

# Multiple Tip Tooling

*Durability,  
Productivity,  
Longevity.*





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## Introduction

*As one of the worlds leading tablet tooling manufacturers I Holland has been instrumental in introducing many innovative and unique developments to the industry including the 'Rotating Head', 'Universal Seal Groove', and is author of the industry's leading global tooling standard the Eurostandard.*

I Holland have been leading the way in the production of Multi-tip tools for over 25 years; this experience has culminated in today's impressive array of configuration options to suit many products in several industries including: Pharmaceutical; Nutraceutical; Detergent; Cosmetic; Veterinary; Confectionery and various industrial applications.

I Holland understands the demand for increased productivity within modern tablet production. We are always striving to ensure that our punches and dies are at the very leading edge of tooling design, allowing our customers to retain a competitive edge. To assist our partners in their quest for increased capacity we developed our Multi-Tip and Micro-Tip range of Multiple Tip tooling.

Many PharmaCote® treatments & coatings and PharmaGrade® steels can be used in conjunction with multiple-tip designs in order to create a robust tooling solution that is capable of being both incredibly productive and durable at the same time. I Holland also offers very competitive lead times on these tooling systems. This document is a reflection of the current

designs and configurations available. I Holland Research and Development and design teams are constantly working on new solutions.

For further information on our R&D activity, please contact:  
[info@iholland.co.uk](mailto:info@iholland.co.uk)





## Benefits of Multiple Tip Tooling

- Increase in productivity - Number of tablets per turret rotation is multiplied by the number of tips.
- No large capital outlay on new tablet presses mean that higher tooling costs are easily outweighed by increased output.
- Reduction in press run-time per output of tablets means that less maintenance is required per batch of tablets produced.
- Reduction in press setup-time per output of tablets.
- Less tablet presses required to satisfy output therefore requiring less floor space leading to more product produced per Sq Metre.
- Fewer tools require less storage space leaving room for production equipment.
- All of these points lead to a reduction in overall plant running costs.





## Multi-Tip or Micro-Tip?



### Holland Multi-Tip

**Diameter larger than 4mm**

- Available for round and shaped tablets
- Available for most tool types including IMA Comprima
- External Cap Fixing available
- Internal Cap Fixing available
- Pin Fixing available
- Monoblock available
- Designer shapes available
- Fitting Pot & Die Alignment Tools available
- Fitting and Assembly instructions provided on request

### Holland Micro-Tip

**Diameter less than 4mm**

- Available for round and shaped tablets
- External Cap Fixing available
- Internal Cap Fixing available
- Fitting Pot & Die Alignment Tools available
- Fitting and Assembly Instructions provided on request



## Multi-tip Design Solutions



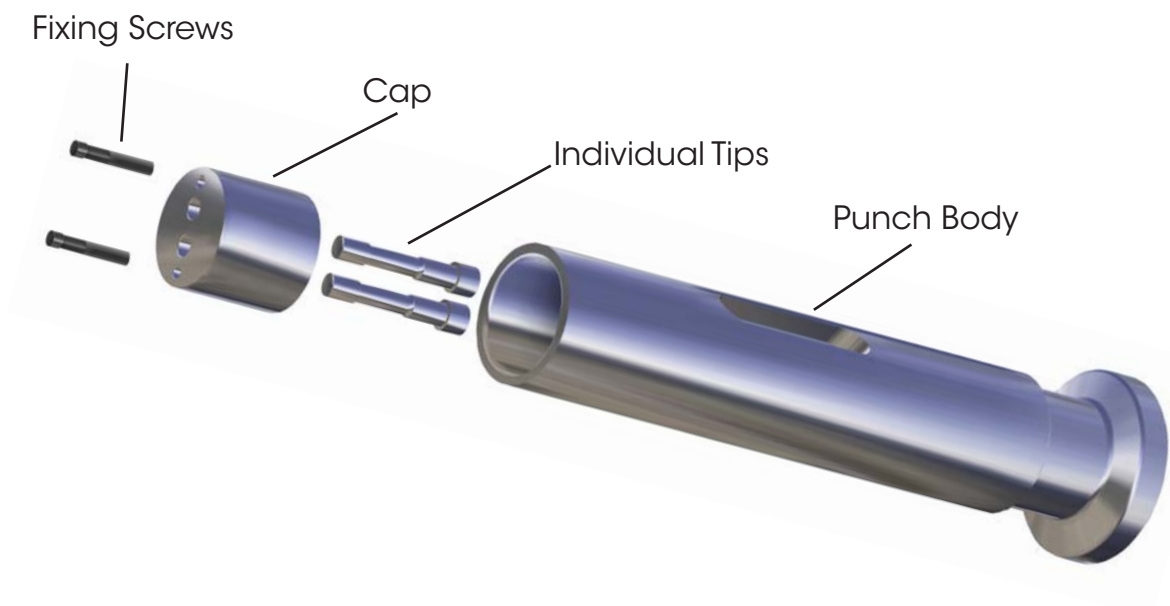
# Internal Cap Fixing

## Description

This design results in a seamless punch barrel as the cap is fitted inside the body. This reduces the risk of damage to the turret punch guides and oil/dust seals as well as reducing contamination concerns but does require disassembly before cleaning. The cap fixing is set to a specific torque to prevent it from working loose.

## Features

- Worn or damaged tips can be replaced individually
- Seamless joint eliminates risk of damage to seals and minimises contamination
- Floating lower tips for smooth alignment
- Material selection can be optimised. For example, tips and body can be of different PharmaGrade® materials depending on granule characteristics and tablet design





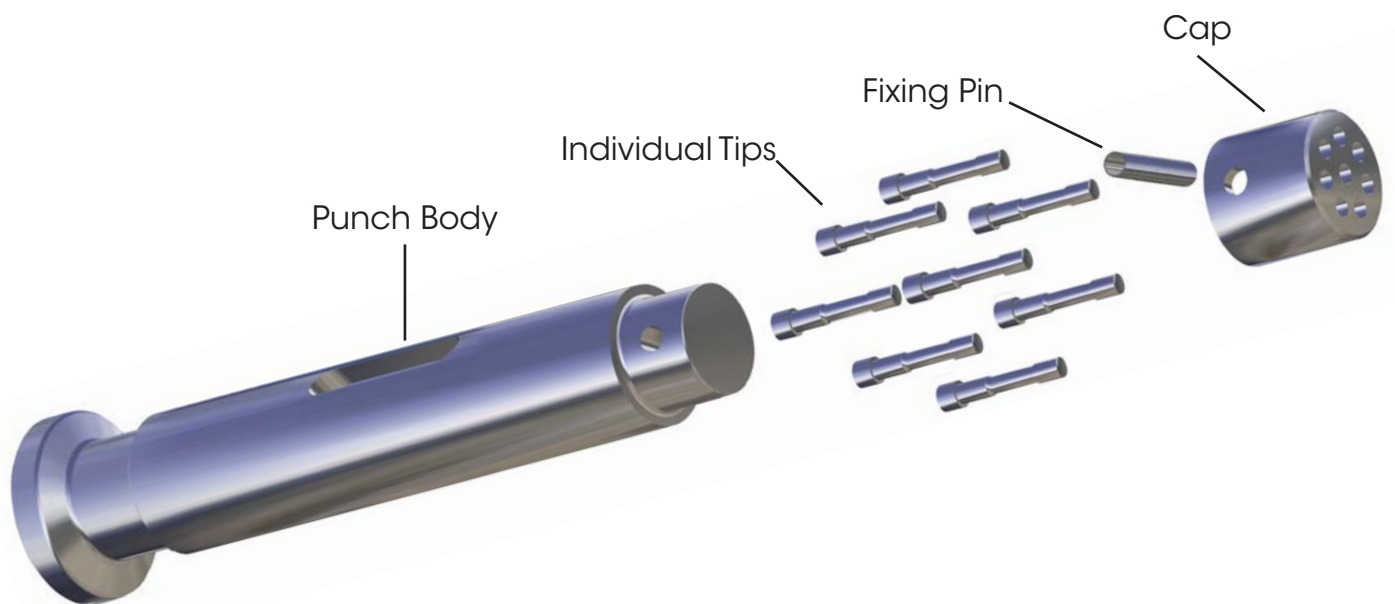
# External Cap Fixing

## Description

Multi-tip punches manufactured with the cap fixing fitted external to the body of the punch. In some circumstances this may allow more tips to be located on each punch. However, the risk of product contamination and damage to punch guides and seals increases with this design as does time taken to clean the punch due to requiring disassembly before cleaning.

## Features

- Worn or damaged tips can be replaced individually
- More tips per punch may be achieved on smaller tip sizes
- Material selection can be optimised. For example, tips and body can be of different PharmaGrade® materials depending on granule characteristics and tablet design





## Monoblock

### Description

This design is machined from a single piece of steel resulting in a solid monoblock multi-tip punch. Monoblock multi-tips offer benefits in reduced cleaning time within the PharmaCare® 7-Step Process and a smaller risk of product contamination compared to composite designs. However, it should be considered that any damage to the monoblock punch requires the whole punch to be replaced.

### Features

- No joint eliminates risk of damage to seals
- No need for assembly/disassembly
- Reduces risk of contamination due to ease of cleaning
- Ideal for Wash In Place machines when appropriate materials and coatings are used.



# Pin Fixing

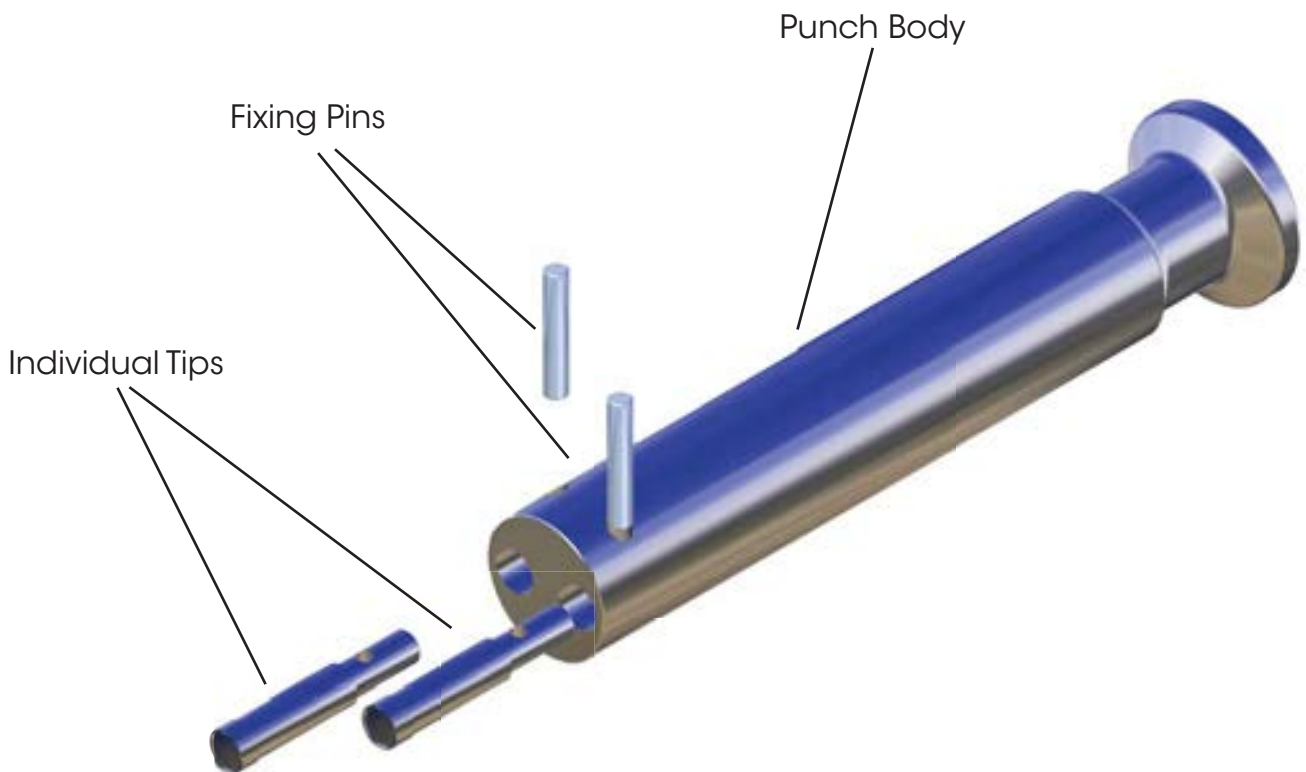


## Description

The simplicity of the Pin Fixing design makes this an effective solution for users who need to change the tips regularly. With a simple pin operating as the fixing device this is a straightforward operation. The pin fixing of the tips also reduces the risk of cross contamination compared to other composite designs and is easy to clean as part of the PharmaCare® 7-Step Process.

## Features

- Simple design makes changing tips easier
- May allow for more tips per punch depending on tablet design
- Fewer component parts
- Replacement of individual tips possible
- Material selection can be optimised. For example, tips and body can be of different PharmaGrade® materials depending on granule characteristics and tablet design





## Tablet Press Considerations

- The upper section of the turret must have keyways. This ensures the correct fixing of the upper punch.
- Modification to the feeder paddles may be required due to increased fill requirements
- Tablet press monitoring systems can be adjusted to monitor the multi-tablet outputs as standard.
- Calibration punch may be required for single sort rejection system (available upon request)
- Granulation flow must be working effectively due to the increased fill requirement
- The tablet press should be in good working order and critical dimensions of the turret (punch guides and die pockets) should all be within tolerance
- Tablet diameter below 3mm may require reinforced tips, and the press will need to be fitted with restricted fill cams





## Frequently Asked Questions

### **Q. What is the smallest tip size available?**

A. The smallest tip size for round Multi-Tip tooling is 4mm and for round Micro-Tip 1.5mm. Shaped tooling must be assessed individually at the time of enquiry.

### **Q. What happens if we break or damage a certain part of the Punch?**

A. Individual components of the composite fixing designs can be replaced individually.

### **Q. How do you clean and polish Multi-Tipped punches?**

A. Multi-Tipped tooling should be maintained in accordance to the PharmaCare® 7-Step process the same way as conventional tooling. This should be achieved using an ultrasonic cleaning bath and automated polishing which gives significant time savings and more consistent results over manual techniques.

### **Q. How do I set up Multiple-Tipped tooling in the tablet press?**

A. In the same way as shaped punches. I Holland recommend the use of a Die Alignment Tool which reduces tooling damage and set up time.

### **Q. What is a Universal Seal Groove?**

A. The Universal Seal Groove gives the ability to use all types of Drip Cup or I Holland Bellows which form a flexible seal between the Turret and the Punch, reducing the risk of oil contamination from the machine's lubrication system.





## Frequently Asked Questions

### **Q. Are bellows and drip cups available for Multi-Tipped punches?**

A. Yes, I Holland offer the Universal Seal Groove which can accommodate both the bellow and drip cup. Alternatively the drip cup can be fitted to the undercut of the tip. Please note the use of a seal groove could limit the maximum number of tips available.

### **Q. Do I have to assemble Multi-Tipped tooling?**

A. No, all I Holland Multi-Tipped tooling is delivered assembled.

### **Q. Can Multi-Tipped tooling be repaired/refurbished?**

A. Yes, this service can be provided by I Holland following assessment of the tooling condition. Damage to the tips of monoblock tooling will usually result in the punch having to be replaced.

### **Q. Can PharmaCote® treatments and coatings be applied to Multi-Tip tooling?**

A. Yes coatings from our PharmaCote® range are suitable for application to our Multi-Tipped tooling.

### **Q. What is the maximum force that I can apply to Multi-Tipped tooling?**

A. In theory the force rating for a single tip can be multiplied by the number of tips on the punch.

**For example:**

**A multi 3 punch maximum force would be calculated as follows**

**(No of tips (3) x Maximum force for tablet design (kN))**

*In addition to the above example we would recommend that the calculated force is reduced by a safety factor of 30% at least for the initial press start up.*



## Additional Features Available For All Multi-tip Designs

### Die Segments

I Holland are experienced in supplying and fitting multi-tip tools compatible with die segments



### Rotating Head

Rotahead punches allow the head to rotate independently to the punch body, providing a 'bearing' between the punch head and cams. The punch head can be manufactured from a harder, more wear resistant material optimising metallurgical characteristics of the punch assembly, and providing extended tooling life.

### Die Alignment tools

The die alignment tool is used in conjunction with multi-tipped tools. The die alignment tool aligns the die bores relative to the keyways in the turret guides; this allows all dies to be fitted rapidly and accurately with just one special tool.



### WIP Keys

Designed with Wash In Place (WIP) solutions in mind, this coated key is extremely resistant to corrosion. When partnered with the Monoblock design and appropriate PharmaGrade® steel, this is the ideal tool for WIP presses.



### Validation punches

Are provided to aid initial press set up and single sort rejection. These punches are often embossed with different marks to distinguish between tablets

# Matrix for Round Multi-Tip Tooling

| Tip Size (MM) >4mm | Eurostandard B, BB, BBS, Pharma, Kilian 20/28 |          |      |                            |          |          | Eurostandard D, Fette 441, Kilian 25/32 |            |          |                            |      |            |   |   |   |   |
|--------------------|-----------------------------------------------|----------|------|----------------------------|----------|----------|-----------------------------------------|------------|----------|----------------------------|------|------------|---|---|---|---|
|                    | Without Universal Seal Groove*                |          |      | With Universal Seal Groove |          |          | Without Universal Seal Groove*          |            |          | With Universal Seal Groove |      |            |   |   |   |   |
|                    | Internal                                      | External | Mono | Pin Fixing                 | Internal | External | Mono                                    | Pin Fixing | Internal | External                   | Mono | Pin Fixing |   |   |   |   |
| 5                  | 5                                             | 4        | 5    | 7                          | 3        | 4        | 5                                       | 4          | 8        | 9                          | 8    | 9          | 6 | 7 | 8 | 7 |
| 5.5                | 4                                             | 4        | 4    | 5                          | 2        | 3        | 4                                       | 3          | 7        | 7                          | 8    | 9          | 6 | 7 | 7 | 7 |
| 6                  | 4                                             | 4        | 4    | 4                          | 2        | 3        | 3                                       | 3          | 6        | 7                          | 7    | 7          | 5 | 5 | 7 | 5 |
| 6.5                | 2                                             | 3        | 3    | 4                          | 2        | 3        | 3                                       | 2          | 6        | 5                          | 5    | 7          | 4 | 5 | 5 | 5 |
| 7                  | 2                                             | 2        | 3    | 3                          |          | 2        | 3                                       | 2          | 5        | 5                          | 5    | 7          | 4 | 4 | 5 | 4 |
| 7.5                | 2                                             | 2        | 2    | 3                          |          |          | 2                                       |            | 3        | 4                          | 4    | 5          | 3 | 4 | 4 | 4 |
| 8                  | 2                                             |          | 2    | 2                          |          |          |                                         |            | 3        | 4                          | 4    | 5          | 3 | 3 | 4 | 3 |
| 8.5                |                                               |          |      | 2                          |          |          |                                         |            | 3        | 3                          | 4    | 4          | 3 | 3 | 4 | 3 |
| 9                  |                                               |          |      | 2                          |          |          |                                         |            | 3        | 3                          | 3    | 4          | 2 | 2 | 3 | 2 |
| 9.5                |                                               |          |      |                            |          |          |                                         |            | 3        | 2                          | 3    | 3          | 2 | 2 | 3 | 2 |
| 10                 |                                               |          |      |                            |          |          |                                         |            | 2        | 2                          | 3    | 3          |   |   | 2 |   |
| 10.5               |                                               |          |      |                            |          |          |                                         |            | 2        |                            | 2    | 3          |   |   | 2 |   |
| 11                 |                                               |          |      |                            |          |          |                                         |            |          |                            | 2    | 2          |   |   |   |   |
| 11.5               |                                               |          |      |                            |          |          |                                         |            |          |                            |      | 2          |   |   |   |   |

Shaped tooling sizes on request.  
 Please Note: Small changes in tablet diameter may result in an increase of available tips.  
 \* Can have standard seal groove.

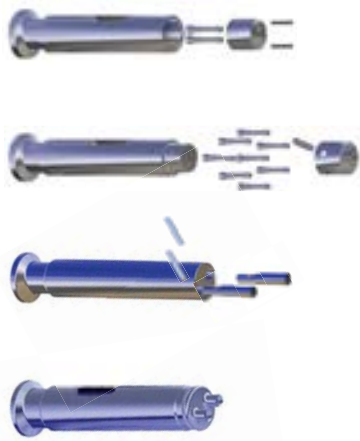


# Matrix for Round Micro-Tip Tooling

| Tip Size (MM) ≤4mm | Eurostandard B,BB, BBS, Pharma, Kilian 20/28 |          |      |                            |          |      | Eurostandard D, Fette 441, Kilian 25/32 |          |      |                            |          |      |
|--------------------|----------------------------------------------|----------|------|----------------------------|----------|------|-----------------------------------------|----------|------|----------------------------|----------|------|
|                    | Without Universal Seal Groove*               |          |      | With Universal Seal Groove |          |      | Without Universal Seal Groove*          |          |      | With Universal Seal Groove |          |      |
|                    | Internal                                     | External | Mono | Internal                   | External | Mono | Internal                                | External | Mono | Internal                   | External | Mono |
| 1.5                | 16                                           | 18       |      | 12                         | 18       |      | 26                                      | 35       |      | 24                         | 35       |      |
| 2                  | 16                                           | 18       |      | 12                         | 18       |      | 26                                      | 35       |      | 24                         | 35       |      |
| 3                  | 7                                            | 8        |      | 6                          | 8        |      | 14                                      | 19       |      | 12                         | 19       |      |
| 4                  | 5                                            | 6        |      | 5                          | 6        |      | 8                                       | 14       |      | 8                          | 14       |      |

Shaped tooling sizes on request.  
 Please Note: Small changes in tablet diameter may result in an increase of available tips.  
 \* Can have standard seal groove.

# Multi-Tip Reference Chart



|                            | Clean assembled | Clean disassembled | Replaceable tips | Material Options | PharmaCote® |
|----------------------------|-----------------|--------------------|------------------|------------------|-------------|
| <b>Internal Cap Fixing</b> | ●               | ●                  | ●                | ●                | ●           |
| <b>External Cap Fixing</b> | ●               | ●                  | ●                | ●                | ●           |
| <b>Pin Fixing</b>          | ●               | ●                  | ●                | ●                | ●           |
| <b>Monoblock</b>           | ●               | ●                  | ●                | ●                | ●           |

## Clean Assembled

- I Holland recommend that this multi-tip design is cleaned in an ultrasonic bath without taking it apart.
- I Holland recommend that this multi-tip design is taken apart before cleaning in an ultrasonic bath.

## Clean Disassembled

- I Holland recommend that this multi-tip design is taken apart before cleaning in an ultrasonic bath.
- This multi-tip design cannot be disassembled but can be cleaned in an ultrasonic bath.

## Replaceable Tips

- The tips on this design are independently replaceable without scrapping the whole punch.
- The tips on this design cannot be replaced.

## Material Options

- Component sections of this assembly can be manufactured from complementary PharmaGrade® steel types to optimise performance.
- This punch design is manufactured from one type of PharmaGrade® steel.

## PharmaCote®

- PharmaCote® technology can be applied to this punch design.



## Typical Shaped Multi-Tip Configuration

### Impact of design selection on tip configuration

These illustrations show a typical 10 x 5 capsule shaped tablet (with a flat bevelled edge) on a Eurostandard 'B' punch and the possible configurations available on different design options with and without a universal seal groove.

### Monoblock



Monoblock Multi 3



Monoblock Multi 3 With  
Universal Seal Groove

### External Cap Fixing



Multi 2 External Cap Fixing



Multi 2 External Cap Fixing With  
Universal Seal Groove



## Typical Shaped Multi-Tip Configuration

### Pin Fixing



Multi 2 Pin Fixing



Multi 2 Pin Fixing With  
Universal Seal Groove

### Internal Cap Fixing



Multi 2 Internal Cap Fixing



Multi 2 Internal Cap Fixing With  
Universal Seal Groove

Please note that these designs are for illustrative purposes only and I Holland will always endeavour to find the best possible solution for each individual application and customer requirement.

# PharmaGrade® Steels

*There are thousands of steel types available but only a few meet the complex design and functional requirements of tablet tooling. Chemical composition of the steel is only one part of the overall equation, material selection must always be considered alongside good tablet design for strong punch cups and punch tip edges.*

To optimise the material and its properties, other processes are required such as:

- **Steel refinement (ESR – Electro slag re-melting)**
- **Optimal heat treatment**
- **Treatments and coatings**
- **Powder Metallurgy**

All PharmaGrade® materials are highly refined to our own specifications and this quality is provided at no additional cost to our customers giving increased strength and wear resistance to tablet tooling.

## **Steel Refinement - ESR**

I Holland's PharmaGrade® ESR material (HPG-S & HPG-P) has a homogeneous carbide structure which is distributed evenly throughout the steel. This provides benefits for the end user such as increased tool strength, extended tooling life over conventional (non-refined) steel and coating uniformity.

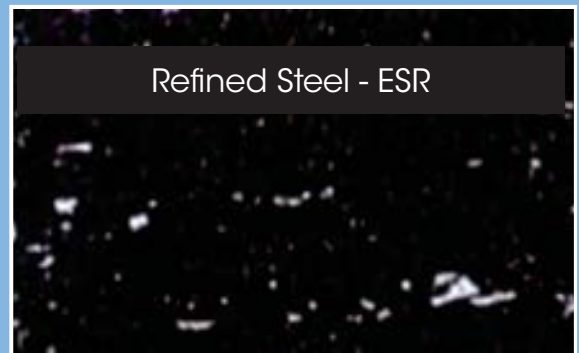
## **Powder Metallurgy**

I Holland offers two specialist powder metallurgy steels (HPG-MP & HPG-MD) each offering a uniform carbide distribution, small carbide size and extremely high wear resistance when compared to HPG-S and HPG-P. Powder Metallurgy steels are recommended for extremely abrasive products.

## Cross Sections Showing Carbide Distribution



Conventional Steel






Holland PharmaGrade®  
HPG-S & HPG-P



Holland PharmaGrade® Steels  
HPG-MP & HPG-MD

# PharmaCote® Treatments and Coatings

I Holland's PharmaCote® range is a suite of treatments and coatings that enhance the performance of substrate material for punches and dies. Our PharmaCote® range is focused on:-

-  Improving wear resistance
-  Improving corrosion resistance
-  Improving anti-stick properties



Our PharmaCote® brochure is also available to advise on this range of treatments and coatings.

| COATING                              | Tooling Type |      | Steel Type |       |        |
|--------------------------------------|--------------|------|------------|-------|--------|
|                                      | PUNCHES      | DIES | HPG-S      | HPG-P | HPG-SS |
| PharmaCote® HC (Standard)            | ✓            | ✓    | ✓          | ✓     | ✓      |
| PharmaCote® HC (Barrel & Tip)        | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC (All Over)            | ✓            | ✓    | ✓          | ✓     | ✓      |
| PharmaCote® HC (Tip Only)            | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC (Head, Neck & Barrel) | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC+ (Standard)           | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC+ (Barrel & Tip)       | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC+ (All Over)           | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® HC+ (Tip Only)           | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® EC (Standard)            | ✓            |      | ✓          |       |        |
| PharmaCote® CN (Standard)            | ✓            | ✓    |            | ✓     | ✓      |
| PharmaCote® CN (Barrel & Tip)        | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CN+ (Standard)           | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CN+ (Barrel & Tip)       | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CX (Standard)            | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CX (Barrel & Tip)        | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CX+ (Standard)           | ✓            |      |            | ✓     | ✓      |
| PharmaCote® CX+ (Barrel & Tip)       | ✓            |      |            | ✓     | ✓      |
| PharmaCote® TN (Standard)            | ✓            | ✓    |            | ✓     | ✓      |
| PharmaCote® TN (Barrel & Tip)        | ✓            |      |            | ✓     | ✓      |
| PharmaCote® DN (Tip Only)            | ✓            |      | ✓          | ✓     | ✓      |
| PharmaCote® RS (Tip Only)            | ✓            |      |            | ✓     | ✓      |



These brochures detail materials, treatments and coatings that are currently available for I Holland tooling. The Research and Development Team is constantly working on the development of new materials.

For further information on our R&D activity, please contact [info@iholland.co.uk](mailto:info@iholland.co.uk)



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