

**TECHNICAL SPECIFICATIONS**  
**CURVE AND PROFILE BENDING MACHINE**

**1.0 PURPOSE :**

The Curve and Profile bending machine shall be used for profiling and spiral curving of Sheet metal strips of Alloy steel for Steam Turbine Strainers.

**2.0 WORK PIECE MATERIAL :**

The Strainer elements to be bent will be Alloy steel (C 0.08-0.12% , Mn 0.3-0.8% , Cr 12.0-14.0%) Rolled stock having Tensile strength up to 800 N/mm<sup>2</sup>.

**3.0 TECHNICAL SPECIFICATIONS :**

- |      |  |                                   |
|------|--|-----------------------------------|
| 3.1  | Width of the Profile roller  | : 80 mm                           |
| 3.2  | Diameter of the Profile roller   | : 80 mm                           |
| 3.3  | Vertical adjustment of the upper Profile roller                        | : 20 mm                           |
| 3.4  | Eccentric adjustment of the Back bearing of the Upper shaft (Stepless) | : +/- 1.5 mm                      |
| 3.5  | Tool holding fixture of the Profile rollers                            | : Special Cone                    |
| 3.6  | Horizontal adjustment of the in and out moving table                   | : 30 mm                           |
| 3.7  | Vertical adjustment of the in and out moving table                     | : 30 mm                           |
| 3.8  | Swivelling of the out moving tables                                    | : 0 - 10 deg.                     |
| 3.9  | Revolutions of the Profile rollers                                     | : 10 rev/min                      |
| 3.10 | Driving power (A.C.Motor)  | : Min. 3 Kw                       |
| 3.11 | Revolutions of the Drive motor   | : 1500 rev/min                    |
| 3.12 | Roller Material  | : High Carbon high Chromium steel |

**4.0 ESSENTIAL FEATURES / REQUIREMENTS :**

- 4.1 Suitable lubrication system should be provided
- 4.2 Machine shall be supplied with suitable arrangement for loading of raw material spools and guide for feeding coil strip between the special rollers on m/c.
- 4.3 Machine shall be supplied with Guide plate segments for bending the strip with following outer diameters (mm) :

220 , 262 , 284 , 362 , 410 , 476 , 596 , 661 and 836.

Remaining Ring portion of each variant of the segments should also be supplied along with the machine.

4.4 Machine shall be supplied with device for stacking the coils after complete curve and profile bending operation.

4.5 Suitable lighting arrangement should be provided on machine.

4.6 The vendor should give agreement/comment against each and every Feature / Item as mentioned in the specifications. Any deviation in the offer shall be clearly highlighted against that particular Item/Feature.

## **5.0 GENERAL DESCRIPTION :**

**This curve and profile bending machine is specially designed for profiling and spiral curving of sheet metal strips .**

The machine housing is a heavy welding construction. The housing consist of one machine upper-part and a separate under-part.

In the machine upper-part are the upper and lower working shaft installed.

The lower-shaft is horizontal running in two heavy size slide bearings. The upper shaft is against the lower shaft installed in angular position. The adjustment of the angle is possible at the front of the shaft through spindle and hand-wheel and at the rear of the shaft through infinitely eccentric device movement.

The machine is driven by one A.C. Motor and worm gear. Motor and gear are forming one compact unit. The worm gear is direct connected to the lower shaft . Motor and gear with integrated oil sump are completely closed for easy maintenance.

Upper-shaft is driven from the lower-shaft by two special Bevel wheels, each wheel installed on the end of each shaft. These Bevel wheels have a special width tooth space to make it possible to adjust the angle between the shaft through a eccentric device. Operating by handles and clamping device for locking of the required angle, during operation of the machine.

On the side faces of the machine adjustable guide tables for sheet-metal strips are installed. Each table is adjustable in horizontal and vertical direction and the table plates can swivel independent

of each other in all directions. The correctly adjusted table position can be clamped in each position for the required curve and spiral form of the stripes.

The table plates have T slots for installing different guide plates in the required positions.

**6.0 MANUALS :**

5 Sets of Operation / Maintenance manuals in English language containing Electrical circuit diagram, Detailed assembly Drgs. of each Sub-assy. with part list should be provided.

Manufacturing Drgs. of fast wearing Items, if any, shall also be provided.

**7.0 COLOUR :**

Colour of the Machine shall be Apple green.

**8.0 WARRANTY :**

Supplier shall provide full and complete Warranty for Two years trouble free operation after successful commissioning of the machine.

**9.0 SPARES :**

9.1 Spares for Two years trouble free operation are to be provided. Item-wise cost of each Spare shall be indicated under the headings Essential spares and Optional spares.

9.2 Two spare sets of Rollers shall be provided with the Machine.

9.3 Two nos. Guide (hardened) for feeding the Strip between the Rollers shall be provided.

**10.0 COMMISSIONING & ACCEPTANCE :**

10.1 The machine shall be supplied with complete electrical equipment ready for the connections to the power mains.

10.2 Details of the Civil work required to be done for the installation of the machine should be specified by the supplier. Civil works will be in the BHEL's scope.

10.3 Provisional acceptance of the machine can be made by BHEL at supplier's work prior to despatch to ensure specification compliance and functioning of the machine. Test material shall be provided by BHEL on request and it shall be the responsibility of the supplier to take it to their works. Used test samples shall be returned to BHEL along with the machine. Test samples shall be checked at BHEL. The machine shall only be despatched only after approval

of the test samples by BHEL .

10.4 Final acceptance shall be made at BHEL, Hardwar following successful erection, assembly, commissioning and job proving within specified accuracy.

10.5 It shall be the sole responsibility of the supplier to rectify any shortcoming in the Design or Operation of the machine observed during commissioning, free of cost.

### **11.0 TECHNICAL SUPPLY CONDITION :**

The machine should be able to operate in following technical conditions :

#### **Power :**

Machine should be suitable to operate on 3-phase A.C. supply of 415 Volts  $\pm$  15%, 50Hz  $\pm$  3%

#### **Environment :**

Tropical environment consists of dust- laden atmosphere during some part of the year.

Temperature Minimum 3° C - Maximum 45° C

Relative Humidity 95% Maximum

### **12.0 QUALIFYING CONDITIONS :**

12.1 This is a special purpose Machine and therefore the design and operation of the Machine should preferably be similar to existing machine working at BHEL , Hardwar to ensure similarity of machine operation and interchangeability of toolings . Machine manufacturers interested in the development of the Machine may discuss and study the working of the existing machine at BHEL , Hardwar and shall give a compliance certificate along with the offer .

12.2 The supplier should be a reputed original machine tool manufacturer.