

PFD - 3D Foil Printing Technology

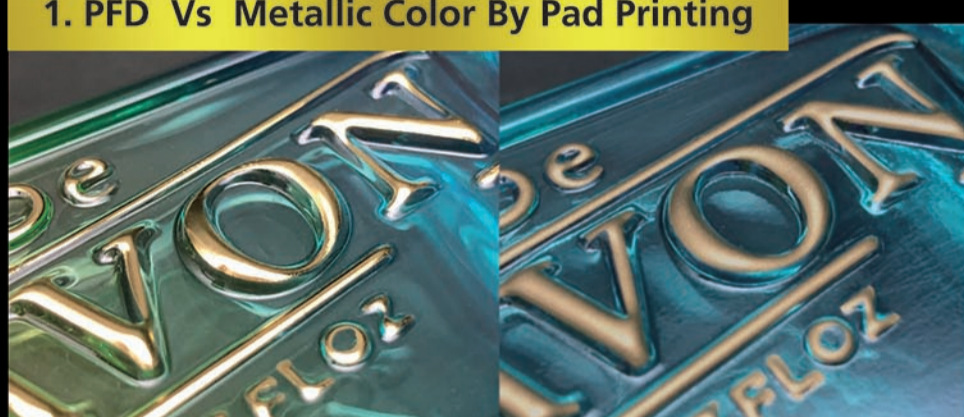
PFD = "Pad Print + Hot Stamp"

PFD is an innovative decoration process to consolidate both pad printing and hot stamping. The final visual outcome : **Pad Print Color Print & Shiny Foil Images On 3D (Irregular) surface**



Why don't we use the traditional foil stamping ?

1. PFD Vs Metallic Color By Pad Printing



We can see metallic color giving dull and matte image. In contrast, PFD able to produce shiny image likes traditional hot stamp foil.

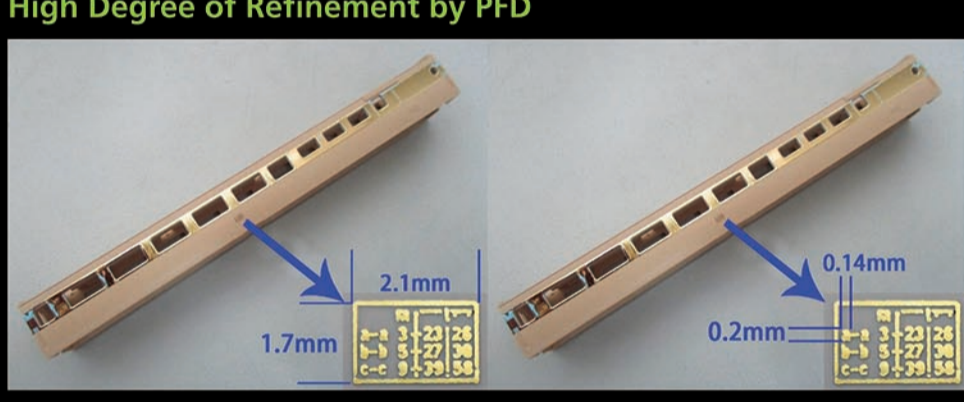
2. PFD Vs Traditional Hot Stamping

Basic element of Hot Stamping : Hot Stamping Die



Metal die plate made by CNC is costly and time consuming made. Silicon die also need female metal mold to form. For fine image, chemical etching need before CNC (min. 2mm) on die plate.

High Degree of Refinement by PFD



It is not easy and costly to produce hot stamping die for fine image. In contrast, due to the nature of pad printing, PFD merely need Approx. 20um engraving depth on printing plate which means PFD allow the image to be extremely fine. (as fine even for 1mm letter)

On Flat Surface

Large and Bold image is popular on flat surface. In this condition, the traditional foil stamping is easy to adopt.



Irregular Surface

To deal with irregular surface, there are two methods: By the traditional foil stamping on irregular surface like roller print, do hot stamping by rotating the product. Use curved die plate OR flat die plate + rotating fixture.

Limit : Both die and rotating fixture is costly with restriction by the shape of product. In this case, mass production in the old days was prevailed but not cope with today's small production with high frequent printing job changes among various products and images.



Curved die

Restriction - Traditional Hot Stamping

- The original tolerance of product does easily produce imperfect contact with die which induce another tolerance. (no matter what material like wood, glass or even with plastic)
- High temperature in Hot Stamping process not likely allow 2nd trial print on same product if there is any failure first time. (no 2nd chance)
- For flat product surface or even with slight curved surface, flat die still able to handle the case. However, to deal with irregular surface like electric tooth brush battery box (see photo below), it is not easy to produce seamless contact between die and product surface and hence the precision of foil stamping is difficult to achieve with high tolerance rate.

Advantages of PFD

PFD able to pad print foil on irregular glass surface and even on embossed letters as seen in photos below.



KENT PFD 3D hot pad printed image on irregular glass surface / embossed letters



PFD : Ideal for 3D surface like Curved Surface (Electric tooth brush battery box)

Either pad print or hot stamping on golf ball with dimples (full around surface) is another good example. PFD can handle the job easily without high cost and consuming heavy time on adjustment.



Irregular plastic / wooden surface (Image across corner)



Foil print on multi-angle prism surface

Unique pad printing silicon pad flexibly deform to keep perfect contact surface with irregular product surface and disregard any impact by the irregular shape and the original tolerance of product.

PFD is not said to be substitution to the traditional hot stamping in any case. The final application does likely depend on the individual project, customers' request, the nature of image / product and even the analysis on the problematic issues from the traditional hot stamping originally used by customer if the case is applicable.

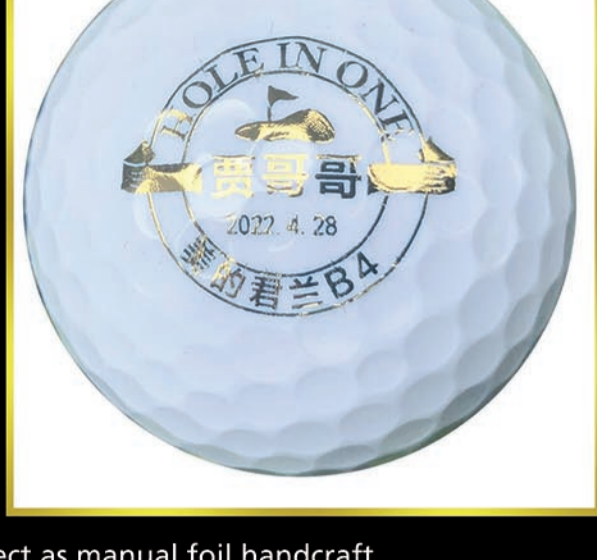
3D Print By PFD - Working Principle

Like a soft foil paper seamless lay on the product surface. (No wrinkle; Wide full cover)

Taking an example of golf ball surface with dimples : Comparatively, the refinement of PFD able to produces similar effect as fine as the manual foil handcraft like a piece of art.



Manual foil handcraft



PFD Hot Stamping Sample : Similar effect as manual foil handcraft

PFD : Combination of Hot Stamping & Multi Color Pad Printing

Don't forget the harmony of both hot stamping and multi-color pad printing on irregular product surface by PFD setup is one of key power. The final visual effect of the printed image : Shiny, metallic and also with beautiful color(s).

With no doubt, PFD offers a good option to the market and facilitate the possibility of new diversified range of creative image designs for various products.

PFD is not absolute 100% application on all products but able to be widely applied on the majority of irregular product surface like curved surface or printed image across the corner of product. That's why we do strongly emphasis the importance of trial print.



In the old days, for printing job as photo above, people have to do foil stamping and then switch to another pad printer separately. The whole process is high labour intensive, costly, time consuming and low productivity with high tolerance rate.

The traditional hot stamping is purely a kind of foil decoration process but not able to go beyond with having any color(s).

In contrast, PFD is All-In-One setup to do both hot stamping and pad print color jobs effectively and adaptable to what the market demand.

PFD is viewed as a technical revolution which break through the bottle neck in the field of image / product design and production.

The final PFD printed outcomes is pleasant to brighten the brand name and bring out the characteristic image, particularly for eyewear, cosmetic, gift & premium like memorable golf ball, jewellery box.

Generally, the Max. PFD Hot Stamping image size cover up to 60 mm diameter. (Advise : Recommend to do trial print for analysis case by case)

Costing - PFD* :

Small PFD Hot Stamping images on Perfume bottle or Golf ball : Approx. USD 0.02.

*Only material cost put in account ; Figure will be varied due to other objective factors.

In fierce competition, the key of success does more or less originate from the foreseen on the invisible opportunity cost cut by the management.

Remark :

It is user-friendly, particularly for those with existing pad printer and pad printing experience. (i.e. 1st priority target for PFD promotion)

As the fundamental setting of PFD different from the conventional pad printer, it is unlikely to transform the existing pad printer into PFD setting.

In Conclusion :

- The high refinement of PFD printed image give you shiny, high glossy, smooth, fine and detailed quality.
- The application of PFD gives you high elasticity, high productivity and wide adoptability.
- The high value added of PFD is from the dramatic invisible cost cut and high opportunity cost cut.

By PFD, you can do two job by one setup with less time, less skill, less cost, less energy consumption, less space occupied but with higher productivity and lower tolerance.

• Hair Brush (wooded)

PFD hot stamp image on top and the curved side of the brush. Before adopting PFD, customer did find the failure rate is high by the traditional hot stamping.



Silver / Gold hot stamps + Pad Print by PFD

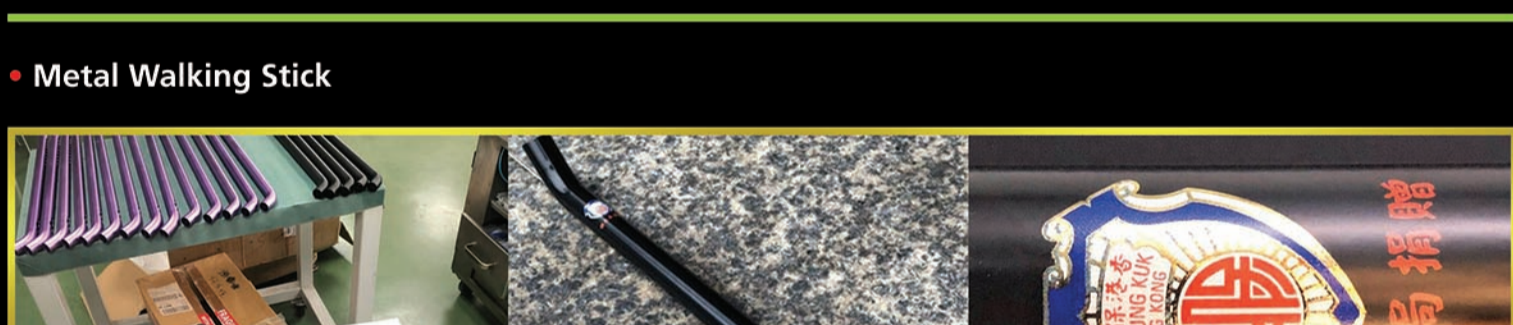
• Eyewear

The traditional hot stamping image on irregular PC surface failed but PFD able to do hot stamp image on 3D surface easily.



Fine hot stamp image printed by PFD on irregular PC surface

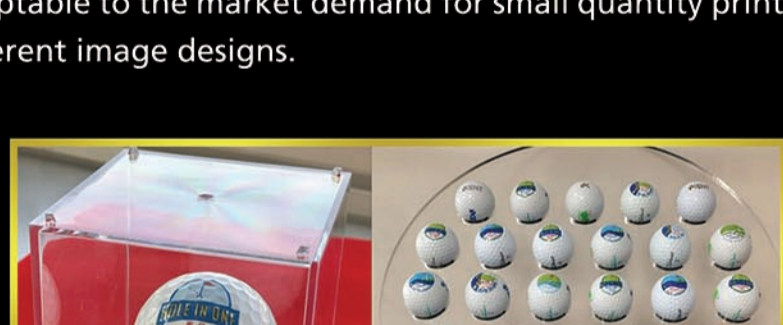
• Metal Walking Stick



Gold Hot Stamp + Pad Print Color(s) by PFD

• PFD Printed Golf Ball (Gift & Premium ; Memorable Event ; Customized Design)

- 3D print across dimples.
- Just-In-Time to do various hot stamped images (e.g. person name, club name, date) on the color printed images of ball as gift & premium or for promotion.
- Ideal for individual customized purpose.
- Adaptable to the market demand for small quantity prints among different image designs.

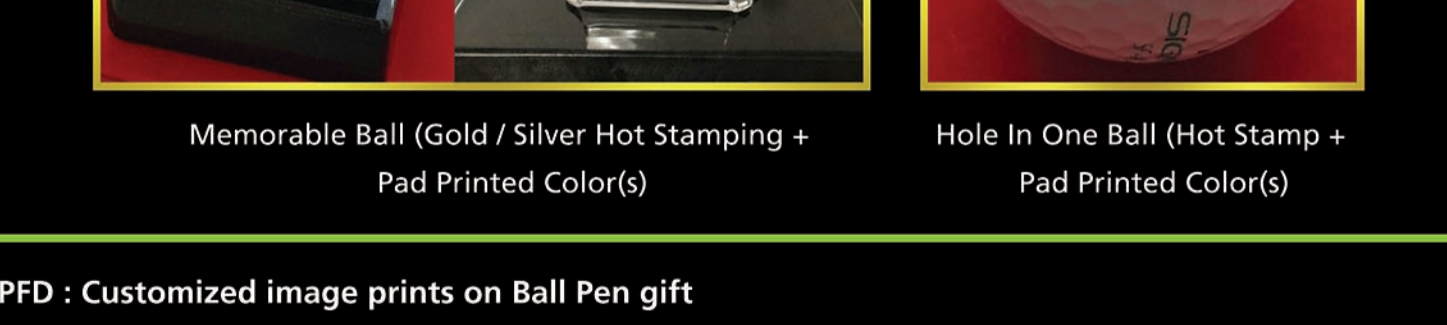


Memorable Ball (Gold / Silver Hot Stamping + Pad Printed Color(s))



Hole In One Ball (Hot Stamp + Pad Printed Color(s))

• PFD : Customized image prints on Ball Pen gift

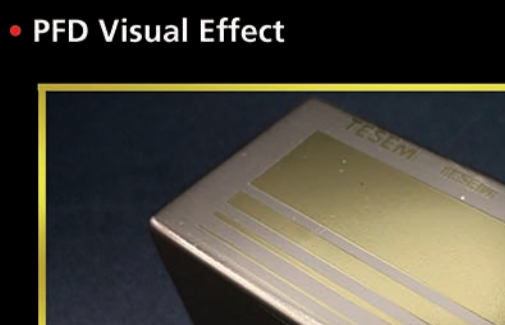


By PFD Hot Stamping

• PFD Visual Effect



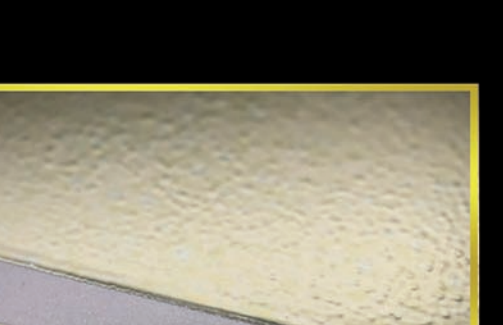
Jewellery Box - Thick PFD hot stamp layer look solid thick and shiny



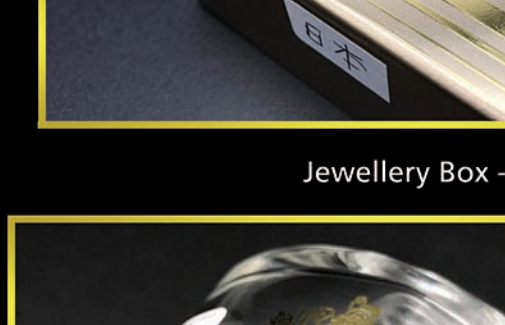
Perfume Bottle



Korean Pill Box (PC)



PFD hot stamping on Hand Cream Glass Bottle



Perfume Bottle



Korean Pill Box (PC)



PFD hot stamping on Hand Cream Glass Bottle

PFD - Printer Models

- All-In-One set up : "Hot Stamp" + "Pad Print Color" by one PFD set up
- 3D Print on any irregular product surface
- You can have 3 options of operation mode
- Do both hot stamping and color pad printings together
- Or do colors pad printing only
- Or do hot stamping only



Gold hot stamp + pad printed colors across the corner of the product

4 Models :

- **PFD-mini**
Either for PFD hot stamp or 2 color pad printing jobs (Economy, compact)
- **PFD-90**
Either for PFD hot stamp or 2 color pad printing jobs (Solid powerful G-TURBO 90 structure for heavy duty production)
- **PFD HVA-150/S & PFD HVA-150/C**
Printing cycle (speed) of PFD :
- Shuttle set up : 9.5 seconds / cycle
- Conveyor set up : 8 seconds / cycle

Remark :

The figure as above may be affected by objective factors like print requirement, ink drying condition, load / unload arrangement, pad hardness, product quality etc...
Even the output cycle can be further upgraded by considering two cavities print design but all is also due to many factors like the nature of the product case by case.

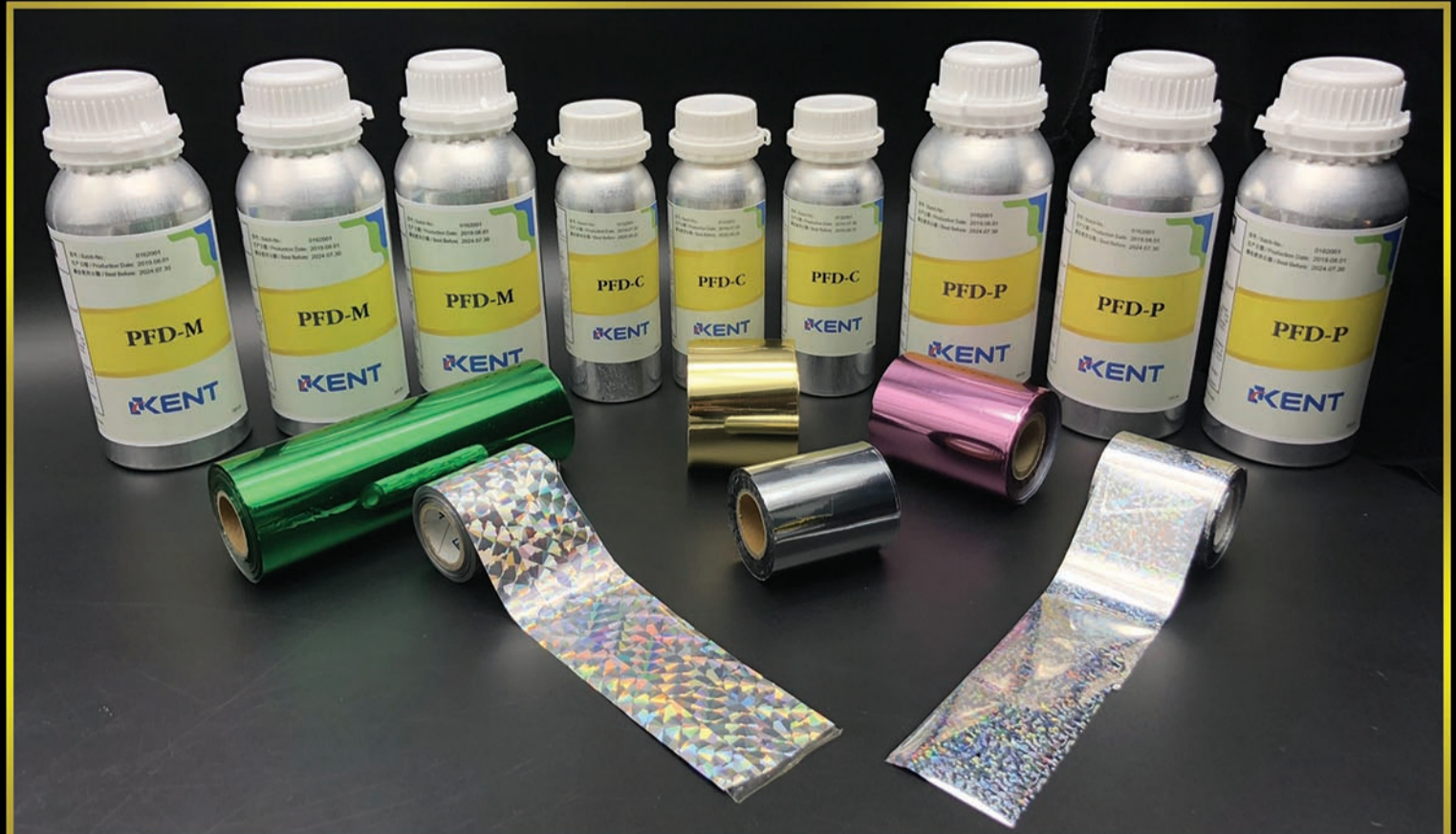
Like pad printer, PFD set up is almost same design in terms of user-friendly and eco-friendly.

With basic pad printing elements like Green Cup, MGP (KENT Laser Engraving Cliché), K2A Anti-statics Pad. On top, there is low cost productive KENT foil(s) and PFD hot stamp glue.

By easy pad printing setting, end-user does initiate each job from touch screen and relax to complete the cycle with KENT Dean On System. There is no more time-consuming preparation like bulky and costly making of hot stamping die mold as traditional hot stamping in the old day.

- Green ink cup
- K2A Anti-static pads
- MGP Green plate & Laser engraving

Basic Green Pad Printing Elements



Low Cost Consumable Items : Hot stamp foil, Hot stamp glue