



WESTERN COALFIELDS LIMITED
(A SUBSIDIARY OF Coal India Limited)
CIN U10100MH1975GOI018626

MATERIALS MANAGEMENT WING, COAL ESTATE, CIVIL LINES, NAGPUR - 440 001.
PHONE : PBX : 0712-2611381, 2510691 Extn : 5606, 5861, Fax : 0712-2510284

Supply Order NO. 12000110919090

DT: 28.08.2019

SUPPLY ORDER

To

M/s. BEML Limited
Vth Floor, Unity Building,
J C Road, Bangalore - 560 002

Vendor Code: 416002
Vendor Category : Manufacturer
Fax : 0712-224 9997

Dear Sir,

Sub : **Formal Order for Supply of 280 HP Motor graders.**

Ref : WCL's Tender enquiry no WCL-hq-pur-yvr-ra-e008-2019-20 opened on 24.05.2019 (Tender ID: 2019_WCL_136716_1); Price bid opening followed by Reverse Auction held on 24.06.19
Your offer / Bid id number 406151
Your letter no BEML/MN/209/BG825/298 dt 26.06.2019
Your letter no BEML/MN/209/BG825/308 dt 01.07.2019
Your letter no BEML/MN/209/BG825/344 dt 06.07.2019

This has reference to above. We are pleased to place FORMAL ORDER on you for the supply of 4 nos of 280HP Motor Graders on the rates, following salient terms and conditions given and general terms and conditions enclosed: -

Description	Ordered qty (nos)	Unit Basic Price Rs.	Extended value Rs.
BEML make, model BG825 Motor Grader 280 HP (minimum) including all necessary filters & O-rings, initial spares required for first 3000 working hours, powered by BEML make Engine model BS6D140-EG; (Replacement requirement/NCD); Detailed technical specifications as per Annexure "A"; Item Code: 1240400004	2	2,07,29,000.00	4,14,58,000.00
Freight & Insurance charges			Inclusive
GST @ 18% on FOR Destination price			74,62,440.00
Total value of order before availing ITC			4,89,20,440.00

Total Value: Rs. 4,89,20,440.00 (Rupees four crores eighty nine lakhs twenty thousand four hundred and forty only).

Terms and conditions :

- Prices: The prices are FIRM on F.O.R. destination basis inclusive of Packing, forwarding, freight and insurance charges upto destination.
- GST: GST shall be paid at actual against documentary evidence as applicable at the time of Dispatch within the stipulated delivery period. The current rate of GST is 18%. Input Tax Credit benefit shall be availed by the consignee, for which you should submit GST Complaint Invoice. You have to comply with the terms and conditions of GST Act/ Rules such as issuance of Tax Invoices, ensure payment of GST and enabling mechanism to facilitate Input Tax credit by WCL. You should upload the Tax Invoices/ Debit Note/ Credit Note in GST Portal, make payment of GST and file returns in time, as prescribed under GST Act and Rule to facilitate WCL to avail Input Tax Credit (ITC) as per eligibility under GST. In case WCL is unable to avail ITC or any liability arises to WCL due to failure on the part of you to comply the above provisions, the entire amount including Interest (If any) borne by WCL shall be recovered from you.
- Security Deposit: Exempted being PSU
- Guarantee / Warranty: The equipment will be warranted against any manufacturing defects/ workmanship for a period of 12 months from the date of commissioning. Any defect observed on this account shall be attended to immediately and in no case beyond a period of one month. For specific warranty on

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[Signature]
3/8/19

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assemblies and sub - assemblies, details given in technical specifications and Special Guarantee clause of order may be referred to.

5. **Performance Bank Guarantee (PBG):** You have to submit performance bank guarantee for 10% of the order value (landed cost) i.e. Rs.48,92,044.00 (rupees Forty eight lakhs ninety two thousand and forty four only) valid for a period of 18 months of from the date of receipt and acceptance of materials to cover the guarantee period and the same shall be released on receipt of satisfactory performance throughout the guarantee period (BG may be submitted for individual equipments). The BG shall be released after successful completion of the guarantee/warranty period after confirmation from GM(EXCV)HOD, WCL(HQ)s or may be extended as deemed fit. No payment shall be made without submission of Performance Bank Guarantee.

The Bank Guarantee issued by the issuing bank on behalf of the supplier in the favour of Western Coalfields ltd shall be in paper form as well as issued under "Structured financial messaging system". The details of beneficiary for issue of BG under SFMS platform is furnished below:

Name of beneficiary and details	
Name	Western Coalfields Limited
AREA	Head quarter
Bank account no / Customer ID	Current account no : 005905018053 Customer id: 556096497 ICICI Bank Ltd, Vishnu Vaibhav, 222, Palm Road, Civil Lines, Nagpur
IFSC Code	ICIC 0000059
Bank Manager name and phone no	Hrushikesh Sakalkale; Ph no =91-9923202096

BG advising message - 760COV / 767 COV via SFMS

Field number	Particulars
7035	ICICI0000059
7037	WCL556096497

6. **Inspection:** Final Inspection shall be carried by the Consignee at Site. However, WCL reserves its right to get the Equipment inspected before despatch by CM(Excv) CIL, Bangalore or the representative of GM(Excv) HOD, WCL Hqrs or any other agency appointed by WCL. In case it is decided to carry out pre despatch inspection by CIL / WCL's representative then equipment has to be delivered at Consignee project within 15 days or earlier from the date of inspection and clearance by CIL / WCL's representative.

7. **Payment Terms:**

80% value of equipment and accessories and initial spares for 1st year of operation and 100% taxes and duties and other charges shall be made within 21 days after receipt and acceptance of material at site by consignee or submission of bills whichever is later.

Balance 20% payment shall be made after successful completion of erection, testing, commissioning and final acceptance of the equipment (along with the accessories) upon presentation of certificates from Area GM/ SO(Excv) of concerned area to the effect that the equipment has been erected and commissioned to their entire satisfaction and free training imparted to the end users & performance testing at the allocated location.

8. **Delivery:** Commencing immediately and completion within four months, which shall be reckoned from 7th day of the order date.

9. **Consignee & Allocation:- WCL's GSTIN no : 27AAACW1578L1ZW**

Allocation	Area	POSTAL ADDRESS OF THE CONSIGNEE
Ukni -1 no	Wani North	The Depot Officer, Regional Stores, Western Coalfields Limited, Wani North Area, PO : Ukni, Distt:- Yavatmal (M.S) Pin: - 445 304
Neeljai - 1 no	Wani area	The Depot Officer, Regional Stores, Western Coalfields Limited, Wani Area, PO : Ghugus colliery, Distt:-Chandrapur (M.S) Pin: - 442 505

10. **Paying Authority:** General Manager (Finance), Western Coalfields Limited, Coal Estate, Civil Lines, Nagpur - 440 001.

11. **EFT Details (as confirmed in your offer):-**

(Handwritten signatures and initials)

Supply Order no 12000110919090 dt 28.08.2019, M/s BEML Ltd

Name of the Bank	State Bank of India
Branch & Location	Kingsway, Nagpur
Account Number	11172255258
Nature of Account	Current Account
IFS CODE of the Branch	SBIN0000432

12. Mode of dispatch: All the stores surely packed are to be dispatched by road transport to the consignee on Freight paid basis.
- 13 Special Guarantees: The following guarantee will apply for the different components -
- i) Complete engine system - 36 months or 6500 hours from the date of commissioning (whichever is earlier) In case of failure of engine system within 6500 hrs., the failed components of the engine system will have to be replaced / repaired depending on the merit of the case, free of cost by supplier. In case of failure of engine system beyond 6500 hrs the system will have to be replaced on prorata payment basis taking the life of the engine system as 7550 W/hrs.
- ii) Transmission Assy. - 36 months or 6500 hrs from commissioning (Whichever is earlier).
- iii) Frame, Chassis & Final Drive (including Differential): 48 months or 8000 hrs from commissioning (Whichever is earlier).
- In case of any guarantee failure intimated reasonably in time to the supplier, the replacement or repair job (as per guarantee settlement) must be completed within 21 days at site by BEML at no cost to the WCL.
13. Performance Guarantee Clause: M/s BEML shall guarantee that the availability of the equipment shall not be less than **86% (Eighty six Percent)** for a period of 12 months from the date of commissioning.
14. Liquidated Damages & Risk Purchase clause: - In the event of failure to deliver or dispatch the stores within the stipulated date / period in accordance with the samples and/or specification mentioned in the supply order, and in event of breach of any terms and conditions mentioned in the supply order, Coal India Limited shall have the right,
- a) To recover from the successful bidder as agreed liquidated damages, a sum not less than 0.5%(half percent) of the price of any stores which the successful bidder has not been able to supply as aforesaid for each week or part of a week during which the delivery of such stores may be in arrears limited to 10% can be increased to 15% at the discretion of Head of MM Division.
- b) To purchase elsewhere, after due notice to the successful bidder on the account and at the risk of the defaulting supplier the stores not supplied or others of a similar description without canceling the supply order in respect of the consignment not yet due for supply, or
- c) To cancel the supply order or a portion thereof, and if so desired to purchase the stores at the risk and cost of the defaulting supplier and also-
- d) To extend the period of delivery with or without penalty as may be considered fit and proper, the penalty, if imposed shall not be more than the agreed Liquidated Damages referred to in clause (a) above.
- e) To forfeit the security deposit full or in part.
- f) Whenever under this contract a sum of money is recoverable from any payable by the supplier, Coal India Limited and its subsidiary companies shall be entitled to recover such sum by appropriating, in part or in whole by deducting any sum from any other contract should this sum be not sufficient to cover the full amount recoverable. The successful bidder shall pay Coal India Limited and its subsidiary companies on demand the remaining balance.
- The supplier shall not be entitled to any gain on any such purchase.
15. SUBMISSION OF BILLS:
- a. **For claiming 80% payment**, following documents are to be submitted along with original bills as per terms of the supply order to the consignee.
- i). Pre-receipted and stamped GST compliant Invoice as per GST act / rule
- ii) Packing list in original list giving details of bill of materials, if applicable.
- iii) Consignment note / RR/ LR in original.
- iv) Warranty / Guarantee and Special Guarantee certificate, if applicable.
- v) Manufacturer's test certificate, if applicable.

Signature
COYAMAN

Signature

Signature

Supply Order no 12000110919090 dt 28.08.2019, M/s BEML Ltd

- vi) DGMS / BIS / Pre dispatch inspection certificates / any other document, if required as per the contract.
- vii) Performance bank Guarantee as per terms of the order
- viii) Price Certificate
- ix) Any other document indicated elsewhere in the order.

b. For Claiming 20% payment, the following documents are to be submitted

- (i) Pre-receipted and stamped bill for 20% payment.
- (ii) Commissioning Certificate from the respective Area General Manager / Staff Officer (Excv)

16. Force Majeure Clause: If the execution of the contract/supply order is delayed beyond the period stipulated in the contract/supply order as a result of outbreak of hostilities, declaration of an embargo or blockade, or fire, flood, acts of nature or any other contingency beyond the supplier's control due to act of God then Coal India Limited or its subsidiary companies any allow such additional time by extending the delivery period, as it considers to be justified by the circumstances of the case and its decision shall be final. If and when additional time is granted by the Coal India Limited and its subsidiary companies, the contract/supply order shall be read and understood as if it had contained from its inception the delivery date as extended.

- a. The successful bidder will advise, in the event of his having to resort to this clause, by a registered letter duly certified by the local chamber of commerce or statutory authorities, the beginning and end of the causes of the delay, within fifteen days of the occurrence and cession of such force majeure conditions. In the event of delay lasting out of force majeure, WCL will reserve the right to cancel the contract, and provisions governing termination of contract as stated in the bid documents will apply.
- b. For delay arising out of Force majeure, the bidder will not claim the extension in completion date for a period exceeding the period of delay attributable to the causes of force majeure and neither WCL nor the bidder shall be liable to pay extra cost provided it is mutually established that the force majeure conditions did actually exist.

17. Manufacturing certificate: As the order is being placed on the basis of consideration that you are a manufacturer of the ordered material, you will have to provide a certificate to the following effect on the body of each bill.

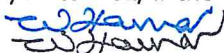
"Certified that the items supplied and included in this bill/ invoice are our own make and have been actually manufactured in our works situated at _____ (address of the factory)

18. Integrity Pact: Integrity Pact as per format (Annexure E of the NIT) signed and furnished by you along with the offer shall remain valid and applicable for this contract. The name of the IEMs for this order are

Dr. (Ms) Nivedita Haran, 23, IFS Vilas, P-6, Builders Area, Greater Noida 201310
Shri A.K.Mohapatra, Qrs no B-5/9, Unit - 9, Bhoi Nagar, Bhubaneswar 751022

19. Arbitration Clause: In the event of any dispute or difference relating to the interpretation and application of the provisions of the contracts, such disputes or difference shall be referred by either party for arbitration to the sole arbitrator in the department of Public Enterprises to be nominated by the Secretary to the Government of India in charge of the department of the Public Enterprises. The arbitration and conciliation act 1996 shall not be applicable to arbitration under this clause. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the law secretary, Dept. of Legal Affairs, Ministry of Law & Justice, Govt. of India. Upon such reference the dispute shall be decided by the law Secretary or the Special Secretary/ Additional Secretary, when so authorized by the Law Secretary, whose decision shall bind the parties finally and conclusively. The parties to the dispute will share equally the cost of arbitration as intimated by the arbitrator.

20. Price Certificate: As undertaken by you in your offer, you shall submit a certificate along with supplies take that you have not supplied / are not supplying similar product systems or sub systems at a price lower than that ordered price in respect of any other ministry/ department of the Govt. of India or a PSU and if it is found at any stage that similar product / Systems / Sub - systems was supply by you to any other Ministry / Department of the Government of India or a PSU at a lower price, then that very price with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by you to NCL, if the contract has already been concluded.





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You will furnish the following certificate to the Consignee / Paying authority along with the bills:


"I/We certify that I/We have not supplied / are not supplying similar product / systems or sub systems at a price lower than that ordered price in respect of any other Ministry / Department of the Government of India or PSU"

Failure in submission of aforesaid certificate by the contract holder, may result in withholding of the payment of their bills against supply.

21. Jurisdiction: All disputes shall be subject to the jurisdiction of Nagpur court only.

Unless otherwise specified above, the purchase order shall also be governed by the terms and conditions given in the General terms and conditions enclosed.

This order is issued with this acceptance. Kindly acknowledge the receipt of this order.


28/8/19
(Dr. Y. Venkata Ramana)
Sr. Manager (MM)

Yours faithfully


28/8/19
(K.S.R. Divakar)
Chief Manager (MM)

Enclosures: -


- Annexure-A : Detailed technical Specification for Motor Graders 280 HP
- Annexure-B : List of Standard Tools
- Annexure-C : Filters and consumables for 3000 Hours of operation
- Annexure-D : Erection Chart of BG 825 Motor Grader
- Annexure-E : Major bought out items of BG 825 Motor Grader
- Annexure-F : Maintenance Schedule
- Annexure-G : Oil & Lubricant chart
- Annexure-H : General Terms & Conditions
- Annexure-G : Bank Guarantee format

Copy to :

1. GM(Excv) HOD / GM(Fin.) I/c - 1 / GM(P&P), WCL(HQ), Nagpur
2. AGM / SO(Excv) / SO(MM) / AFM / Depot Officer, WCL, Wani / Wani North Areas
3. TS to DT(P&P), WCL, Nagpur
4. RD, CMPDIL, RI IV, Nagpur
5. GM(MM), SECL, MCL, CCL, BCCL, ECL, NCL, CIL
6. Sr. Manager (MM/Admn.), WCL(HQ) - The Landed value of the order is Rs.4,89,20,440.00
7. Dr. (Ms) Nivedita Haran, 23, IFS Vilas, P-6, Builders Area, Greater Noida 201310
8. Shri A.K.Mohapatra, Qrs no B-5/9, Unit - 9, Bhoi Nagar, Bhubaneswar 751022
9. M/s BEML Ltd., 33, Cement Road, Shivaji Nagar, Nagpur 440 010
10. Chief Manager (Excv) EED, CIL, Regional Sales Officer, Geeta Mansion, 4th floor, KG Road, Bangalore

Indent details: Indent No. 1471 dt 10.07.2019 against approved Shopping List of HEMM for the FY 19-20
BC Reference: FA/WCL/CAP/BC/HEMM/12/03/31 dated 24.08.2019 for Rs.489.21 lakhs

This is issued with the concurrence of Dir(Fin) on 06.08.19 and approval of CMD, WCL on 06.08.19


28/8/19
(Dr. Y. Venkata Ramana)
Sr. Manager (MM)


28/8/19
(K.S.R. Divakar)
Chief Manager(MM)

Detailed technical Specification for MOTOR GRADERS - 280 HP (minimum).

1. Item description: MOTOR GRADER - 280 HP (minimum): Ordered Quantity: 2 nos (Replacement requirement)

2. Technical specification:

Introduction: These Technical Specifications identify the technical requirements of the Goods and Services which are the subject of this tender.

The Technical specifications are presented as follows

- A. Scope of Supply.
- B. General Requirements
- C. Equipment Specifications

3. Conformity with specification:

The equipment to be provided shall conform with the requirements defined in these parts. Where stated requirements conflict, the order in which the specifications shall prevail is as follows.

Part A - followed by

Part B - followed by

Part C

PART-A

A. Scope of Supply.

A.1 Equipment Package.

You are required to supply as per the equipment package detailed in the order.

A.2 Supplementary Items

- I. The equipment shall be provided with a comprehensive tool kit, which shall include any special tools required for erection, commissioning and for the maintenance and repair of all the equipment.
- II. First fill of all oils, grease and lubricants needed for test and commissioning of each equipment.
- III. All filters & O-rings required for first 3000 working hours.

A.3 Information & Drawings

You shall provide the following documents before the scheduled installation date :-

- (a) Three suitably illustrated copy of operating, repair, and Maintenance instructions for each equipment, written in the English language, substantially bound in book form.
- (b) Three suitably illustrated copy of detailed Spares Parts Manuals covering all plant, equipment accessories substantially, for each Equipment bound in book form.

You shall also submit the data identified in the specifications for each item of Equipment proposed. In addition to the Equipment drawings requested, where appropriate you shall supply detailed drawings illustrating erection/assembly site(s), foundation and accommodation requirements for such items as drive motors, switch installations, etc.

A.4 Erection/Assembly, commissioning and Performance Testing: You shall provide the service of Specialist Technicians to supervise the installation/erection/assembly, commissioning and any performance testing of the plant, equipment and accessories supplied.

The Technicians shall remain at site following commissioning until all necessary personnel are fully conversant with the maintenance and operation of the equipment.

A-5 Training: You shall also be responsible for the provision and delivery content of any suitable training programmes necessary for operation and maintenance of the equipment.

W. D. Daman
W. D. Daman

[Signature]
[Signature]

Supply Order no 12000110919090 dt 28.08.2019, M/s BEML Ltd

PART-B

B. GENERAL REQUIREMENTS.

B.1 Geography and Climatic Conditions.

Elevation : The natural surface varies from 100m to 1000m above mean sea level.

Climate: The climate is sub-tropical to tropical dusty with a hot and humid atmosphere. Monsoon rains occur in the period from June to October –

Ambient Conditions	Relative humidity	-	Maximum 98%
	Temperature	-	Minimum 0 ^o C
		-	Maximum 50 ^o C

Rainfall : The mean annual rainfall is 1000 mm. 90 to 95% of which may fall in rainy season from June to October.

Wind	April to September	-	South to South Westernly
	October to March	-	North Westernly
		-	
	Speed	-	8 Km per hr average 100 Km per hour max.
Under foot	Slushy and highly abrasive	-	

B.2 Goods (Equipment & Machinery)

Detailed specifications of the equipments are given in part - 'C' of this section.

In general all items shall be -

- New, unused and of the current design (incorporating latest proven features) and not likely to be discontinued or become obsolete in near future.
- Designed and constructed to handle without overload and for the working hours stated, the maximum volumes/rates specified.
- Designed to facilitate ready access, cleaning, inspection, maintenance and repair of component parts.
- Designed to facilitate rapid changeover of consumable items.
- The component parts of all items shall, wherever possible, be selected from the standard ranges of reputable manufacturers.

The equipments and accessories shall be physically robust and where necessary capable of dismantling for transportation and ready re-assembly using simple tools. All equipments items provided shall be designed to be compatible within the proposed overall Scope of Supply.

Electrical equipments shall provide all protection devices, controls and interfaces for the equipment to operate safely and efficiently.

All workmanship and materials shall be of first class quality in every respect.

All parts and surfaces which are exposed to corrosive environments shall be suitably protected to prevent any effects of corrosion or erosion.

B.3 Standard: (a) Beside conforming to the standards specified in the equipment specifications, the equipment shall also has to meet approval of the Statutory Government Authorities including Director General of Mines Safety (DGMS) having jurisdiction over the Equipment and its use. (The system of units for all measurements shall be *the System International d'Units(S.I.)*)

B.4 Suppliers Responsibility: The Purchase requires that you shall accept responsibility for the provision of complete operable and compatible Equipment and systems within the Scope of Supply. These documents identifies only the major items required for the installation and you shall ensure that the total supply includes all necessary equipments for it to function effectively and safely. Any additional items you considers necessary to ensure compliance with such a requirements shall be identified and included.

You shall be responsible for the testing and commissioning of the equipments and ensure that it meets the requirements as specified. The commissioning and setting to work of the whole equipments supply package shall be carried out under your supervision in conjunction with the Purchaser's nominated personnel.

B.5 Spare Parts Provisions

B.5.1 Availability of Spare Parts

All items and Equipments proposed shall be of current design and manufacture. You shall warrant that sufficient spares and servicing facilities will be available to maintain the equipments in use through out its life.

Signature
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Signature

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B.5.2. Provisions of Spare Parts.

Within the Contract Price, the Purchaser will agree to purchase all filters and O rings required for first 3000 hours of operation of each equipment.

You shall stock sufficient fast moving and maintenance and other spares in their Local Depots to ensure maximum availability of their equipment .

B.5.3 Emergency Spare Parts

You shall ensure that spare parts required urgently by the Purchaser for repair of breakdown equipments are supplied at over riding priority.

B.5.4 Lifetime Spare Parts.

You undertake and guarantee to produce and maintain stocks, to be available for purchase by the Purchaser under separate agreements of all Spare Parts and Consumables as may be required for maintenance and repair of the Plant throughout its working life. In the event you wish to terminate production of such Spare Parts, you shall:

(a) give not less than six months notice in writing of it's intention to terminate production in order to permit the Purchaser reasonable time in which to procure needed requirements and

(b) immediately following termination, provide to the Purchaser at no cost, manufacturing drawings, material specifications and all necessary permissions to facilitate manufacture of the spare parts elsewhere. In any event, you shall not seek to terminate manufacture of spare parts for a period of not less than ten (10) years from taking-over.

B.5.5. Oil, Lubricants and Fluids

You shall provide to the purchaser a detailed schedule of all necessary oils, lubricants, fluids for the operation and maintenance of equipment and specify the appropriate Grades, Indian and International standard references (whichever is applicable), suitable for different assemblies.

B. 5.6 General

Nothing in this clause B.5 shall relieve you of any guarantee, Availability, performance or other obligations or liabilities under the contract.

B.6 Composite Warranty/Guarantee

You shall warrant that the equipment supplied under this contract is :

a. In accordance with the contract specifications.

b. The equipment shall have no defects arising out of design, material or workmanship and the complete equipment shall be warranted for 12 months from the accepted date of commissioning.

The warranty shall cover for total equipment so that ultimate responsibility has only with you although components may be supplied by different suppliers to the Supplier.

B.7 Performance Guarantee :

B.7.1 Introduction.

B.7.1.1 You shall guarantee that the equipment supplied pursuant to this contract shall be available for use by the Purchaser and shall meet the performance criteria specifications at the level and in accordance with the terms and conditions of the Availability Guarantee herein contained.

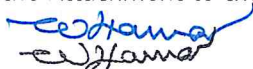
B.7.1.2 Where equipment supplied under the Contract fails to meet the criteria of the Availability Guarantee, you shall, at your own cost, provide suitably qualified and experienced personnel at site to demonstrate to the purchaser's satisfaction that the required level of availability can be achieved and maintained.

B.7.1.3 You shall provide the services of such personnel at site within seven (7) days of notification by the Purchaser that the availability criteria has not been met in any one (1) month.

B 7.2 Guarantee

B7.2.1 You shall guarantee that the equipment supplied pursuant to the Contract shall be available to the Purchaser at the level hereinafter defined to perform to criteria of not less than that defined in the Technical Specifications incorporated in the Contract.

B 7.2.2 You shall guarantee that the equipment shall be available to perform its duty to minimum criteria and to the minimum availability percentage level as defined in the individual equipment specifications included as the Attachment to the Technical specifications.





PART-C

EQUIPMENT SPECIFICATIONS OF MOTOR GRADER 280 HP (Minimum)

1. Scope Of Specification : Covers the technical requirements for the design, manufacture, testing, supply/ delivery, on-site erection and commissioning of a self-propelled, wheeled (Tyre Mounted) Motor Grader of 280 HP(minimum).

2. References

The following International Standards are referred to in, and form part of, the Specification:

- ISO 2867 Earth-moving machinery - Access systems
- ISO-3449 Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements
- ISO 3450 Earth-moving machinery - Wheeled machines - Performance requirements and test procedures for braking systems
- ISO 3457 Earth-moving machinery - Guards and shields - Definitions and specifications
- ISO 3471 Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements
- ISO 5010 Earth-moving machinery - Rubber-tyred machines - Steering requirements
- ISO 6014 Earth-moving machinery - Determination of ground speed
- ISO 6405-1 Earth-moving machinery - Symbols for operator controls and other displays - Part 1 : Common symbols
- ISO 6405-2 Earth-moving machinery - Symbols for operator controls and other displays - Part 2 : Specific symbols for machines, equipment and accessories
- ISO 6750 Earth-moving machinery - Operation and maintenance - Format and content of manuals
- ISO 7129 Earth-moving machinery - Tractors with dozer, graders, tractor scrapers - Cutting edges - Principal shapes and basic dimensions
- ISO 7457 Earth-moving machinery - Measurement of turning dimensions of wheeled machines
- ISO 7464 Earth-moving machinery - Method of test for the measurement of drawbar pull
- ISO 9249 Earth-moving machinery - Engine test code - Net power
- ISO 10570 Earth-moving machinery - Articulated frame lock - Performance requirements

In case the offered model meets equivalent other International Standards, bidder must indicate the same.

3. Design Criteria

The grader shall be capable of continuous operation for protracted periods on a system of 3 shifts (each of 8 hours duration) i.e. 24 hours per day, throughout the year. The grader will be used for haul road maintenance, handling soils, rock and coal in open cast mines.

The grader shall meet the following minimum requirements:

- a) Blade dimensions : 4850 x 680 x 25 mm
- b) Blade lift : 400 mm

4. Technical Requirements

4.1 Engine: The grader shall be powered by a direct injection 4-stroke turbo-charged diesel engine, with Electronic Control Module system, developing minimum 280 HP. net power, measured between 1700 and 2200 r/min according to ISO 9249.

The engine shall be provided with 24V electric starting, dry type 2-stage air cleaner with suitable dust level indicator & evacuator system and 2-stage fuel filter with water separator.

The engine shall have a water jacket cooling system, thermostatically controlled, using an engine driven water pump, with the cooling water re-circulated through a heavy-duty radiator. The system shall be capable of providing sufficient cooling to allow the grader to continuously operate at the full rated output at the maximum ambient temperature.

The moving parts of the engine shall be lubricated by an engine driven oil pump, with full flow oil filtration and cooling. The engine shall be equipped with an over-speed governor.

Signature

Signature

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4.2 Transmission : The grader shall be provided with a suitable efficient transmission having minimum 8 forward and 6 reverse speeds. The transmission shall be provided with a heavy duty removable belly guard designed to minimize the accumulation of dirt and debris.

4.3 Final Drives: Double reduction final drives with spiral bevel gears, planetary gears and roller chain tandem drives for rear wheels shall be provided.

4.4 Axles: The axles shall be heavy duty with traction sensing or other suitable type differential.

4.5 Steering: Full hydraulic power steering, which complies with ISO 5010, shall be provided. Three modes of steering shall be provided for improved maneuverability i.e. straight frame, articulated and offset steering.

4.6 Hoses : All hoses and piping should be protected from damage.

4.7 Brakes : Suitable reliable fail-safe, service, secondary and parking brakes, which comply with ISO 3450, shall be provided.

4.8 Tyres : Tubeless, Rock duty, Cut-resistant Tyres, size 18.00 x 25 / 20.5 x 25 / 23.00 x 25 (12PR) (preferably L-3 / G-3 Type) shall be provided.

4.9 Frames : An articulated frame with a locking device, which complies with ISO 10570, shall be provided.

4.10 Blade Circle : The blade circle shall be an internal gear type of adequate diameter with uniform heat treated teeth. Top and bottom raised wear surfaces shall be provided to prevent the circle teeth from contacting the support shoes.

The blade circle shall be hydraulically controlled to provide full 360° rotation in either direction and fitted with a mechanical lock.

4.11 Mouldboard : The mouldboard shall be a heavy-duty reinforced construction with wear resistant steel and replaceable and reversible Cutting edges, suitable end bits and side edges. Heavy duty hardened steel wear resistant cutting edges, which comply with ISO 7129, shall be provided.

Blade side shift and tip control should be by means of hydraulic cylinders.

4.12 Fuel Tank : The fuel tank should be of sufficient capacity for 20 hours operation without re-fuelling and be provided with a level indicator. The filler opening in the fuel tank shall be in a protected location and provided with a lockable-hinged cap.

Construction of the tank should be such that it provides for easy accumulation and drainage of water with minimum loss of fuel.

4.13 Operator's Cab : A fully insulated, sound suppressed, lockable, Air conditioned operator's cab with tinted safety glass, windshield wipers and washer should be provided. All doors, windows and vents shall have dust and weather proof seals. The operator's seat shall be a fully adjustable bucket type with foam rubber cushion and best quality upholstery. Internal and left and right external rear view mirrors, heavy duty rubber floor mats and a cooling fan shall also be provided. ROPS which comply with ISO 3471 shall be provided.

All operating controls, monitoring and working signals should be conveniently located in consoles within easy reach of the operator and shall comply with ISO 6405-1 and ISO 6405-2.

Ladders and handrails, which comply with ISO 2867, shall be provided for access to the operator's cab.

4.14 Gauges and Indicators : The following shall be provided as a minimum:

- a) Water temperature gauge
- b) Engine oil pressure gauge/indicator
- c) Converter / Transmission oil temperature gauge/indicator
- d) Fuel level gauge
- e) Service meter
- f) Air pressure gauge
- g) Speedometer

4.15 Warning Alarms/Lights : The following audio/visual warning alarms shall be provided:

- a) Front warning horn
- b) Audio Visual Reversing Alarm
- c) Coolant level and temperature
- d) Engine oil pressure and temperature

4.16 Electrical Equipment: The grader shall be provided with the following:

- a) 24V DC electrical system with suitably rated alternator of reputable make

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S. K. Kumar

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- b) Electric start system.
- c) Reputable make high capacity batteries
- d) Battery isolation switch

All electrical circuits shall be protected by adequately rated fuses, which shall be easily accessible for maintenance. At least two spare fuses of each size shall be provided in each fuse box.

4.17 Lighting: Adequate lighting shall be provided for safe nightshift operation.

The lighting system should include the following:

- a) 4 (Nos) Headlights
- b) 2 (Nos) Rear working lights
- c) 4 (Nos) ROPS mounted working lights (2-front and 2-rear)
- d) Cabin dome light
- e) Blade flood lights

Head lights and Rear working lights shall be identical in ratings and fitted in protective area.

4.18 Guards and Shields: Adequate guards and shields, which comply with ISO 3457, shall be provided throughout the grader.

4.19 Fire Extinguisher : Adequate number of fire extinguisher shall be provided on the grader, suitably mounted in a heavy-duty bracket for ease of removal. The extinguisher shall be dry powder (cartridge type) with a minimum capacity of 5 kg and shall comply with Indian Standard IS: 2171.

4.20 Automatic Fire Detection and Suppression System :

DGMS approved / Compliant Automatic Fire Detection and Suppression System shall be provided and suitably mounted in the Equipment. The materials and chemicals to be used in Fire Detection and Fire Suppression System to be supplied with equipment. The type and make of the system must be in DGMS compliance.

4.21 Warning system for Operator's fatigue: A Suitable "Driver's behavior monitoring system" with warning devices and sensors to be installed in the cabin. The device should be small in size which should not block the vision of the driver. The system shall be fully water proof, shock and vibration resistant and should be suitable for operation in extreme climatic condition in Indian Open Cast Mines

5. Ancillary Equipment And Other Requirements

The following shall be provided on the grader:

- a) Front mounted push plate
- b) Rear mounted rigid drawbar

6. Tools and Tackles : A set of standard and special tools and tackles required for erection, maintenance and repair of equipment should be supplied along with each machine.

7. Manuals : 3 (THREE) sets of Operation & Maintenance Manuals and Spare Parts catalogues shall be supplied for each machine, and one set is to be supplied to the Excavation Department, WCL-HQ, Nagpur.

8. Initial Spares : Initial spares / filters recommended for initial 3000 hours trouble-free operation must be provided along with each machine. Machine will be accepted only along with these initial spares. List of such spares (unit-wise) justifying the total requirement as per maintenance schedule should be submitted.

9. Additional Spares : Cutting Edge and End Bits along with Fastener - 24 sets, to cover minimum 3000 hours operation of the machine, shall be supplied along with each machine. In case of any additional requirement during 3000 hrs, the same shall be supplied free of cost.

10. After-sales-service : Availability of sufficient skilled service personnel and spare parts depot / warehouse at vicinity of WCL mines area will be considered while finalizing the tender.

11. Special Guarantees : The following guarantee will apply for the different components -

i) **Complete engine system** - 36 months or 6500 hours from the date of commissioning (whichever is earlier) In case of failure of engine system within 6500 hrs., the failed components of the engine system will have to be replaced / repaired depending on the merit of the case, free of cost by supplier.

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In case of failure of engine system beyond 6500 hrs the system will have to be replaced on prorata payment basis taking the life of the engine system as 7550 W/hrs.

- ii) Transmission Assy. - 36 months or 6500 hrs from commissioning (Whichever is earlier).
- iii) Frame, Chassis & Final Drive (including Differential): for 48 months or 8000 hrs from commissioning (Whichever is earlier).

In case of any guarantee failure intimated reasonably in time to the supplier, the replacement or repair job (as per guarantee settlement) must be completed within 21 days at site by the bidder at no cost to the purchaser.

12. Performance Guarantee : The Supplier shall guarantee that the availability of the equipment shall be not less than **86% (eighty six percent)** for a period of **12 months** from the accepted date of commissioning.

13. Composite Warranty / Guarantee : The complete equipment shall be warranted for 12 months from the accepted date of commissioning.

14. Supervision of Erection and Commissioning: You shall be responsible for erection and commissioning of the material at site. The purchaser will assist in providing necessary erection tools and tackles etc & unskilled man power.

You shall depute qualified and competent engineer(s) to supervise the entire assembly, erection and commissioning of equipment free of cost for suitable man days including Sundays and holidays, if worked, per machine for erection, commissioning and test running, as well as training in operation and maintenance of the equipment at site. Commissioning shall include testing of equipment at maximum rating, under the mining operating conditions as specified to the satisfaction of the user. In order to give proper service to us, suitable free accommodation and transport shall be provided by our Project Officer to the serving staff of You for initial commissioning and servicing of the equipment. The Project will provide all facilities like tools and cranes, semi-skilled labour generally required for assembly of such machine at site free of cost, during the initial commissioning and service of the equipment.

15. Inspection clause: Final Inspection shall be carried by Consignee at Site. WCL reserves its right to get the Equipment inspected before despatch by CM(Excv) CIL, Bangalore or the representative of GM(Excv) HOD, WCL Hqrs or any other agency appointed by WCL In case it is decided to carry out pre-despatch inspection by CIL / WCL's representative then equipment has to be delivered at Consignee project within 15 days or earlier from the date of inspection and clearance by CIL / WCL's representative.

16. Training: You in consultation with the HOD (Excavation) of the respective project, shall arrange to conduct proper training to WCL's operators, technical staff and supervisory personnel for suitable period, within three months from the date of issue of certificate of acceptance & Commissioning of the equipment. Training should be conducted free of cost. You shall contact HOD (Excavation) WCL-HQ before and after conducting the training.

The training shall cover the following

- a) The machine system and safety
- b) Equipment operation and maintenance
- c) Trouble shooting, detection of fault and their remedies, covering:-
 - (i) Electrical and electronics
 - (ii) Mechanical
 - (iii) Hydraulic system
 - (iv) Air system
 - (v) Lubrication system

Comprehensive training manuals with clear illustration shall be provided to each participant. Training course shall be conducted in both English and Hindi languages as required.

17. Dimensions, weights and performance details:

Specification Parameter	M/s BEML's value
Make & Model of offered Equipment : BEML & BG825 MOTOR GRADER	
1 Dimensions, Weights and Performance Details	
1.1 Dimensions	
a) Overall length	10010mm
b) Overall width	4928mm

Supply Order no 12000110919090 dt 28.08.2019, M/s BEML Ltd

c) Ground Clearance	440mm
d) Draw Bar Height	1045mm
e) Height of top of ROPS structure	3550mm
f) Size of Blade	4876mm X 692mm X 25mm
1.2 Weights	
a) On Front Wheels	8400kg
b) On Rear Wheels	19600kg
c) Total Weight	28000kg
1.3 Engine	
a) Manufacturer NAME and model	BEML & BS6D140EG
b) Number of cylinders	6 Nos
c) Bore	Dia 140mm
d) Stroke	165mm
e) Displacement	15.24 Liters
f) Net Power and RPM	209KW (280hp) @ 2100rpm
g) Maximum torque	1236Nm @ 1400 rpm
1.4 Transmission	
a) Manufacturer NAME and model	BEML
b) No of Forward and Reverse Gears	08 Forward & 08 Reverse Speed
c) Maximum Speed in Each Gear	As indicated in Annexure enclosed
d) Final Drive Types	As indicated in Annexure enclosed
e) Axle Types	Reverse elliot type front axle and full floating rear axle
1.5 Steering	
a) Types	Orbitrol type full hydraulic
b) Emergency steer method	Electrically operated pump motor is provided for emergency steering
1.6 Maneuverability	
a) Frame articulation	25 degree left & Right
b) Front wheel steering angle	50 degree Left & Right
c) Wheel lean	18 degree each side
1.7 Brakes	
1.7.1 Service Brakes	
a) Type	Oil disc brakes
b) Actuating system	As indicated in Annexure enclosed
1.7.2 Secondary Brakes	
a) Type	Dual line system protection type
b) Actuating system	As indicated in Annexure enclosed
1.7.3 Parking brake	
a) Type	Mechanical, Dry, Disc type on Output shaft
b) Actuating system	Actuated by spring application and air released
1.8 Tyres	
a) Size and type	18.00X25 , 12PR Tubeless type L-3 Rock type
b) Tread	L3 Type
c) Ply rating	12 PR
d) Rim size	13.00 VA X 25TB
1.9 Hydraulic System	


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a) Make, model, number, flow rates and operating pressures of pumps	As indicated in Annexure Enclosed
b) Make, model, number and ratings of motors	As indicated in Annexure Enclosed
c) Make, model, number, piston diameters and stroke lengths of cylinders	As indicated in Annexure Enclosed
d) Relief valve operating pressures	As indicated in Annexure Enclosed
1.10 Blade Equipment	
a) Circle diameter	1775mm
b) Mouldboard length, height and thickness	4876mm X 692mm X 25mm
c) Blade base	3100mm
d) Blade load	13720Kg
e) Cutting edge length, height and thickness	2438mmX203mmX19mm
1.11 Blade Range	
a) Maximum lift above ground	490mm
b) Maximum drop below ground	680mm
c) Maximum shoulder reach, left and right	2400mm each side
d) Maximum bank cutting angle	90 degree
e) Hydraulic blade tip	49 degree at Forward, 5 degree at Backward
f) Cutting angle	25.5 degree , 84 Degree
1.12 Electrical System	
a) Starter make and model	Make : Remy make (REIL Pondicherry); 24 V ; 7.5 kW
b) Starter control make and model	LUCAS TVS Model : 4ST
c) Alternator make and model	Prestolite/reputed 24V; 100A / 80A / 75A
d) Batteries, numbers and rating	2X12V, 200Ah, Batteries
e) Lighting details	As indicated in Annexure Enclosed


 (Dr.Y. Venkata Ramana)
 Sr. Manager (MM)



 (K.S.R.Divakar)
 Chief Manager (MM)



NIT Ref: WCL-hq-pur-yvr-ra-e008-2019-20

➤ Detailed list of Instrumentation, monitoring and Alarm system as per point No. 14.2. (I).

If the following parameters found any abnormal, the appropriate indicating Error lamp lights and the buzzer sounds at inside the cabin.

A. Digital Signals / Warning Alarms / Lights:

SLNO	PARAMETER	REMARKS
1	Coolant level	
2	Coolant temperature	
3	Engine oil pressure	
4	Engine oil temperature	
5	Warning Horn front	
6	Left Turn	
7	Right Turn	
8	High Beam	
9	Preheat	
10	Differential Lock	
11	Lift Arm Lock	
12	Reverse alarm (Audio visual)	
13	Battery Charge Fail	
14	Seatbelt remainder	Optional
15	Final drive oil temperature	

B. Audio visual Alarm :

If the equipment will change on reverse gear, Audio visual alarm sounds automatically at rear side of equipment.

C. Murphy Gauge (Display parameters) :-

SLNO	PARAMETER	RANGE
1	Engine Oil Temperature °C	40-140 ° C
2	Fuel level	FULL -EMPTY
3	Air Pressure	0-10bar
4	Engine RPM	0-3000RPM
5	Voltmeter	18-32V DC
6	Hour Meter	99999.9hrs
7	Engine Oil Pressure	0-10 Bar
8	Engine coolant temp	40-120 ° C
9	Trans Oil Temp	40-140 ° C
10	Speedo meter	0-100 km/h



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14.3.4 – Transmission:-

Maximum speed in each gear as per TPS point no. 14.3.4.c:-

Gear Range	Forward (km/hour)	Reverse (km/hour)
1st	4.0	4.3
2nd	5.4	5.8
3rd	8.0	8.5
4th	11.5	12.2
5th	15.8	16.9
6th	21.4	22.8
7th	31.3	33.4
8th	44.9	47.9

Final Drive type as per TPS point no. 14.3.4.d:-

- Double reduction final drive of spiral bevel gear with electric over hydraulically controlled differential lock-unlock device and planetary gear.

14.3.7.1 – Service Brakes:-

Actuating System as per TPS Point no.14.3.7.1.b:-

- Foot operated air actuated on 4 wheels and sealed for adjustment free operation.

14.3.7.2 – Secondary Brakes:-

Actuating System as per TPS Point no. 14.3.7.2.b:-

- Two crossed brakes lines provided for sure braking in case of failure on one side.



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14.3.9 Hydraulic System:

a)	Make, model, number, flow rates and operating pressure of pumps	<p>Make: Uchida / Rexroth make triple gear pump. Model: GXP10-COC630RPR35WRTB30ABR-20 Numbers: Three gear pump (tandem) type. Flow rates / operating pressure: 131 l/min & 210 kg/cm² 74 l/min & 175 kg/cm² 63 l/min & 31 kg/cm²</p>																																
b)	Make, model, number and rating of motors	<p>Make: Sumitomo Eaton Model: ME300 Numbers: One Rating: 49 kW (66 HP)</p>																																
c)	Make, model, number, piston diameter and stroke lengths of cylinder.	<p>Make & Model: Pennar / Dantal / Canara Hydraulics</p> <table border="1" data-bbox="577 1120 1332 1473"> <thead> <tr> <th>Cylinder</th> <th>Nos.</th> <th>Piston Dia (mm)</th> <th>Stroke (mm)</th> </tr> </thead> <tbody> <tr> <td>Blade Lifting</td> <td>2</td> <td>100</td> <td>1388</td> </tr> <tr> <td>Blade side shifting</td> <td>1</td> <td>100</td> <td>1700</td> </tr> <tr> <td>Draw bar side shifting</td> <td>1</td> <td>100</td> <td>753</td> </tr> <tr> <td>Front wheel leaning</td> <td>1</td> <td>90</td> <td>190</td> </tr> <tr> <td>Blade tipping (power Tilt)</td> <td>1</td> <td>120</td> <td>404</td> </tr> <tr> <td>Frame articulation</td> <td>2</td> <td>120</td> <td>420</td> </tr> <tr> <td>Front wheel steering</td> <td>2</td> <td>60</td> <td>380</td> </tr> </tbody> </table>	Cylinder	Nos.	Piston Dia (mm)	Stroke (mm)	Blade Lifting	2	100	1388	Blade side shifting	1	100	1700	Draw bar side shifting	1	100	753	Front wheel leaning	1	90	190	Blade tipping (power Tilt)	1	120	404	Frame articulation	2	120	420	Front wheel steering	2	60	380
Cylinder	Nos.	Piston Dia (mm)	Stroke (mm)																															
Blade Lifting	2	100	1388																															
Blade side shifting	1	100	1700																															
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Blade tipping (power Tilt)	1	120	404																															
Frame articulation	2	120	420																															
Front wheel steering	2	60	380																															
d)	Relief valve operating pressures	<p>Work equipment: 210 Kg/cm² Steering: 175 Kg/cm² Transmission: 31 Kg/cm²</p>																																

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BG825 MOTOR GRADER

DESCRIPTION OF HYDRAULIC SYSTEM

The hydraulic system mainly consists of hydraulic reservoir, Triple gear pump, priority flow divider valve, directional control valves and safety valves. The hydraulic reservoir supplies oil to the whole system through triple gear pump. Triple gear pump supplies oil to the following work implements through control valves and priority valve.

- 1. Blade lift LH cylinder
- 2. Blade side shift cylinder
- 3. Ripper control cylinders (if equipped)
- 4. Power tilt control cylinders
- 5. Circle rotation motor
- 6. Drawbar shift cylinders
- 7. Articulate control cylinders
- 8. Blade lift RH cylinder
- 9. Leaning cylinder
- 10. Steering cylinders

The first section of the triple gear pump supplies oil to flow divider. The flow divider is a load sensing priority type. Flow divider. It supplies oil to steering control unit (Orbitrol) depending on the load requirements. In built Relief valve in priority flow divider is set at 175 kg/cm². A double relief valve is set at 210 kg/cm² is provided in the steering circuit to protect the system from shock loads.

The second and third section of the triple gear pump supplies oil to LH and RH control valve respectively. There is an in built relief valve set at 210 kg/cm² in both LH and RH control valve. The control valve is actuated through mechanical linkages.

The LH control valve controls the function of LH blade lift, blade side shift, ripper control (if equipped), power tilt and circle rotation.

The RH control valve controls the function of RH blade lift, drawbar shift, articulation and leaning. One service spool is also provided in the RH control valve. The pilot check valves with safety valve set at 280 kg/cm² is provided in LH blade lift, power tilt & ripper (if equipped) circuit to protect the system.

Pilot check valve is provided in drawbar side shift, articulation, leaning and RH blade lift circuits. Hydraulically operated clutch plates arrangement for locking the blade rotation is provided in the circle rotation circuit.

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14.3.12: Electrical System:

Lighting Details:

Number of Head Lights	4 Nos.
Number of Rear Working Lights	2 Nos.
Number of Lights fitted on ROPS	Front: 2 Nos. Rear: 2 Nos.
Number of Fog Lights	2 nos. mounted on ROPS (Front)
Number of Cabin Dome Lights	1 No.
Number of Blade flood lights	2 Nos.
Number of Stop and Tail Lights	2nos (rear side, part of rear combination lamp)
Turn Signal Lamp	4 Nos. (2 Nos rear side, part of rear combination lamp)

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DESCRIPTION OF AUTO FIRE PROTECTION SYSTEM FOR BG825 MOTOR GRADER

Heavy Duty vehicles used on off-road application requires Fire Protection System to save,

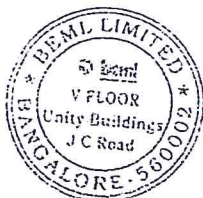
- Costly Vehicle Replacement
- Costly Down Time
- Safety of Operator

The system is pre-engineered system and consist of a pressurised container to store the dry chemical extinguishing agent, an actuation device to expel the dry chemical and a delivery system consisting of flexible hoses and fixed nozzles to transport the dry chemical to the fire hazard area.

Fire suppression system is equipped with Automatic fire Detection & System Actuation. System includes monitoring control panel which indicate suppression system status and audible alarm. System includes test feature with back-up battery. Actuation , may be manual or automatic, at the user's option.

A thermistor strip fire sensing wire is routed all around all around the equipment to detect fire. In case of fire, both audio alarm and indicator will be activated and control unit actuates the squib/solenoid valve after 30 seconds time delay and pressurized nitrogen gas gets released an flows into DCP cylinder. Then the extinguisher powder flows out through high pressure hoses gets distributed to various locations through nozzles flooding the fire prone areas. The extinguishing agent is a Dry Chemical Powder suitable for extinguishing 'A', 'B' & 'C' class fires. The power is not conductive physiologically inert and non-abrasive.

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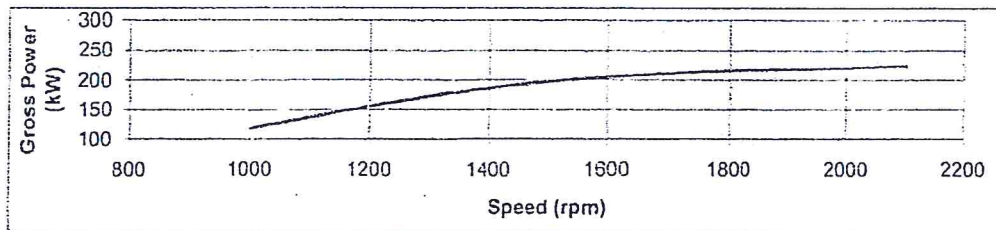


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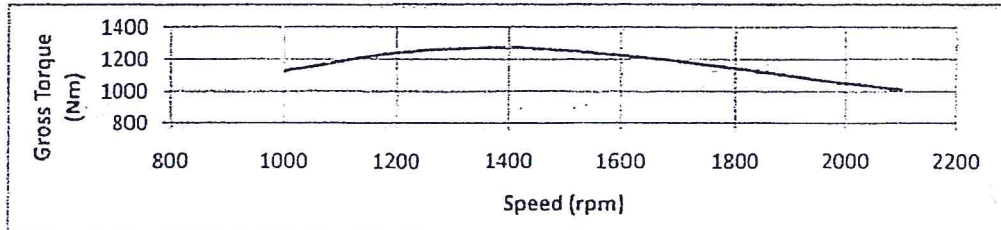


BEML LTD, INDIA Engine Division, Mysore	Engine Model : 8S6D140EG	Ref.Curve No. : 140EG-013
Engine Performance Curve for 8S6D140EG :	Equipment Model : BG225	Date : Dec - 2014
Displacement : 15.24 Litre	Aspiration : Turbocharged	No.of.Cylinders : Six, In-Line
Bore : 140 mm	Stroke : 165 mm	Fuel System : Bosch Ltd India, & Control System by Heinzmann, Germany

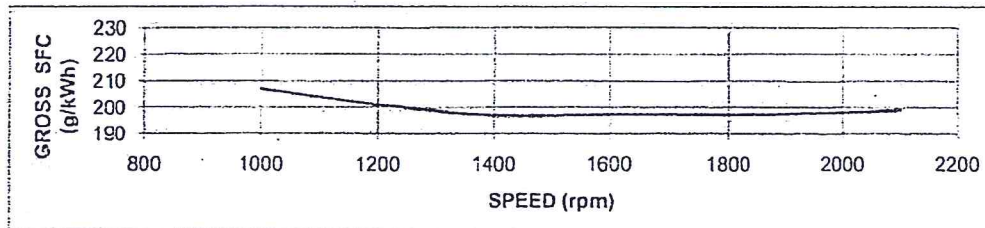
Gross Power - kW



Gross Torque - Nm



Gross SFC - g/kWh



Speed (rpm)	1000	1200	1400	1600	1800	2000	2100
Gross Power (kW)	117	156	187	205	216	222	224
Gross Torque (Nm)	1121	1240	1274	1225	1143	1060	1019
Gross SFC (g/kWh)	207	201	197	197	197	198	199

NOTES: Production tolerance: Within +/- 5% Engine Performance as per ISO 9249

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BG825, BS6D140EG, Rated Power 209kW (280hp) @ 2100 rpm, 140EG-013													
Engine Speed, rpm	Gross Torque Nm	Gross Power kW	Gross Power hp	Gross Torque Rise, %	Accs. Power, Fan - kW	Accs. Power, Alt - kW	Accs. Power, Muffler - kW	Total Accs. Power, kW	Net Torque, Nm	Net Power, kW	Net Power, hp	Gross SFC, g/kWh	Net BSFC, g/kWh
2100	1019	224	299	25	10.0	2.9	1.20	14.1	950	209	280	199	212
2000	1060	222	295		8.6	2.8	1.10	12.6	992	208	279	198	210
1800	1143	216	289		6.3	2.8	1.00	10.1	1090	205	275	197	207
1600	1225	205	275		4.4	2.4	0.77	7.6	1180	198	265	197	205
1400	1274	187	250		3.0	2.0	0.51	5.5	1236	181	243	197	203
1200	1240	156	209		1.9	1.6	0.32	3.7	1210	152	204	201	206
1000	1121	117	157		1.1	1.0	0.19	2.2	1100	115	154	207	211

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Maximum travel speed determined according to ISO 6014:

Model: BG825 Motor Grader

- 44.9 km/hr in forward direction.
- 47.9 km/hr in reverse direction.

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Results of service and secondary brake test:

Model: BG825 Motor Grader

Braking system tested	Slope (%)	Machine speed (km/h)	Stopping distance (m)
Service	0	30	14
Secondary	0	30	28

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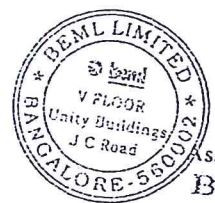
Turning diameter as per ISO 7457:

Model: BG825 Motor Grader

Minimum Turning Diameter:	15.8 meters
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Unity Buildings, J.C. Road,
Bangalore - 560 002.



Maximum drawbar pull as per ISO 7464:

Model: BG825 Motor Grader

Maximum Drawbar Pull:	14,420 kg
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Signature
S. SUNDARESAN
Asst. General Manager (Mktg.)
BEM LIMITED
Unity Buildings, J.C. Road,
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BG825 MOTOR GRADER

DESCRIPTION :

BG 825 Motor grader is a machine used principally for shaping rough and fine finish grading. It can also perform digging, ripping, bank cutting, pushing huge loads and removing the snow. They can perform above and other assignment with a variety of attachable work tools.

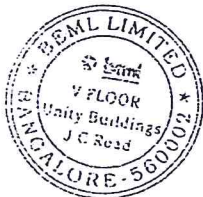
GENERAL CONSTRUCTION :

The frame is made up of front and rear structures. The tough rear frame consists of two cross-welded members supporting the engine, transmission and drive gears. The drive is through tandem wheels at rear. Cabin is mounted on the rear frame for excellent visibility and control. Torsion resistant front frame is single arched and supports front axle. The blade is attached to a circle which is hung from the overhead frame and pulled by a drawbar fastened to the front frame. It also houses hydraulic piping. The frame can be articulated by 25°, which provide good maneuverability and lesser turning radius. The following three excellent basic operating posters are available to meet varying operations needs.

- a) Straight frame with main frame centered and only front wheels used for steering is best for long-pass blading.
- b) Articulated turn uses the full frame 25° articulation, along with around 50° front wheel steering angle and unlocked tandem drive train differential for shortest turning radius.
- c) Crab or Offset steering helps compensate for side drift when turning a windrow, keeps tandem on firm footing when cleaning a wet ditch, increases the stability for slide slope work and side thrust when using snow wing.

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POWER TRAIN :

Powered by compact BEML heavy duty, 4-stroke, direct injection, water-cooled engine Model no BS6D140-EG which provides best combination of power and fuel efficiency. The power from engine is transmitted to the hydro-shift transmission with 8 forward and 8 reverse speeds. In the transmission in response to the load and forward-reverse rotation direction, the speed shifting are done by a single lever. The power is transmitted to the Final drive through the drive shaft. Further, power is separated into left and right perpendicular direction and transmitted to the Tandem drive through the rear axle. The tandem transmits the power to the wheel by a chain and the machine starts moving.

BRAKES :

The equipment is provided with wet multiple disc brakes and lock/unlock differential to deliver smoother, safer operation. Powerful wet multiple-disc brakes employed on all tandem wheels prevent heat build-up during frequent, heavy duty braking action. The lock/unlock differential includes a wet multiple-disc clutch, which can be smoothly locked or unlocked even when the machine being steered. Air actuated multiple disc brakes on 4-rear wheels, are sealed for adjustment free operation. Parking brake is of dry disc type.

HYDRAULICS :

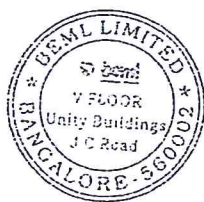
Hydraulic system mainly consists of hydraulic reservoir, triple gear pump, control valve, flow divider valves, check valves, safety valve, hydraulic motor and cylinders.

The pump drives oil from hydraulic reservoir suction strainer provided in the hydraulic reservoir. The first module of the triple gear pump caters oil to the steering cylinder through priority flow divider valve and orbitrol steering valve. Priority flow divider valve provides oil depending on the load requirement. An inbuilt Relief Valve in the priority flow divider valve limits the max. Operating pressure of steering system to 175 kg/cm². Double Relief Valve is also provided in the steering circuit to protect the system from shock loads.

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The second module of the Triple Gear Pump supplies oil to LH blade lift cylinder, Ripper control cylinder (if equipped), Blade Side shift cylinders, Power Tilt cylinder and Circle rotation motor, through LH Direction control valve.

Similarly the third module of the pump supplies oil to Drawbar side shift cylinder, Articulation cylinders, Leaning cylinders and RH blade lift cylinders, through RH direction control valve. One service spool is also provided in the RH control valve.

An inbuilt Relief valve is provided in each LH & RH directional control valves to limit the maximum operating pressure of work implements to 210 kg/cm².

Pilot operated check valves & safety valves are provided in the hydraulic circuit to prevent the system from over loading. Hydraulically operated clutch plates arrangement is provided to lock the blade rotation whenever the blade is being operated under load.

All the return oil from different work implements and different valves is filtered through return line filter provided in the hydraulic reservoir.

FRAME :

The equipment is built on two articulated frames. Two hydraulic cylinders articulate the two frames. Torsion resistance, box sectioned frame constructed with high strength steel totally avoid buckling/bending under severe working.

Front and rear frames are steel-plate-welded and connected with an articulation pin. One piece frame designed for the front frame houses hydraulic pipes and offers excellent front visibility for precise operations.

BLADE EQUIPMENT :

The blade is attached to a circle that is hung from the overhead frame and pulled by a drawbar fastened to the front of the 'A' shaped, 'U' sectioned press formed construction for maximum strength and machined to provide accurate adjustment and precision blading. The draw-bar is fastened to the front of the frame by a ball and socket joint and supported at the rear by two lift cylinders.

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Hydraulically controlled internal gear type circle with induction hardened teeth is supported by six adjustable guide shoes carried on draw bar for smooth 360° rotation.

Mould board-Box-section constructed with wear resistant steel. Reversible overlay side bits are attached to it.

The moldboard on the Motor Grader is connected to circle by fastening to circle knees. A notched tilting rack is provided on the circle knees to enable to be tilted forward or backward with relation to the circle knees.

Blade performance-The operator can position the blade at the desired bank-cutting angle up to 90° on either side without leaving the operator's compartment. The high blade rotating speed facilitates quick blade changes for increased productivity. A large shoulder reach and manual tip control allow the operator to match the 280HP. Articulated type motor grader to the most demanding application. The major design advantage of the cutting edges fitted on to the moldboard is to have long life on all operating conditions.

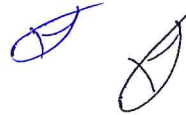
Cabin fitted on the rear frame is spacious, comfortable and sound suppressed Rops is provided for operator safety. The cabin is fitted with tinted glass, rear view mirrors, front and rear windshield washer and wipers for superb working comfort and visibility.

Ergonomically arranged instruments, control levers and pedal boost for operation efficiency. Standard 5-way fully adjustable seat with armrest provides the comfortable position for each operator's need.

TYRES :

The equipment is provided with 18.00 x 25 – 12PR (L-3/G-3) tubeless rock type tyres of reputed make.

Michelin
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GENERAL :

Smooth machine starting, precise finishing operation is ensured with provision of inching pedal. Accidental machine starts are prevented by a gear shift lock device and engine starts only when the shift lever is set in the parking position. The finger tip control of a smooth, electrically controlled transmission provides high maneuverability.

Electronic display monitoring system (7 " LCD display & control system) facilitates daily maintenance checks and alerts the operator in the event of malfunctioning.

Tandem case swings up to 15° assuring high machine stability, positive traction during operation.

See-saw motion from front axle : If one of the front wheels runs over a rock or dips into a hole, the see-saw motion of the front wheel axle about the center pin ensures that the assembly remains horizontal.

Improved forward drive leaning mechanism :

This mechanism shifts the front wheels to the left or right by utilizing a conical rolling action by putting the front wheel at an angle according to the load on the blade, lateral slipping of the front wheels is reduced during operation, thereby facilitating easier forward drive. The leaning mechanism also reduces the turning circle. Reverse Elliot type with a center ground clearance of front axle is 680 mm, oscillation angle 32° (total) & assures stable machine travel. Front wheel leaning is 18° on each side.

Electric-over hydraulically controlled differential lock – unlock device is provided. The differential locking arrangement can be used whenever the differential action is not required.

INCHING FACILITY :

Inching feature is provided through inching pedal which ensures smooth and precise finishing operation.

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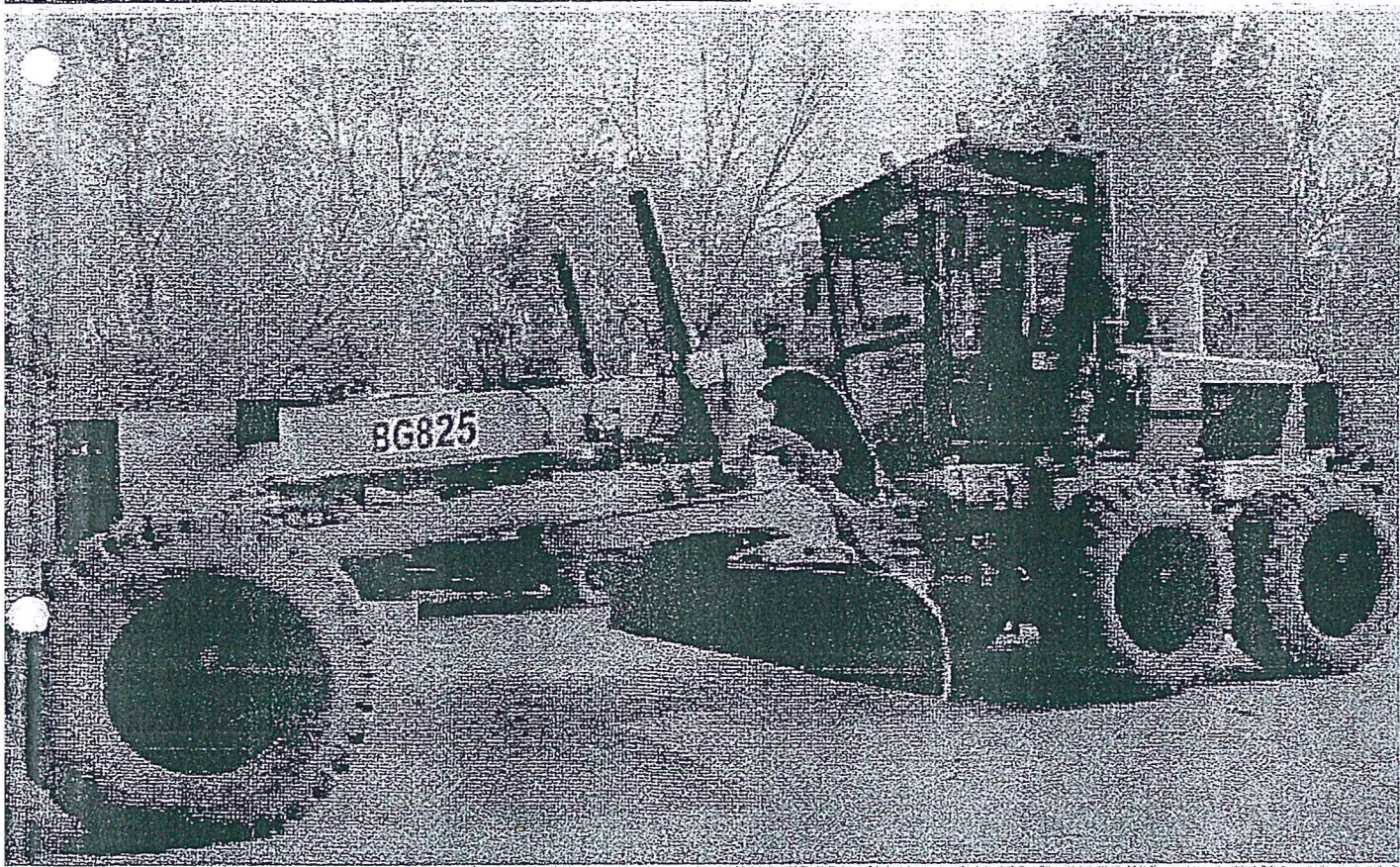
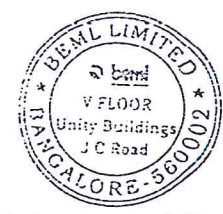
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BG825

MOTOR GRADER



- : High Performance
- : More Productivity
- : Smooth Operation
- : Operator Comfort



Flywheel power (net)	: 209 KW (280 hp) @ 2100 rpm
Blade Length	: 4876 mm
Operating Weight	: 28,000 kg

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BG825

MOTOR GRADER

Salient Features:

Performance:

- With its high engine horse power and operating weight, BG825 is ideal for heavy duty road construction & maintenance jobs at mining yards and demanding job sites.

Productivity:

- High Power BEML engine, high performance blade equipment and frame articulation ensure high productivity.

Operating Ease:

- The finger tip control of a smooth, electrically controlled transmission provides high maneuverability.

Comfort:

- Rear Frame Mounted Operator's compartment enables greater viewing ease of the machine's travelling direction. Operator's comfort is enhanced by adjustable oil suspension seat and rubber pad mounted Operator's compartment. Electronic display monitoring system facilitates daily maintenance checks and alerts the operator in the event of malfunction.

ENGINE

Make	BEML
Model	BS6D140-1 with Electronic control module BS6D140EG
Type	Diesel, 4-Stroke, Water Cooled, Overhead Valve, turbocharged, direct Injection, Mechanical all speed governor.
Flywheel Power	209 kW(280 hp) @ 2100 rpm (SAE J1349)
Net Maximum Torque	1236 Nm @ 1400 rpm
No. of Cylinders	6, Inline
Bore X Stroke	ø 140 x165 mm
Displacement	15,240 cc
Electricals	
Alternator	24V,80 A
Starting Motor	24V, 7.5 kW
Battery	2X12V, 200 Ah Low maintenance free batteries

TRANSMISSION

Make	BEML							
Type	Hydro shift Transmission							
Travel speeds (km/h) at rated engine rpm								
	1st	2nd	3rd	4th	5th	6th	7th	8th
Forward	4.0	5.4	8.0	11.5	15.8	21.4	31.3	44.9
Reverse	4.3	5.8	8.5	12.2	16.9	22.8	33.4	47.9
Max Drawbar pull	14,420kg							

AXLES

Front Axle	
Type	Reverse Elliot - Type
Center Ground Clearance	680 mm
Oscillation Angle	32° (total)
Front Wheel Leaning	18° (each side)
Rear Axle	Full- floating rear axle is made of forged heat treated steel.

FINAL DRIVE

Type	Double - reduction final drives of spiral bevel gears with electric - over hydraulically controlled differential lock-unlock device and planetary gear, roller-chain tandem drives for four rear wheels.
Tandem	Tandem case swings up to 15 degree assuring high machine stability and positive traction during operation.

BRAKES

Service Brake	Foot operated, oil disc brakes, air actuated on 4 rear wheels and sealed for adjustment- free operation. Two crossed brake lines for sure braking
Parking Brake	Mechanical, dry, disc type actuated on transmission output shaft, spring applied and air released.

STANDARD ACCESSORIES

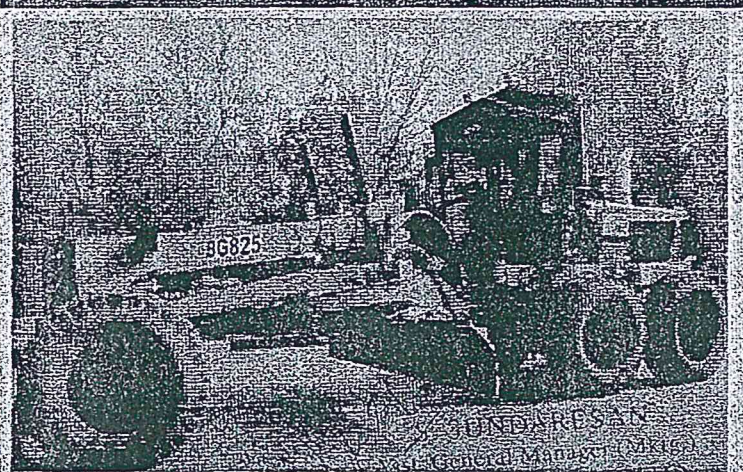
Adjustable console and work-equipment control levers, Adjustable seat, Horn, Back-up alarm, Stop and tail lamps, Pallet lamp, Pilot check valves for blade lift, Blade tipping, Front wheel leaning, Drawbar side shift and frame articulation cylinders, Turn signal lights, Front working lights, Rear working lights, Head lights, Rear view mirrors, Front pull hook, Rear Drawbar, Fire extinguisher.

OPTIONAL ATTACHMENTS

Rear Mounted Ripper: Four Parallel linkage type, with hydraulically controlled raise and lower functions. This ripper can be used to dig out rocks or hard ground not removed by a scanner.

No. of shanks	3
(Max. 4 shanks installable)	
Max. digging depth	480mm
Max. lift above ground	875mm
Max. digging width	2,980mm
Additional weight	2,585 kg

Push plate, Tyre inflation kit, AC Cabin, Auto lube system, Auto fire suppression system, ROPS mounted rear and front lamp.



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HYDRAULICS

Hydraulic pumps	
Type	Three gear pump (tandem) type
Capacity (total)	268 l/min (steering, work equipment control LH and RH)
1st Pump	131 l/min - steering
2nd pump	74 l/min - control LH work equipment
3rd pump	63 l/min - control RH work equipment
Hydro shift transmission pump	
Type	Gear type
Capacity	133 l/min
Differential pump	
Type	Gear type
Capacity	17 l/min
Hydraulic motor	
Type	Piston type hydraulic motor
Output power (for blade rotation)	49kW (66 hp)
Hydraulic cylinders	
Type	Double acting piston type, each connected to pilot check valve for positive cylinder action.
Operation Qty. in numbers	
Blade lifting	2 (without pilot check valve)
Blade side shifting	1
Drawbar side shifting	1
Front wheel leaning	1
Blade tipping	1
Frame articulation	2
Front wheel steering	2
Control valves	
Type	5-spool type, two valves (LH & RH) with built-in relief valve
Relief valve settings	
Work equipment	210 kg/cm ²
Steering	175 kg/cm ²
Transmission	31 kg/cm ²

STEERING

Type	Orbitrol, full hydraulic steering system
Cylinders	
Type	Double acting
Quantity	2 nos.
Max. steering angle	50° left and right of front wheels
Frame articulation angle	25° left and right
Min. turning radius (Frame articulated)	7.9m

WHEELS

Front & rear tyres	18.00 x 25 - 12PR(L-3) rock-type tubeless tyres
Rims	13.00 VA X 25TB
Inflation pressure	2.6 kg/cm ² max.

SYSTEM REFILL CAPACITIES

Systems	Capacity (Liters)
Coolant	58
Fuel tank	500
Engine	36
Transmission	35
Tandem case (each side)	95
Final drive case	57
Hydraulic oil	80

BLADE RANGE

All blade movements and positions can be hydraulically controlled from the operator's seat.

Max. lift above ground	490mm
Max. drop below ground	680mm
Max. shoulder reach : Left	2,400mm
: Right	2,400mm
Max. bank cutting angle	90°
Hydraulic blade tip	49° forward, 5° backward
Cutting angle	25.5° - 84°

BLADE EQUIPMENT

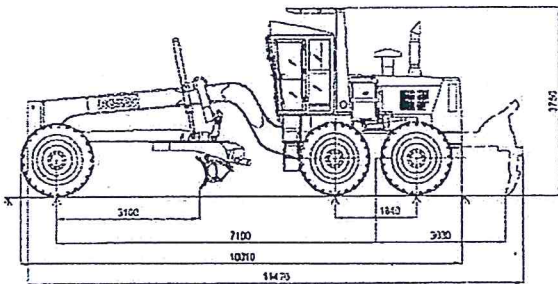
Drawbar	
Type	A-shaped, U-section press - formed and welded construction for maximum strength
Circle	
Type	Internal gear type, hydraulically controlled with six guide shoes for 360° smooth rotation.
Circle diameter (outer)	1,775mm
Mould Board	
Type	Box-section construction with wear resistant steel, hydraulic blade side shift and tip control. Reversible overlay end bits, side edges are attached.
Length X height	
X thickness	4876mm X 692mm X 25mm
Blade Base	3,100mm
Blade Load	13,720kg
Cutting Edges - STANDARD FITMENT	
Type	Curved type cutting edges meet SAE standard J739b
No. of cutting edges	2
Length X height	
X thickness	2438mm x 203mm x 19mm

FRAMES

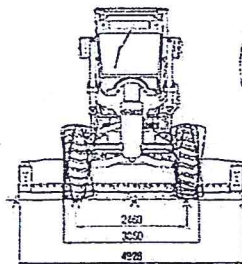
Type	Frames are articulated by two hydraulic cylinders. Box sectioned front and rear frames are of steel plate welded construction and connected with an articulation pin. One-piece frame design for the Front Frame in which hydraulic pipings are installed.
Front frame section	350mm(width) X 400mm(height)

OPERATING WEIGHT

On front wheels	8400 kg
On rear wheels	19,600 kg
Total weight (approx.)	28,000 kg



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GROUND CLEARANCE - 440mm



ROPS and Cabin (low - profile type), push-plate and rear mounted ripper are optionally available
 Material and Specifications are subjected to change without notice, Illustrations may include optional equipment & accessories.

BG825

TECHNICAL SPECIFICATIONS

Signature

Signature

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Form No. BG825/001/07/2013



बी ई एम एल लिमिटेड
BEML LIMITED

A Govt. of India Miniratna Company Under Ministry of Defence

Grader from BEML

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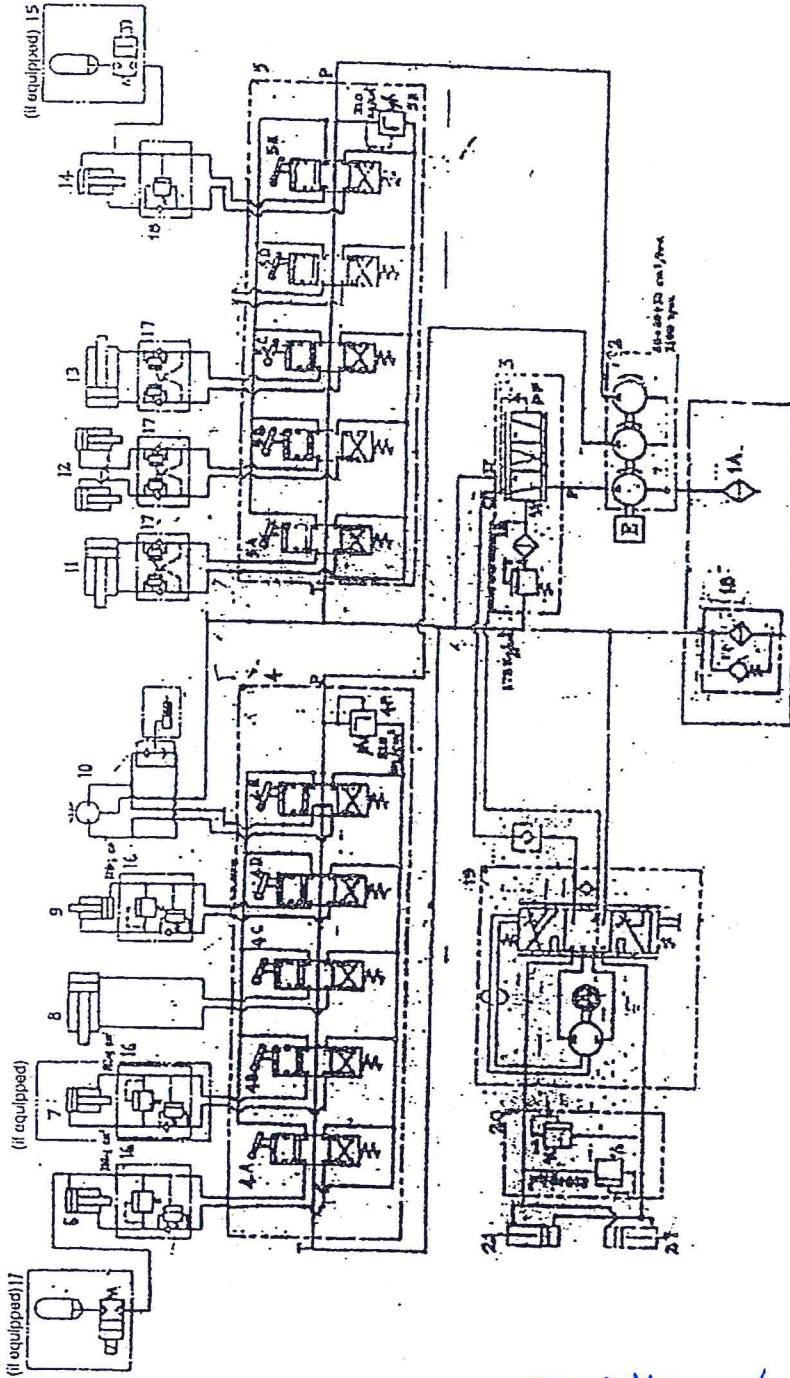
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HYDRAULIC CIRCUIT DIAGRAM



- 1. Hydraulic tank
- 1A. Strainer
- 1B. Hydraulic filter
- 2. Hydraulic pump (for work equipment and steering)
- 3. Priority flow divider valve (175 kg/cm²)
- 4. L.H. hydraulic control valve (5-spool)
- 4A. Blade lift (L.H.) control spool
- 4B. Ripper control spool (if equipped)
- 4C. Blade side shift control spool
- 4D. Power tilt control spool
- 4E. Circle rotation control spool
- 4F. Relief valve (210 kg/cm²)
- 5. R.H. hydraulic control valve (5-spool)
- 5A. Drawbar shift spool
- 5B. Articulate control spool
- 5C. Leaning spool
- 5D. Service spool
- 5E. Blade lift (R.H.) control spool
- 5F. Relief valve (210 kg/cm²)
- 6. Blade lift cylinder (L.H)
- 7. Ripper cylinder (if equipped)
- 8. Blade side shift cylinder
- 9. Power tilt cylinder
- 10. Circle rotation motor
- 11. Drawbar shift cylinder
- 12. Articulate cylinder
- 13. Leaning cylinder
- 14. Blade lift cylinder (R.H.)
- 15. Accumulator
- 16. Pilot check valve (with safety valve) (set pressure 280 kg/cm²)
- 17. Pilot check valve
- 18. Pilot check valve
- 19. Steering valve
- 20. Double over relief valve (210 kg/cm²) at 10 1/min.
- 21. Steering cylinder



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Instrumentation & Monitoring System

(Murphy Gauge Details and monitoring System)

Model: BG825 Motor Grader

1. GAUGE PROVIDED ON DASH BOARD

a) Engine water temperature gauge:

Range (in °C)	40	60	80	100	120
MAKE: M/s Murphy					

b) Fuel level gauge:

Level Indication	EMPTY	FULL
MAKE: M/s Murphy		

c) Engine oil pressure gauge:

Range in bar	0	2	4	6	8	10
MAKE: M/s Murphy						

d) Air pressure gauge:

Range in bar	0	2	4	6	8	10
MAKE: M/s Murphy						

e) Tachometer/Speedometer:

Range in rpm	0-3000
MAKE: M/s Murphy	

Range in kmph	0-140
MAKE: M/s Murphy	

f) Engine oil temperature gauge:

Range (in °C)	40	80	120	140
MAKE: M/s Murphy				

g) Transmission oil temperature gauge:

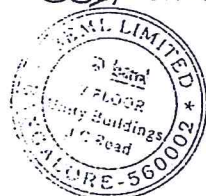
Range (in °C)	40	80	120	140
MAKE: M/s Murphy				

h) Hour meter:

Range in Hrs	0 TO 99999.9
MAKE: M/s Murphy	

i) Voltmeter:

Range (V DC)	16 TO 32
MAKE: M/s Murphy	



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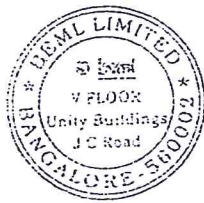
2. WARNING INDICATION (Make: M/s Murphy)

- a) Engine water level
- b) Engine water temperature
- c) Engine oil pressure
- d) Engine oil temperature
- e) Transmission oil temperature
- f) Air pressure
- g) Final drive oil temperature
- h) Low battery indication

3. PIOLT LAMP INDICATION (Make: M/s Murphy)

- a) High beam
- b) Alternator signal
- c) Pre-heat
- d) Turn signal (Right & left)

W. J. J. J.
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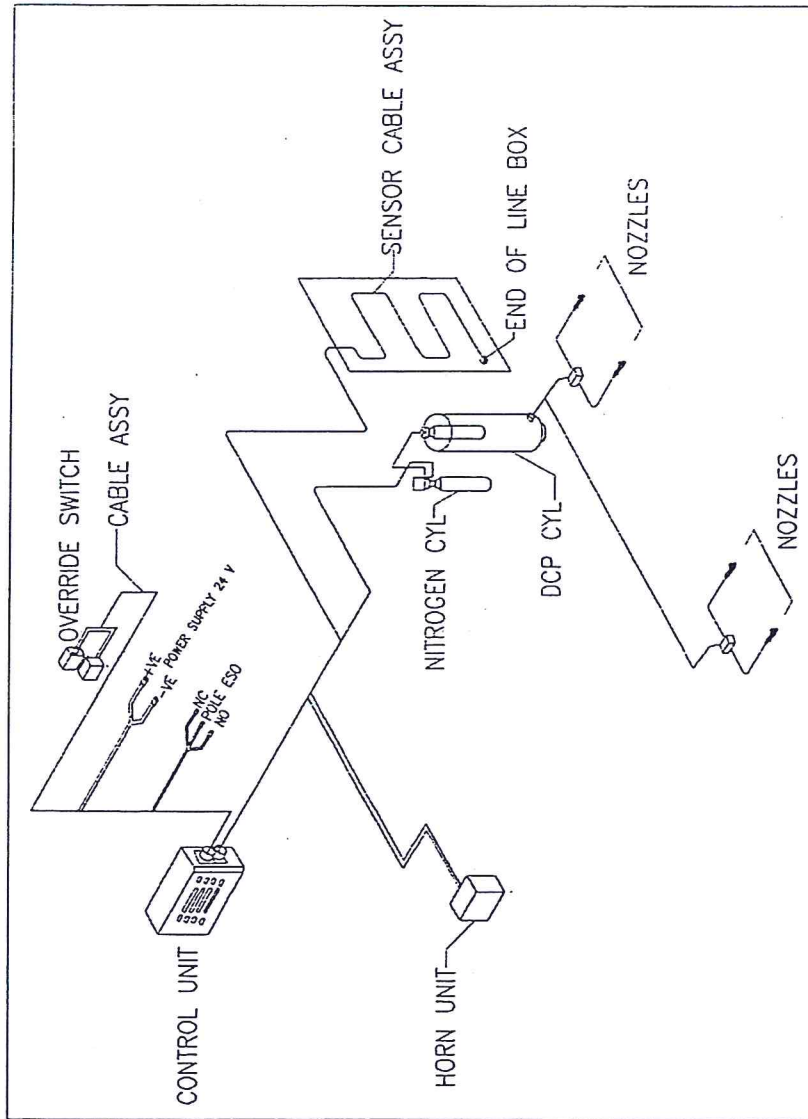
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Auto Fire Detection and Suppression System

SCHEMATIC DIAGRAM

Model: BG825 Motor Grader



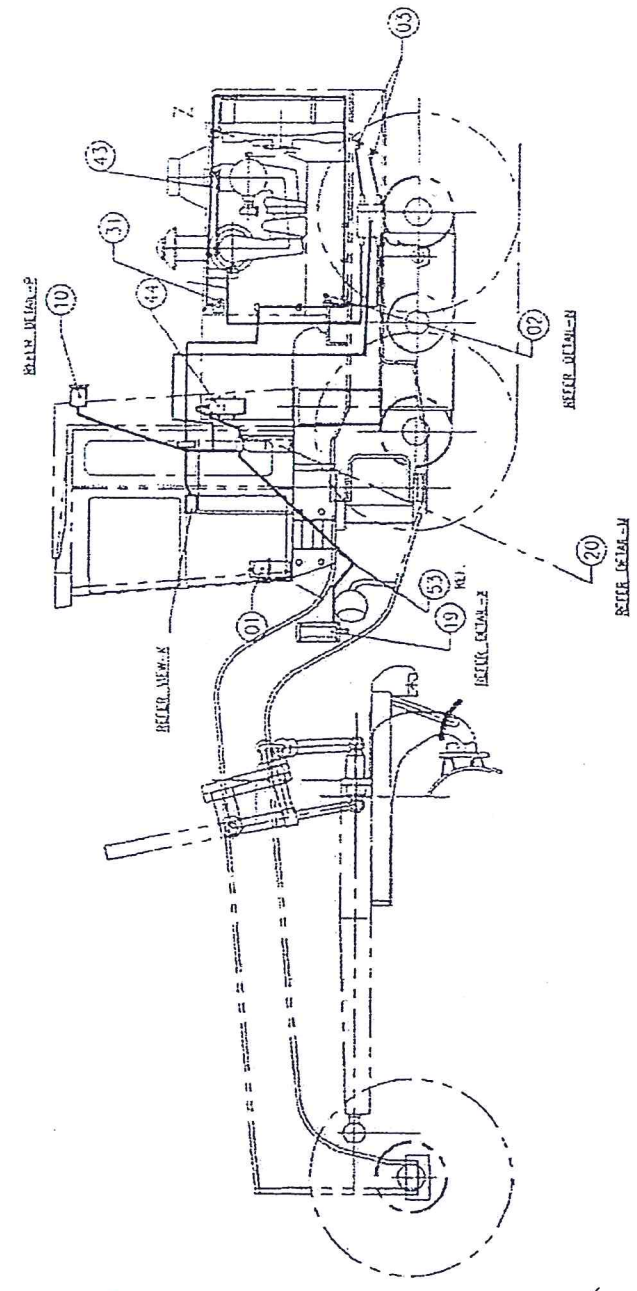
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W. Kumar



C.S. Sundaresan
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System Layout

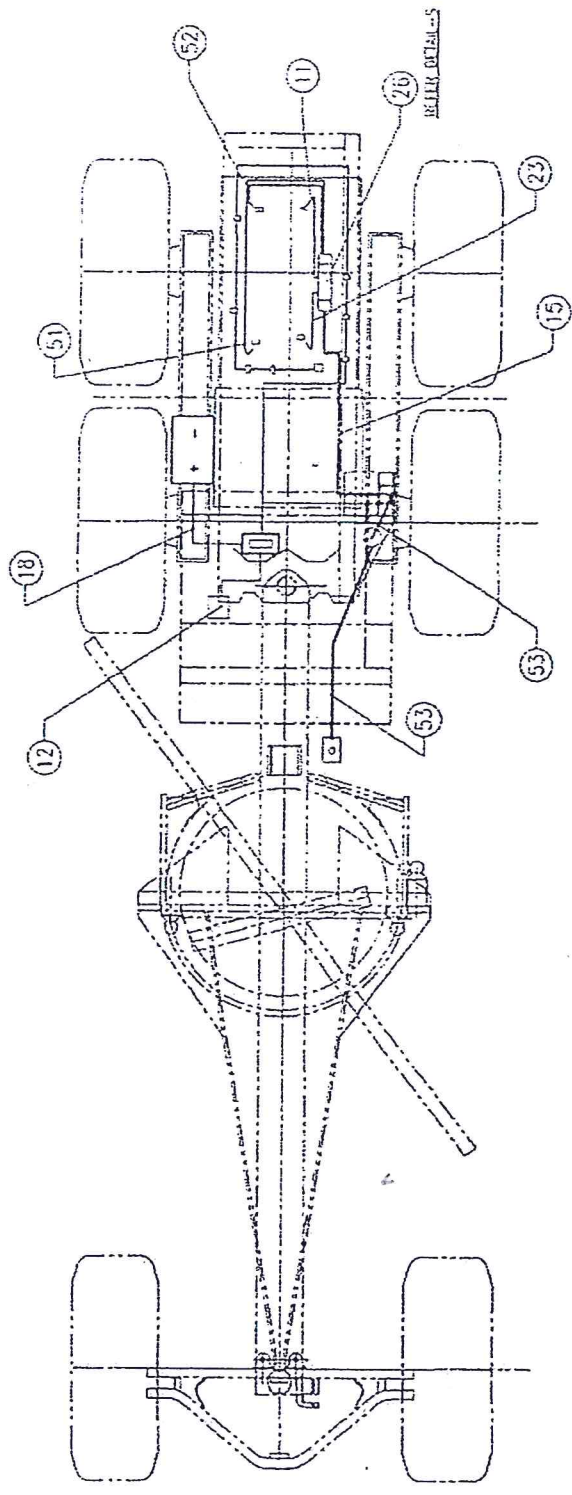


Sl.No	Part Number	Description	Qty
20	452FP02195	Nitrogen cylinder	1
31	985FP11576	Sensor end	1
43	452FP02146	Sensor cable	1
44	452FP02154	DCP Cylinder Assy.	1
53	452FP02223	1/2" Hose	2

Sl.No	Part Number	Description	Qty
01	950FP02034	Portable cylinder assy.	1
02	950FP11106	Nozzle conical	2
03	950FP11114	Nozzle Silt	2
10	950FP02123	Horn Unit	1
19	985FP02788	Pilot Cylinder	1



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SI.No	Part Number	Description	Qty
26	950FP11109	Pipe Cross	1
51	452FP02207	1/2" Hose Assy	1
52	452FP02215	1/2" Hose Assy	1
53	452FP02223	1/2" Hose Assy	2

SI.No	Part Number	Description	Qty
11	985FP02414	1/2" Hose assy	1
12	985FP02496	Override switch	1
15	985FP02577	1/2" Hose assy	1
18	985FP02771	Cable Assy	1
23	985FP02439	1/2" Hose Assy	1



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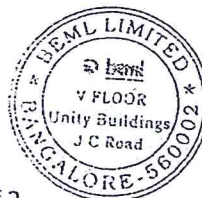


BG825 - Standard Tool list			
Mer : M/s.WCL			(Per Equipment)
Sl.No	Material	Description	Quantity
1	451TI11023	ENGG. PATTERN SCREW DRIVER - 8 X 150 MM	1
2	451TI11226	SLIP JOINT PLIER 200 MM L	1
3	451TI11234	RATCHET HALF INCH SQ DR	1
4	451TI11259	UNIVERSAL JOINT - 1/2" SQ DR	1
5	451TI11275	EXTN. BAR - 1/2" SQ.DR. - 250 MM	1
6	451TI11283	SWIVEL HANDLE 1/2 IN SQ DR	1
7	452TI02006	DOUBLE ENDED OPEN JAW SPANNER	1 set
7.1	451TI11048	D.E.O.J. SPANNER - 8 X 10 MM	1
7.2	451TI11056	D.E.O.J. SPANNER - 12 X 14 MM	1
7.3	451TI11064	D.E.O.J. SPANNER - 13 X 17 MM	1
7.4	451TI11072	D.E.O.J. SPANNER - 19 X 22 MM	1
7.5	451TI11081	D.E.O.J. SPANNER - 24 X 27 MM	1
7.6	451TI11097	D.E.O.J. SPANNER - 30 X 32 MM	1
7.7	452TI11021	D.E.O.J. SPANNER - 36 X 41 MM	1
7.8	452TI11038	D.E.O.J. SPANNER - 46 X 50 MM	1
7.9	955TI11088	D.E.O.J. SPAN - 18X19 MM	1
7.10	955TI11071	D.E.O.J. SPAN - 16X17 MM	1
8	452TI11005	ALLEN WRENCH - 10 MM	1
9	452TI11013	S.E.O.J. SPANNER - 75 MM	1
10	935TI11774	HEX SCREW DRIVER	1
11	985TI01002	TOOL BOX	1
12	985TI11103	THICKNESS GAUGE	1
13	985TI11111	GREASE GUN WITH SUITABLE NOZZLE	1
14	985TI11128	BAR	1
15	985TI11322	PHILIPS SCREW DRIVER - 8 X 150 MM	1
16	CFB0223040	BOLT HEX HD. M30X140 -3.5C.P- GR.10.9	1
17	CFN0123026	NUT HEX M30 X 25.6 - 3.5CP - GR-10	1
18	452TI02039	ALLEN KEY SET	1 Set
18.1	985TI11777	ALLEN KEY 4mm	1
18.2	985TI11282	ALLEN WRENCH - 6 MM	1
19	935TI11425	T HANDLE	1
20	452TI11087	BI-HEX SOCKET 1" SQ DRIVE 80mm	1
21	935TI02191	TYRE INFLATION KIT	1 Set
21.1	935TI03009	TYRE INFLATOR	1
21.2	935TI11782	ADOPTOR	1
22	990TI11094	ALLEN KEY 3/16"	1
23	901908035	WRENCH FILTER	1

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BEML LIMITED

Unity Buildings, J.C. Road
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BG825 - Standard Tool list

mer : M/s.WCL

(Per Equipment)

Sl.No	Material	Description	Quantity
24	451TI02065	BI-HEX SOCKET 3/4" SET	1 Set
24.1	451TI11307	3/4" SQ DR SOCKET - 41 MM (BIHEX/HEX)	1
24.2	985TI11922	BI HEX/ HEX SOCKET 1" SQ DRIVE - 36 mm	1
24.3	985TI11914	3/4" SQ DR BI-HEXAGONAL SOCKET 32 MM	1
24.4	985TI11906	BI-HEX/ HEX SOCKET 3/4" SQ DR 30 MM	1
24.5	985TI11899	BIHEX/ HEX SOCKET 3/4" SQ DR 27 MM	1
24.6	985TI11882	3/4" BI-HEXAGONAL SOCKET 24 MM	1
25	452TI02022	BI HEX. SOCKET SET 1/2"	1 Set
25.1	451TI11178	BI-HEX SOCKET 1/2" SQ.DRIVE - 22 MM	1
25.2	451TI11161	BI-HEX SOCKET 1/2" SQ.DRIVE - 19 MM	1
25.3	451TI11153	BI-HEX SOCKET 1/2" SQ.DRIVE - 17 MM	1
25.4	451TI11145	BI-HEX SOCKET 1/2" SQ. DRIVE - 14MM	1
25.5	451TI11137	BI-HEX SOCKET 1/2" SQ.DRIVE - 13 MM	1
25.6	451TI11129	BI-HEX SOCKET 1/2" SQ.DRIVE - 10MM	1
26	451TI02073	RING SPANNER SET	1 Set
26.1	452TI11079	RING SPANNER 36x41mm	1
26.2	955TI11266	RING SPANNER 30X32 MM	1
26.3	955TI11241	RING SPANNER 24X27 MM	1
26.4	955TI11209	RING SPANNER 18X19 MM	1
26.5	955TI11193	RING SPANNER 16X17 MM	1
26.6	955TI11177	RING SPANNER 12X13 MM	1

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NIT Ref: WCL-hq-pur-yvr-ra-e008-2019-20

INITIAL FILTERS / CONSUMABLES FOR 3000 HRS OPERATION PER EQUIPMENT

Customer: WCL

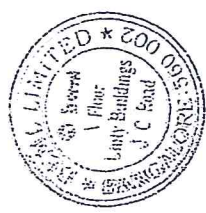
SI.No	Part No	Description	Change Interval	Qty / Eqpt	Extd. Qty
FILTERS / CONSUMABLES					
1	WA9652	ELEMENT HYDRAULIC	I-250 & 1000	2	8
2	452PTB0027	T/M FILTER ELEMENT	500	1	6
3	985TK70723	HYD. BREATHER ELEMENT	1000	1	3
4	41Z9900472A	ENGINE MAINT KIT	250	1	12
5	00Z0090821	PREMIXED ACF 210 Liters	As when reqd.	1	1
6	41Z1200244	AIR CLEANER ELEMENT	500	1	6
7	0412122570	V BELT FAN	2000	1	1
8	0412021933	V BELT ALTERNATOR	1000	1	3
9	41Z9900829	TAPPET SETTING KIT	I-250 & 2000	1	2
GET (Additional)					
10	452WAB0012	CUTTING EDGE KIT	As when reqd.	1	24

Eqpt: BG825 Motor Grader

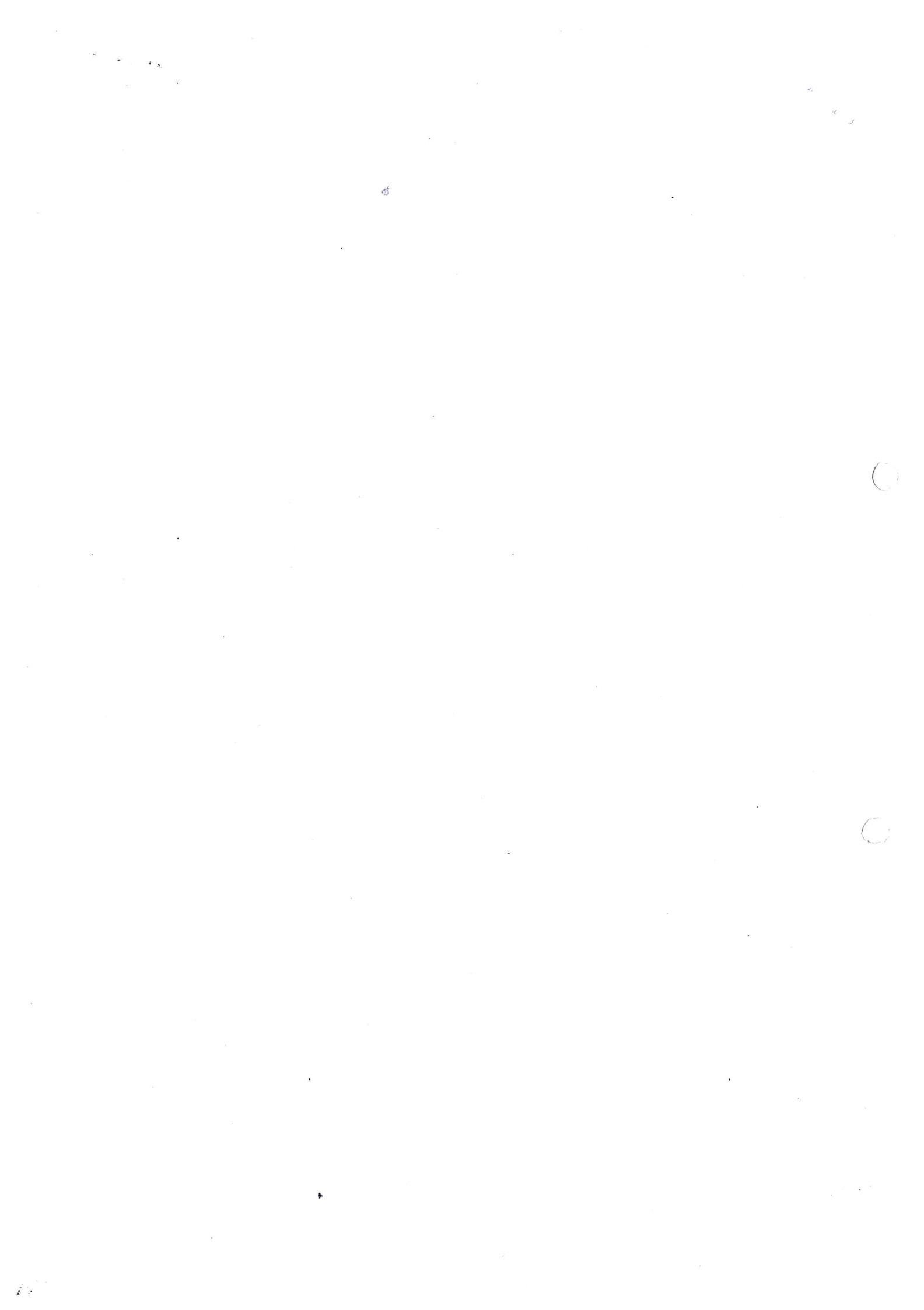
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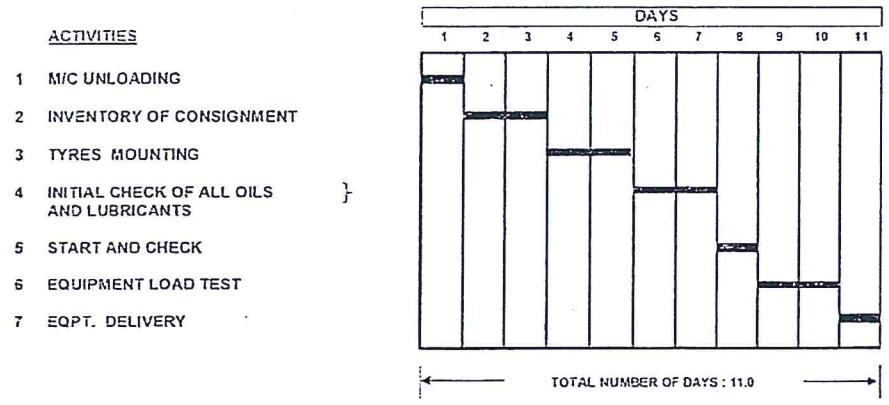


Annex - C





ERECTION CHART FOR BG825 MOTOR GRADER

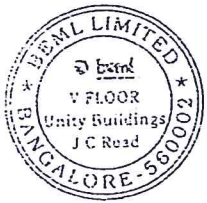


Note: The above schedule is indicative only. However, depending upon the manpower and facilities being extended by the purchaser it may vary.
 Erection work will be commenced after receipt of full consignment at site and commissioning will be completed within the period specified in the NIT.
 Any delay in erection and commissioning due to non availability of facilities as indicated in tender, which are to be provided by the projects will not be to 'BEML' account.

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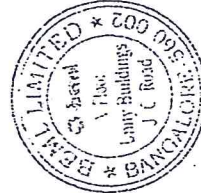
MAJOR BOUGHTOUT ITEMS : BG825 A/c WCL



SL. NO.	DESCRIPTION	MODEL / PART NUMBER	MAKE
1	TYRES	18.00 x 25 - 12 PR L3 (2353012110)	JK / MRF / Reputed Make
2	HYD. CYLINDERS	640000462400-BLADE LIFT CYLINDER ASSY-2 No's	Canara Hydraulics, Dental Hydraulics, Omi Shakthi, Pennar industries Ltd, (PLEASE NOTE THAT ONE SINGLE MAKE OF CYLINDERS WILL NOT BE AVAILABLE ON ANY EQPT. IT MAY BE COMBINATION OF ABOVE MAKES)
		640000462800-DRAWBAR SHIFT CYLINDER-1 No's	
		640000463200-POWER TILT CYLINDER-1 No's	
		640000463900-BLADE SIDE SHIFT CYLINDER-1 No's	
		640000464200-LEANING CYLINDER ASSY-1 No's	
		640000464800-ARTICULATE CYLINDER ASSY-2 No's	
		640000465300-STEERING CYLINDER ASSY-2 No's	
3	AC	Heater / AC unit - R-9777-0-24P Compressor - RD-5-10725-OP	M/s RED DOT
4	AUTO FIRE PROTECTION SYSTEM	452FPB0024	SOUTHERN ELECTRONICS
5	BATTERY - 200 AH	774EG02019	EXIDE / AMCO / CUMMINS / PRESTOLITE

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MAINTENANCE SCHEDULE

Model: BG825 Motor Grader

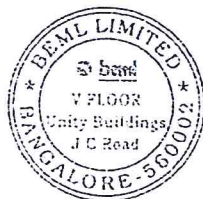
PERIODIC MAINTENANCE SCHEDULE

GROUP	TYPE OF P.M.	DETAILS OF P.M.	HRS. REQD.	MAN POWER REQD.
1	Daily Checks	Walk around check for oil leaks and loose fasteners. CHECK : Oil, Coolant level & Grease level, Grease at all points, Air cleaner restriction & clean element if required, Battery condition & function of Auto electrics and belt tension & adjust. DRAIN : Sediments form Fuel tank & Water separator.	1	2
2	Initial 250 hours	Change: Hydrailic oil and filter element, Transmission oil, Final Drive oil, Tandem case oil and circle reverse gear case oil. Check: Engine valve clearance & adjust	6	4
3	Every 250 hours	Change: Engine oil, lube oil filter & fuel filter. Check: pH value of coolant, Check Air cleaner elements, Fan / Compressor Belt Tension Check: T/M oil level, Hyd, tank oil level, final drive, tandem case and Circle gear case oil level. Check: Crank case breathers and clean if required.	5	3
4	Every 500 Hrs.	Change: Transmission element and Air cleaner elements.	2	2
5	Every 1000 Hrs.	Change: Hydrailic oil and filter element, Transmission oil, Final Drive oil, Tandem case oil and circle reverse gear case oil. Change: Hydraulic Breather Element. Check: Drive shaft bolts torque and correct.	6	4
6	Every 2000 Hrs.	Check: Engine valve clearance check & adjust Check: CBM of engine along with oil sample. Clean : Crank case breathers	4	2

PREVENTIVE MAINTENANCE SCHEDULE:

GROUP	TYPE OF P.M.	DETAILS
A	Initial 50 hrs.	Grease at all points. Check Hydrailic oil, Transmission oil, Final Drive oil, Tandem case oil and circle reverse gear case oil, front wheel spindle bearing oil.
B	Every 2000 hrs.	Check for leakages and pressure checking of all systems. This will be carried out along with 2000 hrs periodical maintenance.
C	Replacement of end bits, cutting edges as and when required. This will be (Depending on wear) done concurrently with respective periodic maintenance.	

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Oil & Lubricant Chart

Model: BG825 Motor Grader

SL NO.	RESERVOIR	GRADE OF OIL	CHANGE PERIOD (Hrs)		REFILL CAPACITY IN LITRES	PRODUCT NAME					
			INITIAL	EVERY		BEML	IOCL	BPCL	HPCL	CASTROL	BALMER LAWRIE
1	ENGINE OIL	SAE 15W40 CH4		250	36	Engine Oil 15W-40 CH4	Servo Premium 15W-40 CH4	MAK CH4- 15W-40	HP DIESELINO 15W 40 CH4	RX Super Max 15W-40 (API CH4)	Gold Premium CH4 15W-40
2	HYDRAULIC OIL	SAE10W	250	1000	80	EH10W	Servo pride Servo ultra 10W	MAK CD 10W	HP SAE10W	RX SAE10W	UNITRANS 10W
3	TRANSMISSION OIL	SAE30 CD	250	1000	35	ET30CD	Servo Ultra KB30	MAK CD30	HP Hylube X-3 30(KB)	RX SAE30	Balmerol Protomac ULT30
4	FINAL DRIVE	SAE30 CD	250	1000	57	ET30CD	Servo Ultra KB30	MAK CD30	HP Hylube X-3 30(KB)	RX SAE30	Balmerol Protomac ULT30
5	TANDEM CASE	SAE30 CD	250	1000	95 (Each)	ET30CD	Servo Ultra KB30	MAK CD30	HP Hylube X-3 30(KB)	RX SAE30	Balmerol Protomac ULT30
6	CIRCLE REVERSE GEAR CASE	SAE90	250	1000	15.5		Servo Gear SM 90	MAK Spirol EP 90	HP gear oil EP90	Axle oil 90	HP 90 sp1
7	GREASE FOR JOINTS	NLGI (EP-2)	As per Requirement				Servo grease FG EP2	MAK Lanthax EP2	HP EP2	Spheerol EP2	Liprex EP2

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