



**M/s Shree Krishna Agro Industries
BALRAM 950 DI TRACTOR**



भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & CO-OPERATION)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

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T-840/1349/2012

M/s. Shree Krishna Agro Industries,
BALRAM 950 DI TRACTOR – Commercial (Initial)

Manufacturer : M/s.Shree Krishna Agro Industries,Balram Mini Tractor, Sasan Talala Road,Near Borvav Patiya,Tahsil Talala Gir, Distt:Junagadh-362150, (Gujarat)

Test requested by (applicant) : Applicant

Selected for test by : Applicant

Place of running-in : At applicant's works

Duration of said running-in (h):

- Engine : 49

- Transmission : 40

Method of Selection : The tractor was submitted directly by the applicant for test. Hence method of selection is not known.

1. SPECIFICATIONS

- 1.1 Tractor:**
- Make : M/s Shree Krishna Agro Industries
- Model : Balram 950 DI
- Brand name : None
- Type : Four wheeled, two wheel driven, Agricultural Tractor without Power Take off Shaft.
- Year of manufacture : October, 2011
- Chassis number : BJ0110021
- Country of Origin : INDIA
- 1.2 Engine:**
- Make : M/s. P.M. Diesels Pvt.Ltd.
- Model : FH – 785
- Type : Four stroke, air cooled, naturally aspirated, direct injection, diesel engine
- Serial number : EJ7229
- Engine speed (Manufacturer's recommended production setting), (rpm):**
- Maximum speed at no load : 2700 -2900
- Low idle speed : 900 – 1250
- Speed at maximum torque : 1180 -1580
- Rated speed, (rpm):**
- For PTO use : NA
- For drawbar use : 2600
- 1.3 Cylinder & Cylinder Head:**
- Number : One



15.4 Brakes:

Description	Initial specified height of lining (mm)	Measured thickness of brake lining after test, (mm)	Measured height of lining over rivet head, (mm)	Minimum permissible height of lining over rivet head, (mm)
Left	9.10 to 8.90	6.49 to 7.15	1.02 to 2.13	Up to rivet head
Right	9.10 to 8.90	6.23 to 7.02	0.98 to 2.08	

15.5 Front axle:

Any marked wear of king pins : None
 Any marked wear of king pin bushes : None
 Clearance between king pins and bushes, (mm) : 0.08 to 0.275 | Against discard limit of 0.40 mm
 Condition of thrust bearings : Normal
 Condition of bearings for stub axles : Normal
 Condition of seals for stub axles and king pins : Normal
 Clearance between centre pin and bush, (mm) : 0.14 to 0.19 | Against discard limit of 0.80 mm

15.6 Steering system:

Visual condition of the components of complete steering assembly : Normal

15.7 Starter motor & Alternator:

Presence of soil/oil in housing : None
 Condition of bearings and other Components : Normal

16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustment/ Defects/ breakdowns and Repairs	Tractor run hours
(i)	During engine performance test fuel filter was found partially choked & replaced with new ones.	5.3
(ii)	During final wear assessment burred & scratches were marks observed on the centre pin.	86.0
(iii)	Some part of RHS brake shoe lining was found broken and removed itself from the brake plate.	86.0

17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameters applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2008 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No.)
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1	2	3	4	5	6	7
17.1.1 Engine Performance :						
a)	-Maximum engine power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for engine power >35hp. -7.5/+10% for Engine power ≤ 35 hp.	7.0	7.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	7.0	7.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	262	287	No
d)	Maximum crankshaft torque, (Nm)	Non Evaluative	± 8%	30	35.1	Yes
e)	Back-up torque, percent	Non Evaluative	7 %, min.	42	36.6	Yes
f) Maximum operating temperature (°C):						
1)	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	130	100	Yes
2)	Cylinder liner (Blower outlet)	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	200	69	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions.	3.00	1.78	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter	0.55	Yes
17.1.2 Drawbar performance :						
a)	Max. drawbar pull with without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	5.45 (D) 5.86 (R)	6.36	Yes
b)	Maximum drawbar power without ballast, (kW).	Evaluative	Min. 80% of engine power as referred in 17.1.1(a) of engine performance.	5.6 (D) 5.6 (R)	5.6	Yes



1	2	3	4	5	6	7
c)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	115	39	Yes
17.1.3 Power lift and hydraulic pump performance :						
a) Maximum lifting capacity throughout the range of lift, (kN):						
	1) At hitch points	Non Evaluative	[Tolerance of minus 10%]	5.00 (D)	7.19	yes
	2) With the standard frame	Evaluative	The lift capacity should at least be 18 kg/PTO hp. and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft.	3.50 (D) 1.49 (R)	4.10	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)	Non Evaluative	[Tolerance of plus 5 mm]	10	04	Yes
17.1.4 Brake performance at maximum attainable speed of 24.45 kmph:						
a) Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballast, (m):						
	1) Cold brake	Evaluative	10	10	7.2	Yes
	2) Hot brake	Evaluative	10	10	7.6	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	350	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes	Yes	Yes
17.1.5 Noise measurement :						
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98	96	Yes
17.1.6 Amplitude of mechanical vibrations at :						
	1) Left foot rest	Non Evaluative	100 microns (max)	100	250	No
	Right foot rest			100	270	No
	2) Seat (with driver seated)			100	420	No
	3) Steering wheel			100	300	No
17.1.7 Haulage requirements :						
a) Gross mass of the trailers, (tones):						
	1) Two wheel	Non Evaluative	--	1.50	1.50	Yes



1	2	3	4	5	6	7
b) Distance travelled / litre of fuel consumption, (km/l):						
	1) Two wheel	Non Evaluative	--	11.0 to 12.5	11.0 to 12.3	Yes
c) Fuel consumption (ml/km/tonne):						
	1) Two wheel	Non Evaluative	--	50.0 to 58.0	50.4 to 60.4	No
17.1.8 Wetland cultivation :						
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	The tractor is not recommended for wet land cultivation		--
	1) Clutch assembly	-do-				--
	2) Brake housings	-do-				--
	3) Front axle hubs	-do-				--
17.1.9 Safety features :						
a)	Guards against moving and hot parts	Evaluative	As per CMVR	At present no requirements	Provided	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Provided	Provided	Yes
17.1.10 Labelling of tractors (Provision of labelling plate):						
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	Balram	Yes
	2) Model	Evaluative		--	950 DI BALRAM	Yes
	3) Year of manufacture	Evaluative		--	2011	Yes
	4) Engine number	Evaluative		--	EJ7229	Yes
	5) Chassis number	Evaluative		--	BJ0110021	Yes
	6) Declaration of engine power, kW (Ps)	Evaluative		--	9.5 HP	Yes
17.1.11 Discard limit for:						
a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	85.45	85.02 to 85.03	Yes
b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.103	Yes
c) Ring end gap (mm):						
	- Top comp. ring.	Evaluative	To be specified by the manufacturer	2.00	0.55	Yes
	- 2 nd comp. ring.			2.00	0.70 to 0.75	Yes
	- Oil ring.			2.00	0.60	Yes



1	2	3	4	5	6	7
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	To be specified by the manufacturer	0.20	0.128	Yes
	- 2 nd comp. ring.			0.20	0.086	Yes
- Oil ring.	0.20			0.062	Yes	
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	--	Roller bearing provided	--
	- Crankshaft end float	Evaluative		0.90	0.45	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.70	0.136 to 0.158	Yes
	- Axial	Evaluative	-do-	0.50	0.35	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.40	0.08 to 0.275	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.80	0.14 to 0.19	Yes

17.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns.	None	Yes

17.2 Optional requirements as per Clause-4 (Table-2) of IS:122107-2008:

S. No.	Characteristic	Requirements as per IS: 12207-2008	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5
1	Maximum air cleaner oil pull over (%).	0.25% (maximum)	0.26	No
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not meet the requirement	No
3.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	--



1	2	3	4	5
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Not Provided	--
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Does not meet the requirements	No
6.	Specifications of linkage drawbar and swinging drawbar	Should meet the requirements of IS: 12953-1990 and IS: 12362 Part 3-1994.	Does not meet the requirements	No
7.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Front tow hook not provided	No

17.3 Conformity with following IS:

- i) Guide lines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
- ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in March, 2009)] : Not Applicable
- iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468(Part-2):1997(Reaffirmed in March, 2009)/ISO 730-1:1994] : Does not conform
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : Does not conform
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : Does not conform
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed in March, 2007)] : Does not conform
- vii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1 & Part-2) –2006 & 2007 (Reaffirmed in March, 2009)]/ ISO 3767-2:1991] : Does not conform
- viii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed in March, 2009)] : Does not conform
- ix) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009)] : Does not conform
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2009)] : Conforms



- 17.4 Salient Observations:**
- 17.4.1 Laboratory tests:**
- 17.4.1.1 Engine Performance:**
- i) The backup torque is **36.6 %**.
 - ii) The specific fuel consumption corresponding to maximum power was measured as **287 g/kWh** against the declaration of **262 gm/kWh**, which does not meet the requirement of IS: 12207-2008 with regard to tolerance.
- 17.4.1.2 Power lift and hydraulic pump performance:**
- i) The moment about rear axle with hitch point and standard frame was calculated as **4.60 kN-m** and **5.13 kN-m**. Whereas, the moment about the front axle was as calculated **4.51 kN-m** under unballasted condition. The moment about rear axle is on higher side as compared to the moment about front axle. It is therefore, recommended that standard ballast mass at front axle may be provided to avoid front lifting of the tractor
- 17.4.1.3 Air cleaner pull over test :**
- The maximum oil pull over was recorded as **0.26%** when tractor parked on ground level position against the maximum limit was **0.25%**. This should be examined and suitable improvement should be done.
- 17.4.1.4 Mechanical vibration:**
- The amplitude of mechanical vibration marked as (*) in chapter-9 of this report are on very higher side especially at foot rest, steering control wheel and operator's seat. This calls for reduction in amplitude of vibration in view of improving service life of the component(s) and the operator's comfort.
- 17.4.1.5 Three point linkage:**
- The Lateral distance from lower hitch point to centre line of tractor and power range (without force) does not meet the requirement of IS: 4468- (Part-2) -1993 (Cat. 1N Narrow Hitch). This may be looked into for necessary corrective action.
- 17.4.1.6 Linkage Drawbar :**
- The dimensions 'A' and number of holes on linkage drawbar does not meet the requirements IS: 12953- 1990 & IS: 4468 (Part-2)-1993. This should be looked into for necessary corrective action.
- 17.4.1.7 Operator's Seat:**
- i) The length of seat from SIP, width of seat does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.
 - ii) The height of upper edge of back rest above SRP does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.
 - iii) Longitudinal adjustment provided on operator's seat i.e. forward and rearward from the mid position was not provided, against the minimum and optimum requirement of ± 25 mm and ± 100 mm respectively. In view of enhancing comfort level of operation, this may be looked into.



- 17.4.1.8 Location and operation of operator's control:**
- i) Anti slip surface , vertical retainness at both side and provision for drainage of water is not provided in brake and clutch foot pedals which does not meet the requirement of the IS: 12239 (Part-1)-1996. This should be looked into for necessary corrective action
 - ii) The alternator 'V' belt is not guarded which does not meet the requirement of the IS: 12239 (Part-1)-1996. This should be looked into for necessary corrective action
 - iii) Working clearance around the hydraulic draft control lever and the position control lever does not meet the requirement of the IS: 12239 (Part-2)-1996. This should be looked into for necessary corrective action
- 17.4.1.9 Symbols of operator's control and other displays:**
- Some of the controls / display such as grease lubricant frequency, oil lubricant type & frequency, caution, vertical movement implement and engine revolution gauge are not identifiable with the symbols as per IS: 6283 (Part 1&2)-1998. This needs to be looked into for necessary corrective action.
- 17.4.1.10 Location and operation of operator's control:**
- Location and movement of following controls does not meet the requirement of IS: 8133-1983 and calls for necessary corrective action.
- i) Marking on hydraulic control lever is not provided.
- 17.4.2 Field performance test:**
- 17.4.2.1 Dryland operation:**
- i) During mould board plough operation excessive wheel slippage was observed. Suitable ballast mass may be recommend for field operation.
- 17.4.2.2 Wetland cultivation (Puddling operation):**
- The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation). Hence, the wetland cultivation (puddling operation) was not conducted.
- 17.4.3 Component/ assembly inspection**
- During final wear assessment burred & scratches mark observed on the centre pin and some part of RHS brake shoe lining was found removed itself from brake shoe assembly. This should be looked into.
- 17.4 Maintenance / Service Problems:**
- No noticeable maintenance or service problem was observed during the test.
- 17.5 Recommendation with regard to safety on tractor:**
- The following requirements, inter alia, may be considered for incorporation on the tractor:
- i) Provision of spark arresting device in the exhaust system.
 - ii) Provision of safety against accidental start of engine.
 - iii) Provision of Differential lock.



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- 17.6 Adequacy of Literature supplied with machine:
17.6.1 The following literature has been supplied by manufacturer for reference during the test.
- Operator's manual for Balram 950 DI Tractor
 - Service manual for Balram 950 DI Tractor
 - Spare part's catalogue for Balram 950 DI Tractor
- 17.6.2 The literature should be brought out in national & regional languages also.

TESTING AUTHORITY:

R.K.Nema
R.K.NEMA
AGRICULTURAL ENGINEER

P.K.Verma
P. K. VERMA
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V.N. KALE
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Test Report compiled by **Shri Pramod Yadav**, Senior Technical Assistant.**18. APPLICANT'S COMMENTS**

Para No.	Our Reference	Applicant's comments
18.1	17.4.1.1(ii), 17.4.1.2(i)&(ii), 17.4.1.3, 17.4.1.4, 17.4.1.5, 17.4.1.6, 17.4.1.7, 17.4.1.8, 17.4.1.9, 17.4.1.10, 17.4.2.1	We are taking the steps for the improvement as suggested.



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M/s. Shree Krishna Agro Industries,
BALRAM 950 DI TRACTOR – Commercial (Initial)**ANNEXURE-I****BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST**

S. No.	Item	M.B.Plough	Cultivator
1.	Make	Not specified	Not specified
2.	Type	Mounted	Mounted
3.	No. of bottoms/blades	Two	Seven
4.	Type of bottoms/blades	General purpose	Reversible shovel
5.	Size of bottoms/blades, (mm)	350	325 x 60 x 7
6.	Spacing of bottoms/flanges, (mm)	200	220
7.	Lower hitch point span, (mm)	460	509
8.	Mast height, (mm)	350	410
9.	Overall dimensions (mm):		
	- Length	1100	1530
	- Width	530	590
	- Height	810	830
10.	Gross mass, (kg)	60	80

ANNEXURE-II**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	Engine performance test	10.5
3.	Power lift and hydraulic pump performance test	0.8
4.	Drawbar performance test	12.6
5.	Turning ability	0.2
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	0.2
8.	Brake test	1.0
9.	Noise measurement	1.4
10.	Air cleaner oil pull over test	3.5
11.	Mechanical vibration test	0.5
12.	Theoretical speed test	0.4
	B. FIELD TEST:	
1.	M.B. Ploughing	24.8
2.	Cultivator operation	10.6
	C. HAULAGE TEST:	11.5
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	7.8
	TOTAL:	86.0