

# SPRAYTIME®

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## Belt Grinding Systems Save Time, Add Capacity and Payback in Three Months or Less

As the economy slowly grows, the need for more grinding capacity at thermal spray job shops will increase as well. While sales growth at most shops will be very welcome, it won't be big enough or fast enough to justify large capital projects to expand capacity. So how can a job shop increase capacity without laying out hundreds of thousands of dollars to buy a new grinder?

One option is belt grinding attachments. Belt grinding attachments are becoming very popular with coating shops. Belt grinding attachments are added onto an existing grinder. New belt technology allows for faster finishing of thermal spray coatings. This means less cost and shorter delivery times.

Belt grinding systems are uniquely suited for finishing or stripping ceramic plasma spray and tungsten carbide or chrome carbide HVOF applied coatings. Due to their high hardness these coatings are ideal because of how they fail. The cutting action of the diamond belts makes quick work of the coatings. Conventional grinding removes the coating by compressively failing the coatings. Belt grinders cut the coatings in a shearing action, which is much more efficient. Thermal spray coatings fail faster in shear than in compression.



So the cutting action of a belt grinder can reduce the time to strip or finish a typical size roll by 60% or more. Changing belts can be done in 2-3 minutes. Compare that to changing a diamond wheel on a conventional grinder, dressing the new wheel, or moving the part to another grinder with the right wheel and you can clearly see the time advantage belt grinding systems offer. Most thermal spray coated parts can be finished with a

roughing belt 70 microns and a finishing belt 20 microns. Thermal spray coatings require diamond belts.

In a timed test a belt grinding system was able to remove 0.017 in. per side of tungsten carbide HVOF coating in 90 minutes. The roll was 8 in. OD x 65 in. face length. Typically, it would have taken several hours to strip this much tungsten carbide. In another test a 6 in. OD x 70 face length roll was finished from an as-coated state to 18 microinches Ra in two hours. Again, this size roll would normally have taken 4-6 hours to grind. Taper on both rolls were held within the specified TIR of 0.0015 in. Another WC coated roll was finished from the as coated state to less than 1 microinch Ra in 2 hr 30 min without having to change grinding wheels or moving the part to another grinder and without Superfinishing. Three diamond belts were used in this case. Typically, only two are needed.



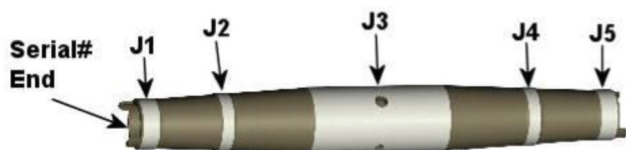
The belt on a belt grinding system is changed by simply stopping the grinder, opening the safety guard door, releasing the pneumatic tension on the belt and removing the belt to be changed. Then reverse the process. Slip the new belt onto the grinding wheel and around the idlers in the belt tensioning system and re-tension. Close the safety guard door and go back to work. Simple as that.

Belt grinding attachments are added to an existing cylindrical grinder. The cost for belt grinding attachments are about 1/10th that of a new grinder. It is simply an attachment. Installation takes 1 to 2 days. The grinder wheel is used as the platen which drives

the belt at speeds similar to those used when finishing a roll or part with the grinder when using the wheel. If a part must be finished with a conventional grinding wheel, just remove the belt, back off the belt attachment and use the grinder as it was in the past.

Belts to finish hard chrome plating are available as well. Belt grinding systems are becoming especially popular with coaters and chrome platers who repair aircraft landing gear.

Tests conducted by the USAF at Hill AFB in Utah produced some very exciting results. Several tungsten carbide coated diameters on B1-B axles were first ground by conventional grinding wheels and the time recorded. The areas took a total of 4 hours to grind. Then axles of the same part number were finished with a belt grinding system which took a total of 13.4 min. Estimated time savings on each axle were 3.75 hr. See Figure below.



The conclusions of the USAF tests were:

- Dramatic reduction of grinding times with belt compared to standard wheel;
- Surface finishes were very good without a great degree of optimization;
- Burns were not found where most aggressive grinding took place;
- Belt change took approximately 2.5 min.

Another benefit of belt grinding systems is that it is nearly impossible to create grinding burn in a part. This is because there is considerable less load friction created with a belt compared to a grinding wheel. Burns in parts, also known as over tempering, can cause cracking and reduce fatigue life. Burning is an especially dangerous condition for aircraft parts since burns in exotic metals, unlike ferrous materials, are usually invisible. Aircraft parts which have grinding burns must be scrapped. That can get very expensive.

So if you are considering expanding your grinding capabilities you might want to take a look at belt grinding attachments. ROIs are typically measured in months.

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