

Report on a User's Experiences

Practical Test of a Manual Powder Coating Gun

For eight days, an expert user tested a new manual powder coating gun. The following excerpts from his diary give an insight into his experiences.

The employees at Trumpf Laser- und Systemtechnik GmbH near Stuttgart in Germany have many years of experience in powder coating. Complex machine parts are coated mainly by hand

in a manual booth or in an automatic booth with manual pre-coating and finishing processes.

In February 2011, Oskar Heinz, head of powder coating at Trumpf, de-

cidated to invest in a new manual gun (OptiFlex) from Gema Switzerland GmbH for the first time. Compared to the guns previously used by the company, this offered significant improvements in overall handling, powder consumption and powder penetration, together with better options for setting the coating parameters on the control unit. In addition, the new gun produced a much higher quality finish, including in the case of metallic powders.

When Gema introduced its successor, the OptiFlex2, onto the market six months ago, Heinz decided to carry out some practical tests. In order to provide the manufacturer with comprehensive feedback, he recorded his experiences from the first to the eighth day of the testing period. These are excerpts from his diary.

Day 1

I start up the gun at the beginning of the day using the same settings as the previous model. The first thing that strikes me is that this simply isn't right. It's using too much powder. There is an excessive build-up on the edges and the coated surfaces don't look smooth or uniform.

I reduce the powder output, but that alone isn't enough. Then I reduce the voltage and the current and things start to look much better. Believe it or not, I've cut the powder output by 30% after half an hour. Now I got used to it and my colleagues want to try the gun out. It's a big "aha" moment.

Day 2

All the programs are stored. For me, the design of the gun is a success. It's the



Oskar Heinz, head of powder coating at Trumpf in Ditzingen: "A very successful spray gun."

small details that really impress me. For example, the pivoting control unit, the new injector and the cleaning function. The only minor problem is that the gun is slightly longer than its predecessor and a little top-heavy.

We start by coating smaller parts. I notice a few things:

- The penetration is much better than the previous model, even with our problem “Trumpf blue” powder.
- There are noticeable improvements in the application efficiency.
- The appearance of the coating is better.
- The picture frame effect is less reduced.
- There is almost no build-up on the edges (Trumpf blue).
- If the powder were better, the results would be even more striking.
- One of my colleagues says: “I don’t have to go over the parts as often, even in the corners and on the edges.”
- The cleaning process is very quick.
- Well-designed components include the new injector, the collector nozzle and the extension with a locking mechanism.
- The best thing of all is cleaning at the press of a button, using the “P” switch on the gun.

Day 3

Today I do some fine-tuning of the control unit and decide to use our blue problem powder. First I try to get rid of back ionisation. I keep the powder output the same to make sure that the coating thickness is correct. I reduce the current and immediately the back ionisation disappears. Considerable improvements are possible even with a difficult powder. The unattractive picture frame effect is also significantly reduced. After the curing process, I take a look at the parts. The visual inspection shows:

- Better coverage of undercuts.
- The penetration is significantly improved even with difficult powder.
- The structure seems stronger.

My colleagues also feel that if we had had a better blue powder, the results would definitely have shown an even



After selecting the program for parts that are difficult to coat: “The powder moves easily into the corners and the edges. There is no powder build-up in the corners.”

greater improvement. Next we begin coating large parts (cross beams). I start as normal with 85% powder output, but I notice immediately that this is too much. I reduce the powder output, ultimately by 30%. My working speed stays the same.

The powder cloud seems more even and uniform and I can coat the corners, edges and undercuts much more effectively.

After reducing the current, the craters and the build-up on the edges disappears. Following the curing phase, I look at the parts in the loading and unloading area and it becomes clear that the results are even better. I go on experimenting with different settings on to the limit.

It’s obvious that this gun produces significantly improved results, even with difficult powder types.

Day 4

Powder coating in the colour RAL 9005 is on the agenda today. I reduce the current again. Black is the easiest powder to use. I choose a specific range of parts for coating with lots of corners, edges and areas that are difficult to access. And, of course, parts that are very difficult to coat because of their shape.

I bring in a colleague to find out what he thinks. He does the testing himself. The result is surprising. A variety of parts that in the past always had a narrow uncoated strip are now completely coated. We are both amazed. The parts look completely uniform and there are no uncoated metal areas at the bottom. Also the build-up of powder in the corners is largely a thing of the past. Over the weekend, I plan to read the user's manual. You can only get a really good result if you know everything about the tools you're using.

Day 5

I will be experimenting with special colours and metallic coatings over the next few days. I'm interested to find out how the precise charge control (PCC) mode functions with metallic powders. I'd also like to look in more detail at recoating. I think I've now got the right settings for blue and black. The results are very good. I will keep things as they are and see whether these settings can be used for our entire range of parts.

Today I'll be using black and blue alternately. I install a new box. The powder hangs in the box like a wet rag. In the past I've had to shake it up by hand several times a day. Now I put the suction pipe in and watch what happens. The suction pipe is much narrower than the previous model. The powder fluidises almost imperceptibly in the box, but it all works without problems. That's true both of black and of Trumpf blue.

One other excellent feature is that there is much less powder waste. In the past we wasted between one and three quarter-full sacks every day. Now that figure has more than halved, which is a significant advantage given today's powder prices.

Day 6

Over the weekend, I've read and inwardly digested the user's manual. First of all, I take a close look at the gun. In my view there should be a central button to allow you to control all the programs from the gun. (Comment: This function is now available on volume production models.)

The buttons should also be raised so that they can be used when wearing gloves. I try out what I have read about over the weekend using RAL 9005 black powder. I press the button on the control unit which shows that I have chosen a program for parts that are difficult to coat. Straight away I notice that something is happening. The powder moves into the corners and the edges almost of its own accord. It all happens in no time, with no powder build-up in the corners. Two of my colleagues try coating some parts and get the same results. When they ask what I've done, I explain to them about the symbols on the control unit.

Despite the cavity, you have total control of the coating process. The working speed is right too. And one other very important point: the quality is top-class.

Day 7

Today's job is coating swarf gates, by far the most difficult part to coat.

First of all, I try applying a complete coating to the parts and it's easy. The corners are coated and I don't need to go through the irritating process of coating the parts over and over again until the corners and gaps are properly covered. This wasn't possible with other spray guns.

Now we come to the special colours: yellow, orange, RAL 9002, RAL 5010. In the past we've had to have one or two extra passes with yellow and orange.

I find two sample metal sheets which are 50 x 50 cm in size. First I paint them black, then I apply a yellow coat on top. On one side I use the normal process and on the other PCC mode. It's almost impossible to get full coverage on the first side. The faults are clearly visible. Now I try the other side with PCC mode. I pass the gun four or five

times over the sheet. There are no faults and you must remember that I'm applying yellow over black.

Orange is the next problem colour and here everything goes smoothly too. The application efficiency is better with all the colours and the work is easier, even with problem powders.

I can reduce the powder output in all cases and work much faster. On top of that, the visible results after curing are better for all the colours I've tested.

Day 8

On the last day of testing, I try metallic powders. After roughly setting up the gun, I coat some small parts and two large sheets using RAL 9006.

The old settings are not much use with this gun, so I switch to PCC mode to see how the powder reacts to my settings. Then I do a bit of fine-tuning until I get the right results. It will be interesting to see what it looks like after curing. A colleague is the first person to see the parts as they leave the cooling area and he's enthusiastic. There is no edge build-up and also no stripes. All in all it's been a great success. It's a pity that there weren't more parts which need a metallic coating. I'm sure we could make some more minor adjustments.

Summary

This is a very well-designed spraying unit with hardly any weak points. The new functions are excellent and the whole thing is a step in the right direction. The gun functions particularly well with difficult powders. It would have been good to be able to test metallic powders on a wider range of parts and for a longer time. Overall, the new gun has a great deal of potential. My summary after eight days of testing is that once you've got your hands on this spray gun, you won't want to let go of it. ■

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