

DIN 25475-2:2009-05 (E)

Nuclear facilities - Operational monitoring - Part 2: Vibration monitoring for early detection of changes in the vibrational behavior of the primary coolant circuit in pressurized water reactors

Contents

	Page
Foreword	3
1 Scope	3
2 Normative references	3
3 Terms and definitions	4
4 Description of the monitoring technology	4
5 Requirements of the vibration monitoring system	7
5.1 Basic structure and interpretation criteria	7
5.2 Data acquisition	9
5.2.1 General	9
5.2.2 Selecting locations and installing the transducers and cables	9
5.2.3 Example of a data acquisition	12
5.3 Signal conditioning	18
5.4 Signal analysis	19
5.5 Signal presentation	19
5.5.1 Display unit	19
5.5.2 Recording	19
5.6 Calibration	19
5.6.1 General	19
5.6.2 Calibration unit	20
6 Commissioning	20
6.1 General	20
6.2 System checks	20
6.3 Measurements during commissioning of the reactor	20
7 Performance of monitoring	21
7.1 General	21
7.2 Prerequisites	21
7.3 Measurements	22
7.3.1 General	22
7.3.2 Reference measurements	22
7.3.3 Operational measurements	23
7.3.4 Identification	23
7.4 Monitoring	23
7.4.1 Selecting a comparative measurement	23
7.4.2 Determination and evaluation of changes	24
7.5 Test of the monitoring system	28
7.5.1 General	28
7.5.2 Test during fuel outage of the plant	29
7.5.3 Test during operation of the reactor	29
8 Documentation	29
Annex A (informative) Vibration monitoring, Example 1	31

A.1	General	31
A.2	Monitoring of the components of the primary circuit and reactor pressure vessel internals	31
A.3	Frequency-selective monitoring of the shaft vibrations of the main coolant pumps	33
Annex B (informative) Vibration monitoring, Example 2		43
B.1	Monitoring the components of the primary circuit and reactor pressure vessel internals .	43
B.2	Frequency-selective monitoring of shaft vibrations in the main coolant pumps	45
Annex C (informative) Example of signal trends of a fractured shaft		56
Bibliography		58