

LOW VIBRATION TOOLS WITH TOOLOX

Toolox is a steel concept for production of low vibration tools. Toolox dimensional stability allows good machinability and makes it possible to machine perfectly balanced cutting tools with highest tolerances.

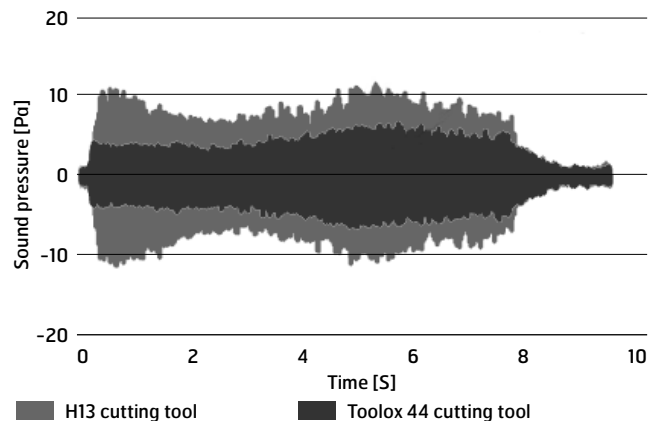
Toolox is delivered in quenched and tempered condition and has guaranteed and tested hardness and impact toughness. Ultrasonic inspection is made for each individual bar delivered. Toolox 44 has a typical hardness of 45 HRC and it features high impact toughness and very low residual stresses.

With use of Toolox there is no need for heat treatment which enables machining in one setup. Thanks to this you can:

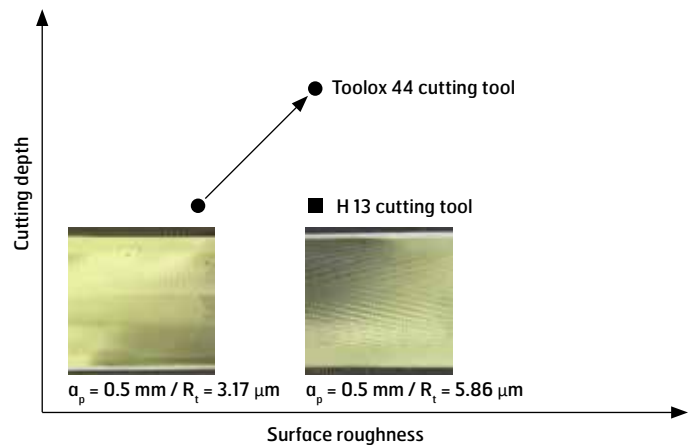
- ▶ Avoid waste of time
- ▶ Avoid cracking which may occur during heat treatment
- ▶ Avoid stress relieving
- ▶ Avoid adjustments due to heat treatment

A studie¹ carried out at KTH, Royal Institute of Technology, shows that cutting tools made from Toolox is more resistant against vibrations. Cutting tools in Toolox 44 allows deeper cuts with the same level of vibrations in the cutting operation and longer insert lifetime compared to traditional tool steels in the same cut level. This makes it possible to achieve higher material removal rate or better surface finish in the machined piece.

The same study¹ shows that Toolox 44 tooling gives better surface quality to machined parts because of less vibration. The lower cutting noise is an indicator on less vibration that skilled machine operators will recognize.



Acoustic signal recorded during machining with 2200 rev/min and an axial depth of cut of 0.5 mm.



With use of a Toolox 44 cutting tool can you either:

- Use the same cutting depth as with a H13 cutting tool and achieve better surface quality on the machined component, or
- Increase the cutting depth until you get the same surface quality as with the H13 cutting tool and gain productivity.

1) Österlind T, Daghini L, Archenti A "Evaluation of tool steel alloy performance in a milling operation through operational dynamic parameters" International Journal of Machine Tools & Manufacture 114 (2017) pp.54-59.

CUSTOMER TESTIMONIAL

Company Name: Gökhan Metal (www.gokhanmetal.com).
They are producing tool holder and they are selling inserts.

Responsible Person: Mr. Irfan BUKEY

Their trade mark: GTECH

Application: End milling - Aluminium Extrusion die production



| Max. ap | D _c | z | D _{cl} | Ds | L | Lf | ls | K (deg) | Kg | Air hole |
|---------|----------------|---|-----------------|------|-------|------|-------|---------|------|----------|
| 1.0 | 16.00 | 2 | 9.5 | 16.0 | 150.0 | 50.0 | 100.0 | 15 | 0.20 | with |

Insert Type: Tungaloy LNMU 03

Tool Holder: Toolox 44 Dia 21 mm

Surface Treatment: Electroless Nickel plating

Cutting parameters

V_c: 150 m/min

f_z: 0,75

a_p: 0,5 mm



| Cutting tool material | Typical hardness | Cutting tool life length | Failure on cutting tool | Insert life length |
|-----------------------|------------------|--------------------------|-------------------------|--------------------|
| AISI 4340 | 42-44 HRC | 10 days | Deformation and wear | 4 to 5 dies |
| Toolox 44 | 45 HRC | 5 months | Wear | 9 to 10 dies |

General Advantages of Toolox44 vs AISI4340

- ▶ Less wear on cutting tool surface
- ▶ Less vibration
- ▶ Less deformation in insert holes
- ▶ No heat treatment
- ▶ Much better end user (tool maker) satisfaction
- ▶ AISI 4340 is generally not delivered in heat treated condition. Cutting tool production of 4340 requires heat treatment in the manufacturing cycle. Toolox 44 is delivered with its final heat treatment, which gives possibilities to shorten the cutting tool manufacturing time.