COTTEC

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TEST AND
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OECD TEST REPORT OF XT—120(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)5?(Final), Code I)



OECD Approval

No. 1371 Full Code

Date July 9, 1992

Tested Tractor
Make: Xingtai Tractor Works
Model: Xing Tai-120
Type: Standard

Submitted for test by
Name: Xingtai Tractor Works
Address: Xingtai, Hebei, China
Tel: (0319)223505 Cable: 5993

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)

XT—120 COTTEC Test No. 911585 OECD No. 1371

Tractor manufacturer's name and address:	Xingtai Tractor Works Xingtai, Hebei, 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:	22 hours
Location of test:	COTTEC, Luoyang, Henan, China

SPECIFICATIONS OF TRACTOR

TRACTOR

—Make:	Xingtai Tractor Works
—Model:	Xing Tai-120
—Type:	Standard
—Number of driving wheels:	2
—Serial No.:	27011
—1st Serial No.:	27011

ENGINE

—Make:	Shunde Diesel Engine Works
—Model:	190A-12
—Type:	4 stroke, spherical combustion chamber, direct injection diesel, naturally aspirated
—Serial No.:	C16671

Cylinders

—Number:	1	
—Disposition:	Vertical	
—Bore/Stroke:	90/110	mm
—Capacity:	700	cm^3
—Compression ratio:	18/1	
—Arrangement of valves:	Overhead	
—Cylinder liners:	Wet type	

Fuel system

—Fuel feed system:	Fuel feed by gravity

—Fuel filter:		
. Make:	Jiangmeng No. 3 Mechanical Accessory Works	
. Model /type:	C0506A, paper cartridge, replaceable	
—Capacity of fuel tank:	14.5	dm^3
—Injection pump		
. Make:	Shaoguan Pump and Injector Works	
. Model/type:	190B, single plunger	
. Serial No. :	21051	
—Manufacturer' s production setting of injection pump:		
. Flow rate (at rated engine speed and full load):	2.57	dm^3/h
. Timing:	32°～38° before T. D. C.	
—Injectors:		
. Make:	Shaoguan Pump and Injector Works	
. Model/Type:	TS4100, multihole	
. Injection pressure:	17.15+0.49	MPa

Governor

—Make:	Shaoguan Pump and Injector Works	
—Model/type:	Mechanical, incorporated into fuel injection pump	
—Governed range of engine speed:	600～2330	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:	190, Rotor	
—Type & Number of filter(s):	Metal mesh screen, 1	

Cooling system

—Type of coolant:	Water	
—Type of pump:	None	
—Description of fan:	Centrifugal, incorporated with flywheel	
—Coolant capacity:	6	dm^3
—Type of temperature control:	None	

—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:	None	
—Safety device:	None	
Electrical system		
—Voltage:	12 (Negative earth)	V
—Generator:		
. Make:	Liaocheng Motor Works	
. Model/Type:	YF14B alternator, incorporated with flywheel	
. Power:	0.14	kW
—Battery (number of accumulators):		
. Model/Type:	6—Q(A)—60, Lead acid	
. Number:	1	
. Rating:	60	Ah at 20 hours rating
Exhaust system		
—Make:	Jiangmeng No. 3 Mechanical Accessory 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:	XT-120, 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: None

Front axle

—Make: Own make
—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	157.53	2.00
2	L	82.52	3.82
3	L	53.97	5.84
4	H	41.54	7.59
5	H	21.76	14.48
6	H	14.23	22.15
R_1	L	157.43	2.00
R_2	H	41.54	7.59

* Calculated with a tyre dynamic radius index of 380 mm (GB 2979-1982)

POWER TAKE-OFF

Main power take-off		
—Type:	Non—independent	
—Method of engagement:	By hand level	
—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:	487	mm
—Distance from the median plane of the tractor:	0	mm
—Distance behind rear wheel axis:	235	mm
—PTO speed at rated engine speed:	644	rev/min
—Engine speed at standard power take-off speed:	1843	rev/min
—Ratio of rotation speeds (engine speed/p. t. o. speed):	3.413	
—Power restriction and maximum torque:	7. 45kW 120 N · m (Manufacturers recomendation)	
—Direction of rotation (viewed from behind tractor):	Clockwise	
Power take-off proportional to ground speed:	None	

POWER LIFT

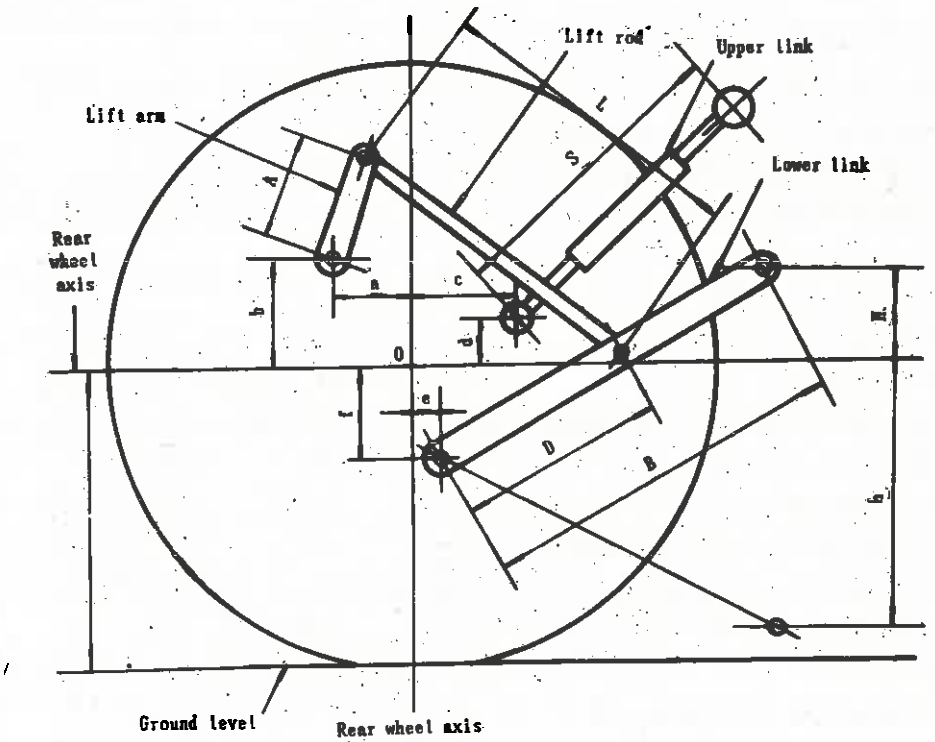
—Make:	Own make	
—Type of hydraulic system:	Partial separated units, open centre system	
—Type and number of cylinders:	Single acting, 1	
—Type of linkage lock for transport:	Mechanical lock	
—Relief valve pressure setting:	9.81±0.5	MPa
—Opening pressure of cylinder safety valve:	None	
—Lift pump type:	CBN-305, gear pump	
—Transmission between pump and engine:	Gear, driven from engine	

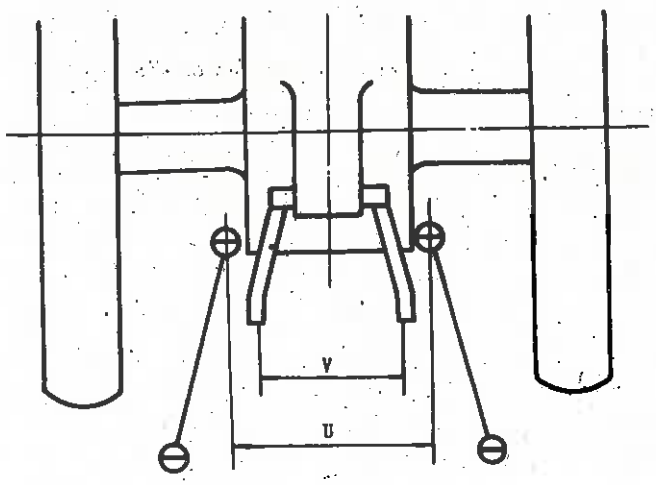
—Type and number of filter(s):	Screen filter, 1
—Site of oil reservior:	In the hydraulic power lift housing
—Tapping point(s)	None
—Maximum volume of oil available to external cylinders:	None

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)	220	
Length of lower links		(B)	462	462
Distance of lift arm pivot	Horizontally	(a)	—7	
point from rear wheel axis:	Vertically	(b)	303	
Horizontal distance between the 2 lower link points:		(u)	326	
Horizontal distance between the 2 lift arm end points		(v)	460	
Length of upper link		(S)	from 350 to 520	415
Distance of upper link pivot	Horizontally	(c)	136	
point from rear wheel axis:	Vertically	(d)	243	
Distance of lower link pivot	Horizontally	(e)	110	
point from rear wheel axis:	Vertically	(f)	85	
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	231	
Length of lift rods		(L)	from 370 to 460	420
Height of lower hitch points relative to the rear wheel axis:				
in low position		(h)	from 126 to 335	200
in high position		(H)	from 323 to 178	242
Height above ground of lower hitch points when locked in transport position			from 703 to 558 lift range	622

* Assuming (r) with a tyre dynamic index of 380 mm (GB 2979-1982)

TRAILER HITCH

—Type:	Fixed	
—Hole diameter:	20	mm
—Height above ground:	370	mm
—Distance of hitch point from rear wheel axis, horizontally:	280	mm

—Distance of hitch point from power take-off shaft end;		
. Vertically;	115	mm
. Horizontally;	0	mm
—Maximum vertical permissible load;	3.5	kN

HOLED DRAWBAR None

STEERING

—Make;	Xingtai Mechine-tool 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 one pedal
—Trailer braking take-off;	None

Parking brake

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

WHEELS

—Number	4	
. Front;	2, steering	
. Rear;	2, driving	
—Wheelbase;	1300	mm
—Track width adjustment;		

	Minimum mm	Maximum mm	Adjustment method
Front	960	960	None
Rear	990	990	None

DRIVER'S SEAT

—Make; Own make

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—Model/Type: XT-120, Operator's sofa
—Type of suspension: Spring
—Type of damping None
—Range of adjustment:
. Longitudinal: 20 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	975	125×95	150
Sidelight	755	35×95	200
Rearlight	950	D95	520
Brakelight	-	-	-

TEST CONDITIONS

OVERALL DIMENSIONS

	Length mm	Width		Height at top of	
		Minimum mm	Maximum mm	protective structure mm	exhaust silencer mm
Ballasted	2178	1100	1240	—	1650
Unballasted	2178	1095	1200	—	1653

GROUND CLEARANCE (unballasted tractor): 253 mm
—Clearance limiting part: Under the rear axle

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TRACTOR MASS

Without protective structure:

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	312	313	285	286
Rear	550	624	407	481
Total	862	937	692	767

BALLAST

	Weights		Water kg
	Number	Total mass kg	
Front	2	27	—
Rear	8	143	—
Optional	—	—	—

TYRE SPECIFICATIONS

	Front	Rear
Tyres:		
Dimensions	4.00—12	7.50—16
Ply rating	4	6
Type	Cross ply	Cross ply
Maximum load (tyre manufacturer's)	1.57 kN	4.22kN
Inflation pressure (tyre manufacturer's)	180—200 kPa	120—140 kPa
Dynamic radius index	254 mm	380 mm
Chosen track width:	960 mm	990 mm

OILS AND LUBRICATION

Capacity and change interval:

	Capacity dm³	Oil change h	Filter change h
Engine	3	250	250
Gear box	11.5	500	—
Rear axle	Common with gear box	—	—
Final drive (rear)	Common with gear box	—	—
Hydraulic system	5	500	-
Steering	0.5	1000	—

Specifications:

	Recommended	Used during test
Engine oil		
Type:	SAE 10W/30	CA—30
Viscosity:	11.4 cSt at 100℃	10～12.5 cSt at 100℃
Classification:	API CC	GB 5323—88
Transmission oil		
Type:	SAE 80	HQB—10
Viscosity:	9.3 cSt at 100℃	10～12.5 cSt at 100℃
Classification:	API GL—4	GB 485—88
Hydraulic fluid		
Type:	Same as trans. oil	Same as trans. oil
Viscosity:		
Classification:		
Steering oil		
Type:	Multi-purpose grease	Multi-purpose grease
Viscosity:		
Classification:		

Grease

—Type: Multi-purpose grease

—Number of lubrication points: 14

Fuel

—Type: Standard diesel fuel in conformity with GB 10327—89 (China standard)

—Density at 15°C: 0.852 g/cm³

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TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF

—Date and location of tests: Dec. 6~7, 1991, COTTEC

—Type of dynamometer: LPA—Bedienpult 250 Elec. dynamometer

Power kW	Speed		Fuel consumption			Specific energy kW • h/l
	Engine rev/min	P. T. O. rev/min	Hourly kg/h	Hourly 1/h	Specific g/kW • h	
1. 1 MAXIMUM POWER—TWO HOURS TEST						
8. 09	2200	644	2. 08	2. 44	257	3. 32
1. 2 POWER AT RATED ENGINE SPEED						
8. 09	2200	644	2. 08	2. 44	257	3. 32
1. 3 STANDARD POWER TAKE-OFF SPEED (540±10 rev/min)						
7. 35	1843	540	1. 89	2. 22	257	3. 32
1. 4 PART LOADS						
1. 4. 1 The torque corresponding to max. power at rated engine speed						
8. 09	2200	644	2. 08	2. 44	257	3. 32
1. 4. 2 85% of the torque obtained in 1. 4. 1						
6. 99	2236	655	1. 82	2. 14	260	3. 28
1. 4. 3 75% of the torque defined in 1. 4. 2						
5. 31	2246	658	1. 42	1. 67	267	3. 19
1. 4. 4 50% of the torque defined in 1. 4. 2						
3. 55	2270	665	1. 08	1. 27	304	2. 80
1. 4. 5 25% of the torque defined in 1. 4. 2						
1. 84	2304	675	0. 76	0. 89	413	2. 06
1. 4. 6 Unloaded						
0. 50	2331	683	0. 55	0. 65	—	—

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	l/h		
1. 5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED						
1. 5. 1 The torque corresponding to maximum power						
7. 35	1843	540	1. 89	2. 22	257	3. 32
1. 5. 2 85% of the torque obtianed in 1. 5. 1						
6. 60	2031	595	1. 70	2. 00	258	3. 30
1. 5. 3 75% of the torque defined in 1. 5. 2						
5. 00	2038	597	1. 32	1. 55	264	3. 23
1. 5. 4 50% of the torque defined in 1. 5. 2						
3. 35	2058	603	0. 96	1. 13	287	2. 97
1. 5. 5 25% of the torque defined in 1. 5. 2						
1. 72	2082	610	0. 70	0. 82	407	2. 09
1. 5. 6 Unloaded						
0. 50	2110	618	0. 51	0. 60	—	—

—No load maximum engine speed:	2331	rev/min
—Equivalent crankshaft torque at maximum power:	35. 12	N • m
—Maximum Equivalent crankshaft torque: (Engine speed: 1372 rev/min)	40. 1	N • m
—Mean atmospheric conditions		
. Temperature:	16	℃
. Pressure:	100	kPa
. Relative humidity:	24	%
—Maximum temperatures		
. Coolant:	87	℃
. Fuel:	18	℃
. Engine air intake:	30	℃
. Engine oil:	100	℃

2. HYDRAULIC POWER AND LIFTING FORCE

—Date and location of tests; April 9,1992,COTTEC

2.1 HYDRAULIC POWER TEST

None

2.2 POWER LIFT TEST

—Sustained pressure with relief valve open; 10.2 MPa

—Temperature of hydraulic fluid; 60 ℃

		At the hitch point	On the frame
Height of lower hitch points above ground in down position	mm	180	155
Vertical movement	mm	442	625
Maximum corrected force exerted throught full range	kN	2.99	2.31
Corresponding pressure of hydraulic fluid	MPa	9.18	9.18
Moment about rear wheel axle	kN • m	1.64	2.68
Maximum tilt angle of mast from vertical	degrees	—	13.0

—Linkage setting for test; see above table and figures

Lifting heights relative to the horizontal plane inculding the lower link pivot points									
mm	—150	—100	0	50	100	150	200	300	350
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	4.09	3.85	3.35	3.17	3.06	2.99	2.99		
Corresponding pressure; 9.18 MPa									
At the frame kN	3.23	3.19	3.08	2.92	2.84	2.76	2.66	2.45	2.31
Corresponding pressure; 9.18 MPa									

3. DRAWBAR PERFORMANCE

—Date of tests: April 2～4,1992
—Location of tests: COTTEC
—Type of track: Concrete

—Height of drawbar above ground:
Unballasted: 372 mm
Ballasted: 365 mm

—Tyre inflation pressure:
Front: 200 kPa
Rear: 120 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)													
1(L1)	2.59	5.13	1.82	2278	15.09	396	2.15	30	76	91	19	81	97.2
2(L2)	4.80	5.11	3.38	2250	15.03	327	2.61	35	80	92	20	81	97.2
3(L3)	6.61	4.53	5.25	2200	10.39	314	2.71	40	81	99	21	81	97.2
4(H1)	7.13	3.66	7.01	2190	7.57	292	2.92	42	83	101	21	81	97.2
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1(L1)	3.19	6.60	1.74	2264	15.05	363	2.35	32	78	92	22	83	98.7
2(L2)	6.07	6.59	3.31	2240	15.00	321	2.65	37	79	98	23	83	98.7
3(L3)	7.12	4.78	5.36	2203	8.02	298	2.86	40	82	100	23	83	98.7
4(H1)	7.24	3.65	7.14	2197	6.17	296	2.88	43	85	102	24	83	98.7
3.3 TEN-HOUR TEST (ballasted tractor)													
3.3.1 FIVE-HOUR TEST at 75% of pull at maximum power													
4(H1)	5.63	2.73	7.43	2256	5.01	319	2.67	40	82	99	25	84	98.5
3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip with additional ballast 130 kg.													
2(L2)	6.37	6.59	3.48	2247	—	—	—	41	82	100	25	84	98.5

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2 : 12.5 g/h

4. TURNING AREA AND TURNING CIRCLE

Details of wheel equipment:

	Tyre size	Track mm
Front	4.00—12	960
Rear	7.50—16	990

	With brakes		Without brakes	
	Right hand m	Left hand m	Right hand m	Left hand m
Radius of turning area	—	—	2.78	2.54
Radius of turning circle	—	—	2.69	2.45

5. LOCATION OF CENTRE OF GRAVITY

—Height above ground: 480 mm

—Distance forward from the vertical plane containing the axle of the rear wheels: 485 mm

—Distance from the median plane of the tractor: From right 3.2 mm

6. BRAKING

—Date and location of tests: April 7,1992, COTTEC

—Type of track: Concrete

—Speed before application of brakes: 22.5 km/h

6.1 COLD SERVICE BRAKING DEVICE TEST

Ballasted tractor	Braking device control force N	178	211	237	262	390	480
	Mean deceleration m/s^2	0.70	1.41	1.95	2.35	2.99	3.07
Unballasted tractor	Braking device control force N	158	205	247	310	420	485
	Mean deceleration m/s^2	1.58	2.31	2.81	3.20	3.35	3.38

6.2 FADE TEST

Ballasted tractor	Braking device control force N	160	196	290	350	425	495
	Mean deceleration m/s^2	2.15	2.67	3.35	3.50	3.61	3.67

—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	282	282

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

—Date and location of tests: April 7,1992, COTTEC
—Sound level meter, Make/Model/Type: B&K 2209
—Type of track: Concrete
—Gear number: 6
—Travelling speed before acceleration: 17.0 km/h
—Sound level: 84.0 dB(A)

OPTIONAL TEST RESULT

8. LOW TEMPERATUER STARTING

—Date and location of tests: Dec. 17,1991, COTTEC
—Details of the cold chamber used for tests.

Available dimensions mm			Minimun temperature
Length	Width	Height	℃
9000	6000	5000	—40

—Operation time sum of tested tractor upto testing: <100 hours
—Starting aids used: Depression device

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—Fuel used for test:

- Type —35 (GB252-1987)
- Solidifying point —35℃
- Viscosity 1.8～7.0 cSt at 20℃

—Engine oil used for test:

- Type 10W/30,CC
- Pour point —30℃
- Viscosity 9.3～12.5 cSt at 100℃

—Coolant used for test:

- Type TCL—P.T.
- Solidifying —30℃

—Measured datums:

Mean atmospheric conditions for tests			Measured temperatures ℃				
Temperature ℃	Pressure kPa	Relative humidity %	Cold chamber	Fuel	Engine oil	Coolant	Electrolyte
7	109.8	62	—1	0.8	—0.9	0.6	3

Measured time S		Starting current A		Starting votage V		Engine speed driven by starter rev/min
Using starting aids	Driven by starter motor	Maximun	Steady	Maximun	Steady	
11.9	14.2	150	100	12.7	10.5	300

—Result:

- Starting minimun temperature of tested tractor without starting aids: —1℃

XT—120 COTTEC Test No. 911585 OECD No. 1371

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.

Director of the COTTEC
Senior engineer

Sun Dianjun

Vice-director of the COTTEC
Senior engineer

Zhu Yinwu

Responsible engineer for these tests:
Senior engineer

Qian Jin

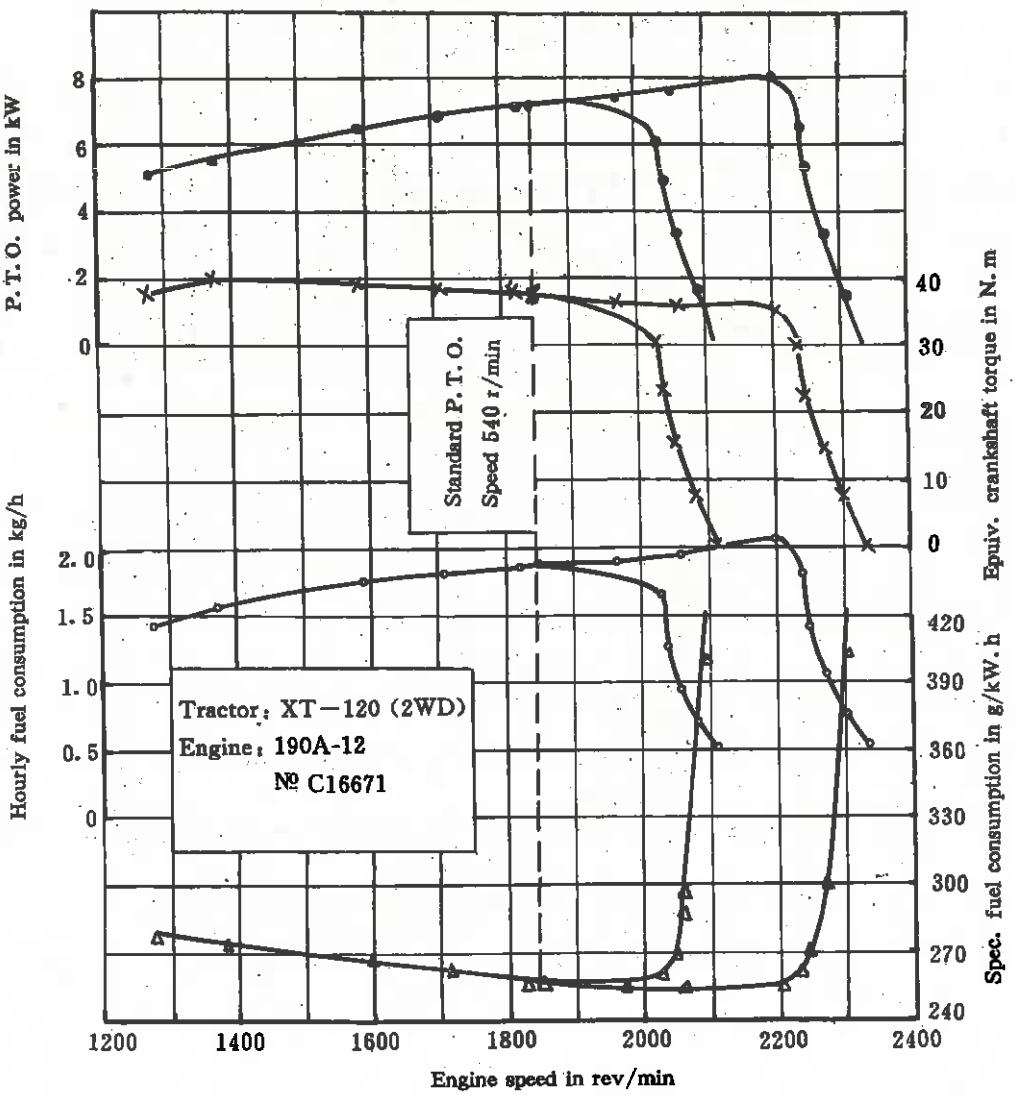
Members of the tractor test board:
Li Lechen, Wang Zhenzhong
Shi Guoquan, Yan Xiaofang

Date: 1992. 5. 7

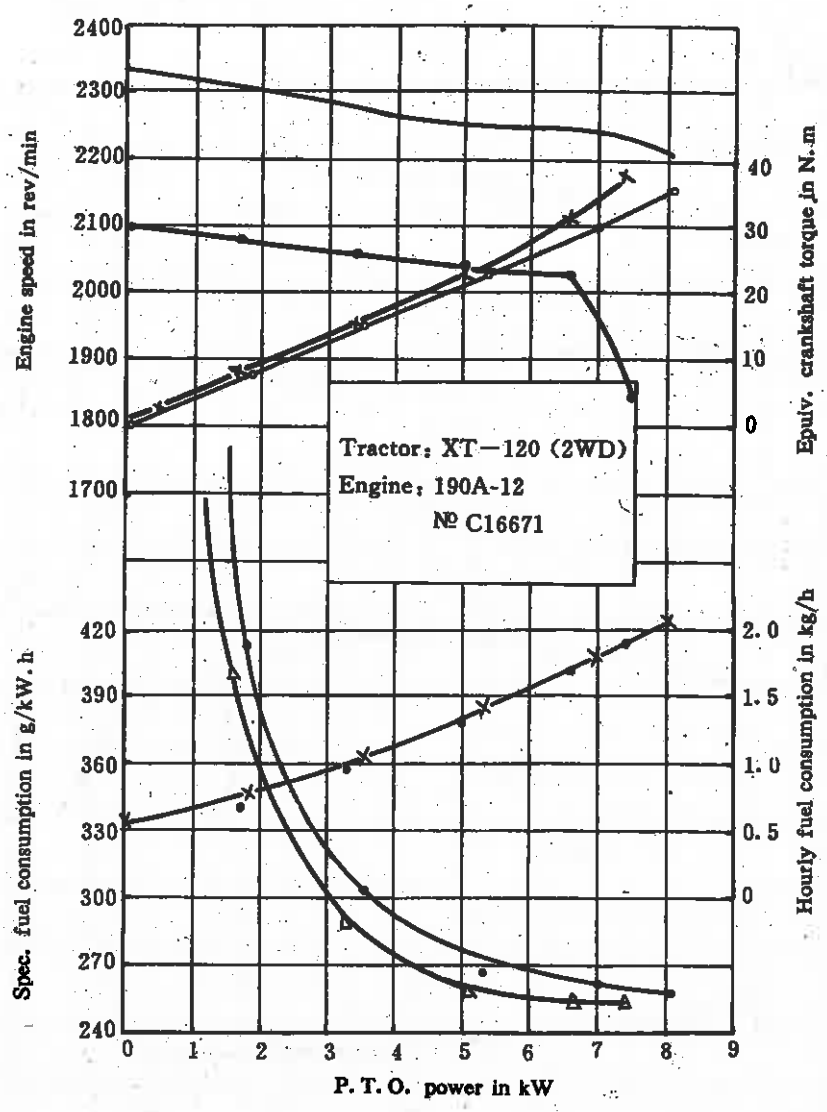
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Qi Liang, Shang Shinian

ANNEX I

MAIN POWER TAKE-OFF TEST CURVES



MAIN POWER TAKE – OFF TEST CURVES



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