

ISO 14839-4:2012-03 (E)

Mechanical vibration - Vibration of rotating machinery equipped with active magnetic bearings - Part 4: Technical guidelines

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Active magnetic bearing system architecture	2
5	Important differences between magnetic bearings and conventional bearings	3
5.1	Some advantages of active magnetic bearings	3
5.2	Some disadvantages of active magnetic bearings	5
5.3	Comparison among rolling, fluid film and magnetic bearings	6
6	System condition monitoring	6
6.1	General	6
6.2	Excess rotor shaft displacement (radial x, y, and axial z)	6
6.3	Excess of rotor expansion	8
6.4	Overload of bearing (over current of bearing coil)	8
6.5	Bearing temperature high	8
6.6	Overspeed of rotor	8
6.7	Power supply defect	8
6.8	Battery power defect	8
6.9	Controller temperature high	8
6.10	Cooling	9
7	Environmental factors	9
7.1	Introduction	9
7.2	Environmental category tables	10
7.3	Explosive atmosphere types	13
8	System requirements	13
8.1	Estimation of bearing load	13
8.2	Limitation of dl/dt for laminated bearings	14
8.3	Balancing	16
8.4	Location of bearings and transducers	17
8.5	Fault recovery and fault handling	17
8.6	Signal processing	17
8.7	Monitoring system	17
9	Touchdown bearings	18
9.1	Touchdown bearing requirements	18
9.2	Design of touchdown bearings	18
9.3	Touchdown bearing monitoring	20
9.4	Touchdown test methods	20
10	Preventive inspection	22
10.1	Introduction	22
10.2	Regular inspection and maintenance	22
10.3	Condition monitoring (recommendation)	22

10.4	Inspection checklist	23
	Annex A (informative) Sizing of magnetic bearings	24
	Annex B (informative) Example of a design specification checklist	27
	Annex C (informative) Example conditions for acceptance tests	29
	Annex D (informative) Touchdown test method example	30
	Annex E (informative) Example of system limitations (current/voltage saturation)	32
	Annex F (informative) Unbalance control	35
	Bibliography	40