COTTEC

CHINA OFFICIAL TRACTOR TEST AND EVALUATION CENTRE

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OECD TEST REPORT OF SHANGHAI 654 (4WD) 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. 1620 Full Code

Date 25th June, 96

Tested Tractor	Submitted for test by
Make: Shanghai	**Name: Shanghai Tractor & Internal Conbustion Engine Corporation**
Model: 654	**Address: Shanghai, P.R. China**
Type: 4WD	**Tel: 86 21 65480006**
	Fax: 86 21 65491996

This report includes 26 pages and may only be duplicated as a whole

SH－654　　COTTEC Test No. 951660　　OECD No. 1620

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This report has been approved by the OECD Co-ordinating Centre (CEMAGREF) in Antony (France) on 25th June, 1996. Approved No. 1620 Full code

SH－654　　COTTEC Test No. 951660　　OECD No. 1620

Tractor manufacturer's name and address:	Shanghai Tractor & Internal Combustion Engine Co. (STEC) Shanghai, China
Location of tractor assembly:	STEC, Shanghai, China
Submitted for test by:	Manufacturer
Selected for test by:	The manufacturer with the agreement of the COTTEC
Place of running-in:	STEC, Shanghai, China
Duration of running-in:	38 hours
Location of test:	COTTEC, Luoyang, Henan, China

SPECIFICATIONS OF TRACTOR

TRACTOR

—Make:	SHANGHAI
—Model:	654
—Type:	4WD
—Number of driving wheels:	4
—Serial No.:	012315
—1st Serial No.:	92－012881

ENGINE

—Make:	STEC
—Model:	4100A－7
—Type:	4-stroke, diesel engine with spherical combustion chamber, water cooling, direct injection
—Serial No.:	29717

Cylinders

—Number:	4	
—Disposition:	Vertical, in line	
－Bore/Stroke:	100/115	mm
—Capacity:	3610	cm^3
—Compression ratio:	17.5:1	
—Arrangement of valves:	Overhead, in line	
－Cylinder liners:	Dry type	

Fuel system		
—Fuel feed system:	Forced feed type	
—Fuel filter:		
. Make:	Shanghai Filter Factory	
. Model /type:	C0708, 2 parallel units, paper cartridge, replaceable	
—Capacity of fuel tank:	62	dm^3
—Injection pump		
. Make:	Shanghai Pump and Injector Works	
. Model/type:	I Serial, 4—cylinder plunger	
. Serial No. :	941122	
—Manufacturer's production setting of injection pump:		
. Flow rate (at rated engine speed and full load):	15.48	dm^3/h
. Timing:	28±2° before T.D.C.	
—Injectors:		
. Make:	Shanghai Pump and Injector Works	
. Model/Type:	Long neck, single hole	
. Injection pressure:	17.2+0.5	MPa
Governor		
—Make:	Shanghai Pump and Injector Works	
– Model/type:	Mechanical, centrifugal	
– Governed range of engine speed:	600～2590	rev/min
– Rated engine speed:	2400	rev/min
Air cleaner		
– Make:	Shanghai Automobile Accessory Factory	
– Model/Type:	4100A, Oil bath	
– Location of air intake:	Front end of the radiator, inside the bonnet	
– Maintenance indicator:	None	
Lubrication system		
– Type of feed pump:	Rotor, JZX108	
– Type & Number of filter(s):	Full flow, paper, 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 blades:	4	
－Fan diameter:	420	mm
－Coolant capacity:	13	dm^3
－Type of temperature control:	Thermostat	
－Superpressure system	20	kPa

Starting system

－Make:	Shanghai Automobile Electrical Machinery Factory	
－Model/Type:	QD1328C, D.C. solenoid engaged	
－Starter motor power rating:	2.0	kW
－Cold starting aid:	Eletrothermic plug	
－Safety device:	Main shift lever in neutral position	

Electrical system

－Voltage:	12 (Negative earth)	V
－Generator:		
. Make:	Shanghai Automobile Electrical Machinery Factory	
. Model/Type:	JFZ1317Y, Alternator, belt driven	
. Power:	0.35	kW
－Battery(number of accumulators):		
. Model/Type:	6－QA－165, Lead acid	
. Number:	1	
. Rating:	165	Ah

Exhaust system

－Make:	Own make
－Model/Type:	SH－654, expansion type, silencer
－Location:	Left-hand side of the engine, vertical

TRANSMISSION TO WHEELS

Clutch(Travel and Power Take-off)

－Make:	Shanghai Clutch Works
－Model/Type:	Dry, Double acting, constant engaging
－Number of plate(s):	2 for travel and P.T.O
－Diameter of plate(s):	295 mm for travel, 280 mm for P.T.O
－Method of operation:	By pedal

Gear box

－Make:	Shanghai Automobil Gear Plant
－Model/Type:	SH-654, Spur gear, planetary reduction, Compound,
－Arrangment:	Gear box with 4 forward and 1 reverse speeds, GROUP GEAR with 2 ranges (L and H)
－Number of gears:	8 forward and 2 reverse gears
－Available options:	Group Gear with 3 ranges (L、M and H) 12 forward and 3 reverse gears

Rear axle and final drives

－Make:	Shanghai Automobile Gear Plant
－Model/Type:	Crown wheel and pinion spiral bevel gear differential, spur gear final drives fixed inside of the rear box.
－Differential Look:	
. Type	Mechanical
. Method of engagement:	Manual by lever
. Method of disengagement:	Self disengaging

Front axle and final drives

－Make:	Shanghai Huizhong Bus Co.
－Model/Type:	Bevel gear differential, Dual universal joints and planetary final drives without differential lock

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 2400 rev/min km/h
1	L	248.77	2.41
2	L	150.73	3.98
3	L	103.60	5.79
4	L	79.54	7.54
5	H	62.19	9.64
6	H	37.68	15.92
7	H	25.90	23.16
8	H	19.89	30.61
R_1	L	188.52	3.18
R_2	H	47.13	12.72

* Calculated with a tyre dynamic radius index of 662.7 mm (ISO 4251/1-1992)
Number of revolutions of front wheels for one revolution of rear wheels: 1.41

POWER TAKE-OFF

Main power take-off

－ Type:	Semi－independent	
－ Method of engagement:	By hand lever	
－ Number of shafts:	1	
－ Method of changing power take-off shaft ends and speeds:	Manually by exchanging p.t.o shafts	

Power take-off proportional to engine speed 540 rev/min

－ Location:	At rear of the tractor	
－ Diameter of power take-off shaft end:	34.79	mm
－ Number of splines:	6, in conformity with ISO 500/1991	
－ Height above ground:	630	mm
－ Distance from the median plane of the tractor:	0	mm

－Distance behind rear wheel axis:	322	mm
－PTO speed at rated engine speed:	557	rev/min
－Engine speed at standard power take-off speed:	2325	rev/min
—Ratio of rotation speeds (engine speed/p.t.o. speed):	4.306	
－Power restriction and maximum torque: (Manufacturers recomendation)	46.2 kW　756 N·m	
－Direction of rotation(viewed from behind tractor):	Clockwise	

1000 rev/min

－Location:	At rear of the tractor	
－Diameter of power take-off shaft end:	34.67	mm
－Number of splines:	21, in conformity with ISO 500/1991	
－Height above ground:	630	mm
－Distance from the median plane of the tractor:	0	mm
－Distance behind rear wheel axis:	319	mm
－PTO speed at rated engine speed:	1013	rev/min
－Engine speed at standard power take-off speed:	2368	rev/min
－Ratio of rolation speeds (engine speed/p.t.o. speed):	2.368	
－Power restriction and maximun torque:	46.2 kW　433 N·m	
－Direction of rotation (viewed from behind tractor):	Clockwise	

Optional Power Take-off:

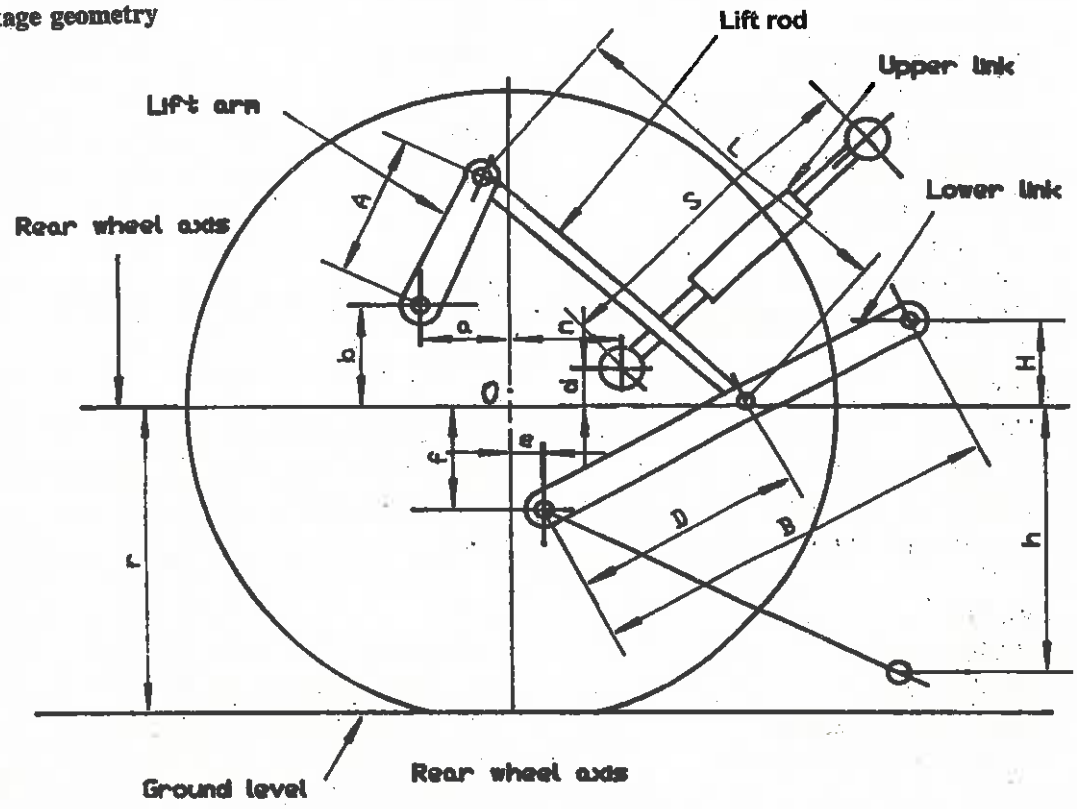
－Location:	At rear of the tractor	
－Diameter of power take-off shaft end:	35	mm
－Number of splines:	8, not in conformity with ISO 500/1991	
－Height above ground:	630	mm
－Distance from the median plane of the tractor:	0	mm
－Distance behind rear wheel axis:	327	mm
－PTO speed at rated engine speed:	833	rev/min
－Engine speed at standard power take-off speed:	2207	rev/min
－Ratio of rotation speeds		

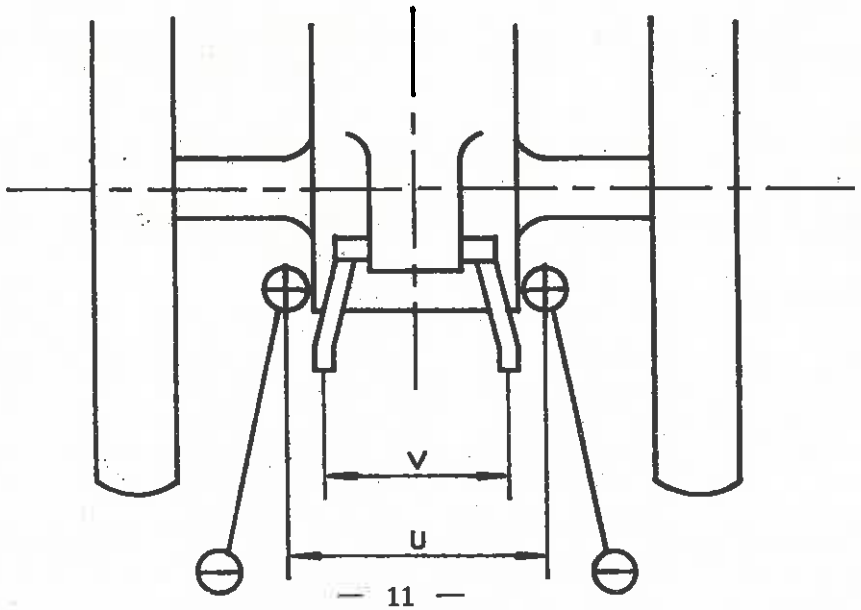
(engine speed/p.t.o. speed):	2.882	
－Power restriction and maximum torque:		
(Manufacturers recomendation)	46.2kW 527N·m	
－Direction of rotation (viewed from behind tractor):	Clockwise	
Power take-off proportional to ground speed:	None	
POWER LIFT		
－Make:	Own make	
－Type of hydraulic system:	Partial separated units, Open center	
－Type and number of cylinders:	Single acting, 1	
—Opening pressure of cylinder safety valve:	18	MPa
－Type of linkage lock for transport:	Hydraulic lock	
－Relief valve pressure setting:	15.68	MPa
－Lift pump type:	CBT F316A gear pump	
－Transmission between pump and engine:	Driven by engine	
－Type and number of filter(s):	1	
－Site of oil reservior:	In the transmission housing	
—Tapping point(s)		
·Type:	ISO standard quick coupler	
·Number:	2	
·Location:	At the rear of tractor	
－Maximum volume of oil available to external cylinders:	15	dm^3
Three point linkage		
－Category:	Ⅱ to ISO standard 730/I－1990	
－Category adapter:	None	
－Linkage geometry:	See next page and following table	

		Dimension or range * mm	Setting used in test mm
Length of lift arms	(A)	255	255
Length of lower links	(B)	890	890
Distance of lift arm pivot point from rear wheel axis: Horizontally	(a)	334	334
Vertically	(b)	355.5	355.5
Horizontal distance between the 2 lower link points:	(u)	526	526
Horizontal distance between the 2 lift arm end points	(v)	530	530
Length of upper link	(S)	from 630 to 820	770
Distance of upper link pivot point from rear wheel axis: Horizontally	(c)	120	120
Vertically	(d)	278	278
Distance of lower link pivot point from rear wheel axis: Horizontally	(e)	22	22
Vertically	(f)	136	136
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	550	550
Length of lift rods	(L)	from 730 to 910	870
Height of lower hitch points relative to the rear wheel axis:			
in low position	(h)	from －14 to 626	473
in high position	(H)	from 459 to 179	247
Height above ground of lower hitch points when locked in transport position		Any height within lift range	

* Assuming (r) with a tyre dynamic radius index of 662.7mm(ISO4251/1-1992)

Linkage geometry





TRAILER HITCH

－Type:	Fixed	
－Hole diameter:	34	mm
－Height above ground:	575	mm
－Distance of hitch point from rear wheel axis, horizontally:	590	mm
－Distance of hitch point from power take-off shaft end:		
. Vertically:	30	mm
. Horizontally:	268	mm
－Maximum vertical permissible load:	15	kN

STEERING

－Make:	Jining Hydraulic Part Factory	
－Model/Type:	BZZI－100, Hydrostatic steering system	
—Method of operation:	Manual operated	
－Working pressure:	6.5	MPa

BRAKES

－Make:	Own make	
－Model/Type	Dry disc, double plates,	
－Method of operation:	By pedals, coupled or independent	
－Trailer braking take-off:	Pneumatic braking, operated by tractor pedals	

Parking brake

－Type:	Mechanical	
－Method of operation:	By pedals locked by ratchet	

WHEELS

－Number		
. Front:	2, steering and driving	
. Rear:	2, driving	
－Wheelbase:	2050	mm

－Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1438	1738	Reversing wheels and Off-set lug rims
Rear	1338	1800	Reversing wheels and Off-set lug rims

DRIVER'S SEAT

－Make:　Own make
－Model/Type:　C3M2 Adjustable suspension
－Type of suspension:　Spring with damper
－Type of damping　Hydraulic damper
－Range of adjustment:
. Longitudinal:　50 mm
. Vertical:　0 mm

MISCELLANEOUS

－Additional seat:　On the left and right fender
－Number of places:　2

LIGHTING

	Height above ground of center mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlight	1180	200×175	250
Sidelight	1220	140×45	335
Rearlight	1620	140×85	730
Brakelight	1440	90×70	645

TEST CONDITIONS

OVERALL DIMENSIONS

	Length	Width		Height at top of	
		Minimum	Maximum	protective structure	exhaust silencer
	mm	mm	mm	mm	mm
Ballasted	3920	1850	2150	—	2375
Unballasted	3570	1850	2125	—	—

GROUND CLEARANCE(unballasted tractor)

—Clearance limiting part: Under the front axle 346 mm

TRACTOR MASS

Without protective structure and full fuel tank:

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	1614	1627	1104	1117
Rear	1696	1758	1353	1415
Total	3310	3385	2457	2532

BALLAST

	Weights		Water kg
	Number	Total mass kg	
Front	7	390	—
Rear	12	463	—

TYRE SPECIFICATIONS

	Front	Rear
Tyres:		
Dimensions	8.30—24	13.6—32
Ply rating	8	8
Type	Cross ply	Cross ply
Maximum load (tyre manufacturer's)	6.15 kN	14.45 kN
Inflation pressure (tyre manufacturer's)	147 kPa	137 kPa
Dynamic radius index	470 mm	662.7 mm
Chosen track width:	1450 mm	1500 mm

OILS AND LUBRICATION

Capacity and change interval:

	Capacity dm^3	Oil change h	Filter change h
Engine	10	125	125
Gear box	35	1000	—
Rear axle	Common with gear box		—
Final drive (rear)	Common with gear box		—
Hydraulic system	Common with gear box		—
Steering	2.5	1000	—
Front axle	8	1000	—
Final drive (front)	3.5	1000	—

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Specifications:

	Recommended	Used during test
Engine oil		
Type:	SAE 10W/30	CA—30
Viscosity:	11.4 mm^2/s at 100℃	10 mm^2/s at 100℃
Classification:	API CC	GB 5323－85
Transmission oil		
Type:	SAE 80W/90	80W/90
Viscosity:	9.3 mm^2/s at 100℃	15～19 mm^2/s at 100℃
Classification:	API GL－4	SH0350—92
Hydraulic fluid		(China standard)
Type:	Same as trans. oil	Same as trans. oil
Viscosity:		
Classification:		
Steering oil		
Type:	Same as trans. oil	N100D
Viscosity:		90～100mm^2/s at 40℃
Classification:		Q/SH 007.1.23—87

Grease

－Type: ZFD－12 complex calcium base grease ZBE 36003－88(China standard)

－Number of lubrication points: 40

Fuel

－Type: Standard diesel fuel in conformity with GB 10327－89

－Density at 15℃: 0.852 g/cm^3

TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF

－Date and location of tests: 16th Sep. 1995, COTTEC

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

Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min	rev/min	kg/h	1/h	g/kW·h	kW·h/l
1.1 MAXIMUM POWER－TWO HOURS TEST						
43.74	2400	557	12.66	14.85	289	2.94
1.2 POWER AT RATED ENGINE SPEED						
43.74	2400	557	12.66	14.85	289	2.94
1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
43.43	2325	540	12.58	14.76	290	2.94
1.4 PART LOADS						
1.4.1 The torque corresponding to max. power at rated engine speed						
43.74	2400	557	12.66	14.85	289	2.94
1.4.2 85% of the torque obtained in 1.4.1						
38.01	2450	569	10.71	12.57	282	3.02
1.4.3 75% of the torque defined in 1.4.2						
28.99	2489	578	8.93	10.48	308	2.77
1.4.4 50% of the torque defined in 1.4.2						
19.47	2511	583	6.98	8.19	358	2.38
1.4.5 25% of the torque defined in 1.4.2						
9.87	2536	589	5.29	6.21	536	1.59
1.4.6 Unloaded						
1.13	2575	598	3.97	4.66	—	—

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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	
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED 540 rev/min						
1.5.1 The torque corresponding to maximum power						
43.43	2325	540	12.58	14.76	290	2.94
1.5.2 85% of the torque obtained in 1.5.1						
38.02	2394	556	10.72	12.58	282	3.02
1.5.3 75% of the torque defined in 1.5.2						
28.89	2424	563	8.62	10.11	299	2.85
1.5.4 50% of the torque defined in 1.5.2						
19.45	2446	568	6.75	7.92	347	2.46
1.5.5 25% of the torque defined in 1.5.2						
9.80	2472	574	5.03	5.90	513	1.66
1.5.6 Unloaded						
1.10	2502	581	3.78	4.43	—	—

－ No load maximum engine speed:	2575	rev/min
－ Equivalent crankshaft torque at maximum power at rated engine speed	174.2	N·m
－ Maximum Equivalent crankshaft torque: (Engine speed: 1335 rev/min)	208.1	N·m
－ Mean atmospheric conditions		
. Temperature:	28	℃
. Pressure:	100.8	kPa
. Relative humidity:	72	%
－ Maximum temperatures		
. Coolant:	102	℃
. Fuel:	40	℃
. Engine air intake:	44	℃
. Engine oil:	111	℃

2. HYDRAULIC POWER AND LIFTING FORCE

－Date and location of tests:　26th Sep., 1995, COTTEC

2.1 HYDRAULIC POWER TEST

－Sustained pressure with relief valve open:　16.2　MPa
－Pump delivery rate at minimum pressure:　39.32　l/min

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power	31.75	14.6	7.73
Flow rate and hydyaulic pressure corresponding to max. hydraulic power	33.45	14.2	7.92

－Tapping point used for test:　At rear part of the tractor
－Temperature of hydraulic fluid:　65.5　℃
－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 at the 610 mm point
Height of lower hitch points above ground in down position (with lifting force) mm	187	137
Vertical movement (with Lifting force) mm	693	805
Maximum corrected force exerted throught full range kN	19.11	11.08
Corresponding pressure of hydraulic fluid MPa	14.6	14.6
Moment about rear wheel axle kN·m	17.43	16.86
Maximum tilt angle of mast from vertical degrees	—	7.8

－Linkage setting for test: see above table and figures on page 11

Lifting heights relative to the horizontal plane inculding the lower link pivot points											
mm	－390	－340	－300	－200	－100	0	100	200	300	353	415
Lifting forces (the values of force 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	—	18.38	19.18	21.22	21.59	21.18	20.35	19.66	19.19	19.10	—
Corresponding pressure: 14.6 MPa											
At the frame kN	18.04	18.24	18.42	18.55	18.36	18.22	17.20	15.99	15.22	14.91	11.08
Corresponding pressure: 14.6 MPa											

3. DRAWBAR PERFORMANCE

—Date of tests: 18th~23th Sep, 1995

—Type of track: Concrete

	Height of drawbar above ground mm	Tyre inflation pressure kPa	
		Front	Rear
Unballasted	365	147	137
Ballasted	360	147	137

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Tempera-ture	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, 4WD)													
2	23.82	23.69	3.62	2495	14.93	360	2.37	29	76	102	28	64	99.9
3	33.97	23.65	5.17	2440	14.93	334	2.55	29	82	108	28	64	99.9
4	39.46	20.38	6.97	2405	10.28	315	2.71	29	86	109	28	64	99.9
5	40.42	15.97	9.11	2390	8.63	303	2.81	29	88	110	28	64	99.9
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor, 4WD)													
1	17.01	28.49	2.15	2503	15.04	442	1.93	30	68	98	29	68	99.5
2	28.44	28.60	3.58	2464	15.04	357	2.39	30	80	104	29	68	99.5
3	36.58	24.62	5.35	2402	10.60	339	2.51	30	86	110	29	68	99.5
4	39.43	19.99	7.10	2398	9.34	320	2.66	31	88	110	29	68	99.5
5	39.75	15.22	9.40	2398	6.50	319	2.67	31	89	111	30	68	99.5
3.3 TEN-HOUR TEST (ballasted tractor, 4WD)													
3.3.1 FIVE-HOUR TEST at 75% of pull at maximum power													
4	31.57	14.99	7.58	2463	6.29	318	2.68	31	81	104	31	70	99.4
3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip without additional ballast													
2	28.22	28.62	3.55	—	—	362	2.35	30	80	102	29	70	99.6

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2 : 70 g/h

4. TURNING AREA AND TURNING CIRCLE

Details of wheel equipment:

	Tyre size	Track mm
Front	8.30－24	1450
Rear	13.6－32	1500

	With brakes		Without brakes	
	Right hand m	Left hand m	Right hand m	Left hand m
Radius of turning area	4.15	3.98	4.70	4.30
Radius of turning circle	3.95	3.85	4.50	4.17

5. LOCATION OF CENTRE OF GRAVITY

- Height above ground: 735 mm
- Distance forward from the vertical plane containing the axle of the rear wheels: 904 mm
- Distance from the median plane of the tractor: From left 0.6 mm

6. BRAKING

- Date of tests: 14th Oct., 1995
- Type of track: Concrete
- Speed before application of brakes: 31.9 km/h

6.1 COLD SERVICE BRAKING DEVICE TEST

Ballasted tractor	Braking device control force N	140	165	210	300	427	598
	Mean deceleration m/s^2	0.46	1.31	2.18	2.80	3.39	3.60
Unballasted tractor	Braking device control force N	116	138	220	310	464	610
	Mean deceleration m/s^2	0.41	1.20	2.15	2.77	3.35	3.51

6.2 FADE TEST

Ballasted tractor	Braking device control force N	179	229	295	355	482	585
	Mean deceleration m/s^2	0.63	1.90	2.56	2.91	3.25	3.30

- 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	180	200

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of tests: 13th Oct., 1995　COTTEC
- Sound level meter, Make/Model/Type: B & K 2209
- Type of track: Concrete
- Gear number: 8(H4)
- Travelling speed before acceleration: 23.8 km/h
- Sound level: 86.5 dB(A)

SH－654　　COTTEC　Test No. 951660　　OECD　No. 1620

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

罗光辉

Luo Guanghui

Vice-director of the COTTEC
Senior engineer

朱荫梧

Zhu Yinwu

Responsible engineer for these tests:
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钱进

Qian Jin

Members of the tractor test board:

Li Lechen　　Xie Zhiqao
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Shen Jilan

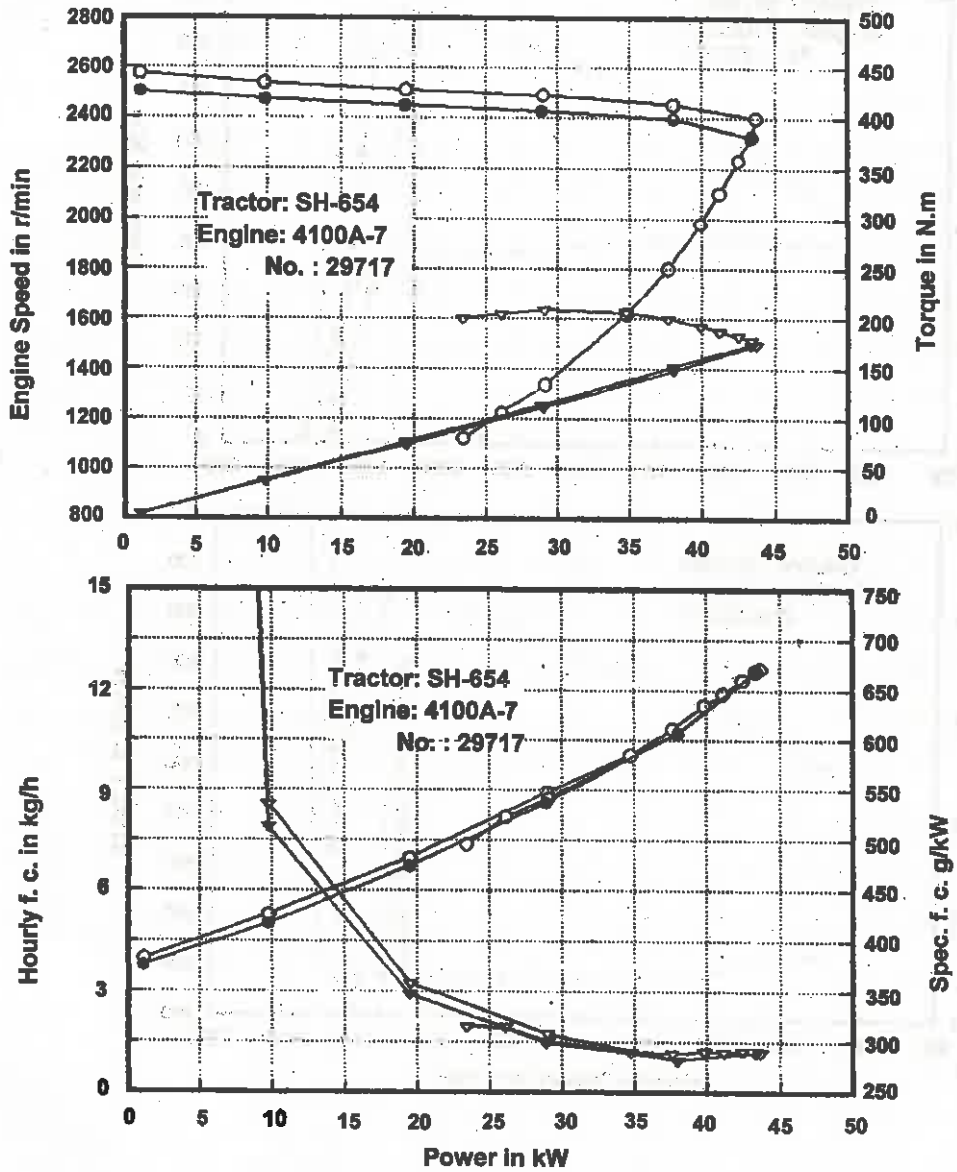
Editor for the test report publish:
Engineer

Fan Jianhua　　Qi Liang

Date: 1996.5.15

ANNEX I

MAIN POWER TAKE – OFF TEST CURVES



MAIN POWER TAKE – OFF TEST CURVES

