TENDER DOCUMENT

NIT No.: BHI/PI(S)/665/1057

FOR

Tender for Detail Engineering, Manufacturing, Testing and Supply of ‘VARIOUS IDLERS PACKAGE AND ASSOCIATED WORKS’ for the project of “Augmentation of Raw Material Handling Receipt and Handling facilities with new OHP Part- B (Package- 061) of Bhilai Steel Plant, (SAIL)”. 

VOLUME - 2

TECHNICAL SPECIFICATION & DRAWINGS

ENGINEERING PROJECTS (INDIA) LIMITED
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TECHNICAL SPECIFICATION & DRAWINGS

GENERAL

The following Technical Specification shall be read in conjunction with General Technical Specification (GTS) of Bhilai Steel Plant, SAIL. If there are any provisions in this Technical Specification, which are at variance with the provisions of General Technical Specification (GTS) of Bhilai Steel Plant, SAIL and General Specification, the provisions in this Technical Specification shall take precedence.

SCOPE OF SUPPLY

The scope of the supply includes Detail Engineering, manufacture, shop fabrication, assembly, testing and inspection at manufacturer’s works, packing, dispatch, transportation, delivery to site of VARIOUS IDLER PACKAGE and ASSOCIATED WORKS as per specifications and scope defined in tender documents complete with all accessories.

CONVEYOR IDLERSS

Three roll inline troughing idlers of equal length shall be used throughout. The angle of inclination of side rollers to horizontal shall be 35°. Troughing as well as return idlers shall be of reputed make and manufactured out of heavy duty seamless tube/ERW tubes as per IS:9296-1983. Spindle - Class 4, IS:1875-1992. Frame - Rolled section. Troughing Idlers – in line equal rolls. Idlers shall be of “drop-in-slot” type. Minimum diameter of idlers shall be as follows:

Carrying Idlers – . Transition idler at 10° and 20° troughing at both head and tail end.

The eccentricity (diametrical run out) of troughing and return idlers shall not exceed +0.8 mm. Minimum shell thickness of idler tube shall be 5.0 mm. All idlers shall be fitted with either heavy duty deep groove ball bearings or seize resistant ball bearings. The bearings shall be held positively on the shafts. Multi-labyrinth seals shall be used for retention of grease. All bearings shall be greased and sealed for life against ingress of dust, water and escape of grease. All bearings shall be rated for minimum 40,000 working hours. Bearing - Taper roller bearing/ deep groove. Bearing housing of idler shall be made of pressed steel of CRCA sheet press fitted and preferably be welded with idler tube.

Self-aligning troughing and return idlers with vertical guide rollers shall be of above specified construction. All self-aligning idlers shall be provided with grease lubricated anti-friction bearings at pivot points. All grease fittings shall be of the button head type or equivalent and shall be accessible from the walkway side of the conveyor by piping. The grease tubing shall be made of aluminium. The grease fittings shall have adequate protection against dust collection

Impact cushioned idlers shall be of above specified construction. The rings or disc for impact idler shall be made of rubber. The minimum number of impact idlers at each loading point shall be six. The first impact idler shall be placed approx. 150 mm behind the loading point. Conveyor with multiple loading points shall also be provided with impact idlers at each loading points.
Transition idlers of above specified construction shall be used adjacent to head and tail drums to permit proper support of loaded belt near the head and tail pulleys without excessive stress and stretch of the belt edges. The transition idlers shall be installed in steps of 10°, 20° troughing angles. Horizontal carrying idlers for supporting flat loaded belts shall also be of above specified construction. Return idlers for wet or sticky material shall be of rubber disc type of two roller trough design. Flat return idlers only shall be used under the "V" scrapers and in high tension areas. One number disc type self cleaning idler shall be provided near discharge pulley.

Idler shaft shall be made of class -4, IS-1875 or EN-8, BS-970 or bright bar of equivalent grade suitable for the duty requirement. Idler frame shall be made of rolled/formed steel with provision for securely bolting to the stringers of the conveyor frame. All fixing bolts shall have spring washers.

Clearance, gap etc. for the carrying and return idlers shall conform to the relevant IS/IPSS Standard to extent possible. The fixing arrangement of carrying and return idlers shall be such as to permit adjustment of idler sets for the purpose of belt training. Allowance for such adjustment shall be provided on both sides of the conveyor and the play shall not be less than 10 mm on either side.

All idler rollers shall be painted with 2 coats of red oxide primer and 2 coats of enamel finish paint.

Following tests shall be carried at random on the assembled idler roller in the presence of BSP/MECON/EPI

1. Friction factor test
2. Idler running test at high speed
3. Test for dust proof
4. Test for water proof
5. Quality test
6. Alignment and co-axiality test.

Bought out items shall be as per approved makes of Mecon / BSP for package 061.

**DRAWING**

2. BSP-EPI-01-061-01-018-55-DE-00486, R4: 3 Roll Impact Idlers
4. BSP-EPI-01-061-01-018-55-DE-00496, R5: 3 Roll Self Align C. I.
7. General Notes on Idlers
**ELEVATION**

**SIDE VIEW**

**DIRECTION OF BELT RUN**

**TYP. DET. OF ROLLER**

**ENLARGED VIEW-Z**

| B (mm) | SWK | R (OEG) | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | m (mm) | n (mm) | j (mm) | H (mm) | D1 (mm) | BOLT | BRG. & d (mm) | BRG. NO | BASE FLAN | BRACKET (Mm) | STIFFENERS | BASE FLAT | Wt. of Hoisting Parts - Rigging Day (kg) | Wt. of Set (kg) | Wt. of Frame (kg) | Total Wt. of Assembly - Frame & Idlers (kg) |
|--------|-----|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|---------------|--------|----------|-------------|-----------|----------|------------------------------------------|---------------|-----------------|---------------------------------------------|
| 1200   | 81  | 10      | 1650   | 430    | 275    | 152.4  | 1515   | 4.5    | 25     | 45     | 37     | 12     | M16     | 26     | 6305           | WF-100      | FLAT 75x58 | Flat 50x46 | FLAT 80x88 | 25.5   | 37.0   | 28.7 | 59.2 |
| 1400   | 80  | 20      | 1650   | 480    | 275    | 152.4  | 1755   | 4.5    | 25     | 45     | 37     | 17     | M16     | 26     | 6305           | WF-100      | FLAT 75x58 | Flat 50x46 | FLAT 80x88 | 25.0   | 54.3   | 30.0 | 85.2 |

**SIGNATURE**

NAME: Design

DATE: 13-1-12

**TECPRO SYSTEMS LTD**
<table>
<thead>
<tr>
<th>TITLE</th>
<th>SL. NO.</th>
<th>CHANGES DONE IN THE DRAWING</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G.A. OF 3-ROLL IMPACT IDLER</td>
<td>1</td>
<td>The dimension ‘E’ has been changed from 1790mm to 1715mm.</td>
<td>Change done to fix the idler frame over stringer properly.</td>
</tr>
<tr>
<td>G.A. OF SELF-ALIGNING CARRYING IDLER</td>
<td>2</td>
<td>Size of Swiveling Base Angle is 90X90X6 for 1200mm Belt Width &amp; 100X100X6 for 1400mm Belt Width.</td>
<td>The Size was not specified in the Rev-3 Drawing. Hence the Drawing has been Revised.</td>
</tr>
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</table>
ELEVATION

VIEW-P

TYP. DET.
OF ROLLER

SIDE VIEW

SEC X-X

ENLARGED VIEW-Z

<table>
<thead>
<tr>
<th>R.M.</th>
<th>SYM</th>
<th>R (DCL)</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
<th>E (mm)</th>
<th>m (mm)</th>
<th>n (mm)</th>
<th>H (mm)</th>
<th>J (mm)</th>
<th>G (mm)</th>
<th>BOLT</th>
<th>SHIFT DA AT BRG. #4 (mm)</th>
<th>BRG. NO.</th>
<th>BRG. F.</th>
<th>BRG. T.</th>
<th>SIDETENSERS</th>
<th>WT. OF ROLLER (kg)</th>
<th>WT. OF Frame (kg)</th>
<th>WT. OF Frame &amp; ROLLER (kg)</th>
<th>TOTAL WT. OF ASSEMBLY (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>L1</td>
<td>00</td>
<td>1400</td>
<td>1400</td>
<td>75</td>
<td>152.4</td>
<td>1220</td>
<td>4.5</td>
<td>25</td>
<td>28</td>
<td>45</td>
<td>37</td>
<td>M16</td>
<td>25</td>
<td>6305</td>
<td>FLAT 13545</td>
<td>FLAT 5058</td>
<td>24.4</td>
<td>30.2</td>
<td>7.6</td>
<td>41.6</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>L2</td>
<td>00</td>
<td>1600</td>
<td>1600</td>
<td>75</td>
<td>152.4</td>
<td>1720</td>
<td>4.5</td>
<td>25</td>
<td>28</td>
<td>45</td>
<td>37</td>
<td>M16</td>
<td>25</td>
<td>6305</td>
<td>FLAT 13545</td>
<td>FLAT 5058</td>
<td>27.2</td>
<td>34.3</td>
<td>7.4</td>
<td>41.6</td>
<td></td>
</tr>
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</table>

Weight of all sellers submitted, so far, seems on lower side. The same shall be taken care of, wherever applicable.
TYP. DET. OF ROLLER

Weight of all Rollers submitted so far seems on lower side. The same shall be taken care of, wherever applicable.
NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. ALL WELDS ARE 6MM FILLET WELD.
3. ALL IDLER TUBES ARE OF 6.3 mm THK. (Minimum) ERW PIPES AS PER IS: 9295,
4. HOUSING SHALL BE MADE OF PRESSED STEEL OF CRCA SHEETS OF 3.15mm.
5. ALL ROLLER SHAFTS ARE CLASS-4 AS PER IS:1875 OR EN-8 AS PER
   BS:970.
6. MOUNTING DIMENSIONS ARE AS PER IS:8598 EXCEPT IDLERS.
7. ALL ROLLER ARE DROP IN TYPE & LIFE SEALED LUBRICATED.
8. ALL BRGS. FOR ROLLERS ARE DEEP GROOVE BALL BRG AND
   SKF/FAG MAKE ONLY WITH DOUBLE LABYRINTH SEAL ON EXTERNAL SIDE &
   CONTACT NYLON SEAL ON INNER SIDE.
9. PAINTING :
   AS PER PAINTING SPECS.
10. FOR IDLER SCHEDULE REFER DOC NO. BSP-EPI-01-061-01-018-55-DE-00531, SHT. - 3 OF 3
11. FOR ALL IDLERS, MAX RUNOUT (TIR) OF ROLLER SHALL BE (+)0.8MM.
12. THE BASE FRAME SHALL BE MADE UP OF CHANNEL.
13. IDLER ROLLERS ARE PREPARED AS PER "DESIGN CRITERIA FOR BELT CONVEYORS".
   (DOC. NO. BSP-EPI-01-061-01-000-55-BE-00004 REV.-2)
<table>
<thead>
<tr>
<th>S.No</th>
<th>Description</th>
<th>Qty</th>
<th>Material</th>
<th>Grade</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ROLLER SHELL (6.3mm THK.)</td>
<td>1</td>
<td>ERW PIPE</td>
<td>IS: 9235</td>
<td>ROUNDED &amp; WELDED WITH BEARING STEEL HOUSING</td>
</tr>
<tr>
<td>2</td>
<td>BEARING HOUSING</td>
<td>2</td>
<td>CORK SHEET</td>
<td>IS: 513</td>
<td>PRESS Steel</td>
</tr>
<tr>
<td>3</td>
<td>DOUBLE Labyrinth SEAL</td>
<td>2</td>
<td>NYLO-PLAST</td>
<td>IS: 2970 / IS:1570</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>RAIN CAP</td>
<td>2</td>
<td>NYLO-PLAST</td>
<td>IS: 3075</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SHAFT</td>
<td>1</td>
<td>EN-8 / 40c8</td>
<td>IS: 3075</td>
<td>BRIGHT BAR</td>
</tr>
<tr>
<td>6</td>
<td>CIRCUIT</td>
<td>4</td>
<td>IS: 3075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>BALL BEARING</td>
<td>2</td>
<td>NYLO-PLAST</td>
<td>IS: 3075</td>
<td>FOR SIZE REFER PARTICULAR IDLER DRAWING</td>
</tr>
<tr>
<td>8</td>
<td>BACK SEAL</td>
<td>2</td>
<td>MILD STEEL</td>
<td>IS: 2062</td>
<td>CALVANISED</td>
</tr>
<tr>
<td>9</td>
<td>DUST RETAINER</td>
<td>2</td>
<td>MILD STEEL</td>
<td>IS: 2062</td>
<td>WITH MILD STEEL END CAP</td>
</tr>
<tr>
<td>10</td>
<td>Dowel PIN</td>
<td>2</td>
<td>SPRING STEEL</td>
<td>IS: 2062</td>
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</tbody>
</table>

The drawing is a cross-section of a typical roller component with various parts labeled. Accuracy & accuracy of design of individual components and their quality shall be the responsibility of the equipment supplier.