

भाकुअनुप – केन्द्रीय बारानी कृषि अनुसन्धान संस्थान

ICAR - Central Research Institute for Dryland Agriculture



संतोषनगर, सैदासाट-पोस्ट हैदरासाट ५०००५९ Santoshnagar, Saidabad P.O. Hyderabad 500 059

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F. No: 2-1/(92)/2017/ST

Date: 21.12.2017

Sub: Quotation is invited for Prototype model of CRIDA tractor drawn front mounted Hydraulically operated harvester for harvesting the Sorghum and Maize crops- Reg.

Dear Sir (s),

Quotations are invited for following items cited below:

S. No	Name of the Items	Qty	
1	Prototype model of CRIDA tractor drawn front mounted Hydraulically operated harvester for harvesting the Sorghum and Maize crops Annexure –I copy enclosed		

TERMS & CONDITIONS

- The last date for submission of quotation is on or before 10-01-2018. Rates offered shall be F.O.R. CRIDA, Hyderabad Quotations should be sent by post only in a sealed cover addressed to the Director, Central Research Institute for Dry land Agriculture, Santoshnagar, Saidabad Post, Hyderabad - 500 059. The cover containing quotation should invariably 2. be super scribed. The quotations in person by hand will not be accepted.
 - Enquiry F. No: 2-1/(92)/2017/ST а.
 - ь. Due on 10-01-2018
 - For Prototype model of CRIDA tractor drawn front mounted Hydraulically operated harvester for с. harvesting the Sorghum and Maize crops
- The quotation should remain open for acceptance for a period of 90 days from the date (due date) 3. 4.
- An earnest money of Rs.5000/-(Rupees Five thousand only) should be deposited in the form of Demand Draft / Banker's Cheque in favour of 'ICAR Unit - CRIDA' payable at Hyderabad. The quotation will not be considered if earnest money is not deposited with the tenders. 5.
- The earnest money would be refunded to all the unsuccessful bidders. For Successful bidders the earnest money would be refunded only after deposition the Security deposit/Performance Guarantee. б.
- An amount of 10% of total order value as Security Deposit (Performance Guarantee) in the form of DD/ PO/Bank Guarantee/FDR for the supply of Rotary shaker is to be deposited by the successful Bidder only after receiving a communication from the Institute. In the event of non-deposition of the same within 15 days of the communication, the earnest money will be forfeited. In the event of any default of performance or conditions of supply, the security deposit will be forfeited. 7.
- No advance payment/delivery against payment is permissible. However, the payment shall be arranged in 10 days from the date of submission of pre-receipted bill in triplicate along with stores. 8.
- The rates quoted should be net payable for each item for delivery at the Institute at the address given above (inclusive of all taxes, packing, forwarding, transport, insurance and excluding rebate/discount etc.) This Institute is not in a position to supply any 'D' or 'C' forms. 9
- 10. While quoting the rates please mention the following:
 - Approximate time for supply of stores from the date of placing order. ٠
 - Guarantee/Warranty/Expiry period
 - In case you have got any rate contract with the DGS&D, the same may be indicated ٠
 - Any other condition
 - Quotation which do not conform to the above terms and conditions will not be considered. The Director, Central Research Institute for Dryland Agriculture, reserves the right to accept or reject any or all quotations without assigning any reasons

Yours Sincerely

(Er C V K N Rao) Stores & Purchase Officer

..... Web Site: www.crida.in Email: store.crida@icar.gov.in Phone :(040) 24530161,(Ext 243) 24530163. 4530157, Fax No. 91-040- 24531802

Annexure -I Design and Development of Sorghum Harvester

Description:

This newly conceived design consists of two pairs of oppositely rotating rotary cutters to cut crop stems by impact. On same axis of rotation of cutting blades, rotates two pairs of oppositely rotating cylinders covered with fins. To catch and convey cut stems. Just behind the cylinders is a horizontal roller with helix around it and behind is an inclined conveyor that rotates to windrow crop falling on it. Function of each part is explained briefly as follows:

- 1. Hydraulic motor is connected to shaft A to give drive to rotary cutters.
- 2. Shaft A is a single shaft rotating in clockwise direction at an rpm of 850 and on it four rotary cutters are fixed through bevel gear pairs for each cutter.
- 3. Rotary discs are mounted on hollow shaft which gets drive from bevel gear pair. Bevel gears are arranged in such a way that from left to right in the figure, first disc rotates in anticlockwise direction and second in clockwise direction. Similar rotation configuration has been designed for the other pair of cutters too.
- 4. Four cutting blades at 90 degrees on each disc have been fixed with nut and bolts for the impact cutting of sorghum stems. Blades are 40mm outside disc to ensure cutting of stems that range from 15mm to 30mm diameter.
- 5. To transfer drive from shaft A to shaft B, sprocket and chain is used in such arrangement that shaft B rotates in 200 rpm.
- 6. Shaft B rotates at 200 rpm and is responsible to rotate the four cylinders. Four bevel gear pairs are fixed on Shaft B to which are fixed four pulleys. Bevel gears are arranged in a manner to drive first pulley from left to right in figure 1, in anticlockwise direction and second in clockwise direction. Similar arrangement is done for the other pair of pulleys too.
- 7. Inside the hollow shaft of rotary cutter, shaft of smaller diameter is inserted to which rotating cylinders are fixed. Belt and pulley arrangement is given to transmit rotation from shaft B to shaft of rotating cylinders.
- 8. Clamps are given in order to give structural support to the rotating cylinders.
- 9. Two pairs of rotating cylinders of diameter same at cutting disc are arranged with fins on the entire surface area to catch and convey cut crop to rear. In a pair, one cylinder rotates in anticlockwise direction and the other in clockwise direction. And by virtue of this opposing motion, cut stems can be conveyed from front to rear easily.
- 10. Five fins are fixed in a column and six such columns are designed on cylinder at 60 degrees angle. In a pair of cylinders, fins are fixed in columns such that while in rotation, in between two fins of second cylinder comes one fin of first cylinder. This arrangement is designed with an aim to catch and hold stem until conveyed to rear.
- 11. To the rear of cylinders, a horizontal roller rotating at 200 rpm in anticlockwise direction with helix of 1 cm height is fixed. This roller gets drive from shaft B through gear drive. Once conveyed to rear due to motion of cylinders, stems need to be pushed further. To fulfill this function, horizontal roller has been designed. This will help in conveying stems from cylinder to conveyor.
- 12. A conveyor belt made up of rubber for high friction and light weight, with cleats of height 20mm at every 300 mm is fixed at the rear of roller. It is designed for adjustable inclination from front to rear and rotatable at 60-90 rpm in clockwise direction from front view. Its function is to convey and windrow the cut crop stems. Conveyor is hydraulically driven and has a gear box to reverse the direction of rotation of conveyor belt.

Materials required for Sorghum harvester fabrication

Specifications:

S.No.	Item(s)	Quantity	Dimensions	Material
1	Cylinder	04	R=110mm, h=700mm,	Mild steel sheet
2	Fins	120	L=60mm, w=40mm, t=2mm	Mild steel sheet
3	Shaft	04	R=10mm, I=120mm	E N 8
4	Pulley	08	4 inches	Aluminum
5	Belt	04	46 inches	
6	Disc	04	R=110 mm, t=5mm	EN8
7	Blades	16	A=45mm, b=75mm, l=80mm	Steel (bardening)
8	Bevel Gears pair	08	l.d=20mm, o.d=50mm	MS or EN8 (hardening)
9	Shaft (power transmission from hydraulic motor)	01	R=10 mm, l=1350 mm	En 8
10	Shaft (power transmission to pulleys)	01	R=10mm, l=1350mm	EN 8
11	Sprocket	01	10 teeth	-
12	Sprocket	03	42 teeth	-
13	Sprocket	02	17 teeth	-
14	Chain	03	1/2 inch	-
15	Shaft cylinder	01	R=100mm, l=1200mm	MS
16	Sheets	01	T=3 mm (default-20 feet avlbl in market)	Ms
17	Conveyor belt	01	L=2370mm, w=750mm, t=2mm cleats of 20mm height at every 300mm	Rubber
18	Rollers for conveyor	03	R=50mm, I=700mm	E N 8
19	Angle iron	01	50x50x3 mm (default-20 feet avlbl in market)100x100x6	MS
20	T section	01	100x100x6	MS
21	Sheets for platform	01	T=6mm	MS
22	Sheet (for fins)	01	T=2mm	MS
23	Pedestal bearing	06	204	-
24	Pedestal bearing	04	205	-
25	Pedestal bearing	04	210	-
26	Nut bolt	50	12mm	-
27	Pulley screws	32	8 mm	-
28	Nut bolt	50	8 mm	-
29	Hydraulic motor	01	Power req2 hp Max operating pressure-140 bar continuous rpm-80 displacement -85 cc/rev	-
30	Hydraulic motor	01	Power req10 hp Max operating pressure-160 bar continuous rpm-850 rpm displacement -50.8cc/rev	-
31	Hydraulic hose	5m	Size -3/8" Pressure- upto 200bar	

Conditions:

- 1) Design specifications may vary time to time during the development process, hence the industry should be ready to incorporate all the modified specifications suggested by the indentor and also the additional parts needed to reach the defined target i.e. cutting and conveying the sorghum stalks without any damage to form the windorow to the side.
- 2) Additional improvements to be taken up by the industry after getting the approval from the office.
- 3) Since the fabrication of the Tractor mounted harvester is to be taken up turnkey basis, necessary field tests are to be conducted as per the suggestions of the indenter on time to time till the final prototype development.

