SILSOE RESEARCH INSTITUTE

OECD Report

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CODE 2

Tests in accordance with the OECD RESTRICTED STANDARD CODE for the Official Testing of Agricultural and Forestry Tractors

McCormick (MTX4) MTX 155 Four-Wheel Drive Tractor with 16-speed Transmission (40 km/h)



Manufactured by: McCormick Tractors International Limited
Doncaster
South Yorkshire, DN2 4PG
England

Reference No: 823

Date: August 2002

ENGINEERING for Life

File: 6377/2001

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Tractor manufacturer's name and address:	McCormick Tractors International Limited Doncaster, South Yorkshire, DN2 4PG England
Location of tractor assembly:	Wheatley Hall Road, Doncaster
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running in:	Wheatley Hall Road, Doncaster
Duration of running in:	46 hours
Location of test:	Silsoe Research Institute Wrest Park, Silsoe, MK45 4HS United Kingdom

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1	Make of tractor:	McCormick
	Model (trade name):	MTX 155
	Type:	Four-wheel drive, unit construction
1.1.2	*Numbers*	
	1st Serial No or prototype:	ZT55AC4JJE3360001
	Serial No:	ZT55AC4JJE3360062
1.1.3	*Other specifications (if applicable)*	
	Model(s) for other countries:	None
	Transmission type or gears x ranges:	16 x 12
	Speed version:	40 km/h
	Manufacturer identification or Technical type number:	MTX4

1.2 Engine

Make:	Perkins
Model:	1000 Series
Type:	4-stroke turbocharged direct injection diesel
Serial No:	U773065H

1.2.1 *Cylinders*

Number/disposition:	6 vertical in-line
Bore/stroke:	100mm/127mm
Capacity:	5985 cm^3
Compression ratio:	17.25 :1
Arrangement of valves:	Overhead
Cylinder liners:	Dry

1.2.2 *Supercharging*

Make:	Garrett
Model:	Part No. 2674A092
Type:	Exhaust gas turbo charger
Pressure:	Max 0.200 MPa

1.2.3 *Fuel system*

Fuel feed system:	Direct injection pump
Make, type and model of fuel filter:	Perkins, disposable canisters incorporating fuel and water separator, V1241 Part No. 2656F809
Capacity of fuel tank:	347 dm^3
Make, type and model of injection pump:	Lucas, mechanical, 1188
Serial No:	05589 JUG
Manufacturer's production setting of injection pump:	87.0 ± 3% mm^3 2200min^{-1} (rev/min)
Flow rate (rated engine speed and full load):	34.45 dm^3/h
Timing:	@ TDC ± 2 degrees
Make, type and model of injectors:	Lucas, Body: KF, Nozzle: L060PBA
Injection pressure:	29.4 ± 0.5 MPa

1.2.4 *Governor*

Make:	Lucas
Model:	All speed governor
Type:	Mechanical, Integral with fuel injection pump
Governed range of engine speed:	750 ± 50 to 2345 ± 50 min^{-1} (rev/min)
Rated engine speed:	2200 min^{-1} (rev/min)

1.2.5 *Air cleaner*

Pre-cleaner	None
Location:	
Main cleaner	
Make:	Donaldson
Type:	Alexin radial flow
Model:	Dia 10" FPG-10-0317 with safety element
Location of air intake:	Transverse, top to rear of engine
Maintenance indicator:	Electric warning indicator lamp on instrument panel

1.2.6 *Lubrication system*

Type of feed pump:	Gear driven
Type of filter:	Cartridge
Number:	2

1.2.7 *Cooling system*

Type of coolant:	Water and antifreeze (33% to 50% solution)
Type of pump:	Gear driven
Specification of fan:	Steel blades with central hub and viscous drive
Number of fan blades:	7
Fan diameter:	575 mm
Coolant capacity:	19.5 dm^3
Type of temperature control:	Wax type thermostat
System pressure:	48 kPa

1.2.8 *Starting system*

Make:	ISKRA
Model:	AZJ 3330 12V 3kW Z10.11.130.807
Type:	Pre-engaged, solenoid operated
Starter motor power rating:	3 kW
Cold starting aid:	Flame plug in air intake channel, Option: Ether injection to air intake manifold
Safety device:	Starting operable when forward/reverse lever is in neutral position

1.2.9 *Electrical system*

Voltage:	12 V negative ground
Generator:	
Make:	Bosch
Model:	K1-14 20/95A
Type:	Alternator
Power:	1.5 kW
Batteries	
Number:	2, Low maintenance
Rating:	95Ah

1.2.10 *Exhaust system*

Make:	Donaldson
Model:	Part No. 220159A
Type:	Axial flow (Radial muffler)
Location:	Right hand side, forward of "A" post
Height of outlet above ground:	3020 mm

1.3 Transmission

1.3.1 *Clutch (Travel alone)*

Make:	McCormick France
Model:	None
Type:	Wet multi-plate
Number of plates:	4
Diameter of plates:	127 mm
Method of operation:	Hydraulically operated by pedal or Electro-hydraulically controlled by forward/neutral/reverse lever, integrated in gearbox

1.3.2 *Gear box*

Make:	McCormick France
Model:	None
Description:	Mechanical, power shift; power shift speed change gear with 4 speeds; range gear with 4 synchronized ranges (I,II,III,IV); 2 multi-plate clutches shift reversing gear (power shifted); range IV locked out in reverse operation; 2 levers, 1 switch

	Forward	Reverse
Number of gears	4	4
Number of ranges/groups	I,II,IIII,IV	I,II,III
Total of arrangements	16	12

Available options:	1 synchronized creeper range (CR), acting on all range gears; provides total 32 forward and 24 reverse speeds

1.3.3 *Rear axle and final drives*

Make:	McCormick France
Model:	None
Type:	Bevel gear drive
Differential lock	
Type:	Electro-hydraulic/ Multiplate differential Lock
Method of engagement:	By switch on side console for manual or automatic use
Method of disengagement:	Automatically disengaged by service brake or engine cut off

1.3.4 *Front axle and final drives* (fitted to test tractor)

Make:	Carraro
Model:	20.19
Type:	Rigid axle
Differential lock	
Type:	Limited slip differential
Method of engagement:	Automatic
Method of disengagement:	Automatic

Front axle and final drives (optional)

Make:	Carraro
Model:	20.25
Type:	Suspended with brake option
Differential lock	
Type:	Limited slip differential
Method of engagement:	Automatic
Method of disengagement:	Automatic

1.3.5 *Total ratios and travelling speeds*

Gear	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed:* 2200 rev/min km/h
Forward			
1	I	260.3	2.88
2	I	216.1	3.47
3	I	174.8	4.29
4	I	141.1	5.32
1	II	139.4	5.39
2	II	115.7	6.49
3	II	93.6	8.02
4	II	75.6	9.93
1	III	69.7	10.78
2	III	57.8	12.98
3	III	46.8	16.04
4	III	37.8	19.87
1	IV	35.3	21.26
2	IV	29.3	25.60
3	IV	23.7	31.64
4	IV	19.1	39.20
Reverse			
1	I	224.4	3.35
2	I	186.3	4.03
3	I	150.7	4.98
4	I	121.7	6.17
1	II	120.2	6.25
2	II	99.8	7.52
3	II	80.7	9.30
4	II	65.2	11.52
1	III	60.1	12.50
2	III	49.9	15.05
3	III	40.3	18.61
4	III	32.6	23.05

Range selection: Main gear lever

(*) Calculated with a tyre dynamic radius index of 905 mm

Number of revolutions of front wheels for one revolution of rear wheels: 1.320

1.4 Power take-off

1.4.1 Main power take-off

Type:	Independent
Method of engagement:	Electro-hydraulically operated, electronically controlled by lever
Number of shafts:	1 interchangeable shaft, 6 or 21 splines to ISO 500/1991
Method of changing power take-off speeds:	540 or 1000 min^{-1} (rev/min) selected by hand lever on right-hand console

Clutch

Make:	McCormick France
Model:	McCormick
Type:	Wet multi-plate
Number of plates:	4
Diameter of plates:	127 mm

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 540 min^{-1} (rev/min)

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 in conformity with ISO 500:1991 (available option 21)
Height above ground:	700 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	600 mm
PTO speed at rated engine speed:	633 min^{-1} (rev/min)
Engine speed at standard power take-off speed:	1877 min^{-1} (rev/min)
Ratio of rotation speeds:	3.476
Power restriction:	None
Maximum torque transmissible:	2500 Nm
Direction of rotation (viewed from behind tractor):	Clockwise

Power take-off at 1000 min^{-1} (rev/min)

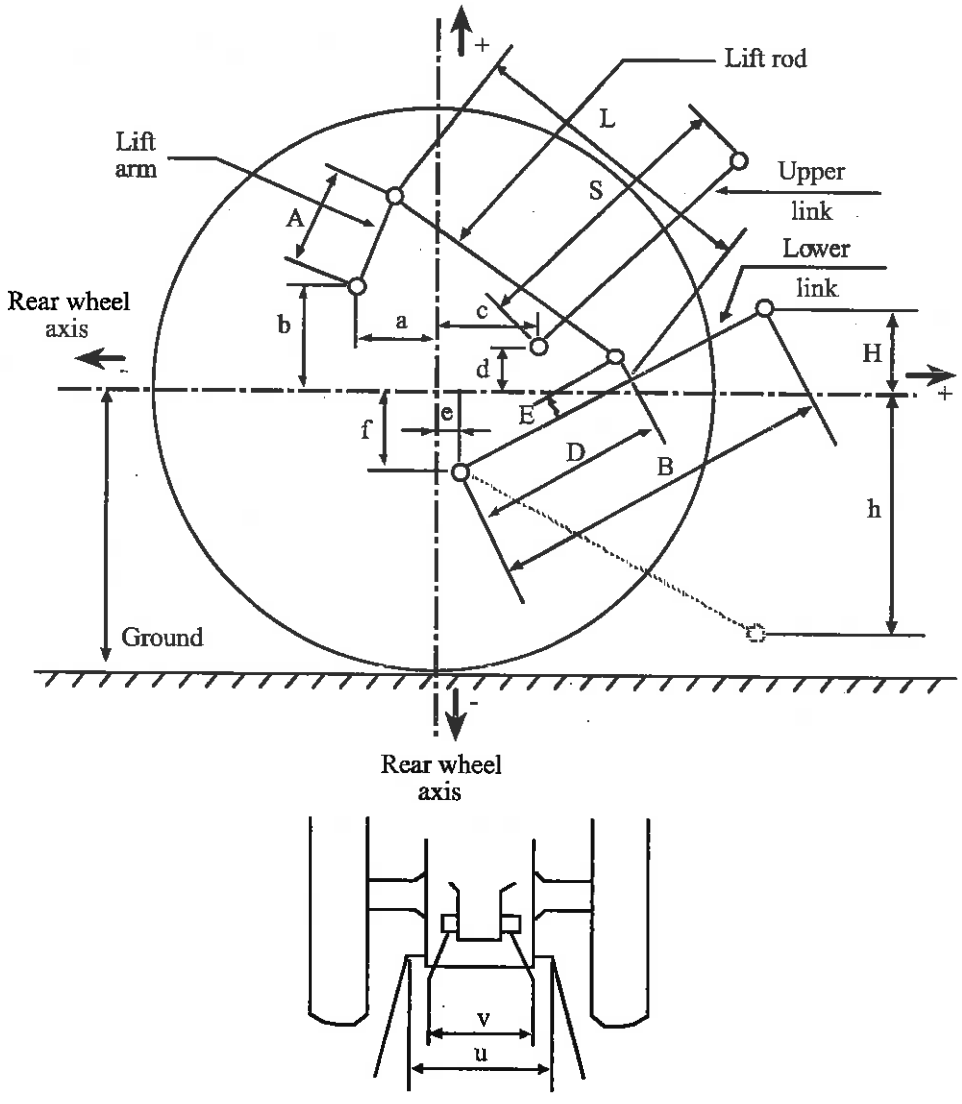
Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	21 in conformity with ISO 500:1991 (available option 6)
Height above ground:	700 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	600 mm
PTO speed at rated engine speed:	1000 min^{-1} (rev/min)
Engine speed at standard power take-off speed:	2200 min^{-1} (rev/min)
Ratio of rotation speeds:	2.200
Power restriction	None
Maximum torque transmissible:	2500 Nm
Direction of rotation (viewed from behind tractor):	Clockwise
1.4.1.2 Power take-off proportional to ground speed	Not applicable

1.5 Hydraulic power lift

Make:	McCormick France
Model:	None
Type:	Piston type, variable displacement closed load sensing system
Type and number of cylinders:	1 inside transmission housing plus the option of 1 external mounted assistor ram (not fitted for test)
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	19.6 – 20.6 MPa
Opening pressure of cylinder safety valve:	23.5 ± 0.7 MPa
Lift pump type:	Pressure flow compensating
Transmission between pump and engine:	Driven by PTO shaft independent of main PTO clutch
Type and number filters:	2, one canister, one cartridge
Site of oil reservoir:	Transmission
Type, number and location of tapping points:	4 remote couplers at rear of tractor
Maximum volume of oil available to external cylinders:	30 dm^3

1.6 Three-point linkage

Category:	3 in conformity with ISO 730-1:1994 + Cor.1:1995
Category adapter:	2 in conformity with ISO 730-1:1994 + Cor.1:1995
Controls:	Draught or position control with lower link sensing



LIFT TEST
Linkage geometry

Fig 2.1

Table 2.1
Dimensions of linkage when attached to the standard frame (ISO 730-1-1994 CAT 2)

			Dimensions or range	Settings used in test
			mm	mm
Length of lift arms:		(A)	410	410
Length of lower links:		(B)	1003	1003
Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	100 450	100 450
Horizontal distance between the two lower link points:		(u)	500	500
Horizontal distance between the two lift arm end points:		(v)	710	710
Length of upper link:		(S)	720 – 926	814
Distance of upper link pivot point from rear wheel centre line:	horizontally: vertically:	(c) (d)	450 200,310	450 200
Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	250 350	250 350
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally:	(D)	675	675
Length of lift rods:		(L)	905 – 1076	1063
Height of lower hitch points (*) Relative to the rear wheel centre line, situated 905mm above the ground level:				
- in low position		(h)	390 – 700	675
- in high position		(H)	58 – 280	65
Height of lower hitch points when locked in transport position (*)			Any height within lift range (hydraulic transport lock)	

*Assuming r = tyre dynamic radius index of 905 mm

1.7 Swinging drawbar (Not fitted to tractor)

(Automatic pick-up hitch with clevis drawbar and separate hook, hydraulic power assisted ram moves equipment out for changeover)

Type:	Clevis	Hook
Height above ground:		
Unballasted Maximum:	484 mm	495 mm
Minimum:	380 mm	---
Type of adjustment:	Inverting drawbar	None
Distance of hitch point from rear-wheel axis, horizontally:	940 mm 1000 mm	690 mm
Distance of hitch point from power take-off shaft end		
Vertically:	216 mm 320 mm	205 mm
Horizontally:	340 mm 400 mm	90 mm
Lateral adjustment (centre of clevis):		
Right-hand:	None	---
Left-hand:	None	---
Distance of pivot point from rear axles horizontally:	Not applicable	---
Width of clevis:	68 mm	
Diameter of drawbar pin hole:	33 mm	
Maximum vertical permissible load:		
Clevis uppermost:	18 kN (Drawbar fully push in)	
Clevis underneath:	18 kN (Drawbar fully push in)	

1.8 Trailer hitch

Type:	Cramer- Kupplung, automatic
Hole diameter:	25 mm
Height above ground:	684 mm 784 mm 884 mm 934 mm 984 mm
Distance of hitch point from rear-wheel axis, horizontally:	755 mm
Distance of hitch point from power take-off shaft end	
Vertically:	-16 mm 84 mm 184 mm 234 mm 284 mm
Horizontally:	155 mm
Maximum vertical permissible load:	20 kN

1.9 Holed drawbar

Type:	None fitted

1.10 Steering

Make:	McCormick
Model:	None
Type:	Hydrostatic servo steering unit, load sensing
Method of operation	
Pump:	Danfoss optional Eaton, Rexroth
Motor:	OSPD 60/185 LSR DYN (Danfoss) Optional OSPD 60/220 LSR (Danfoss) 263-4325-002 (Eaton) LAGU 160/80-11 LDR 240-M06-405S (Rexroth) LAGZ 220/60 LDR 240- M06-405S (Rexroth)
Ram:	Integrated into axle
Filter:	Integrated into transmission
Working pressure:	18.3 MPa

1.11 Brakes

1.11.1 *Service brake*

Make:	McCormick
Model:	None
Type:	Oil-immersed multi plate discs
Method of operation:	Pedal operated muscle power brake with hydraulic transmission, using oil of gear box, acting on rear wheels, front axle drive is engaged automatically during braking
Trailer braking take-off:	Compressed air, one line and two-line system, couplings at rear of tractor

1.11.2 *Parking brake*

Type:	Mechanical wet disc
Method of operation:	Hand lever with ratchet

1.12 Wheels

Number: 4

Front: 2 driving/steering

Rear: 2 driving

Wheelbase: 2850 mm

Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
**Front	*1530	*2230	In steps of 100mm by adjustable gauge bowl and by turning wheels
**Rear	1530	2230	In steps of 100mm by adjustable gauge bowl and by turning wheels

* Track settings of 1530 and 2230 are not possible with front fenders fitted

** EEC Member States only
Overall widths above 3000mm WILL require local authorization for use on the highway
An overall width of 2550mm to 3000mm MAY require local authorization for use on the highway
In certain countries the maximum width MAY NOT be allowed on the highway

1.13 Protective structure

Make: CASE IH

Model: MX30

Type: Cab safety frame

Manufacturer's name and address: McCormick France
BP 109 59964 Croix Cedex, France

Protective device

Tiltable/Not tiltable: Not tiltable

OECD approval

Approval number: 4/0 522/1

Date of approval: 18 September 2002

Nos. minor modification certificates, if any: 1

1.14 Seat

1.14.1 *Driver's seat*

Make/model/Type:	Grammer MSG 95A/31
Seat and steering wheel reversible:	No
Type of suspension:	Pneumatic suspension with automatic weight adjustment
Type of damping:	Hydraulic shock absorber
Range of adjustment:	
Longitudinal:	215 mm
Vertical:	120 mm
Safety belt:	No

1.14.2 *Optional driver's seat(s)* Grammer DS85H/7L,Grammer DS85H/90A

1.14.3 *Passenger seat*

Make:	McCormick (optional)
Location:	Plastic moulded folding seat on left-hand side of inner fender
Capacity (numbers):	1

1.15 Lighting

	Height above ground to centre mm	**Size mm**	**Distance from outside edge of lights to median plane of tractor mm**
Headlights	1385	175 x 90	230
Sidelights	1913	110 x 35	880
Rear lights	1935	65 x 60	805
Rear fender reflectors	1935	50 x 60	857
Axle reflectors	820	105 x 55	656

2 TEST CONDITIONS

2.1 Overall dimensions

	Length	Width		Height at top of	
	mm	Minimum mm	Maximum mm	Protective structure mm	Exhaust pipe mm
Unballasted	5035	2495	2495	3040	3020

2.2 Ground clearance (unballasted tractor) 272 mm

Clearance-limiting part: Drawbar clevis in lowest position

2.3 Tractor mass

Mass (with or without frame/roll guard/cab/other): With cab

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	2744	2759	---	---
Rear	4567	4627	---	---
Total	7311	7386	---	---

2.4 Track specifications Not applicable

2.5 Tyres and track width specification

	Front	Rear
Tyres Dimensions ply rating type	 540/65 R 30 143 A8 Radial	 650/65 R 42 153 A8 Radial
Maximum load (tyre manufacturer's)	27.9 kN	34.8 kN
Maximum load (tractor manufacturer's)	22.9 kN	32.8 kN
Inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
Dynamic radius index	695 mm	905 mm
Chosen track width (manufacturer's nominal)	1800 mm	1750 mm

2.6 Fuel

Type: Diesel oil to Class D, 1.5 to 5.5 cSt.

Density at 15° C: 0.8413 g/cm^3

2.7 Oils and lubrication

2.7.1 *Capacity and change interval*

	Capacity dm^3	Oil change h	Filter change h
Engine	13.5	300	300
Front axle differential (MFD)	6.0	1200	--
Front axle differential (Suspended)	2.2	1200	--
Front axle hub (each) (MFD)	1.5	1200	--
Front axle hub (each) (Suspended)	1.5	1200	--
Gearbox	75.0	1200	1200
Rear axle Hydraulic system Final drives (rear) Steering	Integral with gearbox		
Brakes	Integral with transmission	1200	--

2.7.2 *Specifications*

Oils	Recommended	Used during test
Engine oil Type: Viscosity Classification:	McCormick SAE 15W-40 API CG4 or CF-4	As recommended
Transmission oils Type: Viscosity Classification:	McCormick Kinematic Viscosity @ 100°C 6.4 cSt None	As recommended
Rear final drives Type: Viscosity: Classification:	McCormick Kinematic Viscosity @ 100°C 6.4 cSt None	As recommended
Front differential and final drives Type: Viscosity: Classification:	McCormick SAE 85W-140 Gear oil API GL-5	As recommended
Hydraulic brakes Type: Viscosity: Classification:	McCormick Kinematic Viscosity @ 100°C 6.4 cSt None	As recommended
Hydraulic fluid Type: Viscosity: Classification:	McCormick Kinematic Viscosity @ 100°C 6.4 cSt None	As recommended
Steering oil Type: Viscosity: Classification:	McCormick Kinematic Viscosity @ 100°C 6.4 cSt None	As recommended

2.7.3 *Grease*

Type: Multi purpose

Number of lubrication points: 10

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

Date and location of tests: 27 June 2002
Silsoe Research Institute
Wrest Park, Silsoe, Bedford

Type of dynamometer bench: Eddy Current, Borghi and Saveri

Power	Speed		Fuel consumption			Specific Energy
	Engine	P.T.O.	Hourly		Specific	
kW	min^{-1} (rev/min)		kg/h	l/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER – TWO-HOUR TEST						
107.4	2072	942	28.26	33.59	263	3.20
3.1.2 POWER AT RATED ENGINE SPEED						
105.3	2201	1000	28.93	34.38	275	3.06
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000 ± 25 min^{-1} (rev/min)]						
105.3	2201	1000	28.93	34.38	275	3.06
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
105.3	2201	1000	28.93	34.38	275	3.06
3.1.4.2 85% of torque obtained in 3.1.4.1						
93.4	2301	1046	27.08	32.19	290	2.90
3.1.4.3 75% of torque defined in 3.1.4.2						
70.7	2324	1056	23.05	27.40	326	2.58
3.1.4.4 50% of torque defined in 3.1.4.2						
47.5	2340	1064	18.55	22.05	391	2.15
3.1.4.5 25% of torque defined in 3.1.4.2						
23.9	2351	1069	13.57	16.13	567	1.48
3.1.4.6 unloaded						
0	2361	1073	8.23	9.79	-	-
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED [1000± 25 min^{-1} (rev/min)] 3.1.5.1 the torque corresponding to maximum power						
105.3	2201	1000	28.93	34.38	275	3.06
3.1.5.2 85% of torque obtained in 3.1.5.1						
93.4	2301	1046	27.08	32.19	290	2.90
3.1.5.3 75% of torque obtained in 3.1.5.2						
70.7	2324	1056	23.05	27.40	326	2.58
3.1.5.4 50% of torque obtained in 3.1.5.2						
47.5	2340	1064	18.55	22.05	391	2.15
3.1.5.5 25% of torque obtained in 3.1.5.2						
23.9	2351	1069	13.57	16.13	567	1.48
3.1.5.6 unloaded						
0	2361	1073	8.23	9.79	-	-

No load maximum engine speed: 2361 min^{-1} (rev/min)

Torque (equivalent crankshaft) at maximum power: 494.4 Nm

At rated engine speed: 457.0 Nm

Maximum torque (equivalent crankshaft): 622.2 Nm
(engine speed: 1250 min^{-1} (rev/min)

Mean atmospheric conditions:	
Temperature	24 °C
Pressure	98.3 kPa
Relative humidity	33 %
Maximum temperatures:	
Coolant	89 °C
Engine oil	101 °C
Fuel	62 °C
Engine air intake	32 °C

3.2 Hydraulic power and lifting force

Date of tests: 17 July 2002

3.2.1 *Hydraulic power test*

Sustained pressure with relief valve open: 19.6 MPa

Pump stalled: Not applicable

Pump delivery rate at minimum pressure 96.05 l/min

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	70.46	17.6	20.67
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	90.05	16.5	24.76

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid,
if different from 65 ± 5°C Not applicable

Opening pressure of the unloading valve: Not applicable

Closing pressure of the unloading valve: Not applicable

3.2.2 Power lift test – (To ISO 730-1:1994)

Maximum pressure in the lift cylinder 20.2 MPa

Linkage settings for test – see Table 2.1 and Figures 2.1 and 2.2.

	At the hitch point	on the frame
Height of lower hitch points above ground in down position	230 mm	230 mm
Vertical movement	740 mm	893 mm
Maximum corrected force exerted through full range	63.9 kN	55.1 kN
Corresponding pressure of hydraulic fluid	18.2 MPa	18.2 MPa
Moment about rear-wheel axis	80.1 kNm	102.6 kNm
Maximum tilt angle of mast from vertical	----	10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-390	-325	-200	-100	0	+75	+175	+275	+375	+415	+503
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	--	63.9	66.0	69.3	72.3	73.7	75.4	76.9	77.4	76.0	--
Corresponding pressure: 18.2 MPa											
at the frame kN	58.9	59.0	59.9	61.2	61.9	61.6	61.1	59.6	57.1	55.1	55.1
Corresponding pressure: 18.2 MPa											

3.3 Drawbar power test (unballasted tractor)

Date and Location of tests: 12 August 2002
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted	345	86	86

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels or track	Specific fuel cons	Specific Energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temp	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.1	MAXIMUM POWER IN TESTED GEARS												
1.I	55.6	74.1	2.70	2322	13.0	403	2.09	59	88	96	22	54	101.0
2.I	67.4	72.8	3.33	2309	10.3	360	2.34	59	88	97	21	55	101.0
3.I	83.3	71.7	4.18	2283	7.9	333	2.53	61	88	99	20	58	101.0
4.I	92.6	66.5	5.01	2160	5.7	308	2.73	60	88	99	20	64	100.8
1.II	92.7	66.0	5.05	2154	5.9	306	2.75	59	88	98	19	62	100.8
2.II	94.9	57.3	5.96	2066	4.0	293	2.87	60	89	99	20	61	101.0
3.II	95.2	46.0	7.46	2070	2.9	294	2.86	61	88	101	20	59	100.9
4.II	94.2	36.4	9.30	2071	2.3	298	2.83	60	87	98	21	58	101.0
1.III	94.7	33.8	10.10	2068	2.1	294	2.86	60	89	99	20	60	101.0
2.III	93.1	27.4	12.21	2070	1.8	301	2.80	60	89	101	19	67	100.8
3.III	89.5	21.3	15.13	2067	1.4	310	2.72	61	89	101	19	66	100.8
3.2	FUEL CONSUMPTION												
3.2.1	In selected gear, at maximum power at rated speed												
3.II	93.5	42.3	7.95	2201	2.7	304	2.77	57	90	100	20	62	100.9
3.2.1.1	75% of pull at maximum power at rated speed												
3.II	74.2	31.8	8.39	2308	2.0	341	2.47	57	88	96	20	61	100.9
3.2.1.2	50% of pull at maximum power at rated speed												
3.II	50.2	21.2	8.52	2330	1.5	420	2.00	59	87	93	20	59	100.9
3.2.1.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1												
4.II	74.2	31.8	8.40	1865	2.1	287	2.93	60	87	97	21	55	101.0
3.2.1.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2												
4.II	50.2	21.2	8.53	1882	1.4	330	2.55	59	86	94	21	56	101.0
3.2.2	In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed												
3.II	93.5	42.3	7.95	2201	2.7	304	2.77	57	90	100	20	62	100.9
3.2.2.1	75% of pull at maximum power at rated speed												
3.II	74.2	31.8	8.39	2308	2.0	341	2.47	57	88	96	20	61	100.9
3.2.2.2	50% of pull at maximum power at rated speed												
3.II	50.2	21.2	8.52	2330	1.5	420	2.00	59	87	93	20	59	100.9
3.2.2.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1												
4.II	74.2	31.8	8.40	1865	2.1	287	2.93	60	87	97	21	55	101.0
3.2.2.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2												
4.II	50.2	21.2	8.53	1882	1.4	330	2.55	59	86	94	21	56	101.0

4. OPTIONAL TESTS RESULTS None

5. REPAIRS AND ADJUSTMENTS DURING TESTS: None

6. REMARKS: None

Test carried out by: S J Devonshire

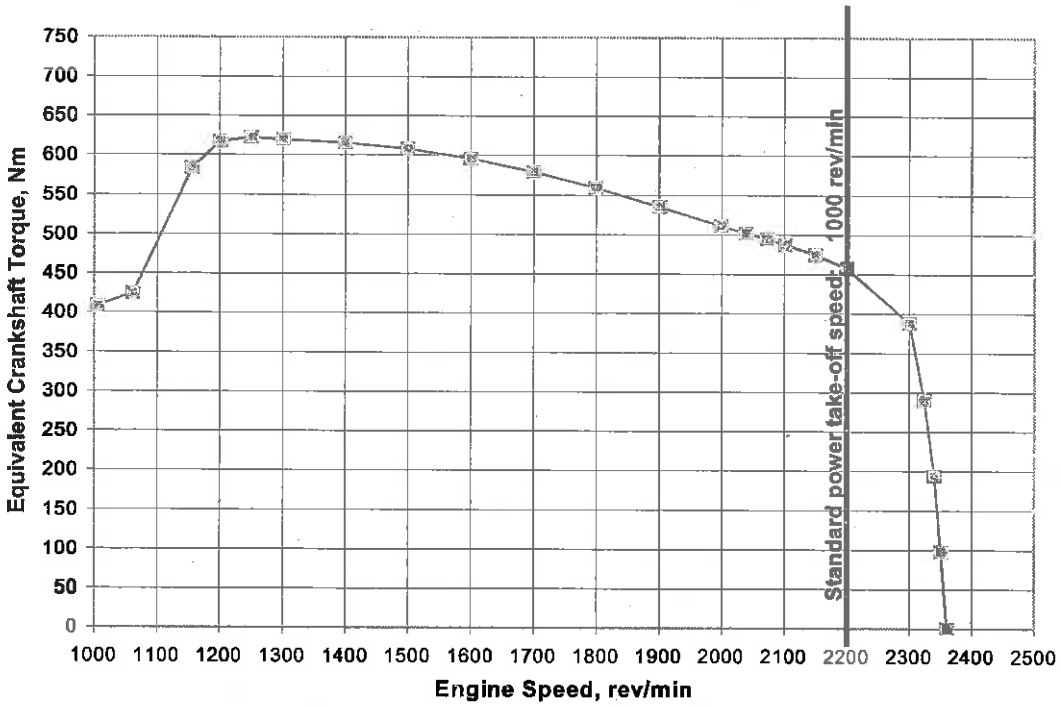
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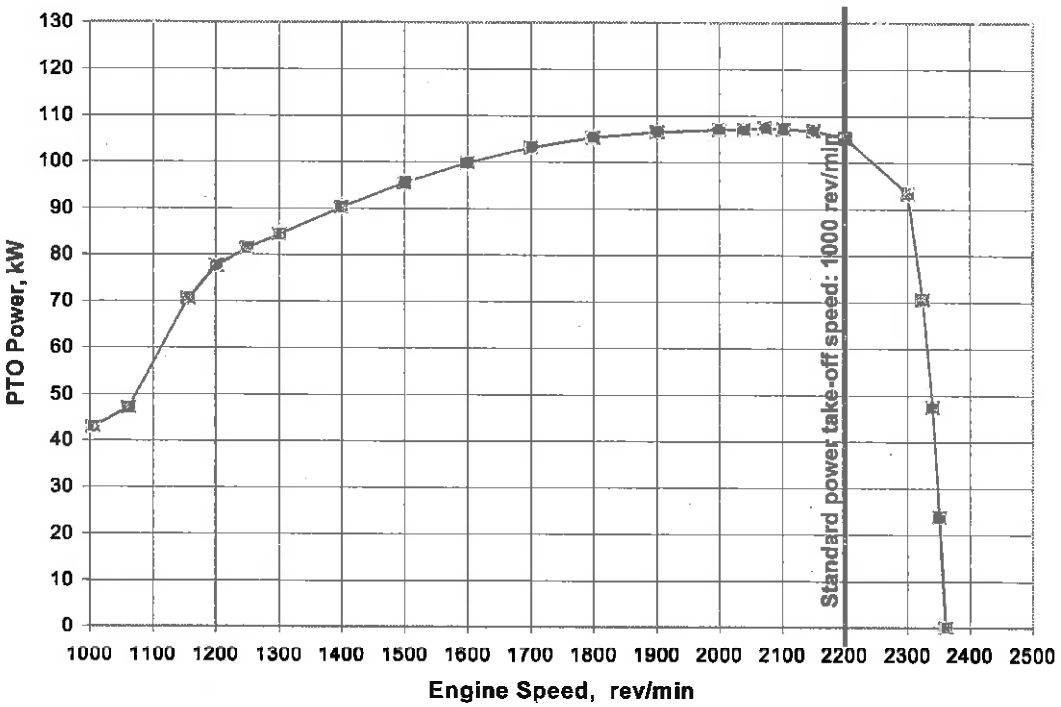


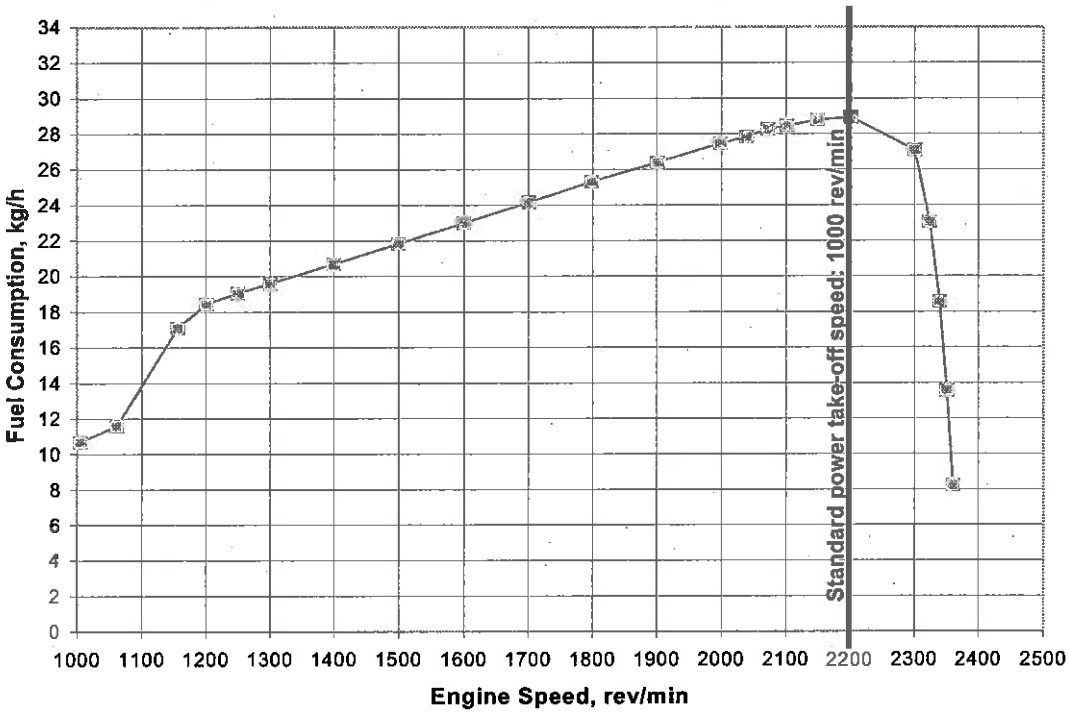
J P Evans
Senior Test Engineer
Field Machinery Group

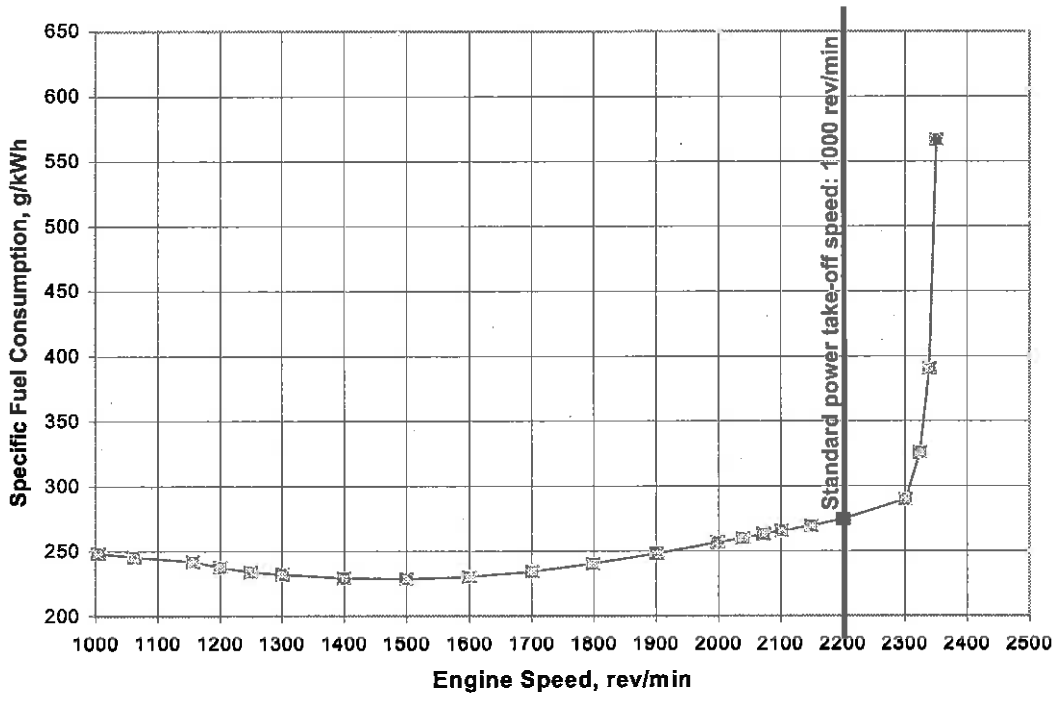
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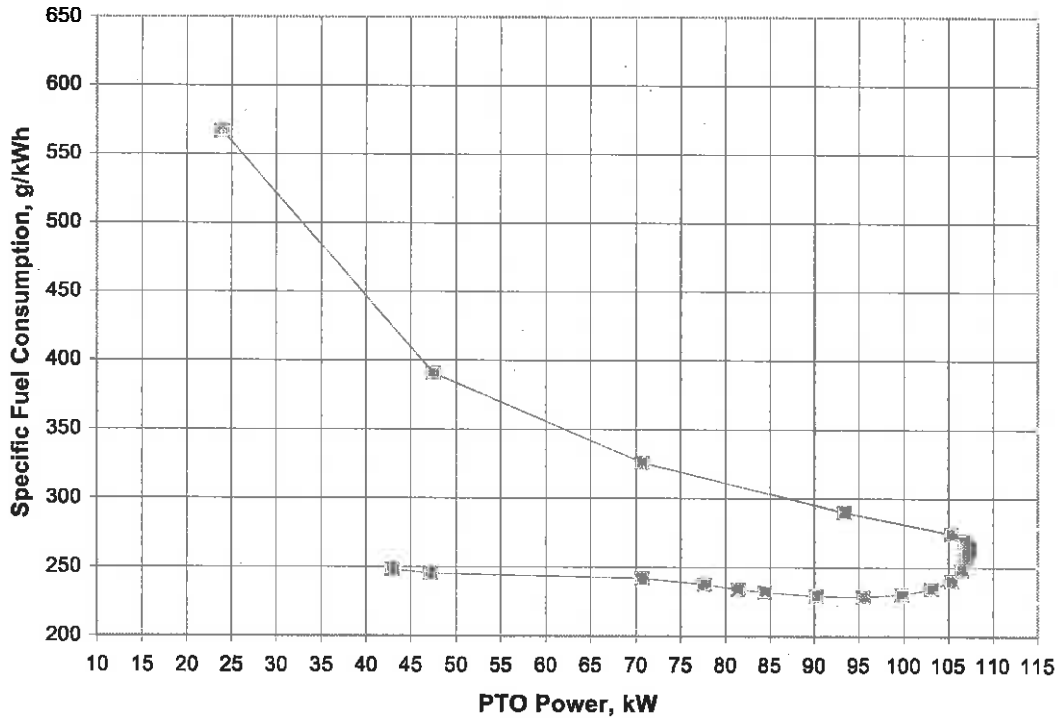
7. ANNEX 1 MAIN POWER TAKE-OFF CURVES






Fuel Consumption, kg/h
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Engine Speed, rev/min
Standard power take-off speed: 1000 rev/min


Specific Fuel Consumption, g/kWh
650
600
550
500
450
400
350
300
250
200
1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Engine Speed, rev/min
Standard power take-off speed: 1000 rev/min


Specific Fuel Consumption, g/kWh
650
600
550
500
450
400
350
300
250
200
10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115
PTO Power, kW