Power calculation BULK Handling

In order to calculate the necessary power required the following formula may be used:

\[
P = \frac{C \times f \times L}{367} \left( \frac{3.6 \times Gm \times V + Qt}{367} \right) + \frac{Qt \times H}{367}
\]

- \(P\) = Necessary power (kW)
- \(C\) = Frictional resistance in belts, bearings etc. (Fig.I)
- \(f\) = Friction in conveyor Pulleys is fixed to 0.025 - 0.030.
- \(L\) = Centre-to-centre distance between drum motor and idler Pulley (m)
- \(Gm\) = Weight of belt and rotating parts in conveyor Pulleys as well as idler Pulley (Fig. II)

The power calculation does NOT include the extra power required for belt scrapers, ploughs, cleaners or receiving hoppers.

**Fig. I** Factor C

<table>
<thead>
<tr>
<th>(L) (m)</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C)</td>
<td>9.0</td>
<td>7.6</td>
<td>6.6</td>
<td>5.9</td>
<td>5.1</td>
<td>5.5</td>
<td>4.1</td>
</tr>
<tr>
<td>(L) (m)</td>
<td>16</td>
<td>20</td>
<td>25</td>
<td>32</td>
<td>40</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>(C)</td>
<td>3.6</td>
<td>3.2</td>
<td>2.9</td>
<td>2.6</td>
<td>2.4</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td>(L) (m)</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>160</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>(C)</td>
<td>1.9</td>
<td>1.8</td>
<td>1.65</td>
<td>1.59</td>
<td>1.47</td>
<td>1.38</td>
<td>1.33</td>
</tr>
<tr>
<td>(L) (m)</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td>(C)</td>
<td>1.25</td>
<td>1.20</td>
<td>1.17</td>
<td>1.13</td>
<td>1.11</td>
<td>1.08</td>
<td>1.05</td>
</tr>
</tbody>
</table>

**Fig. II** Gm (kg/m)

<table>
<thead>
<tr>
<th>(B) (mm)</th>
<th>500</th>
<th>600</th>
<th>650</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gm for standard conveyor</td>
<td>17</td>
<td>26</td>
<td>28</td>
<td>40</td>
<td>56</td>
<td>70</td>
<td>85</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>Gm for heavy and profiled belts</td>
<td>20</td>
<td>30</td>
<td>32</td>
<td>45</td>
<td>62.5</td>
<td>80</td>
<td>110</td>
<td>135</td>
<td>160</td>
</tr>
</tbody>
</table>

After choice of drum motor power, the required belt pull and power consumption may be calculated as shown below:

Required Torque

\[
M = 500 \times \frac{D \times P}{V}
\]

- \(M\) = torque (Nm)
- \(D\) = diameter (m)
- \(V\) = speed (m/sec)

Required Belt Pull

\[
F = \frac{1000 \times P}{V}
\]

- \(F\) = belt pull (N)
- \(P\) = power (kW)
- \(V\) = speed (m/sec.)

Power Consumption (Accurate to +/-20%)

\[
I = 0.9 \times \frac{P \times 1000}{U}
\]

- \(I\) = power consumption (A)
- \(P\) = power (kW)
- \(U\) = voltage (V)

For more information please contact RULMECA or open our Web Page www.rulmeca.com, where you can download the latest edition of RULMECA's power calculation program.

Alternatively, please fill in the following pages and we will run the power calculation on your behalf.