

# DIN ISO 20816-5:2018-12 (E)

## Mechanical vibration - Measurement and evaluation of machine vibration - Part 5: Machine sets in hydraulic power generating and pump-storage plants (ISO 20816-5:2018)

---

### Contents

	Page
National foreword.....	4
National Annex NA (informative) Bibliography.....	5
Foreword.....	7
Introduction.....	8
1    Scope.....	9
2    Normative references.....	10
3    Terms and definitions.....	10
4    Machine arrangements.....	10
5    Measurement procedures and conditions.....	15
5.1    General.....	15
5.1.1    Bearing housing vibration measurements.....	15
5.1.2    Shaft vibration measurements.....	15
5.2    Measurement types.....	15
5.2.1    Absolute bearing housing vibration.....	15
5.2.2    Radial shaft vibration.....	16
5.2.3    Bearing and shaft vibration in the axial direction.....	17
5.2.4    Detrimental influences.....	17
5.3    Measurement locations and directions.....	17
5.3.1    General.....	17
5.3.2    Measurement of relative shaft vibration.....	19
5.3.3    Measurement of the absolute bearing housing vibration.....	19
5.4    Measurement equipment.....	21
5.4.1    General.....	21
5.4.2    Absolute bearing housing vibration measurements.....	21
5.4.3    Shaft vibration measurement.....	23
5.4.4    Measurement of $S_{max}$ or $S_{p-p}$ .....	23
5.5    Operational conditions.....	25
6    Evaluation of vibration measurements.....	25
6.1    General.....	25
6.1.1    Basis of the vibration values.....	25
6.1.2    Effect of turbine operating conditions on bearing housing vibration measurements.....	26
6.1.3    Effect of turbine operating conditions on shaft vibration.....	26
6.1.4    Pump operating conditions.....	26
6.1.5    Special operating conditions.....	26
6.2    Criterion I: Vibration magnitude.....	27
6.3    Criterion II: Change in vibration magnitude and phase.....	29
6.3.1    Assessment criteria.....	29
6.3.2    Monitoring prerequisites.....	29
6.3.3    Specific recommendation related to the generator.....	29

6.4	Operational limits.....	29
6.4.1	Alarms and trips.....	29
6.4.2	Setting of alarms .....	30
6.4.3	Setting of trips.....	30
6.4.4	Special operating conditions .....	30
6.5	Comparison of results for shaft vibration and bearing housing vibration.....	31
6.6	Evaluation based on vibration vector information.....	31
<b>Annex A (normative) Evaluation zone boundaries.....</b>	<b>32</b>	
<b>Annex B (informative) Vibration monitoring — Prerequisite for trend analysis .....</b>	<b>40</b>	
<b>Annex C (informative) Special features of bearing housing vibration and shaft vibration of hydraulic machine sets .....</b>	<b>45</b>	
<b>Annex D (informative) Database, analysis procedure and statistical evaluation .....</b>	<b>48</b>	
<b>Annex E (informative) Recommended practice for vibration data processing.....</b>	<b>53</b>	
<b>Bibliography.....</b>	<b>58</b>	