4L except for horizontal distance PTO to hitch points of horizontal lower links 664 mm (26.1 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. 614 mm (24.2 in) Min. 456 mm (17.9 in)
Changed by:	Inverting drawbar
Distance behind rear axle centre:	1143 mm (45.0 in)
Horizontal distance behind PTO:	509 mm (20 in)
Vertical distance below PTO:	203 and 356 mm (8.0 and 14.0 in)
Lateral movement:	165 mm (6.5 in)
Pivot position relative to rear axle:	1778 mm (70 in) forward
Drawbar pin hole diameter:	46.0 mm (1.81 in)

Implement linkage:



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

Rear tires	radius index	(r)	889	(35.0)
Front tires	radius index	(r')	889	(35.0)
Length of lift arms		(A)	533	(21.0)
Length of lower links		(B)	997	(39.3)
Distance of lift arm pivot points from rear wheel centre	horizontal	(a)	371	(14.6)
	vertical	(b)	601	(23.7)
Horizontal distance between lower link pivot points		(u)	825	(32.5)
Horizontal distance between lift arm end points		(v)	1057	(41.6)
Length of upper link		(s)	756 (29.8) to 946 (37.2), <u>774</u> <u>(30.5)</u>	
Distance of upper link pivot point from rearwheel centre	horizontal	(c)	535	(21.0)
	vertical	(d)	280	(11.0)
Distance of lower link pivot point from rearwheel centre	horizontal	(e)	302	(11.9)
	vertical	(f)	345	(13.6)
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	652	(25.7)
Length of lift rods		(L)	829 (32.6) to 1032 (40.6) <u>956</u> <u>(37.6)</u>	

Height of lower link hitch points relative to rearwheel center line (situated 889 mm (35.0 in) above ground), these data are valid for unloaded power lift:

		* Lift Test *		
<u>Length of lift rods</u>	<u>(L)</u>	<u>956 (37.6)</u>	<u>829 (32.6)</u>	<u>1032(40.6)</u>
<u>Lowest position</u>	<u>(h)</u>	<u>665 (26.2)</u>	<u>458 (18.0)</u>	<u>775 (30.5)</u>
<u>Highest (transport) position</u>	<u>(H)</u>	<u>112 (4.4)</u>	<u>315 (12.4)</u>	<u>13 (0.5)</u>

Type of transport lock: Hydraulic

Steering

Make and type:	Eaton hydrostatic steering control unit, operated by hand wheel
Make and type of pump:	Cessna axial piston pressure and flow compensated
Oil supplied from:	Hydraulic reservoir
Working pressure:	15.9 MPa (2300 lb/in^2), maximum
Recommended oil:	CASE IH Hytran Plus viscosity 6.2 cSt min at 100°C (210°F)
MIL standard:	NA
Oil change period:	1000 hours
Filter change period:	500 hours

Brakes

Make and type:	(2) Kelsey Hayes, caliper, dry disc
Position:	On front axle drive shaft at differential
Method of operation:	Manual/hydraulic, operated with foot pedal
Type of parking brake:	caliper/dry disc, mechanically operated with hand lever
Trailer braking take off:	None

Wheels

Make and size:	Goodyear, Dyna Torque, 20.8 x 42
Type:	Bias-ply, 10 ply rating
Rated maximum load at rated pressure of each tire:	2676 kg (5900 lb) at 110 kPa (18 lb/in^2)
Track width:	inner, 1935 mm (76.2 in) outer, 3360 mm (132.3 in) non-adjustable
Wheelbase	3594 mm (141.5 in)

Seat

Make and type:	Grammer air ride with swivel
Suspension:	Air ride, lateral isolator, weight adjustment
Damping:	Hydraulic
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.:	076/1, Case IH 9180 076/2, Steiger Lion 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 3360 mm (132.3 in) outer wheel track, to centre mm (in)
Headlights	1840 (72.43)	102x152 (4.00x6.00)	1615 (63.6)
Stop and tail lights	1925 (75.80)	57x165 (2.2x6.50)	891 (35.1)
Reflectors: front	1374 (54.08)	48x111 (1.88x4.38)	1372 (54.0)
rear	1900 (74.8)	48x111 (1.88x4.38)	726 (28.6)

Number of grease points

Whole tractor: 35 (includes 17 for PTO and three point hitch).

Overall dimensions

	Length, m (in)	Width max m (in)	Width min m (in)	Maximum height, to top of exhaust m (in)
Single wheels	7.16 (282)	2.47 (97.1)	2.47 (97.1)	3.87 (152.4)
Dual wheels	7.16 (282)	3.89 (153.1)	3.89 (153.1)	3.87 (152.4)

Minimum ground clearance 424 mm (16.7 in) to underside of linkage restraints

CONDITIONS DURING TEST

Masses

Tractor (without driver but with dual wheels and tanks full)

	Front, kg (lb)	Rear, kg (lb)	Total kg (lb)
Unballasted	8520 (18780)	7620 (16790)	16140 (35570)
Ballasted	10480 (23100)	7620 (16790)	18100 (39890)

Track setting during tests

	Inner	Outer
Front:	1935 mm (76.2 in)	3360 mm (132.3 in)
Rear:	1935 mm (76.2 in)	3360 mm (132.3 in)

FUEL AND LUBRICANTS USED IN TESTS

Fuel	Diesel oil to SAE J313, Grade 2-D, specific gravity for pto tests 0.859 at 15°C (59°F), for drawbar tests 0.854 at 15°C (59°F), viscosity 2.0 - 4.27 cSt at 38°C (100°F) Cetane 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)
Hydraulic power lift and steering:	Texaco Rando HD46 SAE 10W viscosity 6.6 cSt at 100°C (210°F)

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 03rd 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						
271.0 (363.3)	1799	858	71.3 (18.8)	61.3 (135.1)	0.226 (0.372)	3.80 (19.28)
PART LOADS						
(1) Manufacturer's rated engine speed						
257.0 (344.5)	2099	1000	71.9 (19.0)	61.8 (136.2)	0.240 (0.395)	3.57 (18.14)
(2) 85% of the torque obtained at rated speed						
225.4 (302.2)	2167	1033	66.7 (17.6)	57.3 (126.3)	0.254 (0.418)	3.38 (17.15)
(3) 75% of the torque defined in (2)						
171.3 (229.6)	2195	1046	54.3 (14.3)	46.6 (102.8)	0.272 (0.448)	3.16 (16.01)
(4) 50% of the torque defined in (2)						
115.6 (154.9)	2221	1059	43.1 (11.4)	37.0 (81.6)	0.320 (0.527)	2.68 (13.61)
(5) 25% of the torque defined in (2)						
58.6 (78.5)	2252	1074	30.5 (8.0)	26.2 (57.7)	0.447 (0.735)	1.92 (9.76)
(6) Unloaded						
2.0 (2.7)	2302	1097	20.6 (5.4)	17.7 (39.0)	8.723 (14.345)	0.10 (0.51)

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						
257.0 (344.5)	2099	1000	71.9 (19.0)	61.8 (136.2)	0.240 (0.395)	3.57 (18.14)
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(6) Unloaded						
2.0 (2.7)	2302	1097	20.6 (5.4)	17.7 (39.0)	8.723 (14.345)	0.10 (0.51)

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

0.254 (0.418) / 0.320 (0.527) / 0.254 (0.418) / 0.320 (0.527)

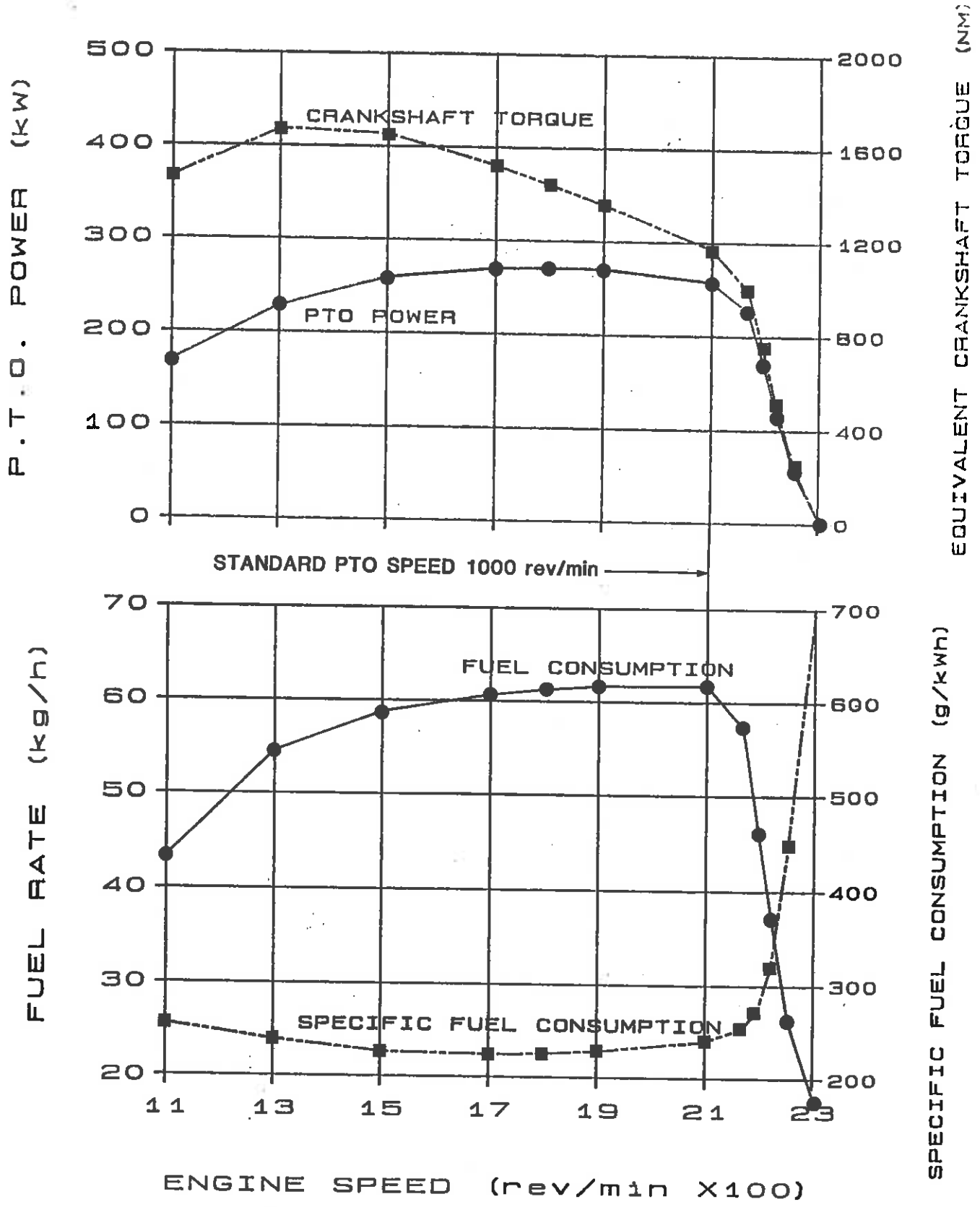
No load, maximum engine speed — 2302 rev/min

Equivalent crankshaft torque at maximum power — 1436.2 Nm (1059.3 lb ft)
at rated engine speed — 1167.5 Nm (861.1 lb ft)

Maximum equivalent crankshaft torque — 1674.2 Nm (1234.8 lb ft) at 1300 rev/min engine speed

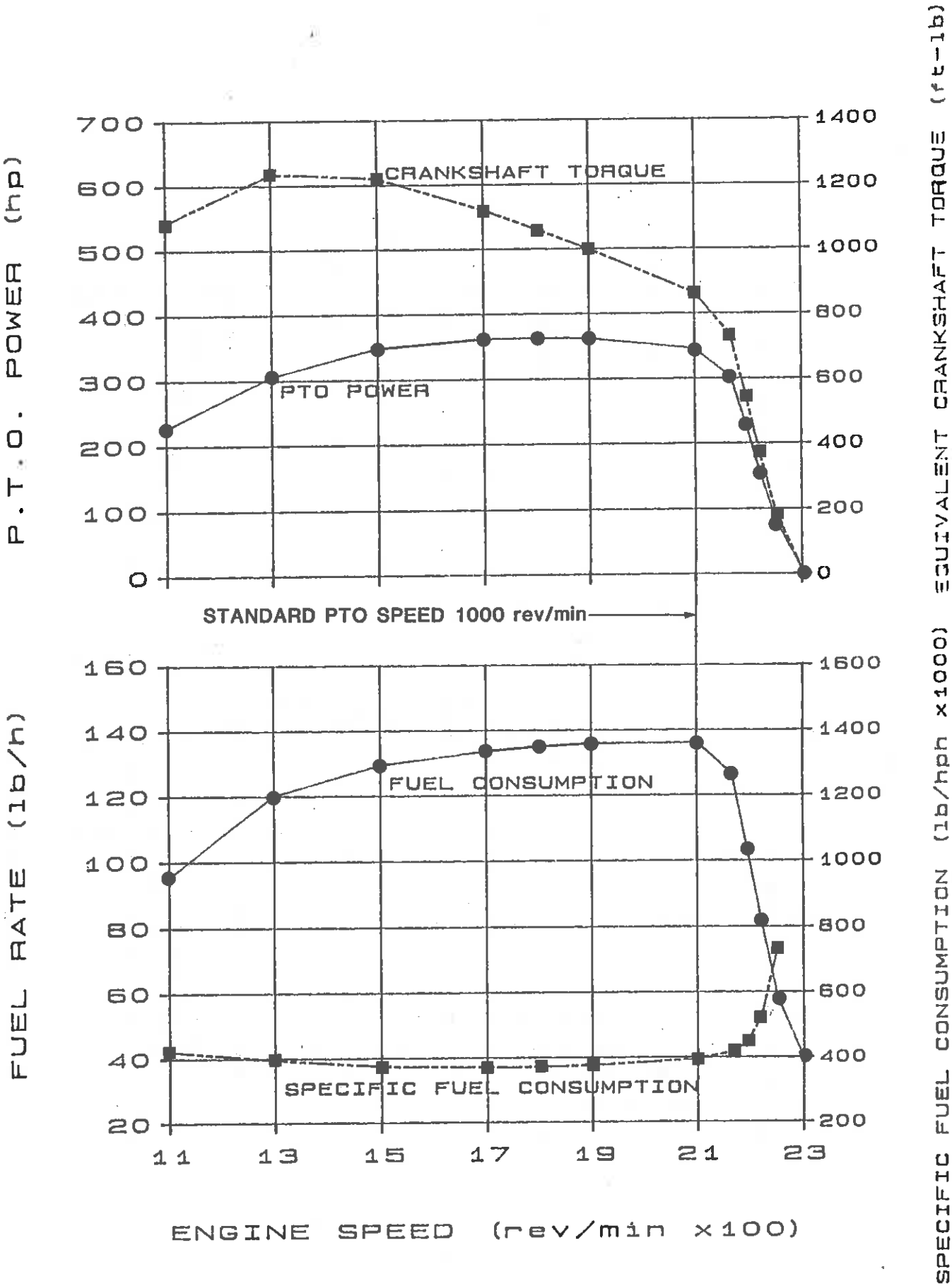
Mean atmospheric conditions — temperature — 29°C (84°F)
pressure — 1049 m bar (30.98 in Hg)
relative humidity — 24%

Maximum temperature — coolant — 88°C (190°F)
engine oil — 120°C (248°F)
fuel — 43°C (109°F)
air intake — 32°C (90°F)



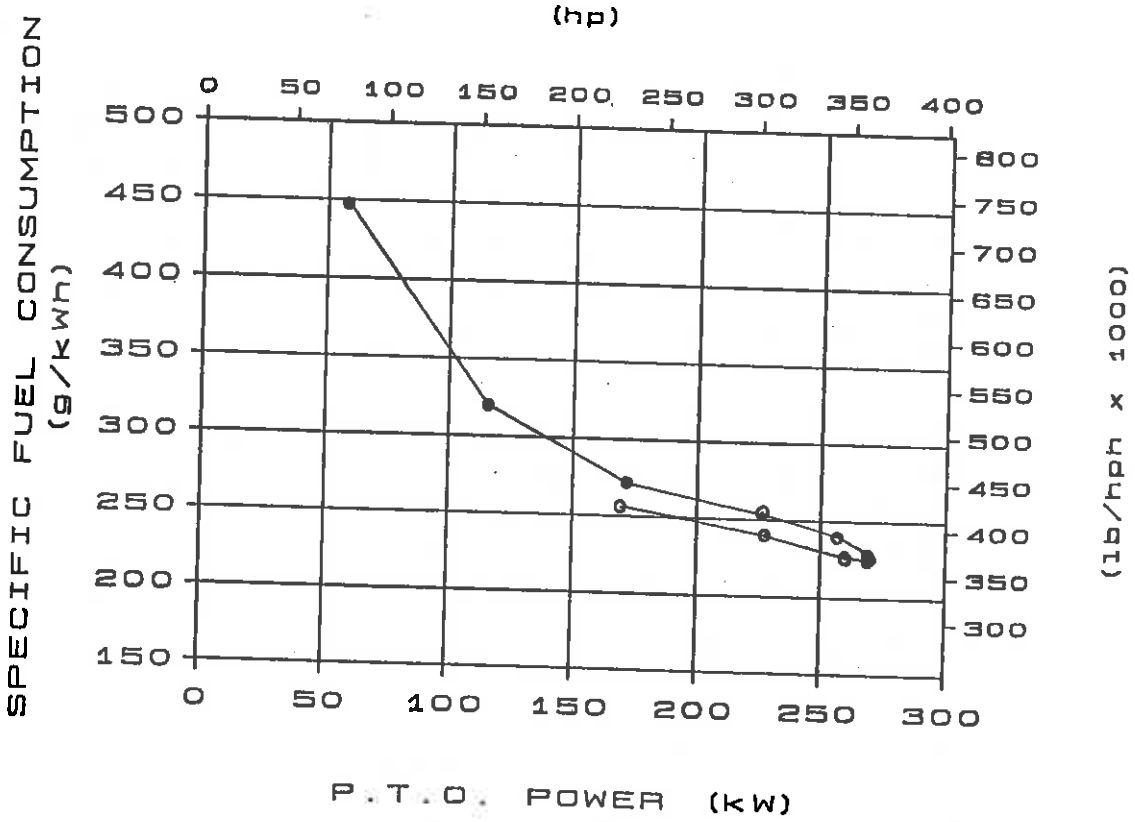
POWER TAKE-OFF TEST

(Metric units)



POWER TAKE-OFF TEST
(English units)

POWER TAKE-OFF PERFORMANCE 9180



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: 14.5 MPa (2110 lb/in^2)
Sustained pressure at compensator cutoff: 17.4 MPa (2531 lb/in^2)

ii) Pump delivery rate at minimum pressure and rated engine speed: 117.3 l/min (31.0 gal/min)

iii)

Pump delivery rate	at maximum power	at 90% of compensator cut off pressure
	103.7 L/min (27.4 gal/min US)	78.7 L/min (20.8 gal/min US)
Delivery Pressure:	14.6 MPa (2120 lb/in^2)	15.7 MPa (2278 lb/in^2)
Power:	25.3 kW (33.9 hp)	20.6 kW (27.6 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	224	777	97.5	14.6	124.6	-
On the frame	224	855	73.5		139.5	7.4 *

Temperature of hydraulic fluid at start of test 65°C
***Tilt angle of mast from vertical position to uppermost position 5.1°**

Lifting heights relative to horizontal lower links											
mm	-344	-300	-200	-100	0	100	200	300	400	430	453
Lifting forces corresponding to 90% of maximum pressure; **15.8 MPa** – at hitch points											
kN		118.0	115.6	113.4	111.2	109.3	107.7	106.1	104.8	104.5	
– at test frame											
kN	116.1	113.3	106.4	100.8	97.3	93.7	90.7	85.9	81.1		78.7
Lifting forces corresponding to pressure at maximum hydraulic power; **14.6 MPa** – at hitch points											
kN		110.1	107.9	105.9	103.8	102.0	100.5	99.0	97.8	97.5	
– at test frame											
kN	108.3	105.7	99.3	94.1	90.8	87.5	84.6	80.2	75.7	50.0	73.5

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	8.8	30.6	21930	2120	92000	-
On the frame	7.9	33.7	16520		102890	7.4 *

Temperature of hydraulic fluid at start of test 65°C (149°F)
***Tilt angle of mast from vertical position to uppermost position 5.1°**

Lifting heights relative to horizontal lower links											
in	-13.5	-11.8	-7.9	-3.9	0	3.9	7.9	11.8	15.7	16.9	17.8
Lifting forces corresponding to 90% of maximum pressure; **2278 lb/in^2** – at hitch points											
lb		26520	26000	25500	25000	24580	24220	23860	23560	23490	
– at test frame											
lb	26100	25470	23920	22670	21870	21070	20400	19320	18240		17700
Lifting forces corresponding to pressure at maximum hydraulic power; **2120 lb/in^2** – at hitch points											
lb		24750	24270	23800	23340	22940	22600	22270	21990	21930	
– at test frame											
lb	24360	23770	22330	21160	20410	19670	19030	18030	17030		16520

3. DRAWBAR PERFORMANCE, Metric Units

Date of Tests: 1987
Type of Track: Concrete

Gear	Speed km/h	Power kW	Drawbar Pull kN	Engine Speed rev/min	Wheel Slip %	Specific Fuel Consumption kg/kWh	Specific Fuel Consumption kWh/L	Temparature, °C Fuel	Temparature, °C Coolant	Temparature, °C Oil	Atmospheric Conditions Temperature °C	Atmospheric Conditions Relative Humidity %	Atmospheric Conditions Pressure mbar
(i) MAXIMUM POWER (unballasted, dual wheels)								Tire inflation pressure: Inner 96 kPa, Outer 82 kPa Height of drawbar above ground: 420 mm					
1	3.33	140.80	152.05	2218	15.08	0.342	2.50	42	83	114	28	39	1012
2	3.98	164.85	149.13	2203	14.95	0.334	2.56	42	83	113	28	42	1012
3	4.76	199.15	150.52	2145	15.02	0.299	2.85	42	86	116	28	44	1012
4	5.13	211.62	148.49	1887	15.06	0.290	2.94	43	88	119	28	44	1012
5	6.42	222.42	124.65	1869	10.48	0.273	3.13	43	88	120	28	56	1012
6	8.14	227.53	100.58	1870	7.85	0.271	3.15	42	87	120	28	56	1012
7	9.43	230.92	88.17	1798	6.85	0.265	3.22	42	88	119	27	58	1012
8	11.80	232.01	70.81	1845	5.29	0.266	3.21	42	87	119	27	60	1012
9	15.14	230.91	54.92	1896	3.96	0.263	3.25	41	86	117	27	60	1012
(ii) MAXIMUM POWER (ballasted, dual wheels)								Tire inflation pressure: Inner 124 kPa, Outer 110 kPa Height of drawbar above ground: 433 mm					
1	3.32	152.19	165.07	2208	15.10	0.345	2.47	45	82	111	24	50	1012
2	3.96	172.63	157.07	2192	15.00	0.339	2.52	44	82	112	25	48	1012
3	4.61	205.38	160.35	2077	15.01	0.298	2.86	40	84	115	24	48	1012
4	5.31	220.76	149.78	1868	11.27	0.273	3.13	41	86	117	25	47	1012
5	6.72	227.80	122.06	1901	7.97	0.269	3.17	41	86	118	25	47	1012
6	7.98	232.13	104.71	1801	6.27	0.265	3.22	41	88	118	27	46	1013
7	9.65	234.91	87.67	1801	4.86	0.262	3.26	41	88	118	27	46	1013
8	11.64	235.63	72.89	1792	3.79	0.259	3.30	43	87	115	27	45	1013
9	15.36	232.29	54.43	1898	2.63	0.266	3.21	40	87	118	27	45	1013
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
6	9.80	213.59	78.51	2160	4.02	0.292	2.93	40	82	114	18	69	1022
(iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
2	4.16	–	157.08	2182	–	–	–	53	84	116	27	62	1009

Total oil consumption during ten hours duration of tests (iii) and (iv) 4 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: July and August 1987
Type of track: Concrete

Gear	Speed mile/h	Power hp	Drawbar Pull lb	Engine Speed rev/min	Wheel Slip %	Specific Fuel Consumption lb/hph	Specific Fuel Consumption hph/USgal	Temparature °F Fuel	Temparature °F Coolant	Temparature °F Oil	Atmospheric Conditions Temperature °F	Atmospheric Conditions Relative Humidity %	Atmospheric Conditions Pressure in Hg
(i) MAXIMUM POWER (unballasted, dual wheels) Tire inflation pressure: Inner 14 psi, Outer 12 psi Height of drawbar above ground: 16.5 in													
1	2.07	188.75	34180	2218	15.08	0.563	12.69	108	181	237	82	39	29.89
2	2.47	220.98	33530	2203	14.95	0.549	12.99	108	181	235	82	42	29.89
3	2.96	266.96	33840	2145	15.02	0.492	14.47	108	187	241	32	44	29.89
4	3.19	283.68	33380	1887	15.06	0.477	14.92	109	190	246	82	44	29.89
5	3.99	298.15	28020	1869	10.48	0.448	15.89	109	190	248	84	56	29.88
6	5.06	305.90	22610	1870	7.85	0.446	15.99	108	189	248	82	56	29.88
7	5.86	309.54	19820	1798	6.85	0.435	16.34	108	190	246	81	58	29.88
8	7.33	311.00	15920	1845	5.29	0.437	16.29	108	189	246	81	60	29.88
9	9.41	309.53	12350	1896	3.96	0.432	16.50	106	187	243	81	60	29.88
(ii) MAXIMUM POWER (ballasted, dual wheels) Tire inflation pressure: Inner 18 psi, Outer 16 psi Height of drawbar above ground: 17.0 in													
1	2.06	204.01	37110	2208	15.10	0.568	12.54	113	180	232	75	50	29.89
2	2.46	231.41	35310	2192	15.00	0.557	12.79	111	180	234	77	48	29.89
3	2.87	275.31	36050	2077	15.01	0.491	14.52	104	183	239	75	48	29.89
4	3.30	295.93	33670	1868	11.27	0.449	15.89	106	187	243	77	47	29.88
5	4.17	305.36	27440	1901	7.97	0.442	16.09	106	187	244	77	46	29.88
6	4.96	311.16	23540	1801	6.27	0.435	16.34	106	190	244	77	46	29.88
7	5.99	314.89	19710	1801	4.86	0.430	16.55	106	190	244	81	46	29.90
8	7.23	315.86	16390	1792	3.79	0.426	16.75	109	189	239	81	45	29.90
9	9.55	311.38	12240	1898	2.63	0.437	16.29	104	189	244	81	45	29.90
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
6	6.09	286.42	17650	2160	4.02	0.480	14.87	104	180	237	64	69	30.17
(iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
2	2.59	-	35320	2182	-	-	-	127	183	241	81	62	29.81

Total oil consumption during ten hours duration of tests (iii) and (iv) 0.009 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	1935 mm (67.2 in)	3360 mm (132.3)
	Rear	1935 mm (67.2 in)	3360 mm (132.3)

	Dual Wheels	
	Left-hand	Right-hand
Radius of turning space, m (in)	7.31 (288)	7.20 (284)
Radius of turning circle, m (in)	6.99 (275)	6.88 (271)

5. LOCATION OF CENTRE OF GRAVITY, single wheels

Height above ground, mm (in)	1421 mm (55.9 in)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	1918 mm (75.5 in)
Distance from the median plane of the tractor, mm (in)	0

6. BRAKING

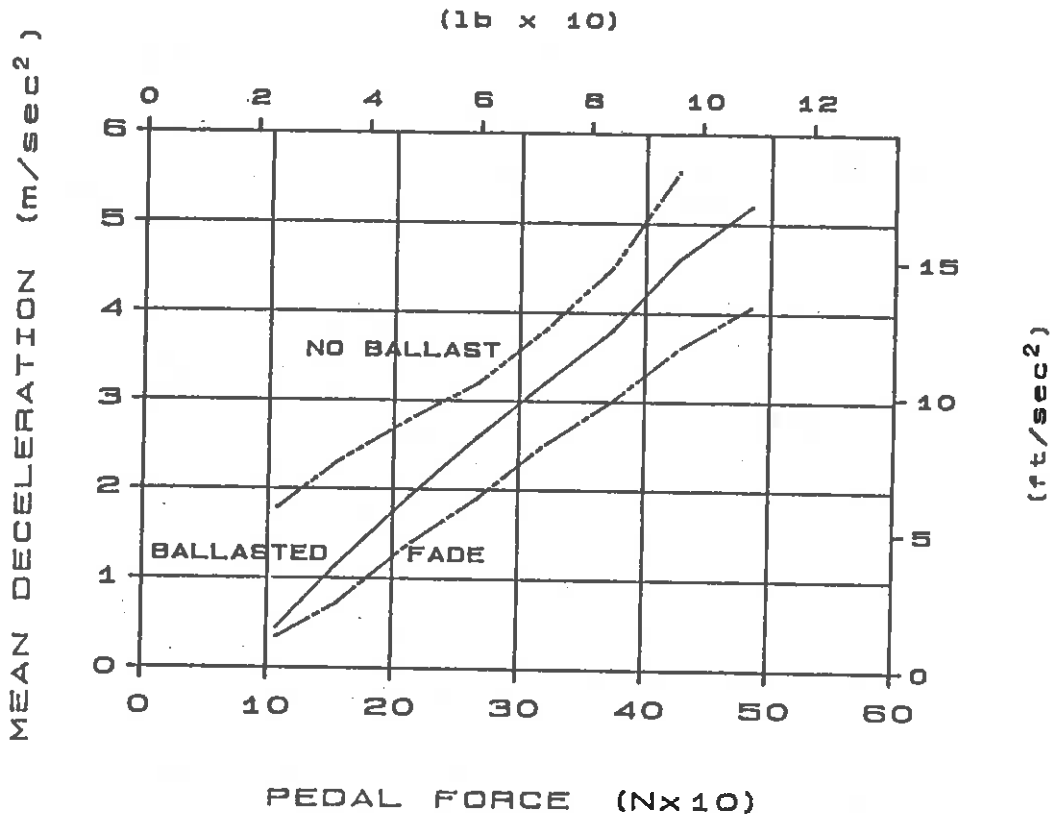
Date of tests: 3rd JUNE 1987

Type of track: Concrete

Masses during brake tests

	Front kg (lb)	Rear kg (lb)	Total kg (lb)
Ballasted	10475 (23100)	7665 (16900)	18140 (40000)
Unballasted	8520 (18780)	7620 (16790)	16140 (35570)

A) Service brakes



Travelling speed before application of brakes, 33.9 km/h (21.0 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 10850 kg (24000 lb)	
	Up	Down	Up	Down
Pull on handbrake N (lb)	67 (15)	67 (15)	67 (15)	67 (15)

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 11th JUNE 1987
Type of sound level meter: Bruel and Kjaer 2218
Type of track: Concrete

Results of tests:

Gear: 12
Travelling speed before acceleration: 25.4 km/h (15.7 mile/h)
Sound level: 95 dBA

OPTIONAL TESTS

8. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: JULY 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*	67.24	(15120)	8.12	(5.04)	80.0
5*	0.24	(50)	8.99	(5.58)	79.0
7	50.80	(11420)	11.98	(7.45)	81.0
9	32.27	(7250)	17.93	(11.14)	81.0
12	No Load		33.9	(21.0)	79.0

*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, P.Eng., Senior Development Engineer
K.A. Carmichael, C.E.T.

Signed: Mitchell Smithers Head of Test Station

for the Director

Date: 19 November 1987