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Happy New Year and welcome to the first 2014 edition of PunchLine, I Holland’s newsletter for tablet manufacturing professionals. We are looking forward to a very busy year ahead, starting with our next webinar entitled ‘Solving your Sticking Problems with Tabletting Science’, which will be broadcast on 6th February 2014 (see pages 3 & 11 for further details). You will also be able to find us at exhibitions in New York, Cairo, Sao Paulo and Tokyo. The ever popular ‘Troubleshooting in Tablet Tooling’ seminar will be held three times in 2014 at I Holland, so keep your eye on our website www.iholland.co.uk for future dates.

Looking back, 2013 was a year that delivered some notable moments for I Holland. Our efforts in the area of innovation and global reach were rewarded with a win at the HSBC global connections awards. Our strategy of delivering excellence in customer service was underpinned by a notable investment in capacity to further bring down our lead times for punches & dies. This was also cemented through our knowledge sharing programme which saw experts from I Holland participating in several international training events. Our in-house training facilities were refurbished, offering our customers an improved learning environment. Importantly, we held our triennial agents seminar. An event that brought together over 35 representatives of I Holland to enhance their knowledge of our products and services and to update them on our business strategy (see page 10) ensuring that we can take a local approach to customer support.

We hope you will enjoy this issue which brings you news of two new offerings from I Holland: our new anti-stick coating PharmaCote® CX and our TSAR≈PREDICT model for coating recommendation/selection. Read on to learn more.

OUR VISION
To be the customer’s preferred choice as the market leading provider of specialist tablet tooling & complementary equipment, characterised by; the excellence of customer service, technical support, speed of response and quality of products.
TSAR-PREDICT is a Revolutionary New Service for I Holland Customers

WHAT DOES IT DO?
TSAR-PREDICT accurately forecasts the correct anti-stick PharmaCote® coating solution for your formulation. It calculates single particle adhesion to the punch tip face without time consuming and expensive field trials.

WHO IS IT AIMED AT?
Any tablet manufacturer experiencing sticking problems including pharmaceutical, nutraceutical, industrial, confectionery, veterinary applications.

WHAT DOES IT COST?
TSAR-PREDICT is a free of charge service available to all I Holland customers.

WHAT INFORMATION DOES I HOLLAND NEED FROM ME?
All we need from you is the name of the API or main component of the formulation. Even if this API is confidential we can work with basic characteristic information on key physical properties.

ABOUT TSAR
The TSAR-PREDICT service is the culmination of two years’ research in association with the University of Nottingham to investigate the root causes of why formulations stick to tablet tooling surfaces. It takes into account interactions between various parameters such as Van der Waals Forces; capillary action and deformation mechanics. This research has been a key part of I Holland’s Tabletting Science Programme.

For further information on the TSAR-PREDICT service, CLICK HERE to register for our FREE WEBINAR or...

Email: info@iholland.co.uk or Telephone: +44 (0)115 972 6153
PharmaCote® CX (Chromium Nitride Extra) is an enhanced Chromium Nitride coating, it has been developed to improve the performance of substrate material for punches and dies.

The coating offers a very smooth finish, outstanding anti-stick performance, including prolonged tooling life due improved corrosion resistance over times more corrosion resistance, and due to the unique method of application, and has PharmaCote® CX features a number of benefits to a multi-layered application. It also shows PharmaCote® HC offering up to 13 giving twice as much tooling life as that of PharmaCote® CN.

Rob Blanchard said: “We are very excited about the potential for PharmaCote® CX and CX+. The coating has been tested, with excellent results. Our PharmaCote® range encompasses many treatments and coatings that are designed to improve surface hardness and wear and corrosion resistance, as well as enhancing anti-stick properties. "PharmaCote® CX has been developed with this in mind and is our most enhanced coating yet. As well as its more obvious benefits it is also extremely easy to clean and maintain using an ultrasonic bath and light automated polishing.” PharmaCote® CX+ has an additional surface modification offering further enhanced anti-stick properties, helping to reduce the effect of formulation sticking to the punch tip face.

PharmaCote® CX Summary

Description: An enhanced Chromium Nitride, silver grey coating that is very smooth due to our unique method of application.

Features: Extremely smooth coating. Thickness: 6-8 microns Hardness: 2000 Hv (est)

Benefits: Prolonged tooling life due to thicker coating application • Excellent anti-stick properties • Superb corrosion resistance - up to 13 X that of PharmaCote® HC • Good wear resistance - more than 2 x the hardness of PharmaCote® HC • Extremely easy to clean and maintain using an ultrasonic bath and light automated polishing

Application: Applied to HPG-P and HPG-SS Steel, punches only

NOTE: All over coating supplied as standard, tip & barrel option available to optimise wear characteristics of HPG-P steel on the compression rollers.
The development of abrasive solid-dose products into a formulation that can be compressed in a modern tablet press at high speed, into a tablet form can cause technical challenges.

The problem of producing solid-dose nutraceuticals, which are typically abrasive in nature, has to be explored as the industry progresses toward stricter regulations and higher standards, which are, in some ways, identical to those used for the pharmaceutical industry. The most common multivitamin formulas contain up to 50 active ingredients and two to eight excipients including coating ingredients. Pharmaceutical formulations tend to contain one to four actives and five to six excipients. The higher numbers of active ingredients in nutraceutical formulations bring challenges related to particle size, flow, compressibility, moisture sensitivity, ingredient interaction, content uniformity and quality control (QC) testing. For example, some active ingredients may be available in granular form, while some may be available only in fine powder form; some may be hydrophilic and others hydrophobic. Because of this the ingredient blend may have many different particle sizes and ingredients with a variety of characteristics. Ingredient blends can also have separation and flow issues. Tablet production from these blends can result in capping, sticking and different patterns on the faces of tablets during compression, as well as basic content uniformity problems.

Vitamin, mineral and food supplement tablets tend to be quite large and bulky when compared with pharmaceutical tablets, especially multivitamins. This is to enable sufficient delivery of the beneficial ingredients. They often require high compaction forces to bond the ingredients into a robust tablet, and the tabletting equipment is usually run at high speeds for long periods of time to satisfy the nutraceutical industry’s demands for high output and low cost.

Nutraceutical formulations normally have more actives present in higher weight than pharmaceutical formulas. The limits of dose size typically result in restricted room for excipients. The typical nutraceutical formulation has 70 - 90% actives with the balance as excipients, while traditional pharmaceutical formulation has 70 - 90% excipients and 10 - 30% actives. The fewer excipients and variety of actives in the same formulation make it difficult to achieve certain desired outcomes such as disintegration time, hardness and friability. Nutraceutical customers are also demanding
smaller dosage size and fewer ‘other ingredients’ (i.e., excipients), which narrows the options for formulators. As the choice for excipients get narrower, it becomes more difficult to formulate and achieve desired outcomes for product.

When compressing any abrasive product, it is important that equal consideration be given to the selection of optimal materials for the tooling construction. Due to the aggressive nature of some nutraceutical ingredients, the properties of materials must be balanced to give maximised tooling performance and durability. These properties include: abrasion; corrosion resistance; compressive strength; hardness; toughness and resistance to chipping and cracking. In order to achieve the desired long life, anti-abrasive and wear resistant properties there are several options.

**Raw Material**

Wear and degradation of the tooling will lead to other tablet-making problems, such as adherence of the granules because of the pitted and worn surfaces of the punches, and also ‘capping’ or ‘lamination’ of the tablets, which could prove costly for the tablet manufacturer.

The correct choice of material will help to reduce the risk of damage to the punches and dies from the effects of abrasion, corrosion and impregnation of hard granules. There are thousands of steel types available, yet, only a few meet the complex design and functional requirements necessary for tablet tooling. Specialist materials such as tungsten carbide (I Holland’s HPG-TC), and enhancement coatings and treatments (I Holland’s PharmaCote® range) should be considered. Commonly used materials for nutraceutical tooling for example include high carbon, high chrome, cold work tool steels. Tungsten carbide is often used for the dies to prevent wear and deformation of the die bores. It features a high compressive strength with an extremely high wear resistance. This helps to reduce die bore wear and ringing and lasts longer than conventional die steels.

**Coatings**

A specific coating developed to combat problems in the manufacture of abrasive formulations and particularly nutraceuticals is PharmaCote® RS. PharmaCote® RS is a resilient surface coating which is applied with electron beam technology. This technology allows a very hard coating to be applied, whilst still giving a very smooth finish. One of the reasons this coating has such fantastic wear resistance is its very high hardness value (3000HV). This coating is only applied to the punch tip as it could cause damage or wear to the tablet press if the whole punch was coated. The compression rollers have a much lower hardness than PharmaCote® RS. Following extensive development work, this coating was tested in the field on a nutraceutical product that was destroying some of the company’s competitor’s punches.
Case Study
A leading nutraceutical manufacturer was experiencing serious issues with a particularly abrasive formulation of part of their range of Vitamins. Only 22 million tablets were able to be compressed before the tooling was worn to such an extent that it was deemed to be unserviceable. This not only necessitated the purchase of new punches but also incurred the associated down time inherent with replacing and setting up 37 stations of tooling. I Holland were challenged to find a solution to extend the life of this tooling. Through its continual research and development programme I Holland were in the final stages of developing a highly promising new anti-abrasive coating RS. This formulation presented an ideal opportunity to trial the coating.

The Trial
A compression trial was set up and I Holland despatched stations of the new RS coated punches for trial along with one of their iNSPECT camera systems. Photographs were taken for record and stored to enable comparisons to be made during the trial. The goal of this trial was to see just how far the useful life of the tooling could be extended by the use of a coating. The RS coating was tested with the same abrasive formula against HPG-P and a competitor’s Chromium Nitride Coating. When the results started to take shape RS emerged as a clear winner. The more common place competitor’s CrN coating was shown to fail between 19.5-21.1 million tablets, the premium steel was withdrawn between 21.1-22.8 million tablets but the PharmaCote® RS was still serviceable at an astonishing 44,010,000 tablets. This represents an approximate 93% increase in the life span of the tooling when compressing this formulation.

The Benefits
These spectacular results translate into valuable cost savings and productivity increases for the customer. This coated tooling now lasts nearly twice as long before it requires replacement, with longer run-time and less need for costly downtime due to tooling replacement. In addition product yield has also increased as the presses need to be set up fewer times. Since these trials PharmaCote® RS coated tooling is now being used successfully at three other locations manufacturing for the same range of nutraceuticals and I Holland has released PharmaCote® RS to assist customers in combating abrasion worldwide.
It’s True: Correct Use Of Ultrasonic Cleaning Really Can Reduce Cleaning Time By More Than 50%

The Product
The Raybond company, located in Saint Louis (France), specialises in bonding solutions that are mainly used to secure fastenings on windows and windscreen in cars. These adhesives are produced in a tablet form which is then inserted into a gun for easy application.

The Problem
The tablets are made by compressing a powder in a Fette press using tooling coated with their hard chromium coating. The formulation is very sticky due to the characteristics of one of the powders used, which is perhaps not that surprising given that it is an adhesive. The extent of the sticking on the punch tips can be seen below (Figure 1) and it is evident that the hard chromium coating supplied by Fette proved insufficient in preventing compressed powder from becoming stuck to the punch tip faces. Raybond tried to remove the remaining stuck formulation from the punches using a Transonic 700H ultrasonic...
cleaner filled with a simple water detergent solution. They used two cleaning cycles of 15 minutes each but this was not successful in removing the product completely and it was still very visible on both punch tips and in die bores. As a result, Raybond had to finish by cleaning manually with a nylon brush and isopropanol. This proved to be a very labour intensive and costly process, with the cleaning of one set of 60 punches and 30 dies taking a minimum of 2 hours 30 minutes for one operator.

The Trial
Based on I Holland’s experience in tool cleaning and associated systems, Raybond consulted with us about application of the PharmaCare® 7 Step Process and I Holland were able to provide advice on how the cleaning regime could be improved. Raybond subsequently sent I Holland 10 contaminated punches that had already compressed several batches of adhesives tablets. A cleaning trial was then carried out using I Holland’s Standard Ultrasonic Cleaner. The bath was filled with water, N10 detergent and KS corrosion inhibitor. At first, the punches were plunged into the cleaner for 5 minutes at 55°C and 45KHz frequency. The results, as we can see below, (Figure 2) were not completely successful with powder remaining on the punch tips.

The Cleaning Solution
I Holland then moved on to a second trial. The punches were submerged for 10 minutes at 55°C using the ‘pulse’ function and a lower frequency (25KHz). When activated, the pulse mode produces intermittent high intensity spikes of ultrasonic power that can substantially improve cleaning. The picture below (Figure 3) shows that the powder was completely removed to the customers’ satisfaction. Mr. Frenot, who is responsible for tooling maintenance at Raybond, was delighted and has since been able to reduce the time needed for punch and die cleaning by at least 50%.

ONGOING ACTION
While the current solution for this problem is a refinement of the ultrasonic cleaning process, I Holland will work with Raybond on eliminating sticking using the PharmaCote coating range. This would further reduce cleaning and press downtime, therefore maximising tooling productivity.
NEWS...

I HOLLAND’S GLOBAL REPRESENTATIVES GATHER FOR SEMINAR

Agents and distributors from I Holland, gathered at the company’s UK headquarters for its triennial international seminar to discuss ways to further the growth and success of the company. More than 35 of I Holland’s team of representatives from across the globe came together in Nottingham on 15-17th October, at the company’s state-of-the-art facility, to identify and develop its global business plan and advance employees’ knowledge of technical developments within the industry.

Chris Prideaux, Managing Director of I Holland said: “The conference came at a time when I Holland is positioning itself for international growth. This ‘meeting of minds’ brought about creativity, new product ideas and progression. It allowed staff to engage in training and discussion of global business issues. “This conference provided the opportunity for I Holland’s key agents and distributors to share success stories and discuss the company’s future. It was also the perfect opportunity to introduce new technical developments and advancements that the company is working on to stay a leader in its field. I cannot begin to overstate the importance of bringing together people who can drive the company forward. It provided a platform in which to build upon one another’s knowledge and develop future strategy.”

BSI

In September I Holland successfully completed a ISO 9001 audit re-confirming our position as a supplier of quality products and services. This two day audit covered all areas of the business including Research & Development Manufacturing Systems, Training, Purchasing, Despatch, Sales & Marketing and Customer Support Services. I Holland adopts the ISO standard proudly and uses it as a benchmark for setting standards across our business systems and processes.

www.iholland.co.uk
EVENTS...

TSAR WEBINAR 6th FEBRUARY (14:00 GMT)

This webinar looks at why tablet formulations stick to punch tip faces and how to overcome sticking using punch and die coatings. We will explore how scientific techniques have been used to develop optimised anti-stick coatings for punches and dies, highlighting to tablet manufacturers how quickly an anti-stick tooling solution can be recommended using I Holland’s new TSAR model, TSAR=PREDICT.

This model uses advanced analytical techniques: Atomic Force Microscopy, Surface Topography Characterisation, Laser Profilometry and X-Ray Photoelectron Spectroscopy to demonstrate the causes of sticking and to recommend the correct coating solution for each specific sticky formulation. CLICK HERE TO REGISTER

INTERPHEX 2014

I Holland, will once again be attending INTERPHEX 2014 and will showcase a number of products including the new PharmaCote® CT coating, which will be launched exclusively at the show.

This exclusive (Patent Pending) coating, generates an outstanding anti-stick tip face for tablet production. Clare Taylor, I Holland’s Marketing Manager said: “This is our 5th time at the show and we are really looking forward to introducing industry leaders to our newest product from the PharmaCote® range. PharmaCote® CT, is widely anticipated to be our most effective anti-stick coating to date. INTERPHEX is the perfect opportunity to introduce our product portfolio to a worldwide audience. We will not only present our extensive range of punches and dies, but we will also show our latest addition to the PharmaCare® range, the MF40 automated punch and die polishing machine.” The MF40 was developed to be used as part of the recommended PharmaCare® 7-Step Process, a professional punch and die maintenance and storage programme designed to prevent costly tablet press downtime and tablet compression problems associated with capping, tablet weight and thickness variation to name but a few.

To find out more about I Holland’s product portfolio come and talk to us at booth 2970.

www.iholland.co.uk