METAL 7 RECIPORACATING CONVEYOR WITH FIELD PROVEN EMD TECHNOLOGY
(ELECTROMECHANIC DRIVE)

Introduction:

Métal 7 is a core supplier for iron ore pelletizing plants.

Métal 7 designs and produces made-to-measure belt conveyors that operate in conjunction with roller screens to optimize green pellet screening.

Métal 7 offers the following types of conveyors:

- Reciprocating belt conveyors
- Wide belt conveyors
- Conveyors for the recirculation of large pellets
- Conveyors for the recirculation of fine / small pellets

Métal 7's service offer includes conveyor design and fabrication as well as on-site supervision at time of installation. This equipment can also come with all control systems to ensure a very uniform distribution of green pellets on the traveling grate. To set itself apart from the competition, Metal 7 innovates with his high performance EMD technology for reciprocating conveyor that replaces advantageously the traditional hydraulic drive system.

This EMD virtually eliminates the needs of regular maintenance associated with hydraulic system. Traditional hydraulic system required regular maintenance such as filter change, oil change etc.

- **Features:** Accurate speed and stroke
- **Benefits:** More uniform and constant pellet distribution
- **Features:** Rugged design, with low maintenance
- **Benefits:** Higher uptime than hydraulic system, virtually no maintenance required, no filter, no oil change, no spill, improved safety and environment
- **Features:** Consistent and reliable travel motion
- **Benefits:** Increased performance, improved production
- **Features:** Low power consumption with 15kw motor
- **Benefits:** Consume 50% to 70% less power than traditional Hydraulic cylinder system
**Power transmission components**

- No need of hydraulic components (No cylinders, No hydraulic power unit, No hoses)
- More economical (Capital expenditures)
- Lower operation costs
- Less maintenance
- Lower inventory costs (only few spare parts)
- Fewer specialized personnel required (no hydraulic technician)
- Compact design
- Layout can be adapted to client specifications (can be installed above/under/on the side as required)

**Servomotor**

- Servomotor offers wide variety of speeds (adjustable to 0.3 to 1.25 m/s)
- Up to 7 cycles per minute (or more on demand)
- Power consumption of servomotor is half that of the one of hydraulic system (15 Kw vs 30 Kw)
- Motor brake as a standard safety feature
- Low maintenance

**Idler - Side - Chain take-up**

- Chain take-up allows adjusting tension to the chain.
  - Proper chain tension will ensure smooth carriage operation.
  - Beveled washers absorb the impact of the strong acceleration and reduces the stresses to the chain.
  - Reducing the impact of the chain improves durability and reliability of the equipment.
- Triple chain:
  - Simple and proven solution

**Belt conveyor carriage**

- Belt conveyor including carriage is the same as with an hydraulic system.
- Ensure uniform distribution of the green pellets on the wide belt conveyor.
- Easy adjustment of the stroke

**Control panel**

- Here are the different operations displayed in the control panel.
  - Read out on HMI:
    - Hourly counter
    - Motor performance
    - Alarms
  - Setting available on HMI:
    - Stroke length
    - Speed
    - Acceleration
    - Deceleration
    - End positions.
Advantages of reciprocating belt conveyors with EMD technology

- Increase accuracy and uptime
- EMD system is virtually maintenance free, no more maintenance burden.
- Improved reliability
- Improved safety
- More economical, reduce capital expenditure
- Less maintenance (operational expenditure – OPEX)
- Fewer complex components (no oil filter, no cooler, etc.)
- Fewer specialized personnel required (no hydraulic system)
- Less sensitive to hostile environments
- Travelling distance has a negligible influence on drive system costs
- Better travelling distance flexibility from head
- Environmental benefits (no oil required for drive)
- Lower inventory costs for spare parts
- Electromechanic system is much cleaner than hydraulic system

EMD technology vs. hydraulic drive system

Métal 7’s Research and Development team has developed a new drive for its reciprocating belt conveyor in order to replace the hydraulic drive. The following table illustrates how the two systems compare:

<table>
<thead>
<tr>
<th>Description</th>
<th>Metal 7’s EMD technology</th>
<th>Conventional Hydraulic System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of drive</strong></td>
<td>Chain</td>
<td>Hydraulic unit</td>
</tr>
<tr>
<td><strong>Operating speed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belt</td>
<td>0.3 to 1.25m/s</td>
<td>0.3 to 1.25m/s</td>
</tr>
<tr>
<td>Head</td>
<td>0.3 to 1.25m/s</td>
<td>0.3 to 1.25m/s</td>
</tr>
<tr>
<td><strong>Belt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>Per client’s needs</td>
<td>Per client’s needs</td>
</tr>
<tr>
<td><strong>Motor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>15.0 kW (or +)</td>
<td>30.0 kW (or +)</td>
</tr>
<tr>
<td></td>
<td>(2 x more than electromechanic drive)</td>
<td></td>
</tr>
<tr>
<td>No. of cycles</td>
<td>7 (or +, depending on the width of the wide belt conveyor)</td>
<td>7 (or +, depending on the width of the wide belt conveyor)</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Cost</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Required expertise</td>
<td>Mechanic / electrician = general expertise</td>
<td>Hydraulic technician = specialized expertise</td>
</tr>
<tr>
<td><strong>Safety measures</strong></td>
<td>Motor brake</td>
<td>No safety measures</td>
</tr>
<tr>
<td><strong>Capacity in tons/hour</strong></td>
<td>1200 wet tons per hour (WTPH)</td>
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</tr>
<tr>
<td><strong>Risk of environmental contamination</strong></td>
<td>Null / weak</td>
<td>Average / high (oil required to operate hydraulic drives)</td>
</tr>
</tbody>
</table>