

SPECIFICATION OF VERTICAL MILLING MACHINE EMT-6751(REV-03)

1.0 PURPOSE:

The machine shall be used for machining of small components of various insulating materials such as epoxy based glass epoxy laminates, phenolic based cotton fabric laminates. In addition to insulating materials machine shall also be used for machining ferrous and non-ferrous components.

2.0 MACHINE SPECIFICATIONS:

2.1 SPINDLE

- 2.1.1 Spindle position : Swiveling type Vertical
Swiveling angle +/- 45 deg.
- 2.1.2 Spindle taper : ISO 40
- 2.1.3 Spindle motor power : 5.5 KW or more
- 2.1.4 Spindle speed range : 45 to 2000 r.p.m. (approx.)
- 2.1.5 Vertical movement of quill : 70 mm or more
- 2.1.6 No. of speeds : 12 or more
- 2.1.7 Minimum/Maximum distance from : Vendor to specify
lower face of milling spindle to
table top face.
- 2.1.8 Distance from spindle centre to : Vendor to specify.
column face.
- 2.1.9 Distance between inner face of : Vendor to specify
table to vertical column guidways
- 2.1.10 Distance from either end of the : Vendor to specify
table end to centre of spindle.
- 2.1.11 Diameter of front bearing : Vendor to specify.
- 2.1.12 Vertical quill movement : Vendor to specify.
- 2.1.13 Diameter of quill : Vendor to specify.

2.2 TABLE

- 2.2.1 Overall dimension of table : 1350x310mm or more
(lengthxwidth)
- 2.2.2 Overall clamping area : vendor to specify.
- 2.2.3 Permissible load on table : 300 kg minimum.
- 2.2.4 The table top should have 3 longitudinal T-slots. Size 14x63

2.3 POWER OPERATED TRAVERSE

- 2.3.1 Longitudinal traverse (X) : 800 mm or more
- 2.3.2 Vertical traverse (Y) : 400 mm or more
- 2.3.3 Cross traverse (Z) : 225 mm or more

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- 2.4 FEED RATES
- 2.4.1 No. of feeds : 13 minimum
 - 2.4.2 Rapid traverse rate
 - (a) Longitudinal & cross : 2800 mm/minute or more
 - (b) Vertical : 800 mm/min or more
 - 2.4.3 Feed rates
 - (a) Longitudinal & cross : 16 -800 mm /minute or more
 - (b) Vertical : 4 -200 mm/minute or more

3.0 **GENERAL FEATURES OF MACHINE:**

- 3.1 Preferably the guide ways of all axis should have protective covers with adequate sealing on joints to prevent seepage of glass dust, oil etc. Guide ways should be hardened steel with hardness HRC60 or more.
- 3.2 The machine should be capable of high stock removals with close tolerances on work piece. Metal removing rate in cc/min to be specified.
- 3.3 The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors.
- 3.4 A suitable, preferably centralized lubricating system for lubrication of all moving / rotating elements should be there.
- 3.5 Each axis should have mechanical limit switches interlocked with feed / rapid Drive.

4.0 **ATTACHMENT & ACCESSORIES :**

- 4.1 Machine vices with fixed base, width of jaws 150 mm. 1 No.
- 4.2 Universal swivel vices with fixed base , width of jaw 150 mm. 1 No.
- 4.3 DRAW BOLT TYPE REDUCTION MILLING SOCKETS :
- 4.3.1 Reduction sleeve ISO40 / MT 2 3 No.
- 4.3.2 Reduction sleeve ISO 40 / MT 3 3 No.
- 4.4 COLLET ADAPTER
- 4.4.1 Collet Adopter ISO 40 1 No.
- 4.4.2 Set of collets (metric) of sizes (4,6,8,10,12,16,20,25,30 & 32 mm) One no. Each
- 4.5 STUB ARBORS WITH KEY :
- 4.5.1 ISO40X32X25 3 No.
- 4.5.2 ISO40X22X25 3 No.

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5.0 POWER SUPPLY / ENVIRONMENT CONDITION :

5.1 The machine should be suitable for operation in the following conditions:-

5.2 Power supply for the machine : 415 V + 10% / -15% ,3 phase, 50 Hz +/-3%

5.3 Temperature : 5 to 45 deg.C.

5.4 Relative humidity : 95% max.

5.5 Compressed air : upto 5 Kg / sq.cm

5.6 Other conditions: Similar to tropical country.

5.7 power supply shall be provided by BHEL at single point near the machine. All types of cables, connections circuit breakers required to connect to BHEL's power supply point, shall be supplied by the vendor.

6.0 FIRST FILLING OF OIL

First filling of all required Oils , lubricants, & Grease etc. for the machine and auxiliary system. to be supplied by vendor. The vendor shall also submit estimated annual consumption of all these items on 7000 hours per year working basis.

7.0 ANCHORING MATERIAL

Complete set of anchoring materials including foundation bolts, nuts, washers, fixators, leveling shoes etc for alignment and fixing of the machine on the floor shall be supplied by the vendor. Details to be submitted with the offer.

8.0 NOISE LEVEL

Noise level of the machine during operation should be less than 85 dB (A) at one meter away from the machine.

9.0 MECHANICAL AND ELECTRICAL SPARES

9.1 Wipers

1set

9.2 Indicating lamps and push buttons

5 Nos. each type

9.3 Relays and contactors

1 No. each type

9.4 Limit Switches

2 Nos. each type

9.5 In addition in above vendor should also quote spares required for 2 years trouble free operation.

10.0 OPERATION AND MAINTENANCE MANUALS

10.1 5 sets of Operation & Maintenance manuals shall be supplied, along with the machine.

10.2 Electrical circuit diagram indicating the cables, terminal strip etc with part list and proper identification no. to be supplied.

10.3 Assembly drawings of each unit with marked list of each component with its specification & make will be provided.

10.4 Detail catalogue of bought out items with its specification & make will be provided.

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11.0 INFORMATION TO BE FURNISHED WITH THE OFFER :

- 11.1 General arrangement drg. is to be submitted.
- 11.2 Total power requirement of the machine to be specified by the supplier.
- 11.3 Overall space required for the installation of the machine to be specified by the supplier.
- 11.4 Overall weight of the machine.
- 11.5 Vendor should submit clause wise information along with the offer.
- 11.6 Vendor will submit standard test chart IS:2200(Part 3) and drawing of NASA test piece as per clause 15.0

12.0 COLOUR OF THE MACHINE

The machine should be painted apple green (Polyurethane paint) as per IS: 5

13.0 PRE-ACCEPTANCE OF THE MILLING M/C AT VENDOR WORKS

The vertical milling machine will be inspected at the vendor's works by BHEL Engineers before dispatch.
During Pre- Despatch Inspection vendor shall demonstrate accuracies as per test chart IS:2200(part-3):2002 and carryout machining of NASA / Test piece.

14.0 ERECTION AND COMMISSIONING OF THE VERETICAL MILLING M/C AT BHEL WORKS

- 14.1 Foundation drawing is to be submitted by supplier within 4 weeks of placement of Purchase Order/LOI.
- 14.2 Machine will be erected by BHEL as per supplier's foundation drg. under The vendor's supervision and will be commissioned by the vendor's representative.
- 14.3 Vendor will carryout the accuracy test at BHEL works as per the standard test chart IS:2200(part-3):2002 and carryout machining of NASA / Test piece.

15.0 ACCURACY :

Various accuracies of Vertical Milling Machine shall conform to IS:2200 (part-3):2002. Vendor shall submit standard test chart with the offer. Vendor shall also submit drg. of NASA / Test piece to be machined during Pre-Despatch Inspection at vendor's work and during commissioning at BHEL.

16.0 QUALIFYING CONDITION

Only those vendors (OEMs) should quote who have commissioned at least one Vertical Milling Machine of same (Table size 1350x310 mm or more, Spindle power 5.5KW or more, Load capacity 300 Kg or more, Traverse X axis= 800 mm or more, Y axis= 400 mm or more, Z axis= 225mm or more) in the past ten years (on the date of opening of Tender) and referred machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender).

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Kailash
V.S.
M.G.M.

The following information should be submitted by the vendor about the companies where similar machine(s) have been supplied. This is required from all the vendors for qualification of their offer.

1. Name of the customer / company where referred machine is installed.
2. Complete postal address of the customer.
3. Month & Year of commissioning.
4. Parameters of machine(s) supplied (Table size , Spindle power , Load capacity, Traverse X , Y & Z axis) and application for which the machine is supplied.
5. Name and designation of the contact person of the customer.
6. Phone, FAX no. and e-mail address of the contact person of the customer.
7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them (Original Certificate or Through E-mail directly from the customer). The original performance certificate may be returned after verification by BHEL, if required.
8. BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false / incorrect, the offer shall be rejected.

17.0 GUARANTEE

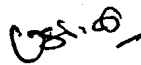
The machine shall be guaranteed for 24 months from the date of commissioning and job proving at BHEL works.

18.0 PACKING

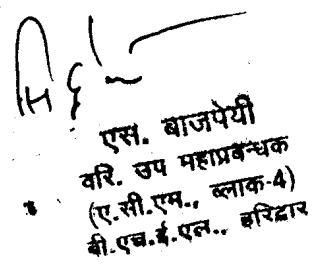
All the items and accessories of the machine shall be suitably packed in rigid wooden boxes to avoid any damage / loss in transit.



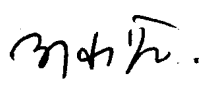
क्र० एन० अक्षय
प्रबन्धक (ई.एम.टी.)
बी.एच.ई.एल., रातोपुर (हरिद्वार)



चरन सिंह
प्रबन्धक, वैक्स, ब्लाक-4 & 7
बी.एच.ई.एल., रातोपुर, हरिद्वार



एस. बाजपेयी
वरि. उप महाप्रबन्धक
(ए.सी.एम., ब्लाक-4)
बी.एच.ई.एल., हरिद्वार



अनिल कपूर
प्रबन्धक
सी.आई.एम., ब्लाक-4
बी.एच.ई.एल., हरिद्वार