ISO/TR 17243-2:2017-08 (E)

Machine tool spindles - Evaluation of spindle vibrations by measurements on non-rotating parts - Part 2: Direct-driven spindles and belt-driven spindles with rolling element bearings operating at speeds between 600 r/min and 30 000 r/min

Contents

Page

Foreword v

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 2

4 Preliminary operations 3
4.1 General 3
4.2 Process load 3
4.3 Spindle speed 3
4.4 Thermal conditions 4
4.5 Spindle position and orientation 4
4.6 Tool or workpiece balancing 4
4.6.1 General 4
4.6.2 Spindle vibration measurements with a tool/workpiece mounted in the spindle 4 4.6.3 Spindle vibration measurements without tool/workpiece 4
4.7 Spindle chuck 5
4.8 Spindle cooling 5
4.9 Drawbar 5
4.10 Background vibration 5
4.11 Idle operation 5

5 Measurement and operational procedures 5
5.1 Measuring instruments 5
5.2 Measurement locations/directions 6
5.2.1 General 6
5.2.2 Naming convention for measurement locations 7
5.3 Sensor mounting procedures 7

6 Evaluation parameters 8
6.1 Vibration velocity parameter 8
6.1.1 General 8
6.1.2 Spindles with maximum speed between 6 000 r/min and 30 000 r/min 8
6.1.3 Spindles with maximum operating speed below 6 000 r/min 9
6.2 Vibration acceleration parameter 9

7 Spindleclassification 10
7.1 General 10
7.2 Classification according to rated power 10
7.3 Classification according to maximum spindle speed 10
7.4 Classification according to bearing type 10

8 Evaluation 11
8.1 General 11
8.1.1 Overview 11
8.1.2 Measurement uncertainty 11
8.2 Criterion I: vibration magnitude 11

8.2.1 General 11
8.2.2 Evaluation zones 12
8.2.3 Exemplary evaluation zone boundaries 12
8.3 Criterion II: change in vibration magnitude 12
8.4 General zone boundaries 12
8.5 Examples of evaluation zone boundary values 13
8.6 Operational limits 14
8.6.1 General 14
8.6.2 Setting of alerts 14
8.6.3 Setting of alarms 14
8.6.4 Setting of the threshold for shutdown 15

Annex A (informative) Introduction to alternative bearing condition assessment techniques 16

Bibliography 18