# DIN 45679:2013-02 (E)

## Mechanical vibration - Measurement and evaluation of coupling forces for assessment of vibration exposure of the hand-arm system

## Contents

Page


Foreword ....3

Introduction ....4

1 Scope ....5

2 Symbols and indices ....5

3 Parameters at hand-grip interface ....6
3.1 Contact pressure ....6
3.2 Push force ....7
3.3 Guiding force ....8
3.4 Lifting force ....8
3.5 Gripping force ....9
3.6 Feed force ....11
3.7 Contact forces ....11
3.8 Coupling force ....12
3.9 Torsion and friction ....13

4 Parameters for the coupling-dependent evaluation of the vibration exposure ....13
4.1 Coupling factor ccp ....13
4.2 Coupling-dependent frequency-weighted acceleration ahwc ....13
4.3 Coupling force-dependent vibration total value ahvc ....13
4.4 Coupling force-dependent daily vibration exposure value A(8)c ....14

5 Measuring procedure and evaluation of measurement results ....14
5.1 General ....14
5.2 Measuring the gripping force ....14
5.3 Measuring the push force ....15
5.4 Measuring the pressure distribution on the contact surface of the hand ....16
5.5 Processing the measurement results: Time history ....16
5.6 Processing the measurement results: Averaging the values ....16
5.7 Evaluation of the measurement results ....17

6 Calculation of the coupling force-dependent values ....17
6.1 Coupling force-dependent frequent-weighted acceleration ....17
6.2 Coupling force-dependent vibration total value and daily vibration exposure value ....19

Annex A (normative) Requirements for measuring equipment ....20

Annex B (informative) Biodynamic effects of machine contact forces ....23

Annex C (informative) Calculation of the gripping force and push force from a pressure measurement ....25

Annex D (informative) Measurement report ....27

Annex E (informative) Calibration and methods for comparison of different force measuring instruments ....29

Annex F (informative) Examples of typical coupling forces and coupling factors ....31

Bibliography ....32