HANSER

# Productive Decoating of PVD Coatings

## Platit CT decoats in less than one hour


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Special reprint

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# Productive Decoating of PVD Coatings

The decoating of cutting tools for regrinding is an important precondition for their recoating with high quality [1]. The methods known today are slow. This article presents a new, fast decoating process and the decoating system developed for this purpose.


1 The new Platit-CT decoating system

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→ In May 2014, the importance, requirements and latest technologies currently available were summarized in detail at a special workshop [2]. As a result, this article can be spared a long introduction and concentrate fully on the economically crucial question concerning the productivity of decoating.

›Productive decoating‹ actually sounds paradoxical. Decoating does not produce any new product but removes an old, used coating so that the new coating can bond well on the reground tool and achieve high performance. Hence, productive decoating primarily means speed. It must not hinder the production of the new coating.

Decoating processes and systems are offered by very few companies on the market. This knowhow is a closely guarded secret and is used predominantly only in their own job coating centers. Very little data is known about the individual processes. It is a known fact, however, that decoating times are long. They require several hours or even days ([3], page 38).

## Platit-CT decoating system and process cycle

The new wet chemical decoating system (Figure 1) from Platit in Selzach/Switzerland works with a free programmable, pulsed voltage supply that is controlled by a simple computer. The tools are held in insulated fixtures (Figure 2). The processes run in 2 electrolytic baths:

- Chemical A: for Ti, Al based coating (acidic),
- Chemical B: for (Al)Ti,Cr (Cr, CrTi, AlTiCr) based coating (alkaline).

The stability of the chemical baths is between two and three weeks depending on frequency of use. Constant new preparation of the chemical baths is not necessary, which reduces the variable costs of the decoating.

The process cycle is shown in Figure 3. In stage 1, pulsed decoating is performed in bath A or bath B. The decoating duration is in minutes. Any thin TiN bonding layer that might be present can be removed afterwards in a conventional decoating module, under protecting voltage ([3]), in peroxide solutions during stage 2 within just a few minutes. Thus, the entire decoating process lasts considerably less than one hour.

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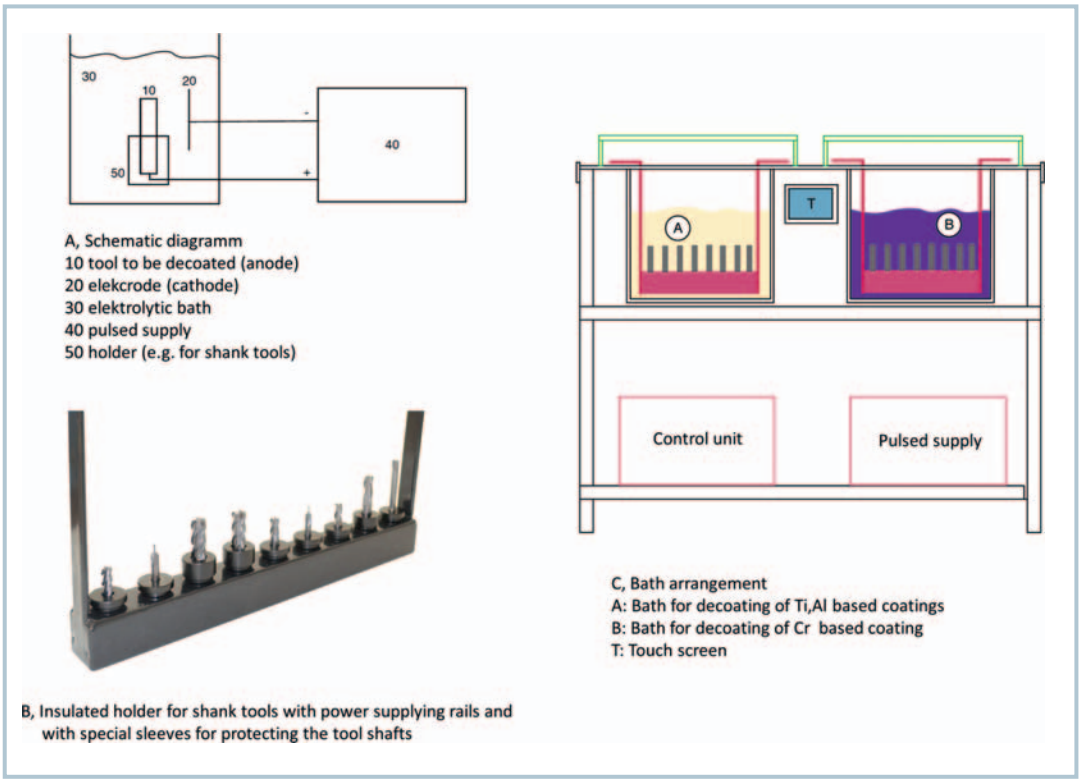
Figures: Platit




**2** Elements of the Platit-CT decoating system. Figure 2-A: schematic diagram, Figure 2-B: insulated holder for shank tools with power supplying rails and with special sleeves for protecting the tool shafts, Figure 2-C: bath arrangement

The end of the decoating process can be detected by the built-in electronics that simplifies the daily practice of the operator greatly. This fast decoating also increases flexibility through the reduction of the decoating time. Its flexibility is of huge importance for small regrinders, they are incessantly struggling with large job coating centers. The decoating process during the reprocessing of the tools no longer takes most of the time (collecting-decoating-regrinding-recoating-delivering).

## The decoating recipes and decoated tools

The decoating recipes are the key to the process, of course. They include the following knowhow:

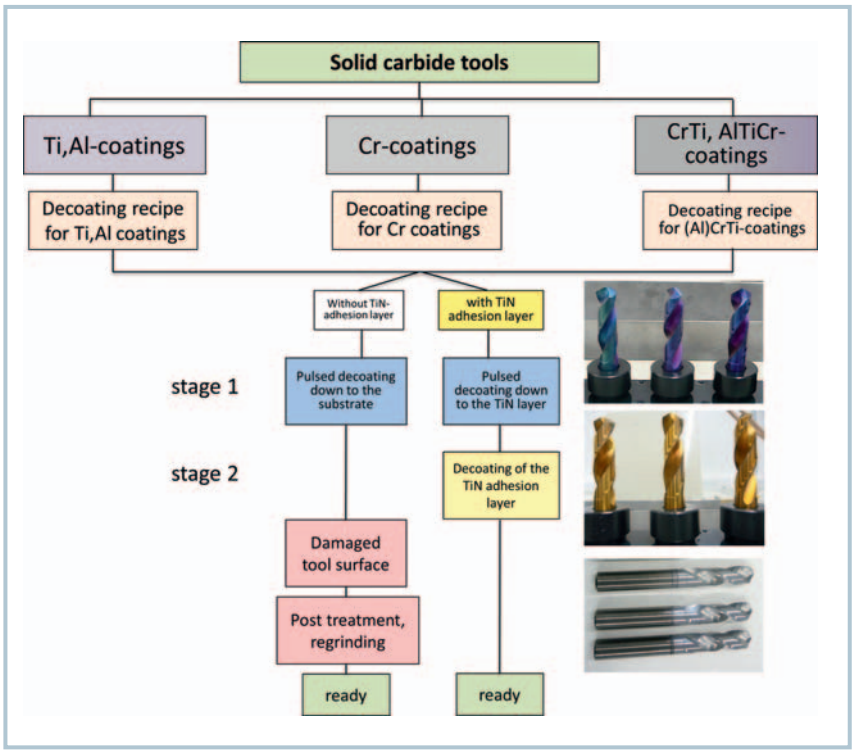
- the recommended special holders for shaft tools and hobs,
- which baths (alkaline or acidic) should be used for the different coatings,
- the program for the electronic control unit of the wet chemical processes (voltage, current, frequency, duty cycle, operating time),
- assessment of the surface quality and any further treatment that might be recommended.

The recipes can be divided into 3 groups (Figure 3):

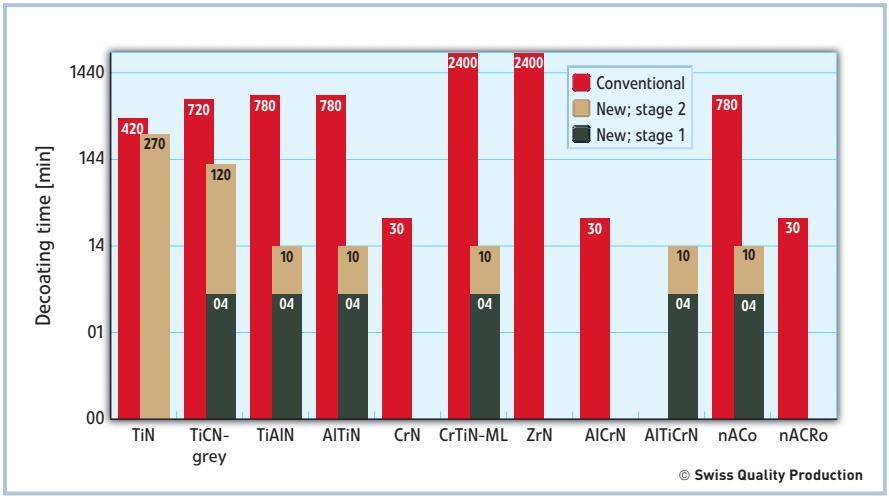
- for Ti,Al based coatings,
- for Cr based coatings,
- for Al, Cr, Ti based coatings.

The recipes vary from each other for carbide tools and HSS tools.

Figure 3 also shows carbide tools before and after the new Platit-CT decoating process. For the user it is tremendously important that the tools do not have any cobalt leaching, thanks to the TiN bonding layer and the two-stage decoating, and that the tool shafts cannot be attacked by the chemicals, thanks to the specially sealed holders. They withstand the decoating without any dimensional changes.




**3** Process cycle of the CT decoating




**4** Comparison of decoating times of solid carbide shank tools with conventional and CT process (for coating thickness of 2 µm)

## The productivity increase

As mentioned in the introduction, the productivity, the short execution time of the decoating, is important so that the recoating of the tools does not suffer any delay. Figure 4 compares, by way of example, the decoating times of the conventional and Platit-CT processes for carbide shaft tools. Caution: The diagram had to be drawn with a logarithmic vertical axis due to the enormous time-savings. ▮

## REFERENCES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**3** Platit – Compendium 2014. 53rd Edition, Platit AG, Selzach 2014

**4** Process for decoating ceramic hard coatings of steel and carbide substrates. Patent application PCT/EP2014/055376, European Patent Office, Munich 2014



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