



How to select a plate bending machine???

The most basic data required is the width of job (length of rolled shell) to be rolled and maximum plate thickness to be used.

The next consideration is shell diameters and accuracy thereof. Quantity of shells to be made and variety of jobs are also to be considered. A look at available accessories is also required.

A) Width of Job:

1. Machines are available in standard spans from 2000 mm to 5000 mm in steps of 500 mm. Other spans are possible on case to case basis. A width of 3000 is the most usual size.

B) Thickness of plates:

1. The bending force depends on **Plate thickness** and the **Yield strength** of the material. Machines are rated for Plates with Yield strength of 26 kg/mm^2 . Find equivalent thickness by a formula. And select a machine capable of bending this thickness.

Equiv. thickness = Actual thickness X (Actual YS)

(Rated YS 26)

2. **Do keep in mind that the force required varies as the square of the plate thickness.** If capacity of the machine is for rolling 30 mm thick plate and we roll 32 mm thick plate, the force required is 1.14 times ($32^2/30^2$) the permissible limit. In smaller machines, this factor becomes very important. e.g. in a 10 mm machine, if you try to roll 12 mm thick plate, the force required is 1.44 times ($12^2/10^2$) i.e. about 44% more force, whereas in a 100 mm machine, if you try to roll 102 mm thick plate, the force required is only about 1.04 times.

C) Diameter of shell

1. The next parameter is the diameter to be made. As the diameter of shell being rolled is reduced, the points of contact with the bottom rolls come closer to each other. This reduces the leverage available to the machine for bending. Therefore, the thickness capacity of the machine goes down as the shell diameter reduces. Thus to form a judgment of machine capacity, information about the shell diameter is very important.

D) Required accuracy

1. The ovality in the shell. When Thin plates are rolled on large machines, the large distance between point of contact with the rolls results into loss of circularity. For jobs less than 40% of machine's rated capacity, higher ovality is to be anticipated. The only solution is to use a smaller machine.
2. The next factor is the permissible straight length after edge bending (pre-pinching). A certain end portion of the plate does not get bent properly. This may add to non circularity. Give due consideration to this fact when selecting a machine.

E) Number of maximum thickness shells per day

1. When you want to drive continuously at 120 km/hr, a car with a top speed of 120 will not do. If majority of jobs are near the maximum capacity of the machine, higher wear and maintenance is expected. A good choice will be the next larger size of machine.

F) Work-load variety

1. Conical bending. For cone bending, the machine needs to be longer than the actual plate width. Proper study on case to case basis is required.
2. Hot Rolling is possible occasionally on any machine. Width should be less than full span. For regular hot rolling work, specially designed machine e is recommended.
3. Stainless Steel, aluminum and other sensitive materials. Normally used machines develop scratch marks on the rolls. These are harmless for average fabrication work. If the same machine is used for SS or aluminum rolling, the job surface may become scratchy. If this is not acceptable, some precautions have to be planned. For building food grade SS equipment, it may be necessary to have the rolls Hard Chrome Plated.
4. Very Large Diameter Jobs. When large diameter shells are to be frequently rolled on a Plate Bending Machine, a central shell support and/or side shell support becomes very useful. This optional accessory will help in supporting the plate so that undue influence of long heavy plate on the machine is avoided and need for a support from overhead crane is minimized.
5. Very Small Diameter shell making. The smallest ID that can be made is 10 to 15% larger than the diameter of the Top Roll. For smaller jobs, an extra small diameter top roll may be required as an additional accessory. For many materials, the YS of the plate increases while bending to a small diameter. This results into increase of load on the machine. If the job is already at machine's maximum capacity, this will result in overloading.