

DIN 969:2020-02 (E)

Threaded fasteners - Axial load fatigue testing - Test methods and evaluation of results

Contents	Page
Foreword	4
1 Scope	5
2 Normative references	5
3 Terms and definitions.....	5
4 Symbols	5
5 Principle.....	7
6 Apparatus	8
6.1 Testing machine	8
6.2 Test fixtures	8
6.3 Internally threaded components	10
6.4 Test washers	10
6.5 Alignment of test fixtures	11
7 Test procedure.....	12
8 Evaluation of results.....	13
8.1 General	13
8.2 Testing in the finite life range	13
8.2.1 Tests involving a minimum number of stress cycles [see subclause 8.1 a)]	13
8.2.2 Determining scatter and position of finite life range [see subclause 8.1 b)]	13
8.3 Tests in the transition range or infinite life range	16
8.3.1 Tests involving a minimum number of stress cycles [see subclause 8.1 a)]	16
8.3.2 Determining scatter and position of transition range [see subclause 8.1 b)]	16
8.4 Determining the Wöhler curve (<i>S/N</i> curve).....	21
8.5 Establishing a Haigh diagram.....	22
9 Test report.....	23
Figures	
Figure 1 — Fixture without insert.....	8
Figure 2 — Fixture with insert.....	9
Figure 3 — Threaded test adapter (example)	10
Figure 4 — Test washer (assembled)	10
Figure 5 — Alignment of test fixtures.....	11
Figure 6 — Stress distribution in the cylindrical section of the load verification stud.....	12
Figure 7 — Location of test nut.....	12

Figure 8 — Probability of failure p_f and number of stress cycles in the finite life range, determined on the basis of eight fatigue tests with $\sigma_a = 150 \text{ N/mm}^2$ (N_{10}, N_{50}, N_{90} : number of stress cycles with 10 %, 50 % or 90 % probability of failure, respectively).....	15
Figure 9 — Fatigue testing and evaluation of test results by the boundary method (example).....	20
Figure 10 — Wöhler curve (S/N curve) $\sigma_a = f(N)$	21
Figure 11 — Haigh diagram.....	22
 Tables	
Table1 — Symbols	5
Table 2 — Order system for the statistical evaluation of eight fatigue tests with a stress amplitude of $\sigma_a = 150 \text{ N/mm}^2$ in the finite life range.....	14
Table 3 — Evaluation of fatigue tests by the staircase method (example).....	18