Insert Wear Reference Guide

Common Types of Insert Wear in Metal Machining with Indexable Carbide

Thermal Cracking

Thermal cracking shows up as small cracks perpendicular to the cutting edge, resulting in chipping and poor surface finish.

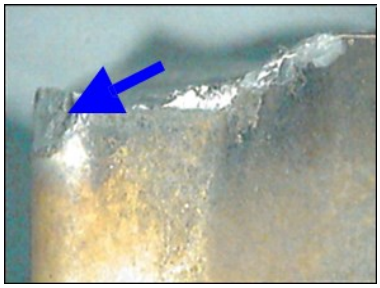
Probable Cause

- Excessive variations in surface temperature, intermittent machining, or variations in coolant supply

Possible Remedy

- Select a tougher insert grade
- Eliminate the use of coolant whenever possible

Edge Fracture



Cutting edge fracture not only damages the insert, but also can destroy the cutter body and/or the work piece itself.

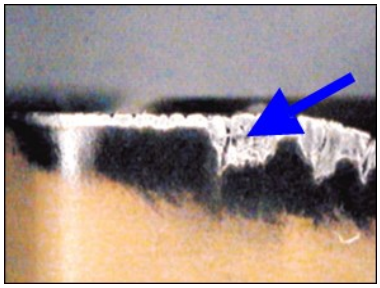
Probable Cause

- Caused by excessive insert wear before indexing the insert
- The grade and geometry could be too weak for the applications
- Excessive load on the insert
- Built-up edge has been formed on the insert

Possible Remedy

- Reduce feed and/or depth of cut
- Select a stronger or thicker insert and tougher grade

Chipping



Characterized by small chips on cutting edge, leading to poor surface finish and excessive flank wear.

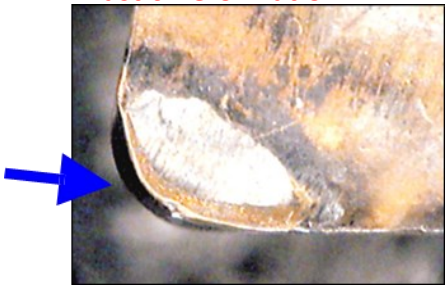
Probable Cause

- Caused by either the cutting edge of the insert being too brittle or a built-up edge has been formed

Possible Remedy

- Select a tougher carbide grade
- Select an insert with a stronger cutting edge
- Increase cutting speed
- Select a positive geometry
- Reduce feed rate at beginning of cut
- Improve stability of the set-up

Plastic Deformation



Plastic deformation of the cutting edge is characterized by a depression of the edge, or an impression on the insert flank, leading to a poor chip control, poor surface finish and insert breakage.

Probable Cause

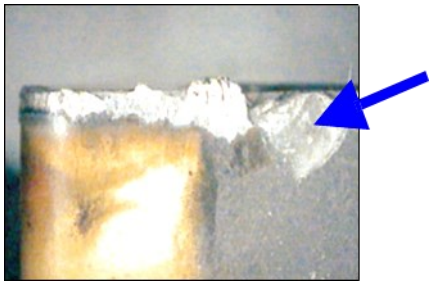
- Too high of a cutting temperature

Possible Remedy

- Select a harder, more wear resistant grade
- Reduce the cutting speed
- Reduce the feed rate

1-877-BY-ISCAR
www.iscarmetals.com

Notch Wear



Notch wear typically causes poor surface finish and the risk of insert edge breakage.

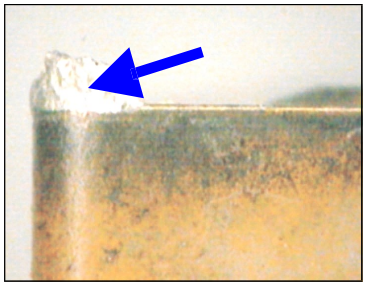
Probable Cause

- Cutting speed too high, or insufficient insert wear resistance of the carbide grade

Possible Remedy

- Select a more wear resistant grade
- For work-hardening materials, select a smaller entry angle
- Reduce cutting speed on heat resistant materials

Built-Up Edge



Built-up edge on an insert will cause poor surface finish and chipping cutting edge when the BUE is torn away.

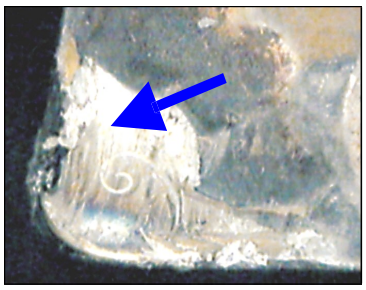
Probable Cause

- Cutting zone temperature is too low
- Negative cutting geometry
- Machining of very sticky materials such as sow-carbon steel, stainless steels and aluminum

Possible Remedy

- Increase the cutting speed
- Change to a more suitable coated carbide grade
- Select an insert with a more positive geometry

Crater Wear



Excessive crater wear causes a weakened cutting edge and poor surface finish quality.

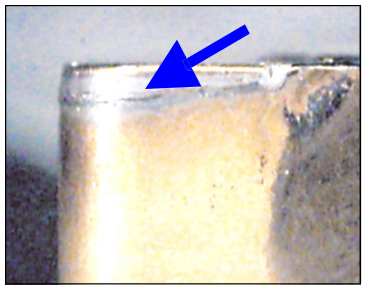
Probable Cause

- Excessive cutting temperatures and pressures on top of the insert

Possible Remedy

- Reduce cutting speed or reduce feed rate to lower the temperature
- Select a more wear resistant carbide grade
- Select a positive insert geometry

Flank Wear



Flank wear is the preferred type of insert wear, symbolizing a normal insert wear over time. Rapid flank wear however can cause poor surface finish quality or an inconsistency in tolerances.

Probable Cause

- Cutting speed is too high, or the chosen carbide grade does not offer sufficient wear resistance

Possible Remedy

- Select a more wear resistant grade
- For work-hardening materials, select a smaller entry angle
- Reduce cutting speed when machining heat resistant materials

Member IMC Group
@IscarUSA
300 Westway Place, Arlington, TX 76018