DIN EN 1804-3:2021-06 (E)

Machines for underground mines - Safety requirements for hydraulic powered roof supports - Part 3: Hydraulic and electro hydraulic control systems

Contents

Page

European foreword 5

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 9

4 Safety requirements 15
4.1 General requirements 15
4.1.1 General 15
4.1.2 Hazard areas 15
4.1.3 Arrangement of the control devices 15
4.1.4 Hold-to-run control 15
4.1.5 Shut-off devices 15
4.1.6 Pressure indicator 15
4.1.7 Arrangement of in-shield and inter-shield hose routing 15
4.1.8 Pipe and hose assemblies 16
4.1.9 Hydraulic fluids 16
4.1.10 Lifting points 17
4.2 Design requirements 17
4.2.1 Protection against ejected fluids 17
4.2.2 Roof contact advance 17
4.2.3 Pressure limiting 17
4.2.4 Interruption of the operating pressure 17
4.2.5 Travel speed 17
4.2.6 Actuating forces 17
4.2.7 Resistance to back pressure 17
4.2.8 Adjustable valves 17
4.3 Requirements of type A valves 18
4.3.1 General 18
4.3.2 Leaktightness 18
4.3.3 Yield pressure 18
4.3.4 Working pressure 18
4.3.5 Closing pressure 18
4.3.6 Pressure pulses 18
4.3.7 Impact resistance 18
4.3.8 Pressure flow behaviour 18
4.3.9 Operating reliability 18
4.3.10 Temperature effects 18
4.3.11 Resistance to back pressure 18
4.4 Requirements for type B and C valves 19
4.4.1 General 19
4.4.2 Leaktightness 19
4.4.3 Resistance to pressure 19
4.4.4 Switching behaviour 19
4.4.5 Operating reliability 19
4.4.6 Resistance to back pressure 19
4.5 Requirements for type D valves 19

4.6 Materials ... 19
4.6.1 Metallic materials ... 19
4.6.2 Light metal ... 19
4.6.3 Other materials ... 19
4.6.4 Seals ... 20
4.7 General electro hydraulic ... 20
4.7.1 General requirements ... 20
4.7.2 Arrangement of in-shield and inter-shield cable routing ... 20
4.7.3 Electro hydraulic valves ... 20
4.7.4 Stroke measurement devices ... 20
4.7.5 Pressure indicator ... 20
4.7.6 Pressure transducer ... 20
4.7.7 Electro hydraulic control unit ... 20

5 Verification of the safety requirements ... 23
5.1 Type testing ... 23
5.2 Additional tests ... 23

6 User Information ... 25
6.1 General requirements ... 25
6.2 Technical and application data ... 26
6.2.1 Introduction ... 26
6.2.2 General description ... 26
6.2.3 Performance data ... 26
6.2.4 Hydraulic data ... 26
6.2.5 List of additional drawings and documents ... 26
6.3 Handling, transport and storage ... 26
6.3.1 Introduction ... 26
6.3.2 Handling and transport ... 26
6.3.3 Storage ... 27
6.4 Installation and commissioning ... 27
6.4.1 Installation ... 27
6.4.2 Commissioning ... 27
6.5 Operation ... 27
6.6 Maintenance ... 27
6.6.1 Introduction ... 27
6.6.2 Technical description ... 27
6.6.3 Maintenance instructions ... 27
6.6.4 Fault diagnosis and correction ... 28
6.6.5 Preventive maintenance schedules ... 28
6.7 Spare parts identification lists ... 28
6.8 Marking ... 28
6.9 Residual risks ... 28

Annex A(normative) Test for verification of the safety requirements ... 29

A.1 Load tests ... 29
A.1.1 General ... 29
A.1.2 Lifting points ... 29
A.1.3 Testing of type A valves ... 29
A.1.4 Testing of type B valves ... 33
A.1.5 Testing of type C valves ... 36
A.1.6 Testing of type D valves ... 37

Annex B (informative) List of significant hazards ... 38

Annex ZA(informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered ... 41

Bibliography ... 43