### Technical Data

#### Formulas

<table>
<thead>
<tr>
<th>Belt Length</th>
<th>Belt Speed in feet per minute</th>
<th>Maximum Product Weight on Belt at any one time</th>
</tr>
</thead>
<tbody>
<tr>
<td>When pulleys are approximately the same size:</td>
<td>( S = D \times \text{RPM} \times 0.2618 \times 1.021 )</td>
<td>( P + G_1 \times C \times (\text{in feet}) \times W \times (\text{in feet}) )</td>
</tr>
<tr>
<td>( L = \frac{D + d}{2} \times 3.1416 + 2C )</td>
<td>( E = F \times (P + M) )</td>
<td>( P = \frac{G_2 \times C}{S \times 60 \times \text{(minutes)}} )</td>
</tr>
<tr>
<td>When one pulley is much larger than other (at least 3 or more times larger)</td>
<td>( E_1 = E \times K )</td>
<td>( E_2 = E + E_1 )</td>
</tr>
<tr>
<td>( L = \frac{D + d}{2} \times 3.1416 + 2C + \frac{(D - d)^2}{4C} )</td>
<td>( E_2 )</td>
<td>( T = \frac{E_2}{W} )</td>
</tr>
</tbody>
</table>

**Horsepower to Drive a Conveyor Belt**

For Level conveyors:

\[ HP = \frac{F \times S \times (P + M)}{33,000} \]

For Inclined conveyors:

\[ HP = \frac{(P \times B) + (P + M) \times F \times S}{33,000} \]

**Effective Tension**

(pull needed to move belt and load horizontally)

\[ E = F \times (P + M) \]

**Slack Side Tension**

(addition tension required to prevent slippage on pulley drive)

\[ E_1 = E \times K \]

**Maximum Product Weight on Belt at any one time**

When load is known per square foot:

\[ P + G_1 \times C \times (\text{in feet}) \times W \times (\text{in feet}) \]

When load is known by lbs. per hour:

\[ P = \frac{G_2 \times C}{S \times 60 \times \text{(minutes)}} \]

### Key to Symbols

- **B** – Sine of angle of incline
- **C** – Center to center distance (in inches)
- **D** – Diameter drive pulley (in inches)
- **d** – Diameter tail pulley (in inches)
- **E** – Effective Tension (in lbs.)
- **E_1** – Slack side tension (lbs.)
- **E_2** – Tight side tension (lbs.)
- **F** – Coefficient of friction (see Table #1 below)
- **G_1** – Load per sq. or cu. ft. (in lbs.)
- **G_2** – Load per Hour (in lbs.)
- **HP** – Horsepower
- **K** – Drive factor (table #2 below)
- **L** – Belt length (in inches)
- **M** – Belt Weight (overall length, not c/c)
- **P** – Product weight (in lbs.)
- **RPM** – Revolutions per minute
- **S** – Speed feet per minute
- **T** – Operating tension PIW (in lbs.)
- **W** – Belt width (in inches)

### Table #1 – Coefficient of Friction

<table>
<thead>
<tr>
<th>Belt</th>
<th>Steel or Aluminum</th>
<th>Metal Rollers</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS pulley side</td>
<td>.30 to .35</td>
<td>.10 to .15</td>
</tr>
<tr>
<td>Bare Duck or BB side</td>
<td>.20 to .25</td>
<td>.10 to .15</td>
</tr>
<tr>
<td>Cover on pulley side</td>
<td>.50 to .55</td>
<td>.10 to .15</td>
</tr>
</tbody>
</table>

### Table #2 – Drive Factor K

<table>
<thead>
<tr>
<th>Screw Belt Wrap on Drive Pulley</th>
<th>Gravity or Take-up</th>
<th>Weighted Take-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare</td>
<td>Lagged</td>
<td>Bare</td>
</tr>
<tr>
<td>180°</td>
<td>1.6</td>
<td>1.0</td>
</tr>
<tr>
<td>220°</td>
<td>1.2</td>
<td>.6</td>
</tr>
<tr>
<td>240°</td>
<td>1.0</td>
<td>.5</td>
</tr>
</tbody>
</table>

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