Data Sheet For Calculation
(For Clamping Devices)

CYLINDER FORCE/ THRUST FORCE/ PULL FORCE/ CLAMPING FORCE
Oil Pressure (bar) x Plunger Effective Area (cm²) = Force (kgf)

CYLINDER OIL CAPACITY
Effective Area (cm²) x Stroke (cm) = Cylinder oil capacity (cm³)

DESIGN FOR CALCULATING CLAMPING FORCE
Rated Clamping Force (kgf) = Spindle H.P x Machine Efficiency x Factor of Safety x 75 x 60
Cutting Speed (m/min)

Where: Machine Efficiency = 0.7 to 0.95
Factor of Safety = 1.5 to 2

<table>
<thead>
<tr>
<th>Materials</th>
<th>Coefficient of Friction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry</td>
</tr>
<tr>
<td>Cl on Cl</td>
<td>0.3</td>
</tr>
<tr>
<td>Cl on Steel</td>
<td>0.2</td>
</tr>
<tr>
<td>Steel on Steel</td>
<td>0.15</td>
</tr>
</tbody>
</table>

OR

Rated Clamping Force (kgf) = Spindle Power (kW) x Machine Efficiency x Factor of Safety x 60
Cutting Speed (m/min) x 9.81 x 1000

The minimum clamping force of all clamps should be equal to the rated clamping force of machine.

DESIGN FOR CALCULATING CLAMPING FORCE
Stud bolt size used in the existing fixtures with manual clamping is the best clue for selecting the clamping force. Material strength & grade of bolts is assumed to be class 8.8

<table>
<thead>
<tr>
<th>Std size</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M16</th>
<th>M20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping Force in Kgf</td>
<td>402</td>
<td>732</td>
<td>1160</td>
<td>1686</td>
<td>3140</td>
<td>4900</td>
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</tbody>
</table>

HINT FOR SELECTION
• Selected cylinder capacity should exceed the force required to do job by 20% to 25%. This ensures longer cycle life without overloading & accommodates the friction loss.

GENERAL POINTS
• Check to see that working fluids are compatible to the cylinder/ element seals
• When ordering Seal Kits for any of the elements in this catalogue, add Prefix ‘SK’ to the respective model code of the element.

NOTE
• Any Special requirement of cylinder & clamping devices to suit customer’s requirement will also be met. Technical specifications mentioned may be subjected to alteration due to continual improvements & development.