CAMTC

Report on test in accordance with the OECD STANDARD CODE FULL CODE (CODE I) for the official testing of agricultural tractors

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OECD Approval No: 1485 Full Code
Approval Date: Sep. 15, 1993



DONG FANG HONG 180 (2WD) tractor
Manufactured by The First Tractor Works China
Luoyang, Henan, China
Box. 471004, China
Test No: 93OS204
Date: Oct. 1992

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

DFH-180 CAMTC OECD NO.1485 Full Code

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DFH—180 CAMTC OECD No. 1485 Full Code

– Tractor manufacturer's name and address:	The First Tractor Works China Luoyang China
– Location of tractor assembly:	Luoyang
– Submitted for test by:	The manufacturer
– Selected for test by:	The manufacturer with the agreement of CAMTC
– Place of running–in:	At the testing station
– Duration of running–in:	50h
– Location of tests:	CAMTC

I. SPECIFICATIONS OF TRACTOR

TRACTOR

– Make / Model / Type:	The First Tractor works China / Dong FangHong 180 (2WD)
– Number of driving wheels:	2
– Serial N ° :	856
– 1st Serial N ° :	856

ENGINE

– Make / Model / Type:	Jianxiang Diesel Engine works China / TY290TA / Vertical,twin–cylinder,Water cooling direct injection naturally aspirated diesel
– Serial N ° :	1093

Cylinders

– Number / disposition:	2 / Vertical
– Bore / stroke:	90 / 100 mm / mm
– Capacity:	1272 cm'
– Compression ratio:	18:1
– Arrangement of valves:	Overhead
– Cylinder liners:	Wet

Fuel system

– Fuel feed system:	Fuel feed by pump

– Make / Model / Type of fuel filter:	C0506B / paper Cartridge replaceable
– Make / Model / Type of injection pump:	I series / two jar plunger pump
– Serial number:	1786
– Manufacturer's production setting of injection pump:	
• Flow rate (rated engine speed and full load):	4.0 dm^3 / h
• Timing:	22 ° –28 ° before T.D.C.
– Model / Type of injectors:	TS4100(four holes)
– Injection pressure:	18.13MPa

Governor.

– Model / Type:	TIF275–1000G / Mechanical whole course centrifugal
– Governed range of engine speed:	from 600 to 2370 rev / min
– Rated engine speed:	2200 rev / min

Air cleaner

– Pre–cleaner	
• Make / Model / Type:	Wei Fang power works / 195 / centrifugal
• Location of air intake:	Left side of the fuel tank
– Main cleaner	
• Make / Model / Type:	Wei Fang Power Works / 195 / oil bath

Lubrication system

– Type of feed pump:	JZX1018 Rotor
– Type of filter(s):	J0708, replaceable, paper element
– Number:	1

Cooling system

– Type of coolant:	Water
– Type of pump:	Centrifugal, belt driven
– Number of fan blades:	4
– Fan diameter:	280 mm
– Coolant capacity:	8 dm^3
– Type of temperature control:	Thermostat
– Superpressure system:	None

Starting system

– Model / Type:	QD1242 / solenoid engaged
– Starter motor power rating:	1.5 kW
– Cold starting aid:	Electrothermal plug

Electrical system

– Voltage:	12 V
– Generator	
• Make / Model / Type:	Kaifeng Internal ElectricityWorks / JF1201C / belt driven
• Power:	0.2 kW
– Battery (Number of accumulators):	1
• Rating:	80Ah at 20 hours

Exhaust system

– Make / Model / Type:	Own make / DFH–180
– Location:	Left–hand side of engine, Vertical

TRANSMISSION TO WHEELS

Clutch

– Make / Model / Type:	Own make / dry, single disk, Travel and Power Take–off
– Mumber of plates:	1
– Diameter of plates:	228 mm
– Method of operation:	Mechanical, by pedal

Gear box

– Make / Model / Type:	own make / Mechanical
– Arrangement:	GEAR BOX with 4 forward and 1 reverse speed, GROUP GEAR with 4 ranges (low–low, low–high, high–low, high–high)
– Number of gears:	16 forward, 4 reverse
– Available options:	Creeper device

Rear axle and final drives

– Make / Model / Type:	Own make / Crown wheel and spur gear differential spur gear final drives
– Differential lock:	
• Type:	Mechanical
• Method of engagement:	By hand level
• Method of disengagement:	By hand level

Front axle and final drives

– Make / Model / Type:	Own make / Balanced arm

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 2200 rev / min km / h
1	LL	449.4	0.79
2	LL	271.0	1.31
3	LL	189.8	1.87
4	LL	121.6	2.92
R	LL	338.0	1.05
1	LH	159.2	2.23
2	LH	97.0	3.66
3	LH	67.8	5.24
4	LH	43.4	8.18
R	LH	120.3	2.95
1	HL	134.52	2.64
2	HL	82.02	4.33
3	HL	57.42	6.19
4	HL	36.72	9.67
R	HL	101.72	3.49
1	HH	48.0	7.39
2	HH	29.2	12.15
3	HH	20.6	17.36
4	HH	13.1	27.11
R	HH	36.3	9.79

LL = Low low range LH = Low high range
HL = High low range HH = High high range

(*) Calculated with a tyre dynamic radius index of 428mm (ISO 4251 / 1–1984).

POWER TAKE-OFF

Main power take-off

-Type:	Not independent
-Method of engagement:	By hand lever, driven by the main cluth
- Number of shafts:	1

Power take-off proportional to engine speed

540 rev / min	
- Location:	At rear of the tractor
- Diameter of power take-off shaft end:	35 mm
- Number of splines:	6, in conformity with ISO500 / 1979
- Height above ground:	477 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear wheel axis:	334 mm
- PTO speed at rated enging speed (2200 rev / min):	547 rev / min
- Engine speed at standard power take-off speed:	2172 rev / min
- Ratio of rotation speeds (enging speed / p.t.o speed):	4.022
- Power restriction and maximum torque:	12.60 kW 245 N.m
- Direction of rotation (viewed from behind tractor):	Clockwise

POWER LIFT

- Make:	Own make
- Type of hydraulic system:	Half divide put, open centre system
- Type and number of cylinders:	1, single acting
- Type of linkage lock for transport:	Mechanical
- Relief valve pressure setting :	$15.69^{-0.49}$ MPa
- Opening pressure of cylinder safety valve:	None
- Lift pump type:	Gear
- Transmission between pump and engine:	Gear driven from gearbox
- Site of oil reservoir:	Transmission housing
- Type, number and location of tapping points:	Thread, 1 on the hoist housing

– Maximum volume of oil available to external cylinders: 8.8 dm^3

Three–point linkage

– Category: 0, in conformity with IN to ISO 730 / 2–1979

– Category adapter: None

Linkage geometry:

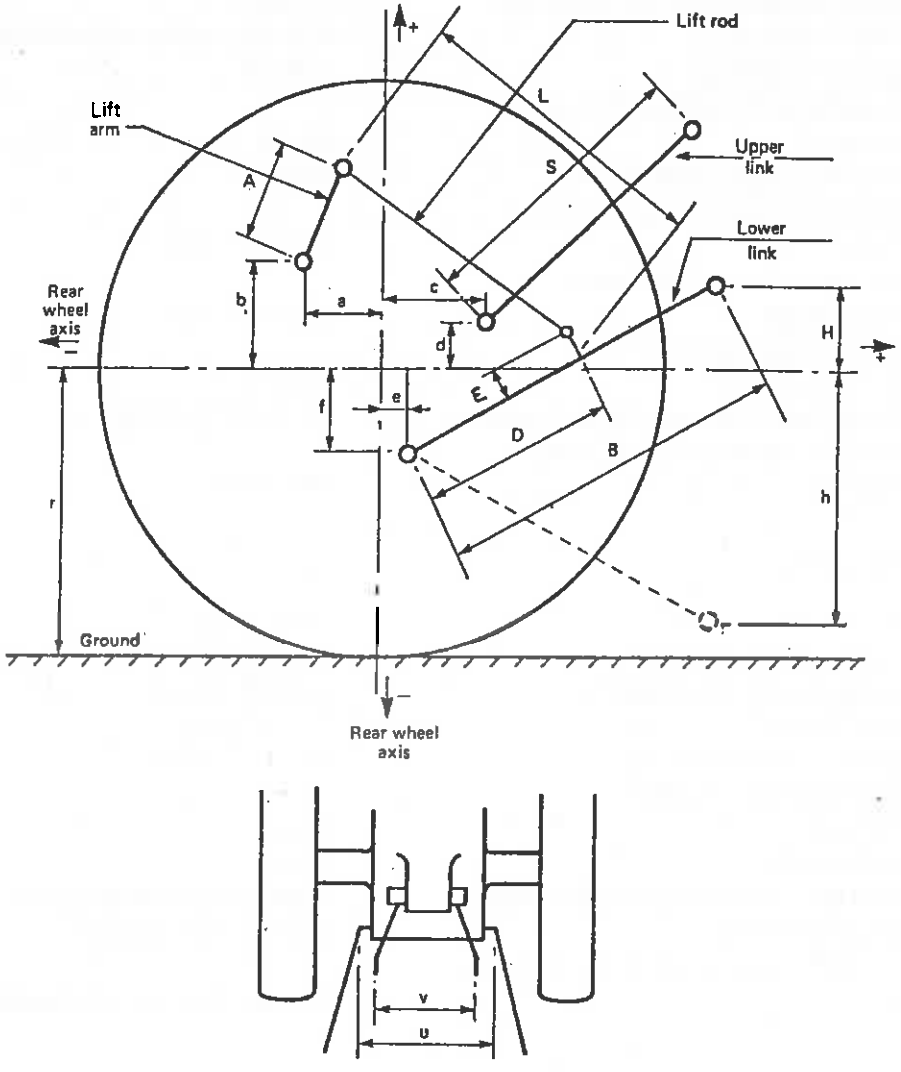


Table 1.1–Dimensions of linkage when attached to the standard frame

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	230	230
Length of lower links	(B)	480	480
Distance of lift arm pivot: horizontally	(a)	97	97
point from rear wheel axis: vertically	(d)	333	333
Horizontal distance between the two lower link points	(u)	260	260
Horizontal distance between the two lift arm end points	(v)	330	330
Length of upper link	(s)	from 400 to 550	447
Distance of upper link pivot point from rear : horizontally	(c)	265	265
wheel axis : vertically	(d)	223	223
Distance of lower link pivot point from rear : horizontally	(e)	225	225
wheel axis : vertically	(f)	223	223
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	240	240
Length of lift rods	(L)	from 410 to 490	453
Height of lower hitch points relative to the rear wheel axis			
– in low position	(h)	162–344	337
– in high position	(H)	100–259	103
Height above ground of lower hitch points when locked in transport position		475–625	/

"(*) Assuming(r) = tyre dynamic radius index of 428mm (ISO 4251 / 1–1984)"

TRAILER HITCH

– Type:	Fixed
– Hole diameter:	26 mm
– Height above ground:	397 mm
– Distance of hitch point from rear wheel axis, horizontally:	460 mm
– Distance of hitch point from power take–off shaft end	
• Vertically:	49 mm
• Horizontally:	142 mm
– Maximum vertical permissible load:	5.21 kN

STEERING

– Make / Model / Type:	Own make / None / Worm and roller
– Method of operation:	Mechanical

BRAKES

Service brake

– Make / Model / Type:	Own make / None / fixed cam hoof
– Method of operation:	Mechanical by pedal
– Trailer braking take–off:	Air brake

Parking brake

–Type:	Fixed cam hoof and pawl cotter
– Method of operation:	Mechanical and hand lever

WHEELS

– Number	4
• Front:	2, steering
• Rear:	2, driving
– Wheelbase:	1440 mm

-Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	880	880	None
Rear	1000	1000	None

DRIVER'S SEAT

- Make / Model / Type: Own make / None / single seat, soft cushion
- Type of damping: spring

LIGHTING

	Height above ground of centre mm	Size mm	Distance from outside side edge to median plane of tractor mm
Headlights	810	140 × 100	180
Sidelights	1090	60 × 100	260
Rearlights	1050	D120	500

Ⅱ. TEST CONDITIONS

Overall dimensions

	Lenght	Width		Height at top of	
		minimum	maximum	protective structure	exhaust silencer
	mm	mm	mm	mm	mm
Ballasted	2460	1200	1200	/	1732
Unballasted	2460	1200	1200	/	1736

Ground clearance(unballasted tractor): 270 mm

– Clearance–limiting part: Under Engine housing

Tractor mass

Without protective structure:

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	402.5	409.5	401.0	404.0
Rear	714.5	782.5	608.0	680.0
Total	1117.0	1192.0	1009.0	1084.0

Ballast

	Weights		Water
	Number	Total mass kg	kg
Front	/	/	/
Rear	4	108	/
Optinal	/	/	/

Tyres specifications

	Front	Rear
Tyres:		
• dimensions	4.00–14	7.50–20
• ply rating	4	6
• type	cross ply	cross ply
• maximum load(tyre maunfacturer's)	2.18 kN	7.30 kN
• inflation pressure(tyre manufacturer's)	196–245 kPa	98–196 kPa
• dynamic radius index	277 mm	428 mm
Chosen track width:	880 mm	1000 mm

Oils and lubrication

-Capacity and change interval:

	Capcity dm^3	oil change h	Filter change h
Engine	3.5	250	500
Gear box	17	500	
Rear axle	connon with		
Final drive(rear)	gear box		
Hydraulic system	3.9	1000	500

- Specifications

	Recommended	Used during test
Engine oil • Type: • Viscosity: • Classification:	SAE 10 W / 30 11.4 cst at 100℃ APICC	HC-11 11 cst at 100℃ sy 1152—77
Transmission oil • Type: • Viscosity: • Classification:	SAE 80 9.3 cst at 100℃ APIGL—4	HQ—10 10 cst at 100℃ GB 485-81
Hydraulic fluid • Type: • Viscosity: • Classification:	Same as trans. oil	Same as trans. oil
steering oil • Type: • Viscosity: • Classification:	Same as trans. oil	Same as trans. oil

Grease:

• Number of lubrication points: 15

Fuel

- Type: No.0,diesel fuel in conformity with GB252-81 China standard.

- Density at 15 ° C: 0.847g / cm^3

Ⅲ. TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF PERFORMANCE

-Date and location of tests: 28,08,1992 CAMTC
-Type of dynamometer: Eddy Current, SCHENCK W400

Power	speed		Fuel consumption			Specific energy
	Engine	P.T.O	Hourly		Specifi	
kW	rev / min		kg / h	l / h	g / kWh	kWh / l
1.1 MAXIMUM POWER-TWO-HOUR TEST						
12.20	2200	547	3.30	3.90	270.1	3.13
1.2 POWER AT RATED ENGINE SPEED						
12.20	2200	547	3.30	3.90	270.1	3.13
1.3 STANDARD POWER TAKE-OFF SPEED (540 rev / min)						
12.16	2172	540	3.24	3.83	266.1	3.17
1.4 PART LOADS 1.4.1 the torque corresponding to maximum power at rated engine speed						
12.20	2200	547	3.30	3.90	270.1	3.13
1.4.2 85% of torque obtained in 1.4.1						
10.77	2284	568	3.04	3.60	282.1	2.99
1.4.3 75% of torque defined in 1.4.2						
8.13	2297	571	2.47	2.92	303.3	2.78
1.4.4 50% of torque defined in 1.4.2						
5.43	2317	576	1.95	2.32	359.8	2.34
1.4.5 25% of torque defined in 1.4.2						
2.72	2325	578	1.47	1.74	540.4	1.56
1.4.6 unloaded						
0	2337	581	1.05	1.25	/	/

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Power	Speed		Fuel corsumotion			Specific energy
	Engine	P.T.O	Hourly		Specific	
kW	rev / min		kg / h	l / h	g / kWh	kWh / l
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (540 rev / min) 1.5.1 the torque corresponding to maximum power						
12.16	2172	540	3.24	3.83	266.1	3.17
1.5.2 85% of torque obtained in 1.5.1						
10.29	2184	543	2.81	3.33	272.9	3.09
1.5.3 75% of torque defined in 1.5.2						
7.79	2200	547	2.29	2.71	293.7	2.87
1.5.4 50% of torpue defined in 1.5.2						
5.14	2220	552	1.81	2.15	352.9	2.39
1.5.5 25% of torpue defined in 1.5.2						
2.62	2236	556	1.37	1.62	522.1	1.62
1.5.6 unloaded						
0	2252	560	0.98	1.16	/	/

- No load maximum engine speed: 2337 rev / min
- Torque (equivalent crankshaft) at maximum power: 53.0 N.m
- Maximum torque (equivalent crankshaft): 61.7 N.m
  (engine speed: 1629 rev / min)
- Mean atmospheric conditions
  - Temperature: ·28 ℃
  - Pressure: 101.5 kPa
  - Relative humidity: 30%
- Maximum temperatures
  - Coolant: 88℃
  - Engine oil: 105℃
  - Fuel: 27℃
  - Engine air intake: 29℃

2. HYDRAULIC POWER AND LIFTING FORCE

– Date of tests: 02, 09, 1992

2.1 HYDRAULIC POWER TEST

– Sustained pressure with relief valve open: 15.2 MPa

– Pump delivery rate at minimum pressure: 6.0 l / min

	Flow rate	Pressure	Power
	l / min	MPa	kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power	4.55	13.7	1.04
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	4.50	14.0	1.05

– Tapping point used for test: Auxiliary service connection

– Temperature of hydraulic fluid: 62 ℃

2.2 POWER LIFT TEST

	at the hitch point	on the frame
Height of lower hicht points above qround in down position	91 mm	91 mm
Vertical movement	440 mm	538 mm
Maximum corrected force exerted through full range	6.26 kN	3.38 kN
Corresponding pressure of hydraulic fluid	13.68 MPa	13.68 MPa
Moment about rear wheel axis	4.41 kN • m	4.44 kN • m
Maximum tilt angle of mast from vertical	–	13.5 degrees

– Linkage setting for test: see above table and figures

Llfting heights relative to the horizontal plane including the lower link pivot points											
mm	– •••	–130	–113	–100	0	+100	+200	+300	+327	+400	+453
Lifting forces(the values measured are 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 point kN			6.26	6.30	6.58	6.47	6.44	6.55	6.62		
Corresponding pressure: 13.68 MPa											
at the frame kN		5.35	5.33	5.31	5.30	5.06	4.68	4.22	4.20	3.75	3.38
Corresponding pressure: 13.68 MPa											

3. DRAWBAR PERFORMANCE

–Date of tests: 08,09,1992

–Type of track: Concrete

		Tyre inflation pressure	
	Height of drawbar above ground	Front	Rear
Unballasted	397 mm	196 kPa	98 kPa
Ballasted	393 mm	196 kPa	98 kPa

Gear and range	Power	Drawbar pull	Speed	Engine speed	Stip 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)													
LL1	1.34	6.70	0.72	2291	15.2	1021.9	0.82	27	78	93	28	47	100.2
LL2	2.21	6.97	1.17	2261	15.2	711.8	1.19	27	78	93	28	47	100.2
LL3	3.14	6.73	1.68	2248	14.7	557.2	1.51	27	79	94	28	47	100.2
LH1	3.86	6.67	2.08	2231	15.2	496.8	1.70	28	80	94	28	47	100.2
HL1	4.50	6.66	2.43	2233	15.2	497.3	1.69	28	80	97	29	47	100.2
LL4	4.85	6.66	2.62	2237	14.7	454.3	1.85	27	79	94	28	47	100.2
LH2	6.03	6.64	3.27	2235	15.2	410.2	2.05	28	80	95	29	47	100.2
HL2	7.27	6.56	3.99	2217	15.2	420.2	2.00	28	80	96	29	47	100.2
LH3	8.64	6.56	4.74	2226	15.2	387.5	2.17	28	80	96	29	47	100.2
HL3	8.92	5.57	5.76	2204	11.2	366.3	2.29	28	80	96	29	47	100.2
HH1	9.88	4.94	7.20	2203	7.6	340.2	2.47	28	80	97	29	47	100.2
LH4	9.82	4.50	7.85	2200	7.6	341.2	2.46	28	80	97	29	47	100.2
HL4	9.80	3.68	9.58	2201	5.0	345.8	2.43	28	80	97	29	47	100.2

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
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
LL1	1.41	7.25	0.70	2252	15.1	950.5	0.88	26	79	93	27	47	100.2
LL2	2.41	7.41	1.17	2266	15.1	677.9	1.24	26	79	93	27	47	100.2
LL3	3.42	7.36	1.67	2238	14.6	539.4	1.57	26	80	94	27	47	100.2
LH1	3.97	6.87	2.08	2236	15.3	480.8	1.76	26	80	94	28	47	100.2
LH1	4.70	7.02	2.41	2227	15.1	483.0	1.75	27	80	98	28	47	100.2
LL4	5.22	7.22	2.60	2232	14.6	440.0	1.91	26	80	94	27	47	100.2
LH2	6.24	6.79	3.31	2228	15.3	398.6	2.11	26	80	95	28	47	100.2
HL2	7.31	6.63	3.97	2214	14.9	407.2	2.08	27	80	94	28	47	100.2
LH3	8.83	6.70	4.74	2221	15.3	372.9	2.25	27	80	98	28	47	100.2
HL3	9.42	5.98	5.67	2200	10.3	368.0	2.30	27	80	95	28	47	100.2
HH1	9.94	4.98	7.18	2197	6.2	355.5	2.36	27	80	97	28	47	100.2
LH4	10.14	4.66	7.83	2201	6.0	337.3	2.49	27	80	95	28	47	100.2
HL4	9.72	3.77	9.28	2199	6.0	343.9	2.44	27	80	96	28	47	100.2
3.3.1 FIVE HOUR TEST at 75 per cent of pull at maximum power													
LH4	7.88	3.50	8.10	2199	5.0	351.4	2.39	26	79	97	28	47	100.2
3.3.2 FIVE HOUR TEST at pull corresponding to 15 per cent wheelslip in test 3.2													
LH3	8.79	6.72	4.71	2218	15.0	370.4	2.27	25	78	93	26	42	100.0

oil consumption during ten hours duration of tests 3.3.1 and 3.3.2: 24g / h

4. TURNING SPACE AND TURNING CIRCLE

	Without brakes	
	Right hand	Left hand
	m	m
Radius of turning area	3.01	3.27
Radius of turning circle	2.91	3.15

5. LOCATION OF CENTRE OF GRAVITY

- Height above ground: 546.4mm
- Distance forward from the vertical plane containing the axis of the rear wheels: 536.7 mm
- Distance from the median plane of the tractor: −9.5 mm

6. BRAKING

- Date of tests: 08, Sep. 1992

6.1 COLD SERVICE BRAKING DEVICE TEST

Speed before application of brakes: 28.8 km / h

Ballasted tractor	Btaking device control force N	150	250	350	450	550	600
	Mean deceleration m/s^2	1.4	2.0	2.5	3.0	3.1	3.1
Unballasted tractor	Braking device control force N	150	250	350	450	550	600
	Mean deceleration m/s^2	1.9	2.5	2.9	3.4	3.6	3.6

6.2 FADE TEST

Speed before application of brakes, 28.8 km / h

Ballasted tractor	Braking device control force, N	150	250	350	450	550	600
	Mian deceleration, m / s^2	1.3	1.9	2.3	2.7	3.0	3.0

Comments on deviation and Vibration: None

Brakes were heated by: Driving

6.3 PARKING BRAKING DEVICE TEST

Force applied on slope of 18%

	Up	Down
Braking device control force, N	292	388

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of test: 08, 09, 1992
- Type of sound level meter: Bruel &Kjaer 2232
- Type of track: Concrete
- Gear number: HH4
- Travelling speed before acceleration: 21.6 km / h
- Sound level: 83.8 dB(A)
- Repairs and Adjustments During Tests: None

IV. REPAIRS AND ADJUSTMENTS DURING TESTS: None

V. REMARKS: None

Test carried out by : Geng Zhan Bin, Bai Yu Chun

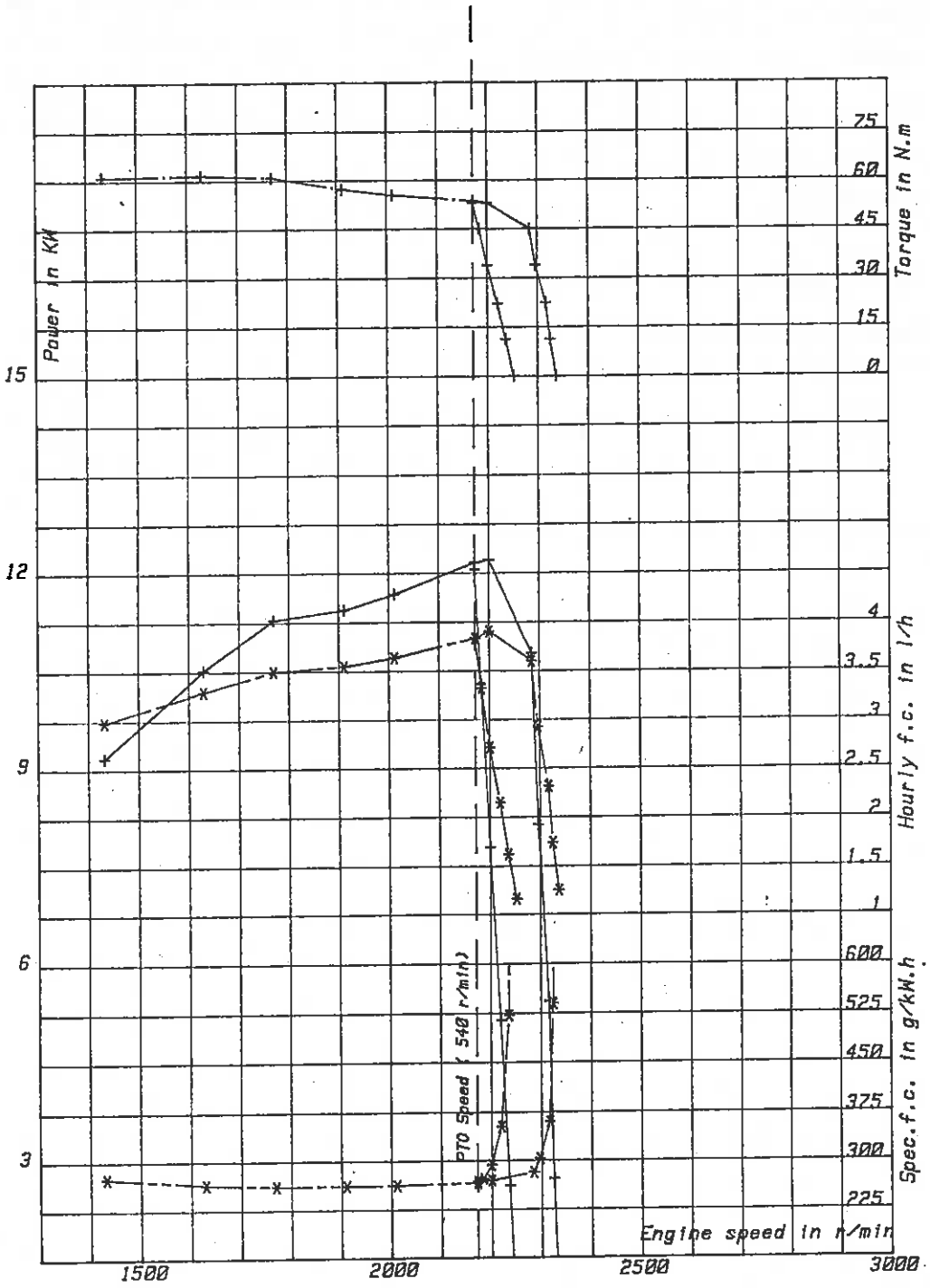
Officer in Charge : Chen Hai Yan

Chief of Tractor Testing Division : Li Xi Jiang 李锡江

For the director : Wang Lian Sheng 王连生

ANNEX

MAIN POWER TAKE-OFF TEST CURVES



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MAIN POWER TAKE-OFF TEST CURVES

