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OECD TEST REPORT OF JM—180(2WD) AGRICULTURAL TRACTOR (CODE I)

Report on test in accordance with the OECD standard code for the official testing of agricultural tractor performance (C(87)53(Final), Code I)



OECD Approval
No. 1354 Full Code
Date 30 JAN. 1992

Tested Tractor
Make: Yancheng Tractor Works
Model: Jin Ma-180
Type: Standard

Submitted for test by
Name: Yancheng Tractor Works
Address: Yancheng, Jiangsu, China
Tel: (0515)225432 Cable: 6639

This report includes 24 pages and may only be duplicated as a whole

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This report has been approved by the OECD Co-ordinating Centre (CEMAGREF) in Antony (France) on Jan. 30, 1992 Approved No. 1354 Full code

JM—180 COTTEC Test No. 911582 OECD No. 1354

Tractor manufacturer's name and address:	Yancheng Tractor Works Yancheng, Jiangsu, China
Location of tractor assembly:	The manufacturer
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the COTTEC
Place of running-in:	COTTEC, Luoyang, Henan, China
Duration of running-in:	31 hours
Location of test:	COTTEC, Luoyang, Henan, China

SPECIFICATIONS OF TRACTOR

TRACTOR

—Make:	Yancheng Tractor Works
—Model:	Jin Ma-180
—Type:	Standard
—Number of driving wheels:	2
—Serial No. :	02581
—1st Serial No. :	02581

ENGINE

—Make:	Shunde Diesel Engine Works
—Model:	TY290
—Type:	4 stroke, direct injection diesel
—Serial No. :	3504

Cylinders

—Number:	2	
—Disposition:	Vertical	
—Bore/Stroke:	90/100	mm
—Capacity:	1272	cm^3
—Compression ratio:	18/1	
—Arrangement of valves:	Overhead	
—Cylinder liners:	Wet type	

Fuel system

—Fuel feed system:	Plunger transfer pump

—Fuel filter:		
. Make:	Jiangmeng No. 3 Mechanical Accessory Works	
. Model /type:	C0506A, paper cartridge, replaceable	
—Capacity of fuel tank:	21	dm^3
—Injection pump		
. Make:	Wuxi Pump and Injector Works	
. Model/type:	2-cylinder plunger, Series 1	
. Serial No. :	1997	
—Manufacturer' s production setting of injection pump:		
. Flow rate (at rated engine speed and full load):	4. 4	dm^3/h
. Timing:	22°～28° before T. D. C.	
—Injectors:		
. Make:	Shaoguan Pump and Injector Works	
. Model/Type:	TS4100, multihole	
. Injection pressure:	18. 13+0. 49	MPa

Governor

—Make:	Wuxi Pump and Injector Works	
—Model/type:	Mechanical, incorporated into fuel injection pump	
—Governed range of engine speed:	650～2400	rev/min
—Rated engine speed:	2200	rev/min

Air cleaner

—Make:	Jiangmeng No 3. Mechanical Accessory Works	
—Model/Type:	K1112, Oil bath with mesh screen	
—Location of air intake:	Left of the engine	
—Maintenance indicator:	None	

Lubrication system

—Type of feed pump:	JZX1018, Rotor	
—Type & Number of filter(s):	J0708C, replaceable, 1	

Cooling system

—Type of coolant:	Water	
—Type of pump:	Centrifugal, belt driven	
—Description of fan:	Axial flow type, belt driven	
—Number of fan blads:	4	
—Fan diameter:	300	mm

—Coolant capacity:	8	dm^3
—Type of temperature control:	Thermostat	
—Superpressure system	None	

Starting system

—Make:	Guangzhou Motor Works	
—Model/Type:	QD1257 Electrical, solenoid pre-engaged	
—Starter motor power rating:	1.8	kW
—Cold starting aid:	Preheater	
—Safety device:	Main shift lever in neutral position	

Electrical system

—Voltage:	12 (Negative earth)	V
—Generator:		
. Make:	Liaocheng Motor Works	
. Model/Type:	2JF200 Alternator, belt driven	
. Power:	0.2	kW
—Battery (number of accumulators):		
. Model/Type:	6—Q(A)—60S, Lead acid	
. Number:	1	
. Rating:	60	Ah at 20 hours rating

Exhaust system

—Make:	Shunde Diesel Engine Works	
—Model/Type:	Expension type silencer	
—Location:	Right-hand side of engine, vertical	

TRANSMISSION TO WHEELS

Clutch

—Make:	Own make	
—Model/Type:	Dry, Single disk, Travel and Power Take-Off	
—Number of plate(s):	1	
—Diameter of plate(s):	200	mm
—Method of operation:	Mechanically by pedal	

Gear box

—Make:	Own make	
—Model/Type:	JM—180, Spur gear	

—Arrangment:	Gear box with 3 forwards and 1 reverse speed, Group gear with 2 ranges (Low and High)
—Number of gears:	6 forwards and 2 reverses
—Available options:	None

Rear axle and final drives

—Make:	Own make
—Model/Type:	Crown wheel and pinion bevel gear differential, spur gear final drives
—Differential lock:	
. Type:	Mechanical
. Method of engagement:	Manual by lever
. Method of disengagement:	Self-disengaging

Front axle

—Make:	Dafeng General Machinery Works
—Model/Type:	Balanced arm type

Total ratios and travelling speeds

Gear No.	Group or range	Numbers of engine revolution for one revolution of the driving wheels	Nominal travelling speed * at rated engine speed of 2200 rev/min km/h
1	L	183.05	2.13
2	L	92.67	4.21
3	L	63.24	6.16
4	H	45.69	8.53
5	H	23.13	16.85
6	H	15.78	24.70
R_1	L	230.81	1.69
R_2	H	57.60	6.77

* Calculated with a tyre dynamic radius index of 470 mm (ISO 4251/1-1984)

POWER TAKE-OFF

Main power take-off

—Type:	Non—independent	
—Method of engagement:	By hand level, Driven by the main clutch	
—Number of shafts:	1	
—Method of changing power take-off shaft ends and speeds:	None	

Power take-off proportional to engine speed

540 rev/min

—Location:	At rear of the tractor	
—Diameter of power take-off shift end:	35	mm
—Number of splines:	6, in conformity with ISO 500/1979	
—Height above ground:	470	mm
—Distance from the median plane of the tractor:	0	mm
—Distance behind rear wheel axis:	281	mm
—PTO speed at rated engine speed:	572	rev/min
—Engine speed at standard power take-off speed:	2077	rev/min
—Ratio of rotation speeds (engine speed/p. t. o. speed):	3.846	
—Power restriction and maximum torque:	13 kW 220 N · m	
—Direction of rotation(viewed from behind tractor):	Clockwise	

Power take-off proportional to ground speed: None

POWER LIFT

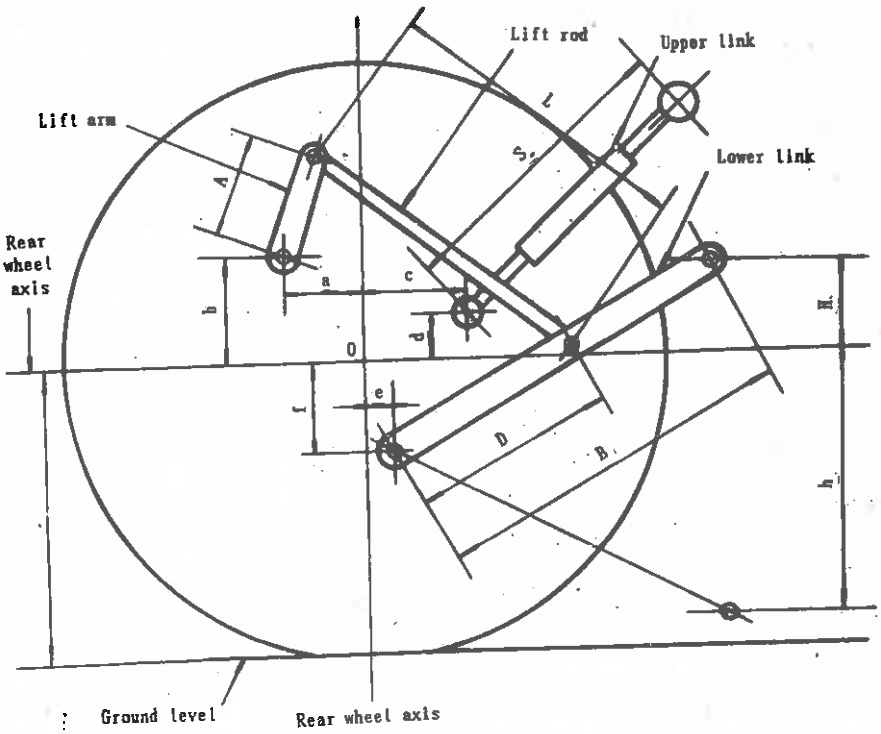
—Make:	Laizhou Machinery Works	
—Type of hydraulic system:	Partial separated units, open centre system	
—Type and number of cylinders:	Single acting, 1	
—Type of linkage lock for transport:	Hydraulic lock	
—Relief valve pressure setting:	14+0.5	MPa
—Opening pressure of cylinder safety valve:	None	
—Lift pump type:	CBN-E306L-X_1, gear pump	
—Transmission between pump and engine:	Gear, driven from engine	
—Type and number of filter(s):	Screen filter, 1	

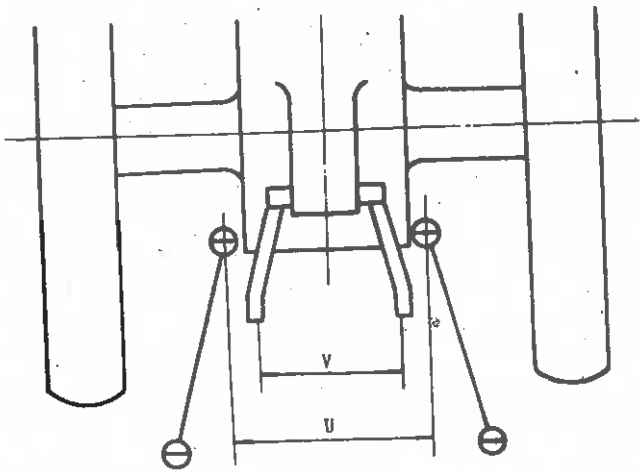
—Site of oil reservior;	In the hydraulic power lift housing	
-Tapping point(s)		
• Type;	Thread	
• Number;	1	
• Location;	Right side of hydraulic power lift housing	
—Maximum volume of oil available to external cylinders;	5.0	dm^3

Three point linkage

—Category;	I N to ISO 730/2—1979	
—Category adapter;	None	
—Linkage geometry;	See next page and following table	

Linkage geometry:





			Dimension or range * mm	Setting used in test mm
Length of lift arms		(A)	190	
Length of lower links		(B)	500	500
Distance of lift arm pivot	Horizontally	(a)	—30	
point from rear wheel axis:	Vertically	(b)	299	
Horizontal distance between the 2 lower link points:		(u)	304	
Horizontal distance between the 2 lift arm end points		(v)	332	
Length of upper link		(S)	from 380 to 530	430
Distance of upper link pivot	Horizontally	(c)	230	
point from rear wheel axis:	Vertically	(d)	215	
Distance of lower link pivot	Horizontally	(e)	155	
point from rear wheel axis:	Vertically	(f)	109	
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	250	
Length of lift rods		(L)	from 380 to 520	460
Height of lower hitch points relative to the rear wheel axis:				
in low position		(h)	from 100 to 405	320
in high position		(H)	from 330 to 145	200
Height above ground of lower hitch points when locked in transport position			Any height within lift range	

* Assuming (r) with a tyre dynamic index of 470 mm (ISO 4251/1-1984)

TRAILER HITCH

—Type:	Fixed	
—Hole diameter:	20	mm
—Height above ground:	343	mm
—Distance of hitch point from rear wheel axis, horizontally:	500	mm

—Distance of hitch point from power take-off shaft end;

. Vertically;	115	mm
. Horizontally;	219	mm
—Maximum vertical permissible load;	5.0	kN

HOLED DRAWBAR None

STEERING

—Make;	Shitouhe Agricultural Machinery Works
—Model/Type;	Worm and roller
—Method of operation;	Manual operated

BRAKES

Service brake

—Make;	Own make
—Model/Type	Dry, shoe-type
—Method of operation;	By pedals, coupled or independent
—Trailer braking take-off;	Air brake, operated by tractor pedals

Parking brake

—Type;	Mechanical
—Method of operation;	Foot pedals, locked by ratchet

WHEELS

—Number		
. Front;	2, steering	
. Rear;	2, driving	
—Wheelbase;	1465	mm
—Track width adjustment;		

	Minimum mm	Maximum mm	Adjustment method
Front	920	920	None
Rear	900	1020	Reversing wheels and off-set lug rims

DRIVER'S SEAT

—Make; Anhu Automobile Accessory Works

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—Model/Type: Operator's sofa
—Type of suspension: None
—Type of damping None
—Range of adjustment:
. Longitudinal: 60 mm
. Vertical: 0 mm

MISCELLANEOUS

—Additional seat: None

LIGHTING

	Height above ground of center mm	Size mm	Distance from outside edge of lights to median of tractor mm
Headlight	1010	115×80	150
Sidelight	1005	100×40	222
Rearlight	1145	145×75	415
Brakelight	1060	68×64	430

TEST CONDITIONS

OVERALL DIMENSIONS

	Length mm	Width		Height at top of	
		Minimum mm	Maximum mm	protective structure mm	exhaust silencer mm
Ballasted	2522	1150	1270	—	1890
Unballasted	2522	1100	1235	—	1894

GROUND CLEARANCE(unballasted tractor): 330 mm
—Clearance limiting part: Under the gear box

TRACTOR MASS

Without protective structure:

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	402	412	400	407
Rear	703	768	555	623
Total	1105	1180	955	1030

BALLAST

	Weights		Water kg
	Number	Total mass kg	
Front	—	—	—
Rear	4	150	—
Optional	—	—	—

TYRE SPECIFICATIONS

	Front	Rear
Tyres:		
Dimensions	4.00—16	8.3—24
Ply rating	4	4
Type	Cross ply	Cross ply
Maximum load (tyre manufacturer's)	2.70 kN	6.02kN
Inflation pressure (tyre manufacturer's)	200—250 kPa	100—150 kPa
Dynamic radius index	296 mm	470 mm
Chosen track width:	920 mm	940 mm

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Power kW	Speed		Fuel consumption			Specific energy kW • h/l
	Engine rev/min	P. T. O. rev/min	Hourly		Specific g/kW • h	
			kg/h	1/h		
1. 5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED						
1. 5. 1 The torque corresponding to maximum power						
13. 17	2077	540	3. 51	4. 12	267	3. 19
1. 5. 2 85% of the torque obtianed in 1. 5. 1						
11. 26	2088	543	3. 04	3. 57	270	3. 16
1. 5. 3 75% of the torque defined in 1. 5. 2						
8. 57	2127	553	2. 47	2. 90	288	2. 96
1. 5. 4 50% of the torque defined in 1. 5. 2						
5. 77	2142	557	1. 90	2. 23	329	2. 59
1. 5. 5 25% of the torque defined in 1. 5. 2						
2. 88	2162	562	1. 37	1. 61	476	1. 79
1. 5. 6 Unloaded						
0	2178	566	0. 98	1. 15	—	—

—No load maximum engine speed:	2310	rev/min
—Equivalent crankshaft torque at maximum power:	58. 8	N • m
—Maximum Equivalent crankshaft torque: (Engine speed: 1669 rev/min)	70. 2	N • m
—Mean atmospheric conditions		
. Temperature:	28	℃
. Pressure:	98. 3	kPa
. Relative humidity:	64	%
—Maximum temperatures		
. Coolant:	98	℃
. Fuel:	53	℃
. Engine air intake:	33	℃
. Engine oil:	118	℃

2. HYDRAULIC POWER AND LIFTING FORCE

—Date of test: July 18,1991

2.1 HYDRAULIC POWER TEST

—Sustained pressure with relief valve open: 13.8 MPa

—Pump delivery rate at minimum pressure: 13.78 1/min

	Flow rate 1/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure epuivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power	4.03	12.4	0.83
Flow rate and hydyaulic pressure corresponding to max. hydraulic power	13.83	9.0	2.07

—Tapping point used for test: Right side of hydraulic power lift housing

—Temperature of hydraulic fluid: 60 ℃

—Opening pressure of the unloading valve: None

—Closing pressure of the unloading valve: None

2.2 POWER LIFT TEST

—Sustained pressure with relief valve open: 13.8 MPa

—Temperature of hydraulic fluid: 60 ℃

		At the hitch point	On the frame
Height of lower hitch points above ground in down position	mm	150	122
Vertical movement	mm	520	**740**
Maximum corrected force exerted throught full range	kN	7.83	**4.07**
Corresponding pressure of hydraulic fluid	MPa	12.4	12.4
Moment about rear wheel axle	kN • m	5.09	5.11
Maximum tilt angle of mast from vertical	degrees	—	16.5

—Linkage setting for test; see above table and figures

Lifting heights relative to the horizontal plane inculding the lower link pivot points									
mm	—225	—175	—100	0	100	200	315	395	465
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting)									
At the hitch point kN		7.83	7.92	8.06	8.08	8.12	8.92		
Corresponding pressure; 12.4 MPa									
At the frame kN	6.04	6.21	6.13	5.97	5.65	5.16	4.60	4.21	4.07
Corresponding pressure; 12.4 MPa									

3. DRAWBAR PERFORMANCE

—Date of tests: July 7～17, 1991

—Type of track: Concrete

—Height of drawbar above ground:
Unballasted: 360 mm
Ballasted: 355 mm

—Tyre inflation pressure:
Front: 200 kPa
Rear: 140 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/kW • h	kW • h/l	℃	℃	℃	℃	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
2(L2)	6.87	6.60	3.75	2266	15.0	379	2.25	47	78	95	27	65	98.3
3(L3)	9.84	6.49	5.46	2244	14.9	351	2.43	50	80	100	27	65	98.3
4(H1)	11.58	5.34	7.81	2197	10.1	317	2.69	54	82	106	29	65	98.3
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1(L1)	4.02	7.53	1.92	2287	15.0	483	1.76	48	77	94	26	62	98.4
2(L2)	7.83	7.54	3.74	2260	15.0	366	2.33	51	80	99	27	62	98.4
3(L3)	10.73	7.09	5.45	2205	11.1	339	2.51	54	81	103	28	60	98.4
4(H1)	11.73	5.28	8.00	2196	6.6	313	2.72	54	82	106	28	60	98.4
3.3 TEN-HOUR TEST (ballasted tractor)													
3.3.1 FIVE-HOUR TEST at 75% of pull at maximum power													
4(H1)	9.23	3.96	8.39	2251	6.8	324	2.63	52	80	100	30	61	98.3
3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip without additional ballast.													
2(L2)	7.85	7.52	3.76	2259	—	—	—	52	81	101	31	61	98.3

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2 : 19.0 g/h

4. TURNING AREA AND TURNING CIRCLE

Details of wheel equipment:

	Tyre size	Track mm
Front	4.00—16	920
Rear	8.3—24	940

	With brakes		Without brakes	
	Right hand m	Left hand m	Right hand m	Left hand m
Radius of turning area	2.71	2.51	3.20	2.80
Radius of turning circle	2.63	2.43	3.12	2.72

5. LOCATION OF CENTRE OF GRAVITY

—Height above ground: 593 mm

—Distance forward from the vertical plane containing the axle of the rear wheels: 580 mm

—Distance from the median plane of the tractor: From right 7.5 mm

6. BRAKING

—Date of tests: July 30,1991

—Type of track: Concrete

—Speed before application of brakes: 25.6 km/h

6.1 COLD SERVICE BRAKING DEVICE TEST

Ballasted tractor	Braking device control force N	132	168	200	242	320	460
	Mean deceleration m/s^2	0.25	1.50	2.66	3.37	3.56	3.61
Unballasted tractor	Braking device control force N	180	200	216	268	380	500
	Mean deceleration m/s^2	0.52	1.60	2.50	3.16	3.33	3.37

6.2 FADE TEST

Ballasted tractor	Braking device control force N	136	192	244	308	376	480
	Mean deceleration m/s^2	0.87	2.24	3.24	3.44	3.46	3.51

—Maximum deviation of tractor from its original course: 0 mm
—Abnormal vibration: None
—The brakes were heated by: Driving

6.3 PARKING BRAKING DEVICE TEST

	Up	Down
Braking device control force N	206	206

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

—Date of tests: July 17,1991
—Sound level meter, Make/Model/Type: B&K 2209
—Type of track: Concrete
—Gear number: 6
—Travelling speed before acceleration: 19.5 km/h
—Sound level: 82.5 dB(A)

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REPAIRS AND ADJUSTMENTS DURING TESTS:

None

REMARKS:

In COTTEC the safety limit speed of drawbar testing equipment is 12 km/h , so we only do drawbar power test in the gears which the speed is below 12 km/h.

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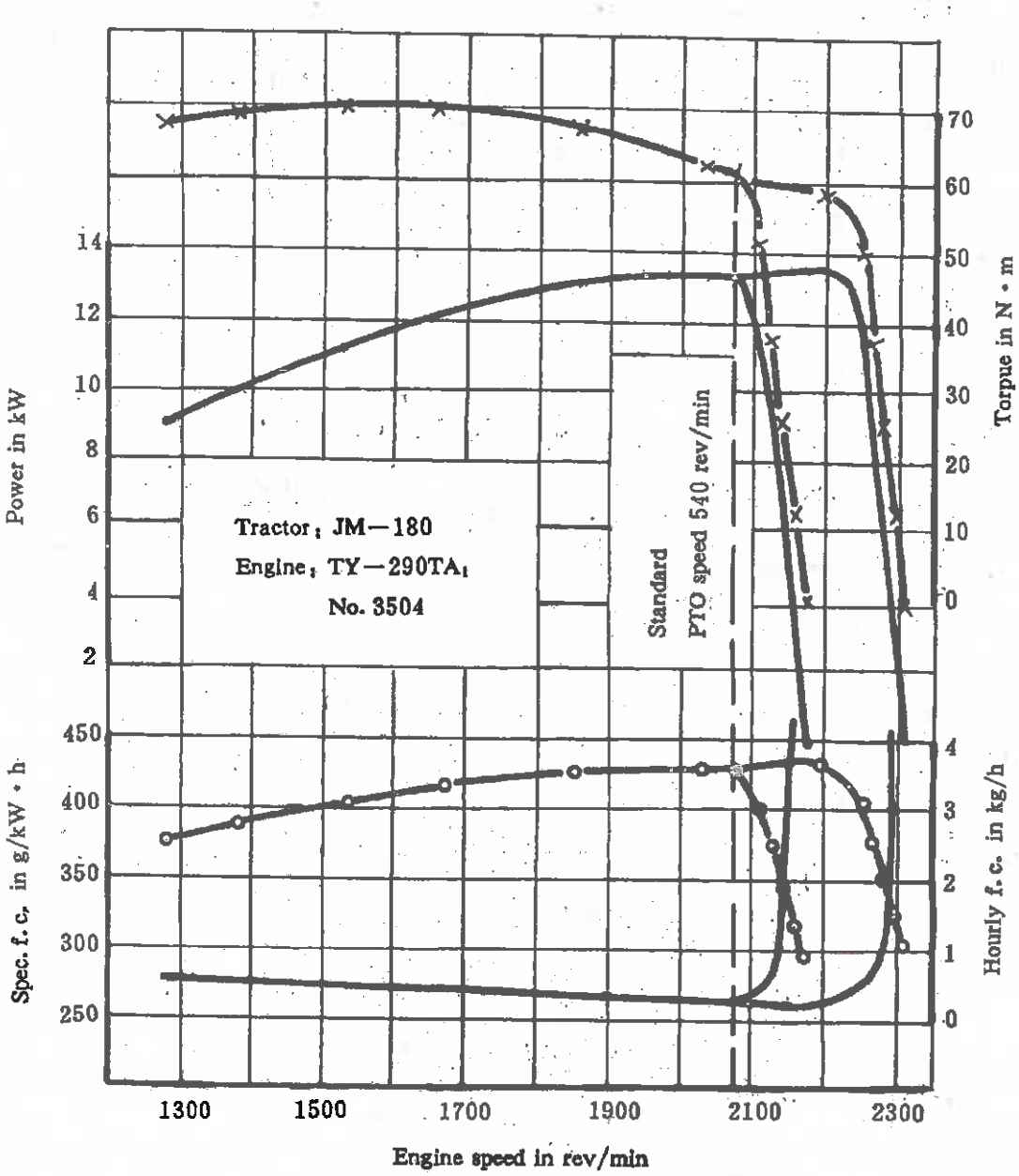
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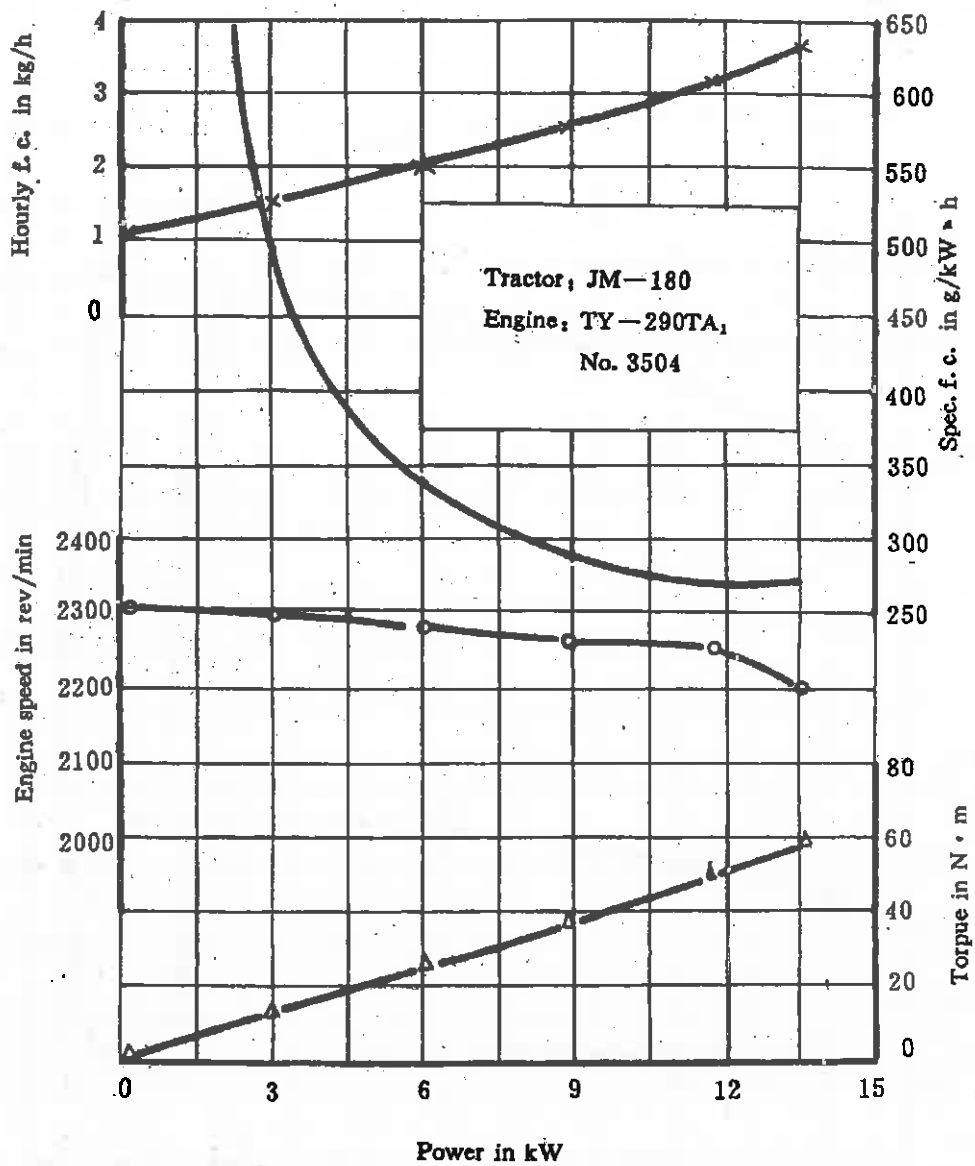
ANNEX I

MAIN POWER TAKE - OFF TEST CURVES



JM—180 COTTEC Test No. 911582 OECD No. 1354

MAIN POWER TAKE – OFF TEST CURVES



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