



**ACE, ACW 101 SELF PROPELLED,  
COMBINE HARVESTER**



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय

(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

(An ISO : 9001 - 2008 Certified Institute)

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**Manufacturer** : M/s Action Construction Equipment Ltd.  
 Jajru Road, 25<sup>th</sup> Mile stone, Mathura Road,  
 Ballabgarh, Faridabad, (Haryana) 121004.

Test requested by (applicant) : The manufacturer  
 Selected for test by : The manufacturer

**1. SCOPE OF TEST**

The combine Harvester was tested in accordance with IS: 8122 (Part-I)-1994 (Reaffirmed in 2011) and IS: 8122 (Part-2)-2000 (Reaffirmed in 2011). The scope of the test was to check and assess the following.

**1.1 Lab Test**

- 1.1.1 Specification checking.
- 1.1.2 Engine performance.
- 1.1.3 Header lifting test.
- 1.1.4 Mechanical Vibration at various assemblies / sub assemblies.
- 1.1.5 Noise level measurement.
- 1.1.6 Brake test.
- 1.1.7 Location of centre of gravity.
- 1.1.8 Turning ability test.
- 1.1.9 Operator's field of vision.

**1.2 Field Test**

- 1.2.1 Field performance and suitability of the machine for harvesting wheat & paddy crop with regard to :
  - i) Quality of work
  - ii) Rate of work
  - iii) Fuel consumption
- 1.2.2 Ease of adjustments and handling.
- 1.2.3 Operator's comfort and safety.

**1.3 Investigation after field test**

- 1.3.1 Nature of breakdowns and repairs; and
- 1.3.2 Wear of various critical components.

**2. METHOD OF SELECTION**

The machine was directly submitted for test by the applicant at the Institute. Hence, the method of selection is not known.

**3. SPECIFICATION**

**3.1 Name & Address of manufacturer** : M/s. Action Construction Equipment Limited, Jajru Road, 25<sup>th</sup> Mile stone, Mathura Road, Ballabgarh, Faridabad-121004 (Haryana)

**Make** : ACE  
**Model** : ACW 101  
**Serial Number** : ACW 101-102015-0001  
**Type** : Self propelled, wheel type combine harvester  
**Year of manufacture** : 2015



Comb-62/1551/2016

ACE, ACW 101 SELF PROPELLED COMBINE HARVESTER - Comm. (ICT)

1	2	3	4	5	6
17.10	<b>Labelling of combine harvester (Provision of Labelling plate) :</b>				
	1) Make	Should conform to the requirements of IS: 10273- 1987 along-with declared value of HP	--	ACE	Yes
	2) Model		--	ACW 101	Yes
	3) Year of manufacture		--	2015	Yes
	4) Engine number		--	FCHM407570	Yes
	5) Chassis number		--	ACW101-102015-0001	Yes
	6) Declaration of power,(kW)		--	Not provided	No

**18 SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS**

**18.1 Engine Performance Test:** All the tested data & parameter reproduced here again from Test Report No. E-119/1587, March 2014, on Ashok Leyland H6ETIC3RD22 Engine, issued by N.R.F.M.T&T.I Hisar.

Engine Brake power, kW	Crankshaft torque, Nm	Engine speed, (rpm)	Hourly fuel consumption,		Specific fuel consumption, kg/kWh	Specific energy, kWh/l
			l/h	Kg/h		
<b>i) Maximum power – 2 hours test:</b>						
70.7	321.3	2200	24.82	20.51	0.290	2.85
60.6	356.3	1700	18.28	15.18	0.251	3.31
57.0	356.3	1600	16.72	13.89	0.244	3.41
52.6	351.0	1500	15.25	12.65	0.240	3.45
<b>ii) Power at rated engine speed (2200 rpm)</b>						
71.0	322.5	2200	24.70	20.53	0.289	2.87
69.6	316.4	2200	24.55	20.16	0.290	2.84*
<b>iii) Maximum torque:</b>						
54.0	385.8	1400	15.45	12.81	0.237	3.49
51.5	367.5	1400	15.13	12.44	0.242	3.40*
54.3	387.7	1400	15.58	12.95	0.239	3.48**
54.4	388.7	1400	15.50	12.87	0.236	3.51***
48.8	375.0	1300	13.71	11.38	0.233	3.56****
<b>V) Five hour rating test:</b>						
<b>a) Engine loaded to 90% of maximum power:</b>						
65.0	285.1	2282	24.39	20.00	0.308	2.67
<b>b) Maximum power:</b>						
69.5	316.0	2200	24.78	20.32	0.292	2.81

\* Under high ambient condition.

\*\* At 1850 rpm.

\*\*\* At 1750 rpm.

\*\*\*\* At 1650 rpm.

**18.1 Engine performance:**

All the tested data & parameter are given below on basis of Report No. E-119/1587 March 2014, on Ashok Leyland H6ETIC3RD22 Engine, issued by N.R.F.M.T&T.I Hisar.

- i) The maximum power output of the engine was observed as 70.7 kW & 57.0 kW 52.6 kW at 2200 rpm and 1700, 1600 and 1500 rpm of engine at full throttle and setting recommend for field operation respectively, under natural ambient condition during two hours maximum power test.
- ii) The specific fuel consumption corresponding to maximum power was measured as 0.290, 0.251, 0.244 and 0.240 Kg/kWh which is considered to be slightly on the higher side at full throttle setting.



- iii) The back-up torque of the engine was measured as 19.6 which is considered to be normal.
- iv) The maximum smoke density was recorded as 3.12 (Bosch No.) which is within the permissible limit.
- v) The maximum temperature of engine oil, coolant (water) and exhaust gas were observed as 117.4, 102 and 501 °C respectively which is within the permissible limit.
- vi) The lubricating oil & coolant consumption during five hours rating test were measured as 0.334 g/kWh and 1.90% of total coolant capacity respectively.

**18.2 Turning ability:**

The radius of turning circle at LHS and RHS was observed as 13.44 and 14.81 and turning space as 15.24 and 16.33 respectively without brake.  
The radius of turning circle at LHS and RHS was observed as 9.65 and 12.39 and turning space as 11.59 and 13.91 respectively with brake.

**18.3 Visibility:**

The visibility around the cutter bar from operator's seat in normal sitting position is satisfactory.

**18.4 Braking Performance:**

- i) The mean deceleration and stopping distance corresponding to 580 N pedal force was measured as 2.47 m/sec<sup>2</sup> and 9.50 m respectively and the performance is in line with the IS:15806-2008 & CMVR requirements.  
**However the mean deceleration of 2.5 m/sec was not achieved. This calls for necessary improvements in the brake system of the combine harvester.**
- ii) The performance of parking brake was found satisfactory.

**18.5 Mechanical Vibration:**

The amplitude of mechanical vibration of components marked as (\*) in chapter 12 of this report are on higher side. This calls for providing suitable remedial measures to dampen the vibration in order to improve the operational comfort and service life of various components & sub assemblies.

**18.6 Noise measurement:**

- i) The ambient noise emitted by the machine was measured as 88 dB (A) which has approached limit level of 88 dB (A). This call for reduction in noise level to improve the operator's comfort and safety.
- ii) The noise at driver's ear level was measured as 97 dB (A) which is within the limit the level of 98 dB (A).

**18.7 Field Test:**

**18.7.1 Summary of field tests:**

The results of the field test are summarized below:

Sl.No.	Observation	Wheat harvesting	Paddy harvesting
1.	2.	3.	4.
1.	Forward speed (kmph)	2.73 to 3.12	1.74 to 2.08
2.	Area covered (ha/h)	0.525 to 0.826	0.461 to 0.664
3.	Fuel consumption: - (l/h) - (l/ha)	5.60 to 8.00 8.66 to 12.52	8.90 to 10.06 13.40 to 21.85
4.	Crop throughput (tonne/h)	2.33 to 9.79	5.75 to 10.50



Comb-62/1551/2016

ACE, ACW 101 SELF PROPELLED COMBINE HARVESTER - Comm. (ICT)

1.	2.	3.	4.
5.	Grain breakage in main grain outlet (%)	0.781 to 2.450	0.755 to 2.244
6.	Header losses (%)	0.136 to 0.282	0.157 to 0.518
7.	Total non-collectable losses (%)	0.141 to 0.287	0.297 to 1.245
8.	Total collectable losses (%)	0.202 to 1.980	0.621 to 1.630
9.	Total processing losses (%)	0.212 to 2.001	1.287 to 2.234
10.	Threshing efficiency (%)	98.02 to 99.79	98.35 to 99.37
11.	Cleaning efficiency (%)	95.80 to 98.58	95.57 to 96.63

**18.7.1.1 Wheat Harvesting:**

- The grain breakage in all the varieties tested was measured as 0.781 to 2.450 % which is considered higher side.
- The total non collectable losses ranged from 0.141 to 0.287 % which is considered normal.
- The total processing losses ranged from 0.212 to 2.001 % which is considered higher side.
- The threshing efficiency ranged from 98.02 to 99.79 % which is considered normal.
- The cleaning efficiency ranged from 95.80 to 98.58 % which is considered to be lower side.

**18.7.1.2 Paddy Harvesting:**

- The grain breakage ranged from 0.755 to 2.244 % which is considered to be higher side.
- The total non-collectable losses ranged from 0.297 to 1.245 % which is considered to be normal.
- The total processing losses ranged from 1.287 to 2.234 % which is considered to be higher side.
- The threshing efficiency ranged from 98.35 to 99.37 % which is considered to be normal.
- The cleaning efficiency ranged from 95.57 to 96.63 % which is considered to be lower side.

Necessary improvements are required to be incorporated to reduce the total processing losses and to improve cleaning efficiency by applicant.

**18.7.2 Harvesting of any other crops:**

The performance of combine to harvest wheat and paddy crops was evaluated as the same were recommended by the applicant.

**18.7.3 Ease of Operation and Safety Provision:**

- The controls provided around the operator are within easy reach but not labelled with symbols as per Indian standard. Therefore it is recommended that the symbols as per the requirement of IS-6283-1998 may be provided.
- The design of stone trap need to be modified for easy cleaning.
- The safety covers for drive chain sprocket/belts for cutter bar, reel, and platform auger, are considered essential & may be provided from safety point of view.
- Spark arresting device is not provided in the engine exhaust system which is considered essential.
- The mechanical arrangement for adjusting the reel speed though provided needs to be modified such that the same could be controlled from the operator's position.
- Mechanical lock for reel in raised position needs to be provided to ensure safety while working on cutter bar.

**18.7.4 Assessment of Wear:**

- i) The wear of engine components of cylinder liners, piston, piston rings, valves, valve guides, springs, big-end bearings and main bearings were observed within the permissible limit.
- ii) The transmission gears and components were found in normal working condition.
- iii) The timing gears, clutch lining, release bearing were found in normal working condition.
- iv) The condition of the components of hydraulic system and steering system was observed to be normal.
- v) The condition of the bearing, chains, sprockets and belts was observed to be normal.
- vi) The components of starter motor and alternator were found in normal working condition.
- vii) The rate of wear of rasp bar and peg teeth of threshing cylinder & concave were observed to be normal.
- viii) **During the wear assessment, LHS of the brake lining was found completely worn out. So stringent quality improvement is required for the brake system.**
- ix) The load on the front and rear tyres exceeds the maximum load carrying capacity of the tyre (front 3450 kg /tyre and for rear 1845 kg /tyre rear).The suitable tyres with appropriate load carrying capacity is recommended.

**18.8 Hardness and Chemical composition:**

- i) The hardness of knife blade both in the Hardened Zone & remainder zone was measured as 81 to 97 and 90 to 104 HRC respectively. The hardness of knife blade is not conforming to the requirement of IS: 6025-1999.
- ii) The percentage of carbon was recorded as 0.450 percent in knife guard which is on lower side against the requirement of 0.70 to 0.95% as per IS: 6025-1999.
- iii) The percentage of Manganese was recorded as 1.110 & 0.707 percent in cutter bar blade and knife guard respectively which is on higher side against the required range of 0.30% to 0.50% as per IS 6025-1999.
- iv) It is therefore, recommended that the material used for fabrication of above components should essentially meet the requirement of Indian Standard.

**18.9 Dimensions of critical components:**

The dimension of knife blades and blades guards does not meets the requirement of IS: 6025-1982 and IS: 6024-1983. It is required to improve at manufacturing level to meets all the dimension of above components as per the requirement of Indian Standard.

**18.10 Maintenance/Service problems:**

No noticeable maintenance/service problem was observed during the course of test at this Institute.

**18.11 Labelling Plate of Combine Harvester:**

On labelling plate Power is not provided on the combine harvester which does not conform to requirements of IS: 10273-1987. This should be looked into for corrective action.

**18.12 Literature supplied with the Machine:****18.12.1** The following literature was supplied with the machine for reference during testing

- i) Operator manual of Ashok Leyland for Genset/Industrial/Marine Engines.
- ii) Part catalogue of Ashok Leyland for Genset/Industrial/Marine Engines.
- iii) Operators manual for ACW1101 wheel combine harvester.
- iv) Spare part catalogue for ACW1101 wheel combine harvester.



Comb-62/1551/2016

ACE, ACW 101 SELF PROPELLED COMBINE HARVESTER - Comm. (ICT)

**19. Citizen charter**

Test duration under citizen charter	Duration of Test	Whether the report released within time frame given in the citizen charter	Remarks
10 Months	7 Months (November, 2015 to June, 2016)	Yes	--

**TESTING AUTHORITY:**PRAMOD YADAV  
AGRICULTURAL ENGINEERC. V. CHIMOTE  
TEST ENGINEERY.K.RAO  
SENIOR AGRICULTURAL  
ENGINEERJ. J. R. NARWARE  
DIRECTORTest report Compiled by **Sh Nitesh Kumar Verma**, Senior Technical Assistant.**20. Applicant's Comments**

Para no.	Reference	Comments
20.1	3.9.1 (ii,iii,iv,viii,ix & x), 3.9.2 (i,iv,v,vii & viii), 3.9.3.3 (a & b), 3.9.4 (a) and 3.9.5	We are using the best available blades & guards in the market. However, regarding their hardness and chemical composition, we will take-up the matter with the manufactures to provide as per the IS: 6025-1982.
20.2	15 (2 & 3)	The matter is referring to the manufacture. The suitable correction action will be taken after study.
20.3	17.8 (iv)	The matter is referring to engine manufacture. A suitable corrective action will be taken after study.
20.4	17.9 (ii)	Regarding chemical composition of blades, we will take-up the matter with the manufactures to provide as per the IS: 6025-1982.
20.5	18.5	We will work out to reduce amplitude of mechanical vibration.
20.6	18.6 (i)	We have gone through the observations and will provide the provision as per standard.



Comb-62/1551/2016	ACE, ACW 101 SELF PROPELLED COMBINE HARVESTER - Comm. (ICT)
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**Annexure-I**

**COMBINE RUN HOURS DURING TEST**

A.	LABORATORY TESTS:	HOURS
1.	Running-in	8.0
2.	Engine Performance test	-
3.	Radius of turning space & turning circle	0.5
4.	Location of Centre of Gravity	0.5
5.	Visibility test	0.2
6.	Brake Performance Test	1.0
7.	Noise measurement	1.0
8.	Mechanical vibration test	0.5
9.	Header lifting test	3.0
10.	Nominal speed test	1.0
B.	FIELD TEST:	
1.	Wheat Harvesting	26.5
2.	Paddy Harvesting	25.6
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	16.2
	<b>TOTAL</b>	<b>84.0</b>





Annexure-II

**OBSERVATION SHEET FOR FIELD TESTING (WHEAT HARVESTING)**

Test No.	Date of test	Variety of crop	Field soil condition Dry/Wet	Height of plants (cm)	Length of ear head (cm)	No. of grains per ear head	Plant Population		Straw grain ratio	Moisture (%)		Atmospheric conditions at the time of test	
							No of plant/m <sup>2</sup>	No of tillers/m <sup>2</sup>		Grain	Straw	R.H (%)	Pressure, (Kpa)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	18/03/16	MP 1203	Dry	60 to 100	8 to 9	41 to 42	25 to 29	180 to 186	0.470 : 1	10	9	47	97.4
2	19/03/16	MP 1203	Dry	70 to 89	9 to 10	48 to 50	20 to 22	148 to 150	1.349 : 1	10	8	43	97.4
3	20/03/16	MP 1203	Dry	55 to 84	9 to 10	47 to 72	18 to 20	140 to 150	1.630 : 1	8.6	5	44	97.4
4	22/03/16	GW 322	Dry	53 to 85	9 to 10	47 to 63	21	200 to 210	0.569 : 1	11	2	70	97.4
5	12/04/16	MP 1203	Dry	59 to 70	9 to 10	28 to 41	20	130 to 300	0.674 : 1	6.6	4.6	69	97.4



## Annexure-III

## OBSERVATION SHEET FOR FIELD TESTING (PADDY HARVESTING)

Test No.	Date of test	Variety of crop	Field soil condition Dry/Wet	Height of plants (cm)	Length of ear head (cm)	No. of grains per ear head	Plant Population		Straw grain ratio	Moisture (%)			Atmospheric conditions at the time of test	
							No of plant/m <sup>2</sup>	No of tillers/m <sup>2</sup>		Grain	Straw	R.H (%)	Pressure (Kpa)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	16/11/15	Pusa 1121	Dry	120 to 123	24 to 26	75 to 92	20 to 22	530 to 540	4.528:1	15	50	65	97.6	
2	17/11/15	Pusa 1121	Dry	121 to 123	25 to 29	104 to 178	18 to 23	340 to 352	4.178:1	17	56	50	97.4	
3	18/11/15	Pusa 1121	Dry	90 to 110	18 to 20	42 to 72	14 to 21	240 to 270	2.120:1	15	46	50	97.5	
4	19/11/15	Pusa 1121	Dry	126 to 130	23 to 26	40 to 48	21 to 25	357 to 380	4.030:1	16	50	65	97.3	
5	20/11/15	Pusa 1121	Dry	100 to 130	28 to 32	70 to 100	20 to 21	325 to 330	2.519:1	16	48	48	98.0	



Annexure-IV

FELD TEST DATA ANALYSIS WHEAT HARVESTING

Test No.	Date of test	Duration of test (hr.)	Speed of operation (kmph)	Width of cut (m)	Rate of work		Through put		Fuel consumption		Pre-harvest loss (kg/ha)	Crop straw/Grain ratio (SKH/G KH)	Crop throughput (t/h)	Grain breakage in main outlet (%) (a)
					Area covered (ha/hr.)	Grain output (Kg/h.)	Clean Grain (kg/h) GKH	Straw (kg/h) SKH	(l/h)	(l/ha)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	18/03/16	2.00	2.90	4.22	0.623	4260.29	4266.312	2006.152	7.80	12.52	Nil	0.470:1	6.272	0.781
2	19/03/16	6.52	3.12	4.13	0.789	4158.257	4169.096	5624.402	6.83	8.66	Nil	1.349:1	9.793	1.750
3	20/03/16	4.00	2.96	4.06	0.525	3630.730	3641.20	5935.826	5.72	10.89	10	1.630:1	9.578	2.317
4	22/03/16	6.00	2.73	4.00	0.868	1479.55	1482.05	843.60	5.60	10.87	2.5	0.569:1	2.326	2.450
5	12/04/16	3.00	3.08	4.00	0.765	2274.03	2278.26	1534.87	8.00	10.46	13	0.674	3.813	2.450
	Avg.													1.443



## Annexure-V

## FIELD TEST DATA ANALYSIS PADDY HARVESTING

Test No.	Date of test	Duration of test (hr.)	Speed of operation (kmph)	Width of cut (m)	Rate of work		Through put		Fuel consumption		Pre-harvest loss (kg/ha)	Crop straw/G rain ratio (SKH/G KH)	Crop through put (t/h)	Grain breakage in main outlet (%) (a)
					Area covered (ha/hr.)	Grain output (Kg/h.)	Clean Grain (kg/h) GKH	Straw (kg/h) SKH	(l/h)	(l/ha)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16/11/15	5.00	1.94	3.86	0.585	1876.458	1900.121	8604.415	9.00	15.38	160	4.528	10.504	1.807
2	17/11/15	4.67	1.88	4.02	0.416	1807.048	1825.312	7626.215	9.10	21.85	121	4.178	9.452	0.755
3	18/11/15	4.46	1.74	4.05	0.664	1835.815	1841.282	3904.103	8.90	13.40	20	2.120	5.745	1.022
4	19/11/15	5.50	2.08	3.99	0.566	1812.337	1823.336	7348.839	10.06	17.77	109	4.30	9.172	1.385
5	20/11/15	6.00	2.03	4.00	0.628	2717.383	2745.609	6915.998	10.00	15.92	50	2.519	9.662	2.244
	Avg.													1.161



Annexure-VI

**FIELD TEST DATA ANALYSIS (WHEAT HARVESTING)**

Test No.	Loss due to combine, percent by mass													Total losses A+B	Threshing efficiency (%)	Cleaning efficiency (%)	
	Non collectible losses (%)(c)																
	Straw outlet (Rake)						Sieve(Shoe)						Header loss (c)				Total (B) (a+b+c)
	Threshed (1)	Unthreshed (2)	Broken (3)	Total (a) (1+2+3)	Threshed (1)	Unthreshed (2)	Broken (3)	Total (b) (1+2+3)									
	16	17	18	19	20	21	22	23	24	25	26	27	28	29			
1	0.836	0.002	0.000	0.000	0.002	0.002	0.001	0.000	0.003	0.136	0.141	0.977	99.16	97.99			
2	0.274	0.000	0.007	0.000	0.007	0.009	0.019	0.000	0.028	0.225	0.260	0.534	99.70	96.90			
3	0.235	0.002	0.000	0.000	0.002	0.003	0.000	0.000	0.003	0.262	0.287	0.522	99.76	96.09			
4	1.980	0.007	0.000	0.000	0.007	0.014	0.000	0.000	0.014	0.148	0.169	2.149	98.02	95.80			
5	0.202	0.005	0.000	0.002	0.007	0.003	0.000	0.000	0.003	0.175	0.185	0.387	99.79	98.58			
Avg.	0.705									0.193	0.208	0.914	99.29	97.07			



Annexure-VII

FIELD TEST DATA ANALYSIS (PADDY HARVESTING)

Test No.	Total collectible losses Unthreshed from main outlet (%) (A)	Loss due to combine, percent by mass												Total losses A+B	Threshing efficiency (%)	Cleaning efficiency (%)		
		Non collectable losses (%) (C)																
		Straw outlet (Rake)						Sieve(Shoe)									Header loss (c)	Total (B) (a+b+c)
		Threshed (1)	Unthreshed (2)	Broken (3)	Total (a) (1+2+3)	Threshed (1)	Unthreshed (2)	Broken (3)	Total (b) (1+2+3)									
16	17	18	19	20	21	22	23	24	25	26	27	28	29					
1	1.398	0.450	0.003	0.006	0.459	0.356	0.0015	0.006	0.377	0.409	1.245	2.643	98.58	96.53				
2	1.630	0.412	0.008	0.006	0.426	0.161	0.001	0.163	0.412	1.001	2.631	98.35	96.15					
3	1.317	0.052	0.000	0.004	0.056	0.047	0.001	0.052	0.189	0.297	1.614	98.68	95.92					
4	0.840	0.284	0.017	0.000	0.301	0.141	0.004	0.146	0.157	0.604	1.444	99.14	96.63					
5	0.621	0.364	0.004	0.004	0.372	0.135	0.003	0.138	0.518	1.028	1.649	99.38	95.57					
Avg.	1.161								0.337	0.835	1.9962	98.83	96.16					



Comb-62/1551/2016

ACE, ACW 101 SELF PROPELLED COMBINE HARVESTER - Comm. (ICT)

Annexure-V

**DETAILS OF GREASING & OILING POINTS**

A)	GREASE NIPPLES.	No. of Grease nipples.
	LOCATION	
1)	DRIVE AXLE SHAFTS	4
2)	CLUTCH HOUSING	1
3)	ENGINE DRIVE SHAFT	1
4)	GEAR BOX PULLEY	1
5)	BRAKE PEDAL	3
6)	INTERMEDIATE SHAFT ASSLY.	5
7)	KING PIN	2
8)	STEERING AXLE HUB	2
9)	CENTER PIN	1
10)	TIE ROD ENDS	2
11)	STEERING CYL. ENDS	2
12)	CUTTER BAR DRIVE	8
13)	CUTTER BAR CLUTCH	1
14)	REEL DRIVE	3
15)	REEL ASSLY.	3
16)	CONVEYOR WORM	4
17)	FEEDER CONVEYOR DRIVE	5
18)	TRAILOR AXLE HUB	2
19)	DUST BLOWER	2
20)	THRESHER DRUM SHAFT	1
21)	THRESHER CLUTCH	3
22)	GUIDE DRUM SHAFT	2
23)	STRAW WALKER BEARING +WOODEN BEARING	14
24)	UPPER SIEVE DRIVE	1
25)	BOTTOM SIEVE DRIVE	2
26)	CLEANER DRIVE	2
27)	CLEANER DRIVE	2
28)	BLOWER ASSLY.	2
29)	AUGER CASING	2
30)	DISCHARGE CLUTCH ASSLY.	1
31)	GRAIN ELEVATOR	3
32)	RETURN ELEVATOR	3
33)	TOP GRAIN AUGER	2
34)	TOP RETURN AUGER	2
35)	DISCHARGE GRAIN AUGER	2
36)	HYD. PUMP	2
37)	REEL CYL. END	1
	<b>Total:</b>	<b>99</b>
<b>B)</b>	<b>OILING POINTS</b>	
1)	Reel drive chain	1
2)	Cutting bar	1
3)	Knife bar	1
4)	Guide assembly with sprocket	1
	<b>Total :</b>	<b>4</b>
<b>C)</b>	<b>Greasing cups</b>	
i)	Rear wheel bearing	2
ii)	Trailer wheel bearing	2
	<b>Total:</b>	<b>4</b>