

Werkzeug Technik

Technologie - System - Logistik

Technical magazine for cutting tools and measurement in the manufacturing

ISSN Nr. 0997 - 6981

www.werkzeug-technik.com

25 August 2015

Nr. 148

PREPRINT
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At which job coating costs can a SME think about investing into a coating system?

User

Job coating

150'000 €



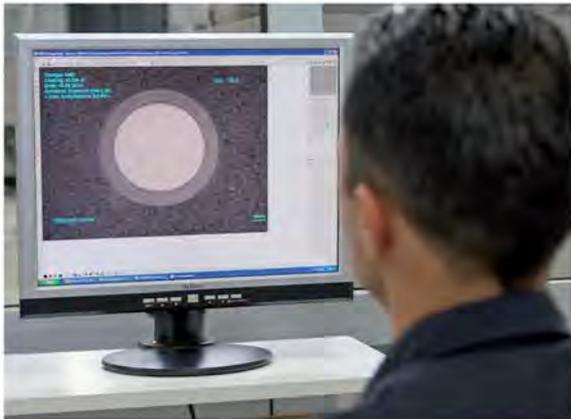
When can a SME think about investing into a coating system?

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In House Coating

ZWT Zisterer offers shortest delivery time with the help of the In House Coating. This includes the continuous quality control of the layer thicknesses. Available types of coatings : TIN, TICN, TIALN, NACO and ALCRO-NANO.

ZWT supports its customers with application recommendations and also provides dedicated coatings for testing.



Fig. 1: SME provides with the in-house coating particularly short delivery times and consistent quality. Source: Zisterer, ZWT, Spaichingen. Germany.

The coating is one of the most important factors they determine the performance of the cutting tools. Whether its influence is more or less than 50%, we prefer to leave it open But the fact is that more and more SMEs decide for an in house coating worldwide. The main reasons for this lie in the technical and operational level: Complete production, fast delivery, better quality, own layers with brand names, and simpler logistics, to mention only the most important ones [1].

These varied reasons are enough for a great deal of companies to decide upon in-house coating. Even small businesses (fewer than 20 employees) opt more and more for in-house coating and thus provide constant quality in extremely short delivery times (Fig. 1).

The specific tool geometry, the dedicated layer and the production process can be developed collectively, which gives rise to an optimal and thoroughly distinct product [2].

The costs, the benefit, and the efficiency of coating at large coating companies are known to be excellent. But what is it like at smaller businesses? Or in other words: at what job coating costs should small or medium-sized enterprises (SME) invest in a separate coating system? This question will be answered below with reference to concrete practical figures.

The technological conditions

First and foremost, the optimal size and capacity of a coating system must be selected with the quantity of tools that need coatings in mind. For example, the 11 series by the coating specialists Platit covers a very wide spectrum of users. It ranges from small regrinders to large forming tool manufacturers [3].

Needless to say, a coating system only functions with the support of the corresponding periphery:

- chiller for cooling,
- cleaning units and
- quality control systems are absolutely necessary, even at the smallest expansion range.
- Additionally, tools need edge preparation and post treatment units, but

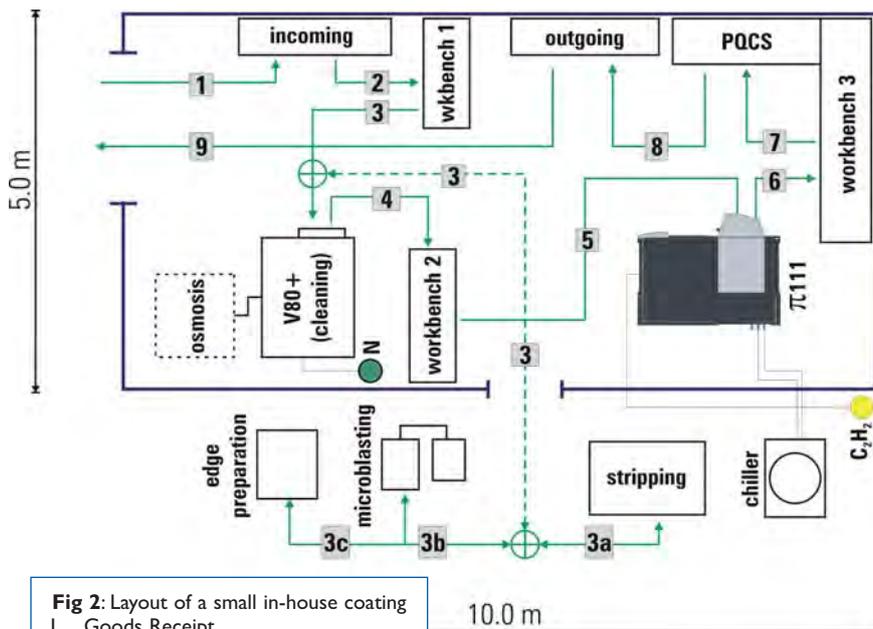


Fig 2: Layout of a small in-house coating

1. Goods Receipt
2. Preparing for cleaning (e.g. micro blasting)
3. Cleaning
 - 3a. Optional: stripping
 - 3b. Optional: cutting edge preparation (e.g. brushes, micro blasting, etc.)
 - 3c. Optional: after-treatment (e.g. micro blasting, polishing, etc.)
 - 3d. Optional: Cleaning for pre- or post-treatment
4. Preparing for coating (e.g. carousels loaded)
5. Coating
6. Discharging the batch
7. Quality control
8. Packaging for delivery
9. Outbound / shipping.

were considered under the following production conditions:

- two shifts of eight hours production time in the day
- fill rate/charge 80 percent
- possible coatings for the different systems
- typical discounts on coatings, depending on the systems and layers and
- the supposition of half a workload in the first year.

With how many tools, or in other words, at what annual job coating costs is it worth it for a small tool manufac-

turer to consider investing in a coating system?

In order to answer this question pragmatically, we will make another calculation. The cash situation of the business is analyzed according to today's usual leasing conditions. The following cash-relevant costs are considered:

- leasing rates, calculated using the price of the coating system (including cathodes, coating recipes, basic holders, cleaning system and a quality system), with an interest rate of 4 percent.
- labour costs, including social costs, and
- variable costs like energy, target, gas and cleaning expenses.
- The costs which arise within a coating company from transportation, repeated packaging, handling damages and rejected deliveries are not considered. These costs are cancelled out or at least decrease heavily due to the in-house coating, which improves the cost situation further.

On the other hand, there are the costs which the tool manufacturer has paid to the job coating company. The diagram in Fig. 4 shows the negative and positive cash flow (loss and gain) which in-house coating can generate against job coating, depending on the amount of tools being coated (or the original costs for job coating).

these are already present in 95% of German grinders [4].

- Furthermore, a decoating system is highly recommended for regrinders [5].

This kind of periphery can serve at least three coating systems. The space requirement of a system for up to three coating installations ranges from 50 to 150 m² [3] (Fig.2).

Costs and profit

An encouraging fact beforehand: the Return on Investment (ROI) is achievable in around two years depending on the size of the installation [3].

The costs pictured in Fig. 3 were calculated for a tool manufacturer that produces drills, end mills, cutting inserts and hobs, with diameters between 3 and 80 mm and lengths from 46 to 180 mm.

- The fixed costs such as credits, wages, social affairs, rent and depreciation, as well as
- The variable costs like energy, target, gas, cleaning and decoating

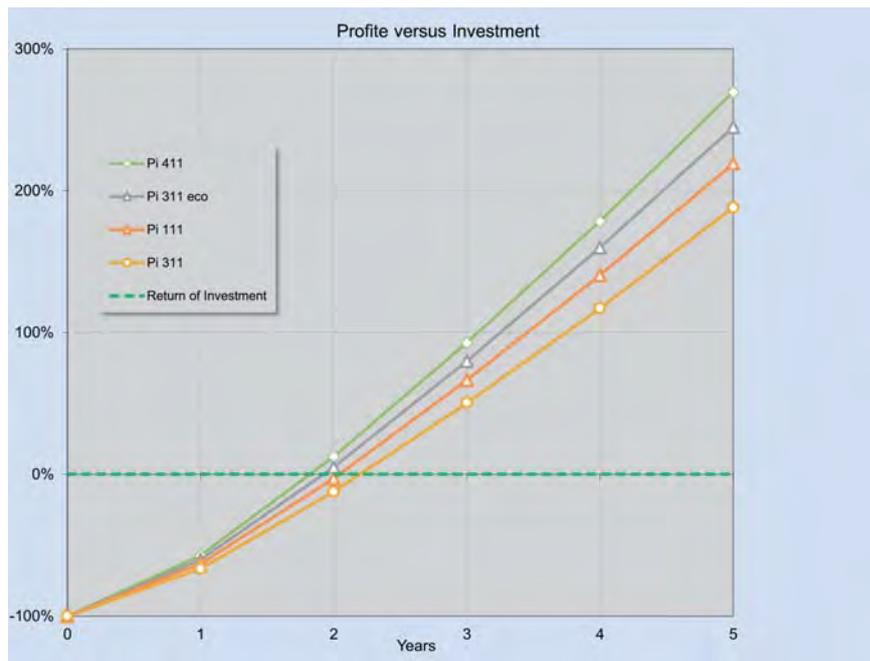
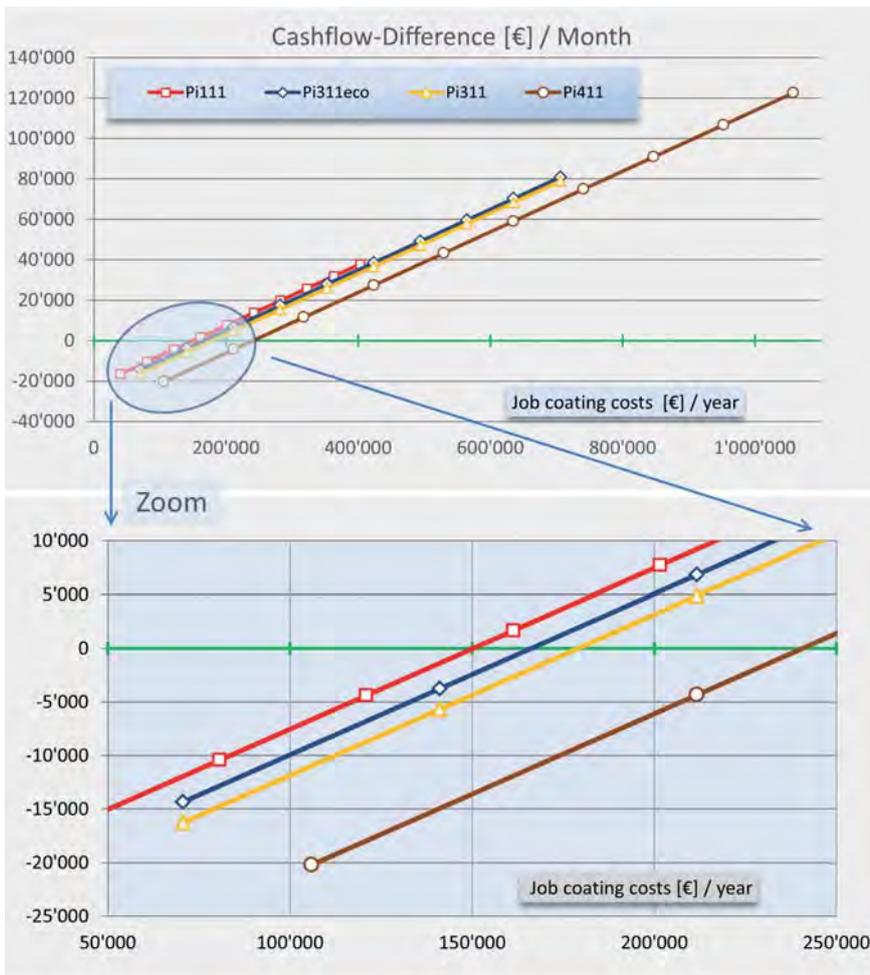


Fig. 3: Comparison of gain and investment (Return on Investment – ROI) with a coating system for in-house coating, illustrated by the example of a tool manufacturer which produces drills, cutters, cutting inserts and hobs.



| | Pi111 | Pi311eco | Pi311 | Pi411eco | Pi411 |
|--------------------------------|---------|----------|---------|----------|---------|
| Min. number of tools / day | 215 | 237 | 256 | 260 | 344 |
| Min. job coating costs / day | 536 | 593 | 639 | 651 | 859 |
| Min. job coating costs / month | 12'517 | 13'848 | 14'914 | 15'190 | 20'052 |
| Min. job coating costs / year | 150'205 | 166'174 | 178'973 | 182'280 | 240'621 |

Fig. 4: Cash flow comparison: At what job coating costs is an in-house coating profitable?

The table in Fig. 4 also illustrates that, according to the calculations for this case, in-house coating is profitable once job coating costs reach 150,000 €.

But the most important benefits are still the technical and operative advantages:

- complete in-house manufacturing done independently,
- being able to deliver quickly,
- simple logistics,
- better and consistent quality, and not least
- the exclusive and dedicated coatings.

Outlook

If you look at the statistics from the global PVD coating industry, you will come to the following conclusions [6] (Fig. 5):

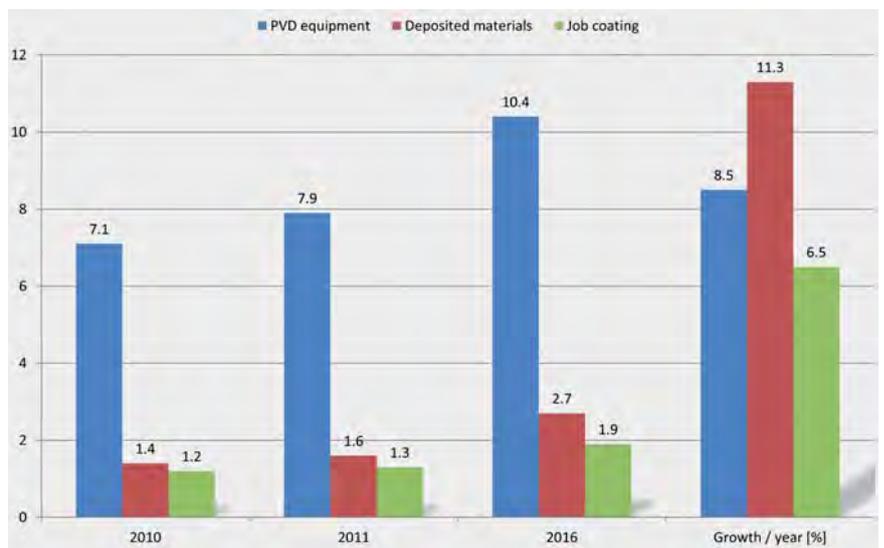


Fig. 5: PVD global market analysis: 2010-2016.
Source: Manufacturing Market Data Published by BCC Research, Wellesley, MA, USA
Physical Vapor Deposition (PVD): Global Markets 2012.

- The growing number of cutting materials prompts more and more dedicated coatings, which cannot practically be delivered by the job coating centers.
 - The increase in PVD systems is bigger than that of job coating. Consequently, the systems are more and more frequently used for in-house coatings.
- In summary, we can therefore establish that in-house coating is quite rightly in trend, due to both the technical and operative, and the economic advantages.

References:

- [1] Cselle, T.: The main reasons for in-house coating
Werkzeug-Technik, Nr. 138, February/2014, p. 100-101.
- [2] Hobohm, M.: The doubler - A high speed drill for cast iron machining.
Werkstatt und Betrieb, Munich, 12/2014, p. 36-38
- [3] Compendium 2015 - 55th edition - PLATIT AG, Selzach/SO, Switzerland.
- [4] Schulenburg, M. a.o.: Survey for priority project "cutting edge".
IWF-TU Berlin, 3/2010.
- [5] Wittel, B. a.o.: Productive decoating of PVD coatings.
Swiss Quality Production, Hanser, Munich, 2014, p.35-37.
- [6] Manufacturing Market Data - Global Markets; Physical Vapor Deposition (PVD)
BCC Research, Wellesley, MA, USA, 2012.

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