

Benefits of our Toolings

Introduction

Imperial Pharmachine has been manufacturing tooling over 46 years. It has always focused on supplying high quality tooling to the pharmaceutical industry. The tooling is made to a high level of dimensional accuracy that not only ensures uniform tablets but also reduces machine downtime and increases productivity. This document summarizes the key technical advantages of tooling manufactured by Imperial Pharmachine

1. Uniform Tablets

Minimum Weight, Thickness and Hardness Variation

One of the main reasons for weight variation is inconsistent working height of lower punches. We maintain the lower punch working height within a range of $\pm 0.01\text{mm}$. This ensures that the tablets manufactured have minimum weight variation. **E.g.:** In a 10mm Tablet with dosing of 6mm the weight variation would be less than **0.35%** with our punches; this would increase by **7.0** times to **2.3%** if the working height range is $\pm 0.07\text{mm}$.

We also ensure that the upper punch working height is within a range of $\pm 0.01\text{mm}$, which ensures uniform Thickness and Hardness of Tablets.

2. Better Finish Tablets

Finish of a tablet is directly dependent on the finish of punch cavity. We polish the punch cavities to mirror finish with an RA value of **0.15microns**, which ensures that the tablets manufactured have a good finish.

3. Higher Yield

Excessive clearance between the lower punch tip and die bore has an adverse impact on yield. To minimise product loss due to powder seepage, we maintain a very tight clearance between the lower punch tip and die bore. This results in yield of more than 99%. It also reduces weight variation in new sets and thereby increases tool life. **E.g.:** In a 10mm tablet the clearance between Lower Punch tip and Die Bore would be **0.03mm**

In addition to higher yield & reduced weight variation the tight clearance also reduces chances of lower punch jamming in turret, hence less wear & tear on punch head and cam.

4. Increased Production

This is possible due to the dimensional accuracy and superior finish of our tooling allows the client to run their machines at higher speeds. Dimensional accuracy ensures that the tooling run smoothly and do not cause excessive vibrations, while the mirror finish drastically reduces frictional forces.

Drag Finished Punches

We provide a micro finish to the whole punch. This reduces friction between the punch body and turret bore which allows the client to run their machines at higher speeds.

Mirror Finish Die Bore

Mirror finish of our die bore reduces the required ejection force, which in turn reduces the stresses that develop in a tablet during ejection. With ejection force reduced it is possible to run the tablet press at higher speed. It also reduces the heat generated, wear & tear of punch head and lower punch cam.

5. Reduced Downtime

Sticking, picking, weight variation, punch jamming, tip breaking and other tooling related problems normally cause a lot of machine downtime. Proper tablet designing and dimensional accuracy of our tooling significantly reduces this downtime. It also allows for faster product changeover

6. **Less Wear & Tear of Tablet Press**

The dimensional accuracy of our tooling reduces wear and tear of tablet press. To minimise this further we provide punches with micro finish and mirror finish die bores, which reduces friction between the tooling and machine parts. The tooling also has additional features to reduce tablet press wear and tear

Die Shoulder

Many times while tightening the Die Locking Screw there is burr formation in diegroove. This burr damages the turret pocket during die removal. We provide a shoulder in the die groove that protects the turret pocket from such damages

Chamfers at critical points

Quiet often a tablet press is damaged due to improper tooling. Absence of chamfers is a major reason for such damages. We provide chamfer at all corners to ensure that the tooling does not damage a machine during installation. Chamfers also prevent the tooling from causing any wear & tear to machine parts during production.

7. **More Tool Life**

Weight variation and Poor tablet finish are two major reasons for discarding tooling. Weight variation is normally caused due to non-uniform working height of lower punches OR improper clearance between lower punch tip and die bore. By ensuring minimum tolerance in these dimensions we ensure that you get maximum life from our tooling.

Uniform Working Height:

Normally punches have to be discarded if the working height range goes beyond 0.3mm ($\pm 0.15\text{mm}$). We maintain the working height of punches within **0.02mm range ($\pm 0.01\text{mm}$)**, which gives the client **0.28mm** of usable working height. If the new punches are in a range of 0.15mm ($\pm 0.075\text{mm}$) then the usable range reduces by **50%** from **0.30mm to 0.15mm**, thereby also reducing the tooling life by **50 %**.

Mirror Finish Die Bore:

Ring formation in die is also one of the key reasons for discarding tooling set. Our dies have mirror finish die bore with RA value of **0.15microns** and hardness of **60-62HRC**. This delays ring formation.

Double Keyway for Shaped Punches

In case of shaped tooling many time the punches have to be discarded due to excessive wear & tear on the 'Head Inside Degree'. To overcome this problem, we provide double keyway in all our shaped tooling. This allows the client to change the key position on the upper punches.

8. **Reduced Annual Expenditure towards Tooling**

Due to the superior quality of our tooling you need to procure **lesser number of extra sets - max 5 sets**. even in case of 75 station machine. This combined with increased tool life reduces the annual requirement of tooling significantly.