



evo-lu-tion

*Dinosaurs belong in museums...not
in your production line.*

Machinability Test #1

DC53 v D2 Test Report

- Comparative Machining Data between DC53 and D2 steel
- Machine Used: Okuma CNC Vertical Milling center (MC-V4020)

DC53 v D2 Test Report

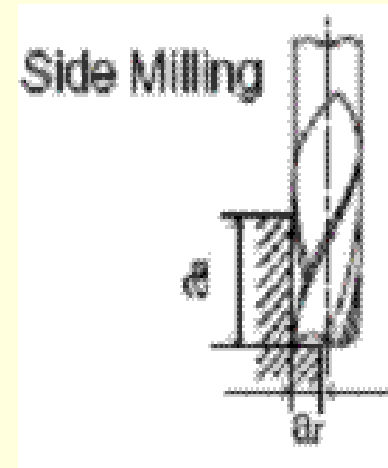
Tool			Point
<u>Type</u>	<u>Size</u>	<u>Coating</u>	<u>Geometry</u>
Nachi SG ESS Drill	1/4" (6.35 mm)	Composite Multilayer SG Coating (TiCN) (3 rake, 2 rake, x-thinning)	
Nachi AG Roughing End Mill	1/2" (12.7mm)	Composite Multilayer AG Coating (TiAlN)	-NA-

DC53 v D2 Test Report

- **Milling Conditions:** Dia. of Mill: 12.7mm (.5") Speed: 25 m/min (626 RPM) Feed: 110mm/min (4.33 IPM) Material: DC53 Coolant: Dry Machining

$$aa = 1.0 \times D = 12.7\text{mm} (.5")$$

$$ar = .5 \times D = 6.35\text{mm} (.25")$$

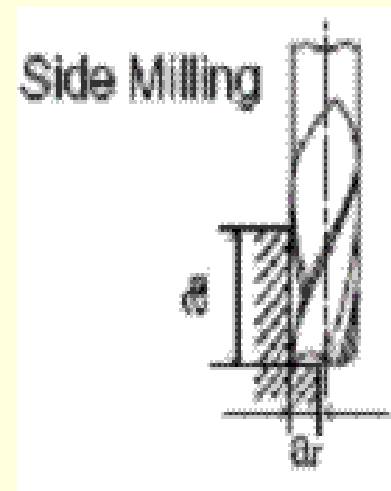


DC53 v D2 Test Report

- **Milling Conditions:** Dia. of Mill: 12.7mm (.5")
Speed: 25 m/min (626 RPM) Feed: 110mm/min (4.33 IPM) Material: D2 Coolant: Dry Machining

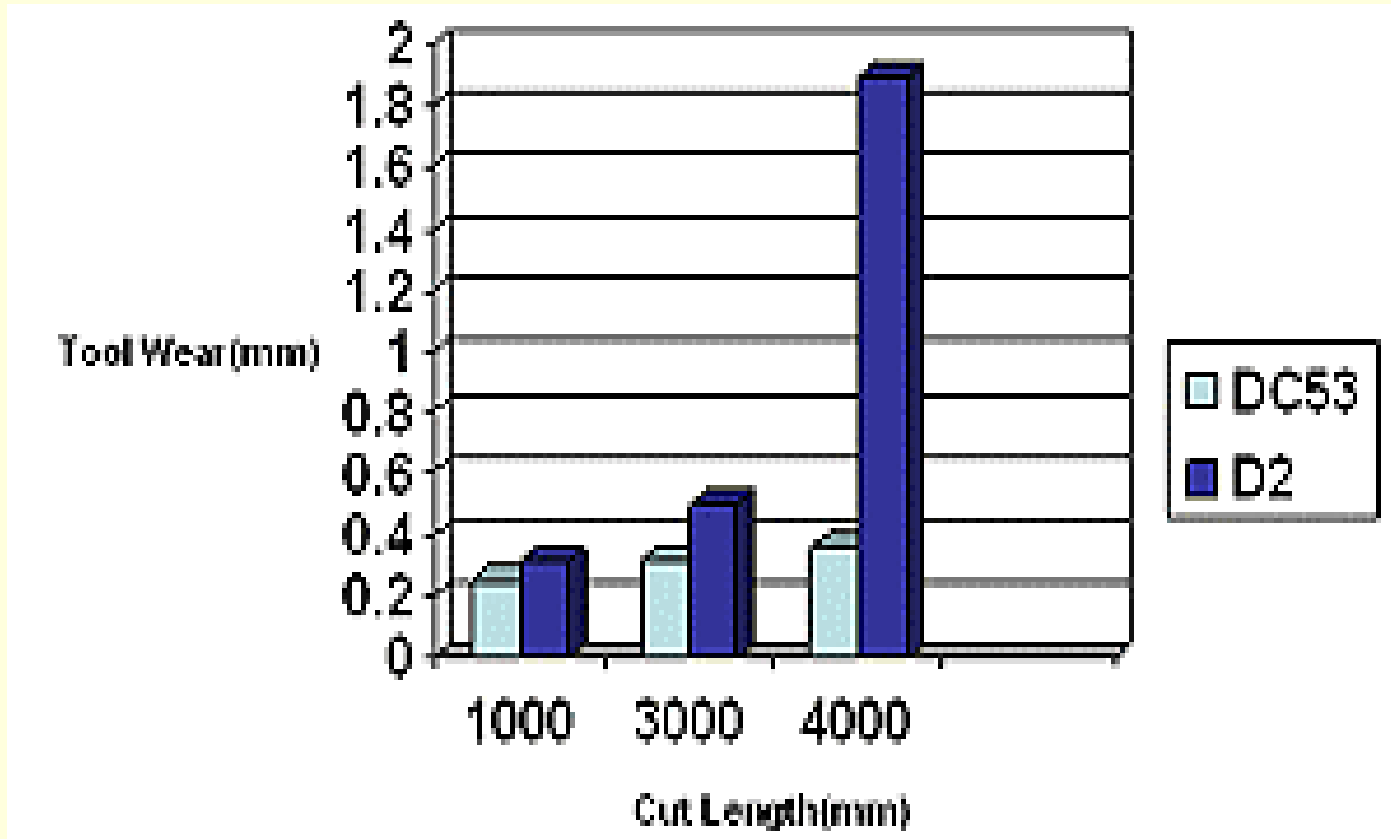
$$aa = 1.0 \times D = 12.7\text{mm} (.5")$$

$$ar = .5 \times D = 6.35\text{mm} (.25")$$



DC53 v D2 Test Report

Comparative Tool Wear Chart after 4m length of Cut:



DC53 v D2 Test Report

- **Analysis:**

Upon inspecting the cutting edges of both end mills under microscope there is little wear on the end mill used to machine DC53 while there is extreme wear on the end mill used to machine D2, in spite of the machining and clamping conditions being identical.

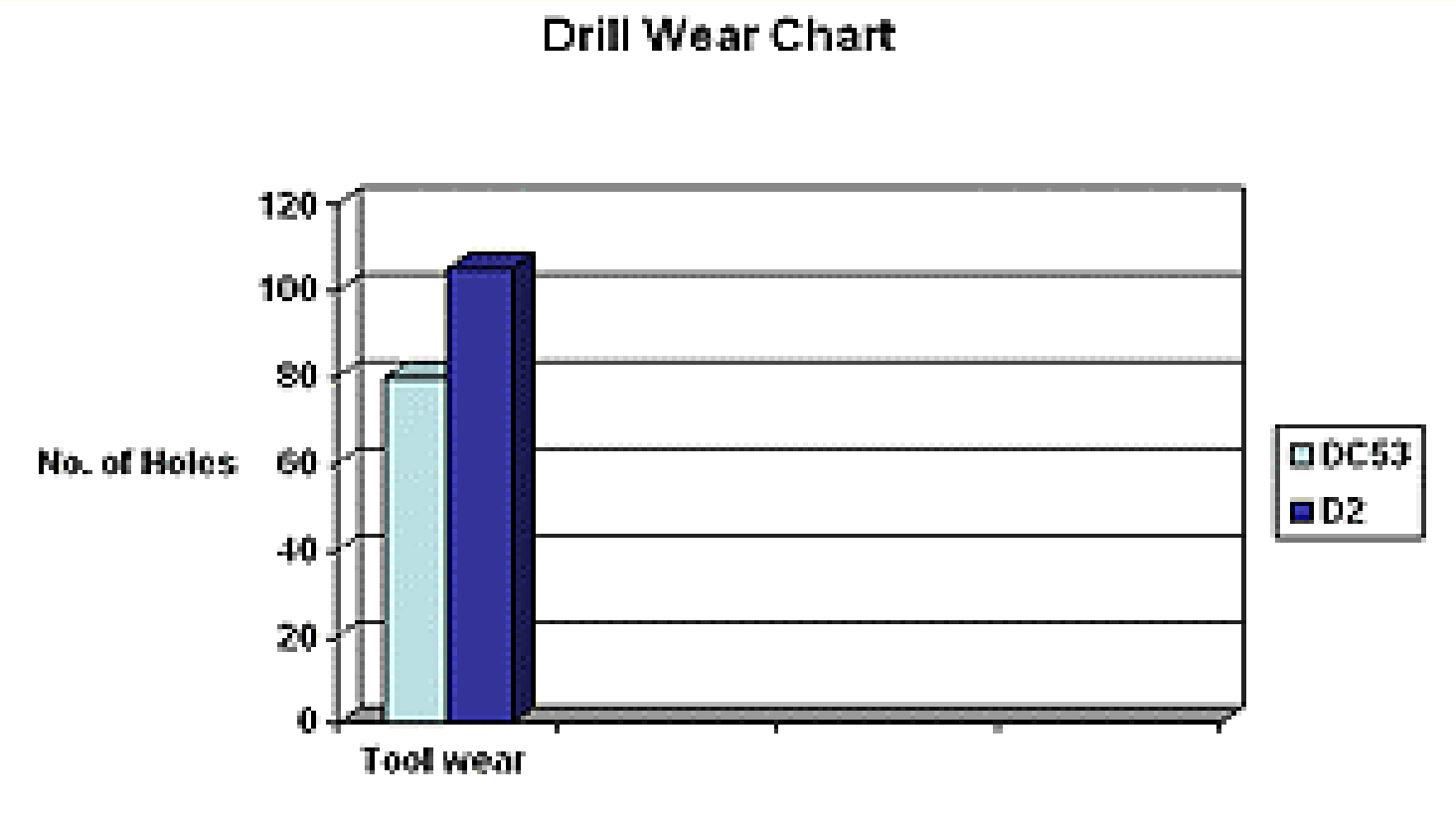
Thus, DC53 because of the perfectly spheroidized primary carbides in its structure has better machinability.

DC53 v D2 Test Report

- **Drilling Conditions:**
Dia. Of Drill: 1/4" (6.35mm) (SG-ESS Drill)
Speed: 29.52m/min (750 RPM)
Feed: .0053 IPR (4 IPM)
Drill Depth: .5" (12.7mm)
No. Of Holes: 110
Material: DC53
Coolant: Water Soluble
- **Drilling Conditions:**
Dia. Of Drill: 1/4" (6.35mm) (SG-ESS Drill)
Speed: 29.52m/min (750 RPM)
Feed: .0053 IPR (4 IPM)
Drill Depth: .5" (12.7mm)
No. Of Holes: 110
Material: D2
Coolant: Water Soluble

DC53 v D2 Test Report

Comparative Tool Wear Chart after 110 Holes:



DC53 v D2 Test Report

Analysis:

Upon inspecting the Drill point edges of both drills under microscope – little wear on cutting edge is evident on the drill used to machine DC53 – while there is significant wear on the cutting edge on the drill used to machine D2, thus further emphasizing that DC53 has better machinability than D2.

DC53 v D2 Test Report

Conclusive Result:

DC53 is superior to D2 in machinability.

Therefore, the use of DC53 is expected to provide relatively longer tool life and reduces the machining time in various applications.

DC53 v D2 Test Report

Conclusive Result (continued):

With DC53 you should experience a minimum of a 20-30% reduction in machining time, when compared to D2. But as a rule of thumb, start by increasing surface speed by 20% over what you use for D-2. When you are satisfied with surface speed, increase feed rates by 10% increments or depth of cut by 10% increments. You will find the combination that best suits your equipment and conditions.



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