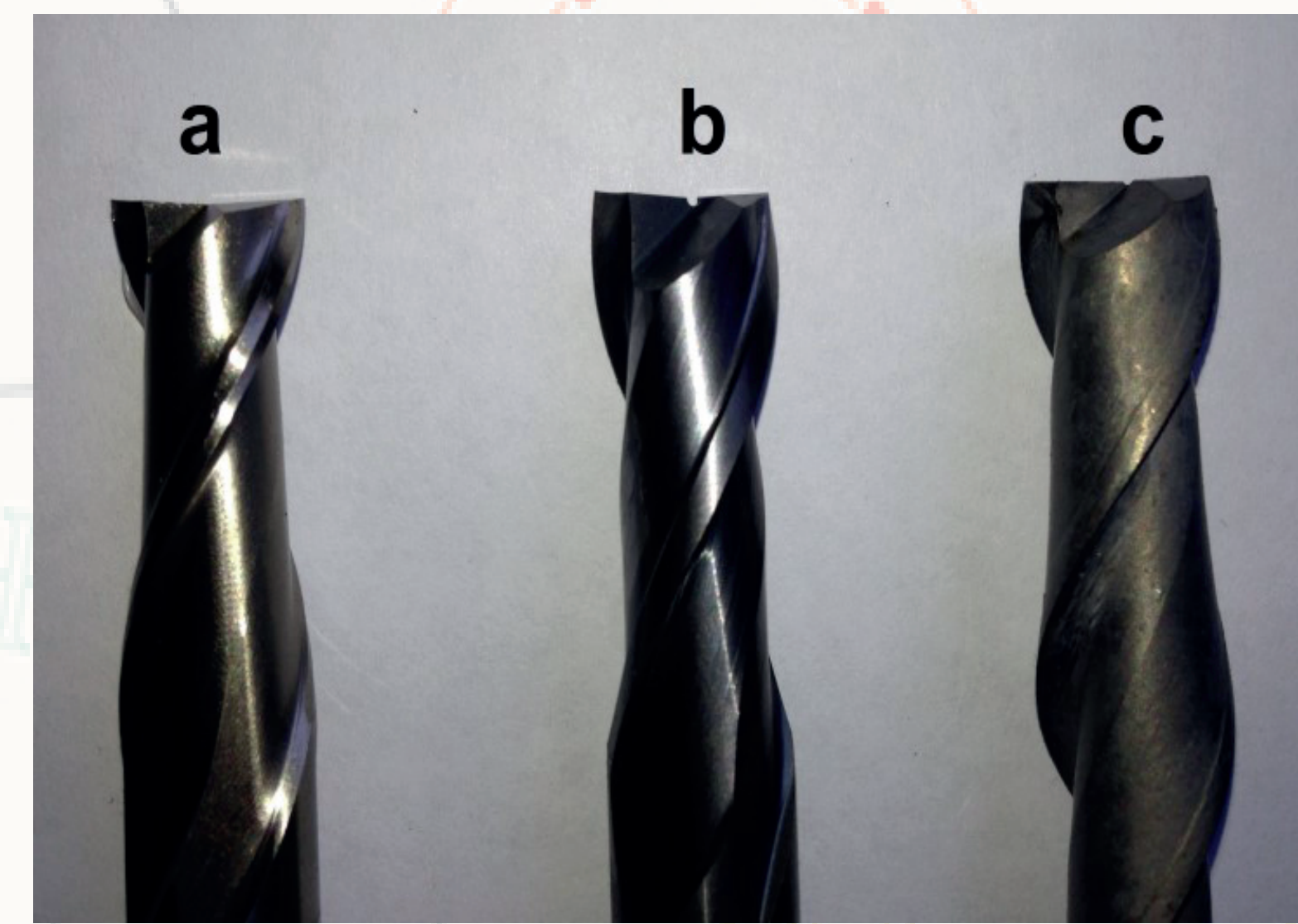
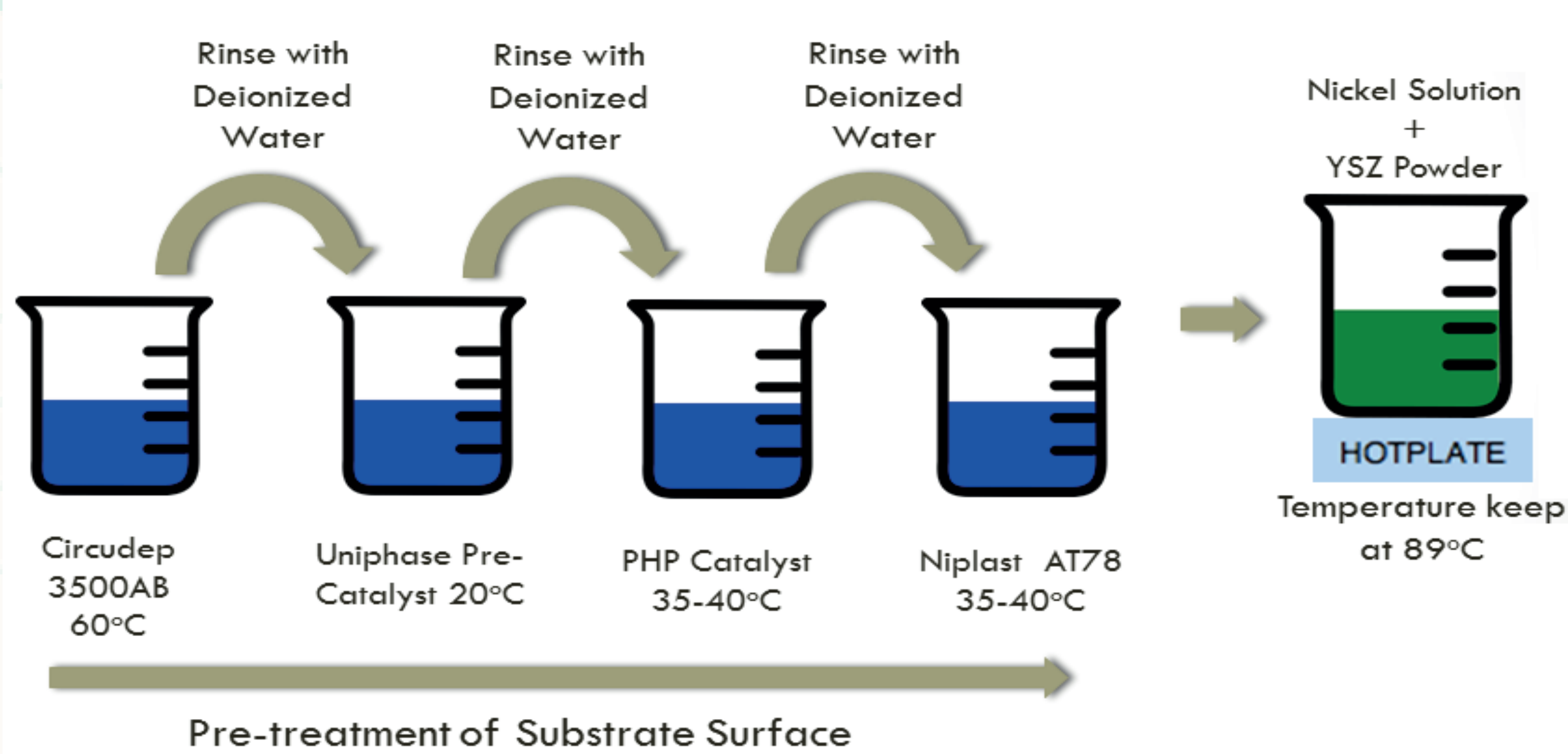


# Ni-YSZ COATED TOOL BIT

Patent File No.: PI2015704180

## PRODUCT FEATURES

- This project involves coating the HSS end mill tool bit with Ni-YSZ via electroless co-deposited coating.
- Electroless coating is a process of deposition metallic ions to the metal state.
- The ability to co-deposit fine particular within an electroless metal matrix has led to a new generation of composite coating.
- The product was compared for its performance to the uncoated HSS and TiN coated end mill.
- The investigations were run by using Deckel Maho DMU50 CNC machine at four different level of spindle speed (800-1100rpm) and five different machining length (120-600mm).
- The surface roughness of Mild Steel is being recorded using Mitutoyo SJ-301 surface roughness tester.



a. Uncoated  
 b. TiN coated  
 c. Ni-YSZ coated

## ENVIRONMENTAL FREINDLINESS

- Process does not require a very high temperature heating as PVD (>600 C)

## NEEDS

- PVD and CVD coated tool bit are high cost
- Besides require specific equipment
- Introduce new coating material for cutting tool industries

## APPROACH

- Setup incubator at TATIUC
- Promoting a new concept of tool bit coating process by collaborating with machining industries
- Expanding the application of new materials Ni-YSZ to common fabrication method

## POTENTIAL MARKET

- Tooling industries
- Oil & Gas industries
- General machining

## BENEFITS

- Cost effectiveness
- Surface roughness vs Machining length results



Deckel Maho DMU50

## NOVELTY

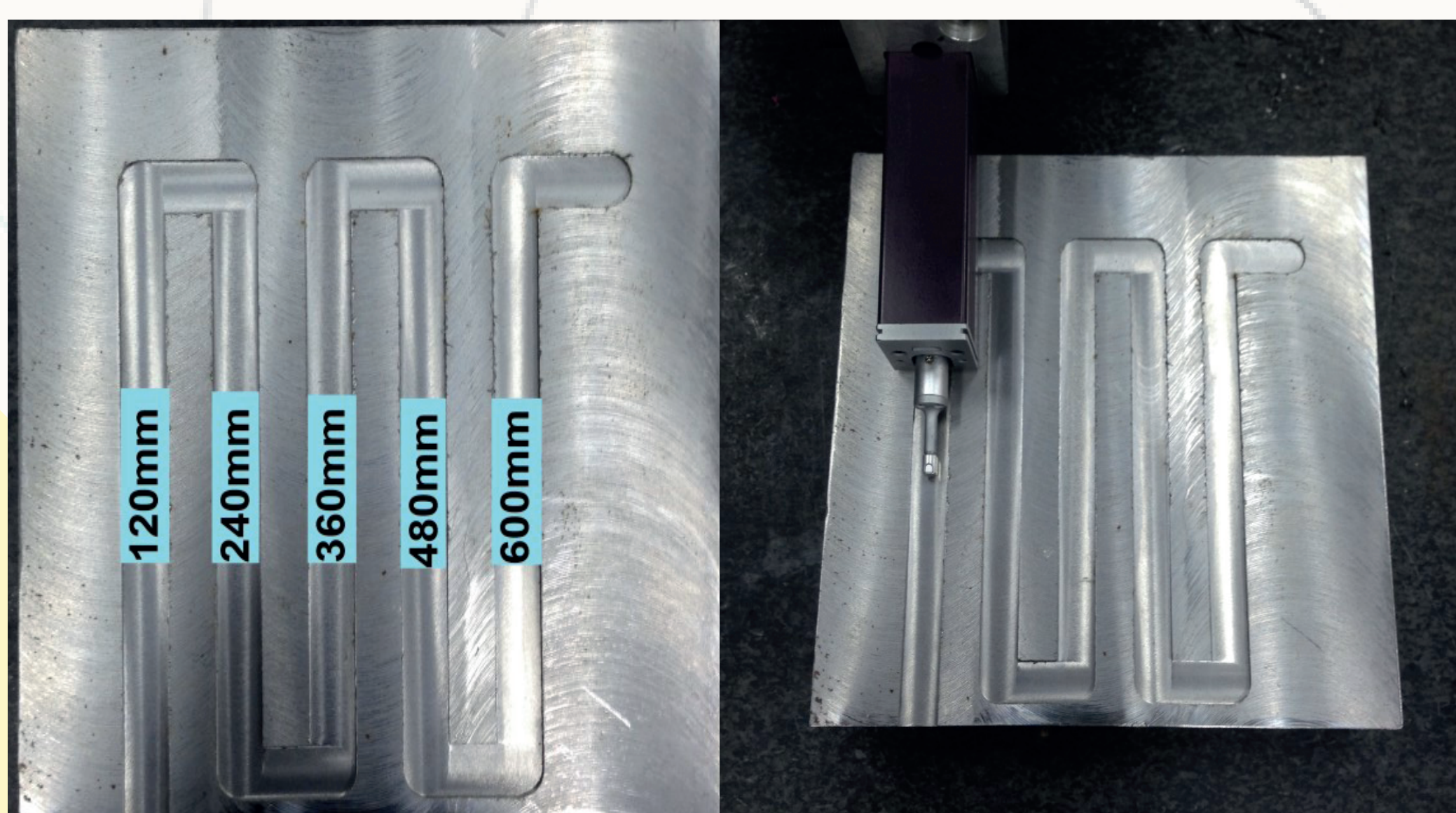
- Commercial coated tool bit is fabricated via PVD or CVD
- Electroless Ni and YSZ co-deposition for cutting tool
- Ni-YSZ composite for it process as well the coated materials

## APPLICATIONS

- Coated Ni-YSZ on tool bit for machining purposes
- Become competitive coated material for machining industries
- Become competitive process for tool bit coating

Item	Cost/RM		
	EN-YSZ	CVD	PVD
Materials	1% of 9533 /12 =RM8	-	-
Overhead	900/160 =5.6/hr x 2 hrs 20 min = RM12.30	-	-
<b>Total/piece</b>	<b>20.30</b>	<b>55-95</b>	<b>75-120</b>

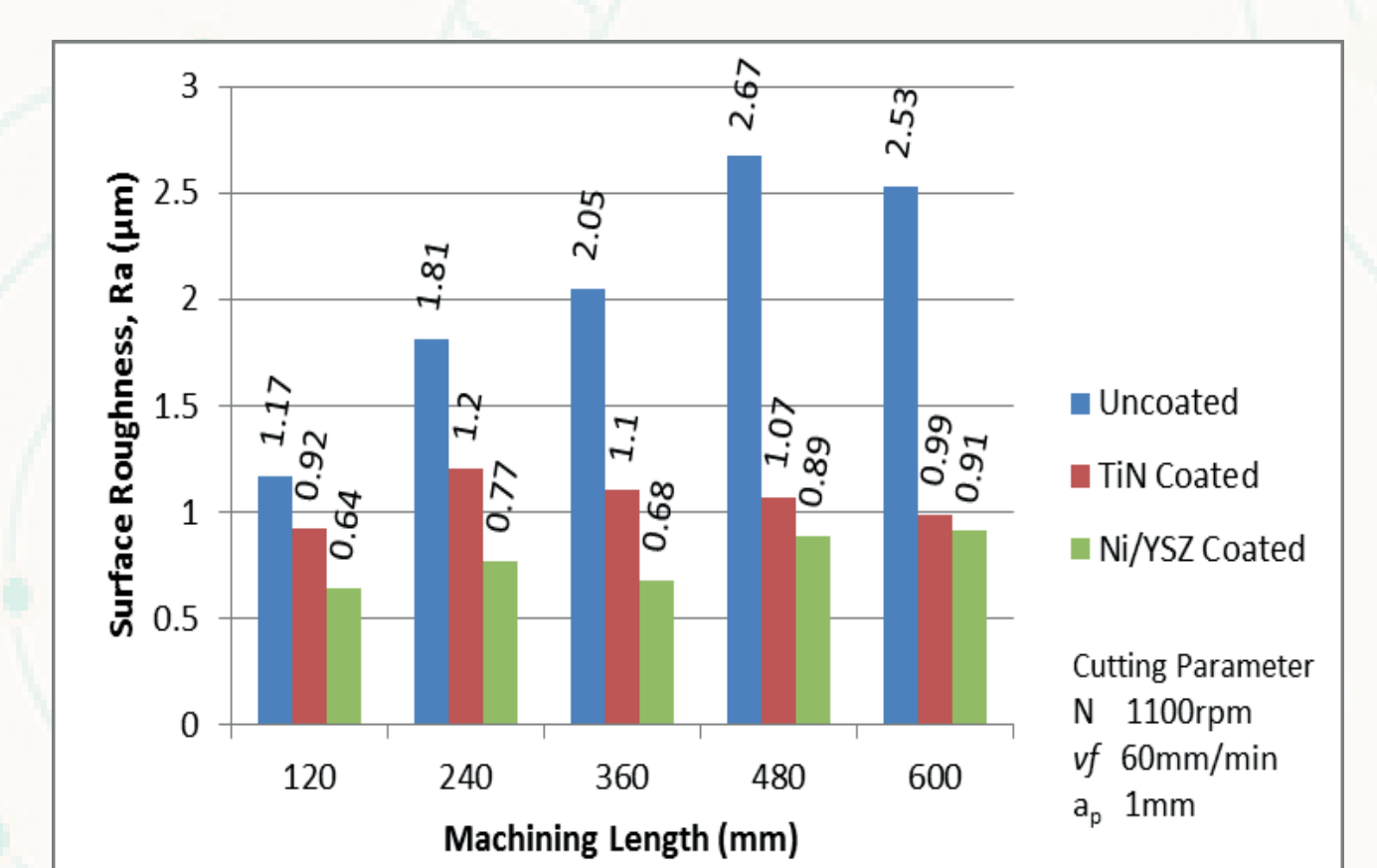
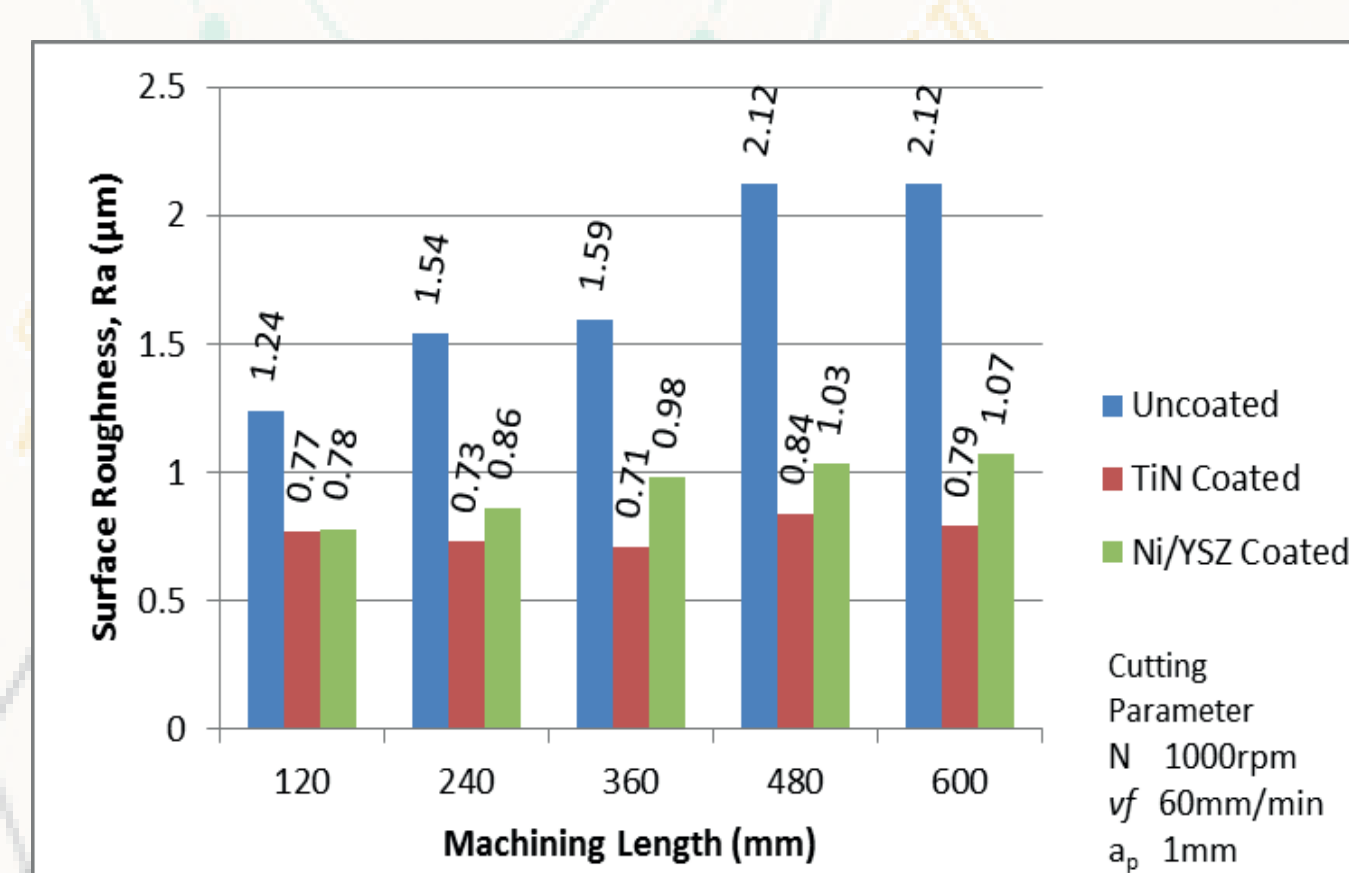
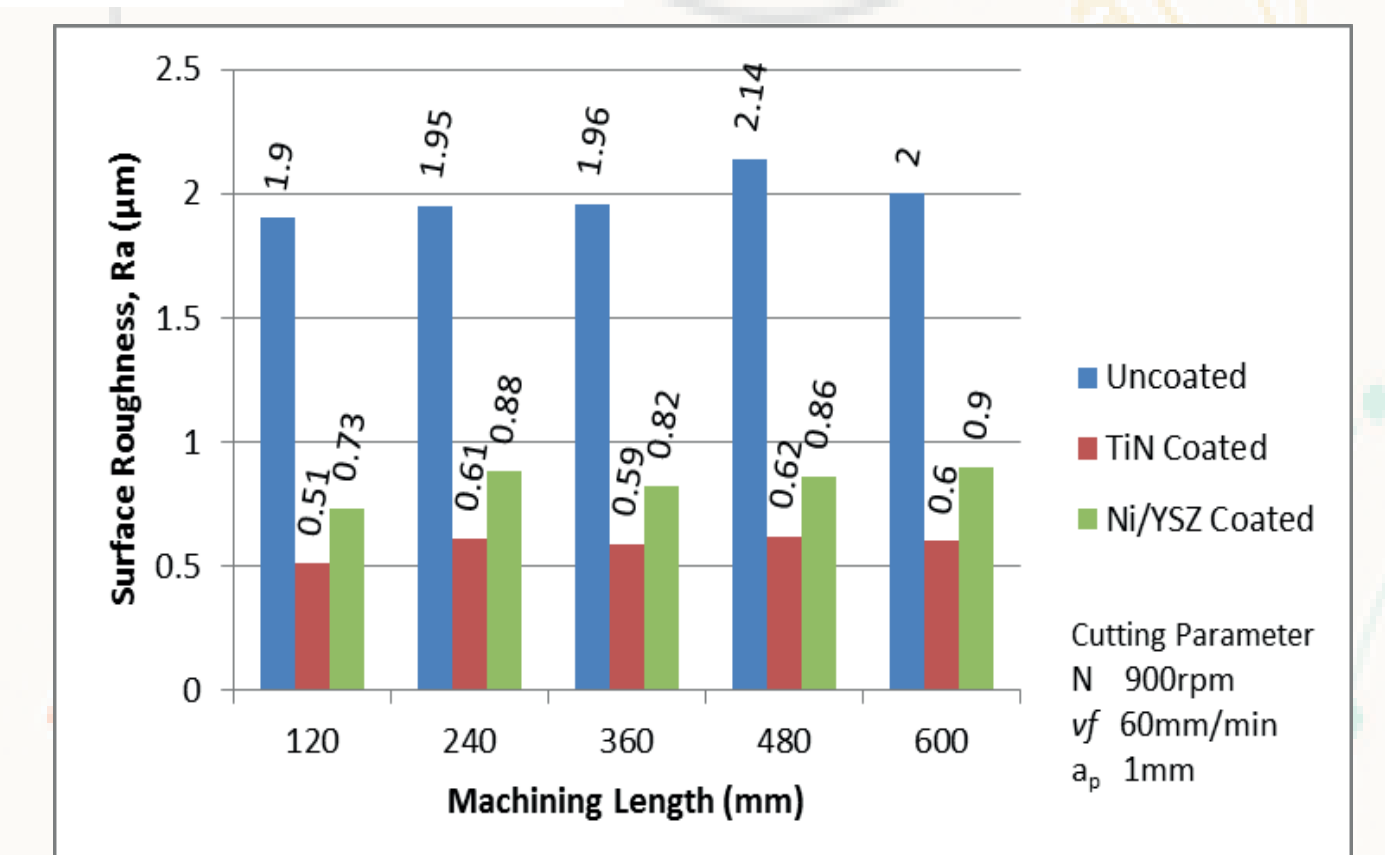
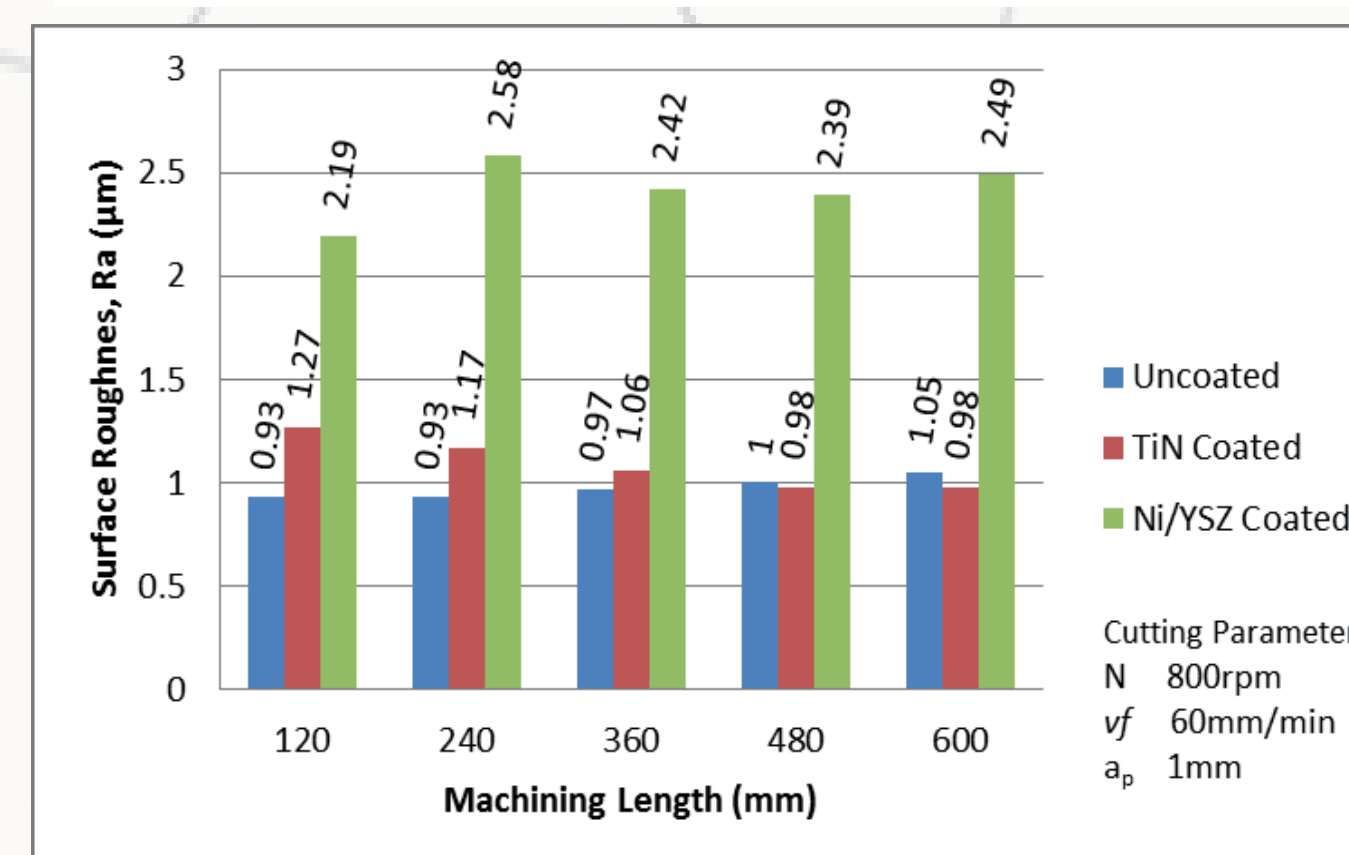
Cost estimation per piece



a.

b.

a. Cutting slot on workpiece  
 b. Surface roughness measurement



Surface roughness against machining length



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