CAMTC

Report on test in accordance with the OECD STANDARD CODE I for the Official Testing of Agricultural Tractor Performance

OECD Approval No : 1602 FULL CODE
Approval Date: 4.Mar.1996



XINJIANG–500(2WD) TRACTOR
Manufactured by: Xinjiang Shiyue Tractor Factory
Urumqi, Xinjiang, China
Test No: 95OS204
Date of test: Oct. 1995

China Agricultural Machinery Testing Centre
40 Shi Li He Donghuan Nanlu
100021, Beijing, China

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- Tractor manufacturer's name and address:	Xinjiang Shiyue Tractor Factory Urumqi,Xinjiang,China
- Location of tractor assembly:	The manufacturer
- Submitted for test by:	The manufacturer
- Selected for test by:	The manufacturer with the agreement of the CAMTC
- Place of running-in:	the manufacturer
- Duration of running-in:	40 h
- Location of test:	CAMTC, Beijing, China

I. SPECIFICATION OF TRACTOR

TRACTOR

- Make:	XIN JIANG
- Model:	500
- Type:	2WD
- Number of driving wheels:	2
- Serial No :	94701
- lst serial No :	304

ENGINE

- Make / Model / Type:	Shanghai Tractor & Internal Combustion Engine Corporation,495A-37,4 stroke,Water cooling, indirect injection,naturally aspirated,spherical combustion chamber
- Serial No :	3892

Cylinders

- Number / disposition:	4, vertical
- Bore / stroke:	95 / 115 mm / mm
- Capacity:	3260 cm^3
- Compression ratio:	16.5 / 1
- Arrangement of valves:	Overhead, in line
- Cylinder liners:	Dry

Fuel system

- Fuel feed system:	Forced feed by pump
- Make / Model / Type of fuel filter(s):	Huangpu Automobile Accessory Works, C0708,paper cartridge,replaceable
- Capacity of fuel tank:	72 dm^3
- Make / Model / Type of injection pump:	Shanghai Injector and Plunger Pump Works, No. I, plunger pump
- Serial No	93041268
- Manufacturer's production setting of injection pump:	
• Flow rate (rated engine speed and full load):	10.0 dm^3 / h
• Timing:	25 ° ~27 ° before T.D.C.
- Make / Model / Type of injectors:	Shanghai Injector and plunger pump Works,Long-neck closed single hole
- Injection pressure:	17.2 ± 0.5 MPa
- Make / Model / Type of carburettor:	/

Governor

- Make / Model / Type:	Shanghai Injector and plunger pump Works steel-ball,all-speed,centrifugal,Incorporated into fuel injection pump
- Governed range of engine speed:	From 550 to 2160 rev / min
- Rated engine speed:	2000 rev / min

Air cleaner

- Pre-cleaner	
• Make / Model / Type:	Shanghai Automobile accessory Works,Centrifugal
• Location of air intake:	Left-hand side of engine
- Main cleaner	
• Make / Model / Type:	Shanghai Automobile accessory Works, oil bath with mesh screen
- Maintenance indicator:	None

Lubrication system

- Type of feed pump:	Rotor
- Type of filter(s):	Full flow,Paper, replaceable
- Number:	1

Cooling system

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- Type of coolant:	Water
- Type of pump:	Centrifugal, belt driven
- Specification of fan or blower:	Axial flow type, belt driven
- Number of fan blades:	4
- Fan diameter:	380 mm
- Coolant capacity:	12 dm^3
- Type of temperature control:	Thermostat
- Superpressure system:	None

Starting system

- Make / Model / Type:	Shanghai Automobile Electrical Machinery Factory,2Q2CD.C solenoid engaged
- Starter motor power rating:	1.84 kW
- Cold starting aid:	Electrothermal plug
- Safety device:	Main shift lever in neutral position

Electrical system

- Voltage:	12 V
-Generator	
• Make / Model / Type:	Shanghai Automobile Electrical Machinery Factory,JF121,Alternator,belt driven
• Power:	0.2 kW
- Battery (number of accumulators) :	3-QA-150,2
• Rating:	150 Ah at 20 hours

Exhaust system

- Make / Model / Type:	Shanghai Tractor & Internal combustion Engine Corporation,expension type silencer, Vertical
-Location:	Left-hand side of engine

TRANSMISSION TO WHEELS

Clutch(travel and power take-off)

- Make / Model / Type:	Xinjiang Shiyue Tractor Factory,dry,dual-acting
- Number of plates:	2
- Diameter of plates:	280 mm
- Method of operaton:	Mechanically,by pedal

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Gear box

- Make / Model / Type: Xinjiang Shiyue Tractor Factory,mechanical
- Arrangement: GEAR BOX with 4 forward and 1 reverse speed GROUP GEAR with 2 ranges (Low and High)
- Number of gears: 7 forward and 2 reverse
- Available options: Creeper device,2

Rear axle and final drives

- Make / Model / Type: Xinjiang Shiyue Tractor Factory,spiral bevel gear set with differential, spur gear final drives installed inside
- Differential lock:
  - Type: Sliding gear
  - Method of engagement: By pedal
  - Method of disengagement: Self-disengaging

Front axle and final drives

- Make / Model / Type: Xinjiang Shiyue Tractor Factory, balanced arm type

Total ratios and travelling speeds

Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*) at rated engine speed of 2000 rev / min km / h
1	L1	100.40	5.03
2	H1	73.63	6.85
3	L2	58.00	8.71
4	H2	42.61	11.86
5	L3	32.20	15.70
6	H3、L4	23.67	21.34
7	H4	16.57	29.23
R1	L	78.60	6.43
R2	H	57.76	8.75

(*)Calculated with a tyre dynamic radius index of 670 mm(ISO 4251 / 1-1992)

POWER TAKE-OFF

main power take-off

- Type:	Semi-independent
- Method of engagement	Driven by the 2nd Plate of the main clutch
- Number of shafts:	1
- Method of changing power take-off shaft ends speeds:	None

Power take-off proportional to engine speed

540 rev / min

- Location:	At rear of the tractor
- Diameter of power take-off shaft end:	38 mm
- Number of splines:	8, not in conformity with ISO 500 / 1991
- Height above ground:	560 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear wheel axis:	366 mm
- PTO speed at rated engine speed (2000 rev / min):	542 rev / min
- Engine speed at standard power take-off speed:	1994 rev / min
- Ratio of rotation speeds (engine speed / p.t.o speed):	3.6923
- Power restriction and maximum torque:	32.5 kW 660 N · m
- Direction of rotation (Viewed from behind tractor):	Clockwise

Power take-off proportional to ground speed

- PTO speed	540 rev / min
- Travelling distance for one revolution of power take-off shaft:	115~902 mm
- Number of power take-off shaft revolutions for one revolution of (rear) driving wheels:	4~27

Optional power take-off

– Location:	Left-hand side of tractor
– Diameter of power take-off shaft end:	28 mm
– Number of splines:	Flat spline 8 × 4
– Height above ground:	823 mm
– Distance behind rear wheel axis:	180 mm
– PTO speed at rated engine speed (2000 rev / min):	104～625 rev / min
– Ratio of rotation speeds (engine speed / p.t.o speed):	3.2～19.2
– Direction of rotation (viewed from behind tractor):	Colckwise

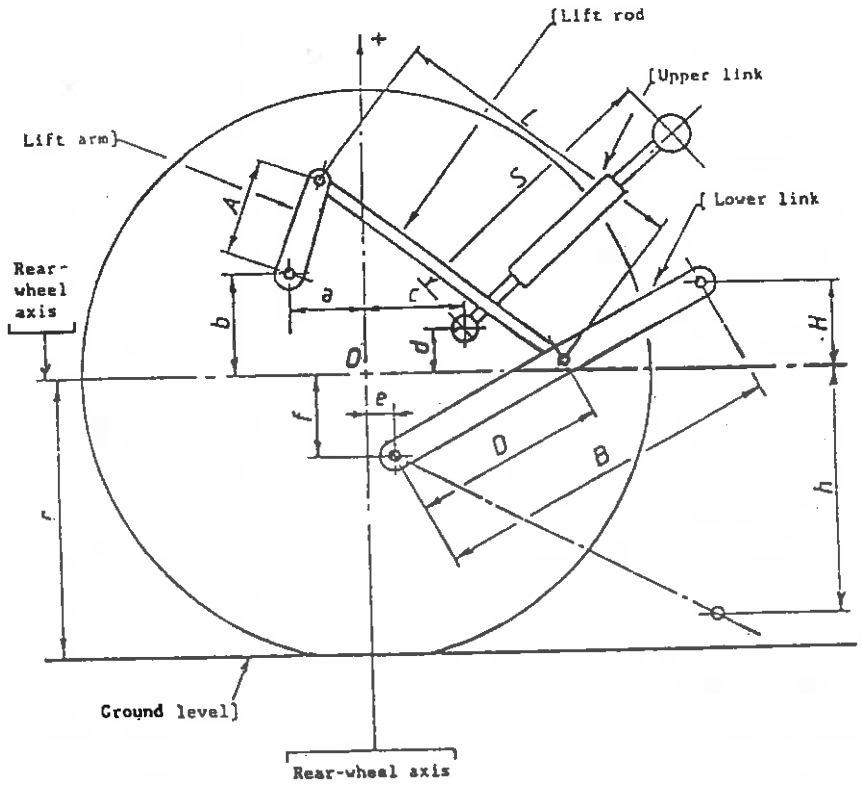
POWER LIFT

– Make / Model / Type:	Xinjiang Shiyue Tractor Factory
– Type of hydraulic system:	Separated units,open centre system
– Type and number of cylinders:	Single acting, 1
– Type of linkage lock for transport:	Hydraulic lock
– Relief valve pressure setting (tolerance):	$16^{+0.5}$MPa
– Opening pressure of cylinder safety valve (if fitted):	None
– Lift pump type:	CBN-E316 gear pump
– Transmission between pump and engine:	Gear, driven from gear box
– Type and number of filters:	Screen filter, 1
– Site of oil reservoir:	Left-hand side of driver seat
– Type, number and location of tapping points:	Hydraulic quick coupler,2, at rear of the tractor
– Maximum volume of oil available to external cylinders:	$12dm^3$

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Three-point linkage

- Category: 2, in conformity with categories 2 of ISO 730 / 1-1990
- Category adapter: None



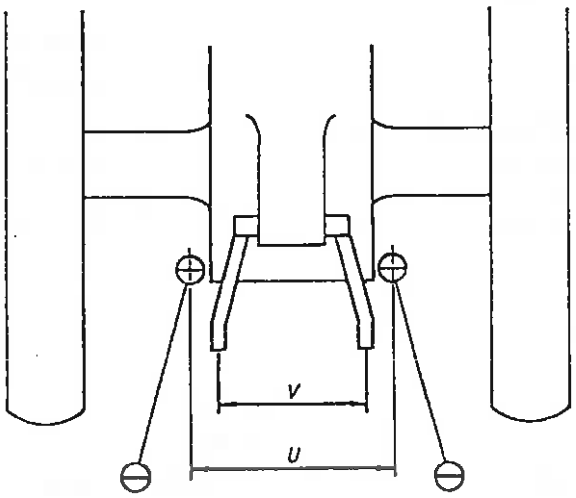


Table 1-Dimensions of linkage geometry (when connected to the standard frame)

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	265	
Length of lower links	(B)	804	
Distance of lift arm pivot : horizontally	(a)	388	
point from rear wheel axis : vertically	(b)	340	
Horizontal distance between the 2 lower link points	(u)	467	
Horizontal distance between the 2 lift arm end points	(v)	593	
Length of upper link	(S)	from 550 to 800	570
Distance of upper link pivot point from rear : horizontally	(c)	515、527、539	539
wheel axis: vertically	(d)	79、115、151	151
Distance of lower link pivot point from rear : horizontally	(e)	282	
wheel axis: vertically	(f)	245	
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	366、506	366
Length of lift rods	(L)	from 557 to 400	508
Height of lower hitch points relative to the rear wheel axis:			
- in low position	(h)	from 360 to 511	473
- in high position	(H)	from 140 to 348	127
Height above ground of lower hitch points when locked in transport position(*)		from 810 to 1013	

(*)Assuming (r) = tyre dynamic radius index of 670 mm (ISO 4251 / 1-1992).

HOLED DRAWBAR

- Number of holes: 7
- Distance between holes: 80 mm
- Hole diameter: 32 mm
- Thickness / width of the drawbar: 32 / 120 mm / mm

- Height above ground
  - Minimum: 410 mm
  - Maximum: 1063 mm
- Horizontal distance to power take-off shaft end (rear): 844 mm

STEERING

- Make / Model / Type: Xinjiang Shiyue Tractor Factory, Worm and roller

Method of operation: Manual operated

BRAKES

Service brake

- Make / Model / Type: Xinjiang Shiyue Tractor Factory,band type
- Method of operation: Operated by pedals, coupled or independent
- Trailer braking take-off (hydraulic of air brake): Air brake,operated by tractor pedals

Parking brake

- Type: Mechanical
- Method of operation: Pedals locked by ratchet

WHEELS

- Number
  - Front: 2 steering
  - Rear: 2 driving
- Wheelbase: 2320 mm

- Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1225	1665	telescopic axlie
Rear	1400	1800	Reversing wheels and off-set lug rims

DRIVER'S SEAT

- Make / Model / Type: Xinjiang Shiyue Tractor Factory
- Type of suspension: Shock absorber
- Type of damping: Spring
- Range of adjustment
  - Longitudinal: 150 mm
  - Vertical: 110 mm

LIGHTING

	Height above ground of centre mm	Size mm	Distance from outside side edge to median plane of tractor mm
Headlights	1026	90 × 140	215
Sidelights	1440	80 × 80	740
Rearlights	1440	Φ115	375
Reflectors	1440	82 × 110	664

II、TEST CONDITIONS

Overall dimensions

	Length	width		height at top of	
		minimum	maximum	Protective structure	exhaust silencer
	mm	mm	mm	mm	mm
Ballsted	4245	2300	2300	/	2280
Unballasted	4125	2300	2300	/	2282

Ground clearance(unballasted tractor): 370 mm

- Clearance-limiting part: Under the rear axle housing

Tractor mass (without frame):

	Ballasted		Unballasted	
	without driver kg	with driver kg	without driver kg	with driver kg
Front	1088	1088	910	909
Rear	1854	1929	1662	1738
Total	2942	3017	2572	2647

Ballast

	Weights		water kg
	Number	Total mass kg	
Front	12	138	/
Rear	8	232	/
Optional	/	/	/

Tyres and track width specifications

	Front	Rear
Tyres:		
• dimensions	6.50-16	14-28
• ply rating	6	8
• type	Cross ply	Cross ply
• maximum load (tyre manufacturer's)	5.83 kN	15 kN
• maximum load (tractor manufacturer's)	5.10 kN	13 kN
• inflation pressure (tyre manufacturer's)	245 kPa	137 kPa
• dynamic radius index	348mm	670mm
Chosen track width:	1300mm	1450mm

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Oils and lubrication

-Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	9	250	25
Gear box	49	1000	—
Front axle	/	/	—
Rear axle	Common with gear box		—
Final drive (front)	/	/	—
Final drive (rear)	Common with gear box		—
Hydraulic system	19	1000	—
Steering	0.5	1000	—

- Specifications

	Recommended	Used during test
Engine oil • Type: • Viscosity: • Classification:	 SAE 10 W / 30 11.4 cSt at 100℃ API CC	 CA-30 10.0 cSt at 100℃ GB5323-85
Transmission oils • Type: • Viscosity: • Classification:	 SAE 80 W 90 13.5～24.0 cSt at 100℃ API GL-4	 HL-20 17.8～22.0 cSt at 100℃ SYB 1103-62S
Hydraulic fluid • Type: • Viscosity: • Classification:	Same as engine oil	Same as engine oil
Steering oil • Type: • Viscosity: • Classification:	Same as trans.oil	Same as trans.oil

Grease:

• Number of lubrication points: 16

Fuel

- Type: Standard diesel fuel in conformity with national standard GB10327-89

- Density at 15℃ 0.847 g / cm^3

Ⅲ、TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF

- Date and location of tests: 11. Oct. 1995, CAMTC
- Type of dynamometer: SCHENCK eddy-current brake W400

Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev / min		kg / h	l / h	g / kWh	kWh / l
1.1 MAXIMUM POWER-TWO HOURS TEST						
33.2	2000	542	8.17	9.68	246.1	3.43
1.2 POWER AT RATED ENGINE SPEED						
33.2	2000	542	8.17	9.68	246.1	3.43
1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev / min)						
33.1	1994	540	8.12	9.64	245.3	3.44
1.4 PART LOADS 1.4.1 the torque corresponding to maximum power at rated engine speed						
33.2	2000	542	8.17	9.68	246.1	3.43
1.4.2 85% of torque obtained in 1.4.1						
29.2	2071	561	7.30	8.65	250.0	3.38
1.4.3 75% of torque defined in 1.4.2						
22.0	2082	564	5.95	7.05	270.4	3.12
1.4.4 50% of torque defined in 1.4.2						
14.7	2094	567	4.61	5.46	313.6	2.69
1.4.5 25% of torque defined in 1.4.2						
7.5	2127	576	3.48	4.12	464.0	1.82
1.4.6 unloaded						
0	2134	578	2.41	2.86	/	/

- No load maximum engine speed: 2134 rev / min
- Torque (equivalent crankshaft) at maximum power: 158.4 N • m
- Maximum torque (equivalent crankshaft): 184.4N • m
  (engine speed : 1289 erv / min)
- Mean atmospheric conditions
  - Temperature: 17 ℃
  - Pressure: 101.8 kPa
  - Relative humidity: 70 %
- Maximum temperatures
  - coolant: 79 ℃
  - Engine oil: 103 ℃
  - Fuel: 18 ℃
  - Engine air intake: 19 ℃

2. HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 6. Oct . 1995

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 16.0 MPa
- Pump delivery rate at minimum pressure: 24.6 1 / min

	Flow rate	Pressure	Power
	1 / min	MPa	kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 percent of the actual relief valve pressure setting and corresponding hydraulic power	15.4	14.4	3.70
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	23.4	13.0	5.07

- Tapping point used for test: At rear of the tractor
- Temperature of hydraulic fluid: 62 ℃
- Opening pressure of the unloading valve: None
- Closing pressure of the unloading valve: None

2.2 POWER LIFT TEST

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	202mm	175mm
Vertical movement	600mm	771mm
Maximum corrected force exerted through full range	14.26 kN	8.28 kN
Corresponding pressure of hydraulic fluid	14.4 MPa	14.4 MPa
Moment about rear wheel axis	15.49kN • m	14.04kN • m
Maximum tilt angle of mast from vertical	/ degrees	16 degrees

-Linkage settings for test see Table 2.1 and Figures 2.1 and 2.2

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-250	-228	-200	-100	0	+100	+200	+300	+372	+400	+521
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting or to maximum power delivered by the hydraulic system, which is lower)											
at the hitch point kN		16.62	16.58	16.32	16.10	15.96	15.38	14.97	14.26		
Corresponding pressure: 14.4 MPa											
at the frame kN	14.23		14.06	12.90	11.94	11.43	11.15	10.95		8.64	8.28
Corresponding pressure: 14.4 MPa											

3. DRAWBAR PERFORMANCE

- Date of tests: 17~19. Oct. 1995
- Type of track: Concrete

		Tyre inflation pressure	
	Height of drawbar above ground	Front	Rear
Unballasted	600 mm	245 kPa	137 kPa
Ballasted	595 mm	245 kPa	137 kPa

Gear and range	Power	Drawbar Pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km / h	rev / min	%	g / kWh	kWh / l	℃	℃	℃	℃	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
1(L1)	21.38	16.99	4.53	2070	15	343.3	2.44	30	70	88	18	51	101.8
2(H1)	25.71	14.62	6.33	2010	8	318.9	2.64	31	71	90	18	51	101.8
3(L2)	26.38	11.20	8.48	2005	6	309.7	2.72	33	73	92	19	51	101.8
4(H2)	26.86	8.18	11.82	2008	4	304.5	2.76	32	72	93	19	51	101.8
5(L3)	26.68	6.15	15.62	2002	3	307.0	2.74	33	73	93	19	51	101.8
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1(L1)	23.68	19.11	4.46	2067	15	325.2	2.59	31	71	90	18	50	101.9
2(H1)	26.28	14.83	6.38	2000	7	310.5	2.71	33	72	92	19	50	101.9
3(L2)	26.97	11.33	8.57	2004	5	303.3	2.77	32	73	93	19	50	101.9
4(H2)	27.10	8.34	11.70	2010	4	302.2	2.78	33	73	94	19	50	101.9
5(L3)	26.59	6.18	15.49	2003	3	307.6	2.73	34	74	93	19	50	101.9
3.3.1 FIVE HOURS TEST at 75 percent of pull at maximum power													
4(H2)	21.06	6.24	12.15	2056	3	326.2	2.58	32	73	93	19	50	101.9
3.3.2 FIVE HOURS TEST at pull corresponding to 15 percent wheelslip													
1(L1)	23.77	19.10	4.48	2070	—	—	—	31	72	93	19	50	101.9

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2 : 49.4 g / h

4. TURNING AREA AND TURNING CIRCLE

Details of wheel equipment:

	Tyre size	Track width
front:	6.50-16	1415
rear:	14-28	1445

	With brakes		Without brakes	
	Right hand	Left hand	Right hand	Left hand
	m	m	m	m
Radius of turning area	4.55	4.52	5.27	5.23
Radius of turning circle	4.37	4.34	5.09	5.05

5. LOCATION OF CENTRE OF GRAVITY

Height above ground: 788 mm

Distance forward from the vertical plane containing the axis of the rear wheels: 797 mm

Distance from the median plane of the tractor: R 7 mm

6. BRAKING

- Date of tests: 16. Oct. 1995

6.1 COLD SERVICE BRAKING DEVICE TEST

Speed before application of brakes: 29.0 km / h

Ballasted tractor	Braking device control force N	300	400	500	550	600	650
	Mean deceleration m / s^2	1.60	2.10	2.60	2.85	2.90	2.90
Unballasted tractor	Braking device control force N	300	400	500	550	600	650
	Mean deceleration m / s^2	1.65	2.20	2.70	2.88	2.92	2.92

6.2 FADE TEST

Speed before application of brakes: 29.0 km / h

Ballasted tractor	Braking device control force N	300	400	500	550	600	650
	Mean deceleration m / s^2	1.50	2.00	2.40	2.55	2.60	2.60

Maximum deviation of tractor from its original course: 90 mm

Abnormal Vibration: None

Brakes were heated by: Driving

6.3 PARKING BRAKING DEVICE TEST

	Up	Down
Braking device control force N	440	400

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of test: 23. Oct. 1995
- Type of sound level meter: B & k 2235
- Type of track: Concrete
- Gear number: 7
- Travelling speed before acceleration: 23.0 km / h
- Sound level: 84.9 dB(A)

Ⅳ. REPAIRS AND ADJUSTMENTS DURING TESTS: None

Ⅴ. REMARKS: None

Test carried out by: Baiyuchun, Gengzhanbin, Tianli
Xiongjinxuan, Chenxinghe,Liuqin,

Officer in Charge: Wangyuanxiang

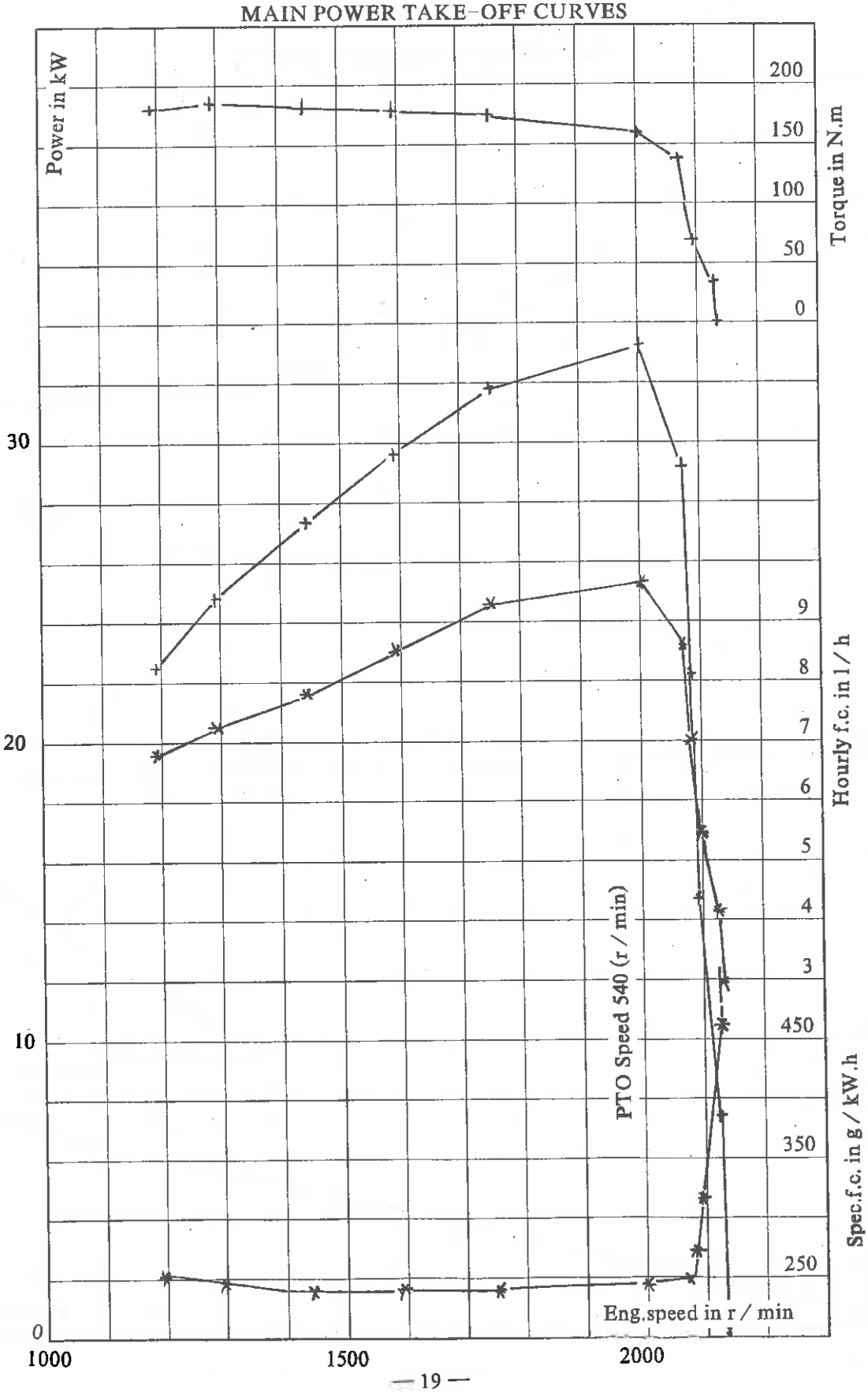
Chief of Tractor Testing Division: Lixijiang

For the director: Wangliansheng

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ANNEX

MAIN POWER TAKE-OFF CURVES



ANNEX

MAIN POWER TAKE-OFF CURVES

