1. Record Nr. UNINA9910461557403321

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| Autore | Caenn Ryen |
| Titolo | Composition and properties of drilling and completion fluids [[electronic resource] /] / Ryen Caenn, H.C.H. Darley, George R. Gray |
| Pubbl/distr/stampa | Waltham, Mass., : Elsevier Inc., 2011 |
| ISBN | 1-283-19603-4<br>9786613196033<br>0-12-383859-2 |
| Edizione | [6th ed.] |
| Descrizione fisica | 1 online resource (721 p.) |
| Altri autori (Persone) | DarleyH. C. H<br>GrayGeorge R |
| Disciplina | 622<br>622.338 |
| Soggetti | Drilling muds<br>Electronic books. |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Front Cover; Composition and Properties of Drilling and Completion Fluids; Copyright; Dedication; Table of Contents; Preface; Chapter 1. Introduction to Drilling Fluids; Functions of Drilling Fluids; Composition of Drilling Fluids; Properties of Drilling Fluids; Drilling Fluid Selection; Mud Handling Equipment; Optimization; References; Chapter 2. The Development of Drilling Fluids Technology; Water-Based Drilling Fluids Technology; Oil-Based Drilling Fluids Technology; Gas-Based Drilling Fluids Technology; References<br>Chapter 3. Equipment and Procedures for Evaluating Drilling Fluid PerformanceSample Preparation; Properties Measured; Multifunctional Circulating Systems; Aging at High Temperature; Particle Size Determination; Identification of Mineral Constituents; Determination of Gas, Oil, and Solids Content; Electrical Properties; Materials for Regaining Lost Circulation; Maintenance of Hole Stability; Lubricity; Factors Affecting Differential-Pressure Sticking of Drill Pipe; Corrosion Tests; Flocculants; Foams and Foaming Agents; Aniline Point; Chemical Analysis; Evaluation of Drilling Fluid Materials<br>ReferencesChapter 4. Clay Mineralogy and the Colloid Chemistry of |

Drilling Fluids; Characteristics of Colloidal Systems; Clay Mineralogy; Origin and Occurrence of Clay Minerals; Ion Exchange; Clay Swelling Mechanisms; The Electrostatic Double Layer; Particle Association; The Mechanism of Gelation; Polymers; References; Chapter 5. The Rheology of Drilling Fluids; Laminar Flow Regime; Turbulent Flow Regime; Influence of Temperature and Pressure on the Rheology of Drilling Fluids; Application of Flow Equations to Conditions in the Drilling Well Rheological Properties Required for Optimum PerformanceThe Importance of Hole Stability; Notation; References; Chapter 6. The Filtration Properties of Drilling Fluids; Static Filtration; The Filter Cake; Dynamic Filtration; Filtration in the Borehole; Notation; References; Chapter 7. The Surface Chemistry of Drilling Fluids; Surface Tension; Wettability; Surface Free Energy; Adhesion; Surfactants; Emulsions; Oil-Wetting Agents; Foams; Defoamers; The Effect of Electrochemical Environment on Rock Failure; Notation; References; Chapter 8. Hole Stability; The Mechanics of Borehole Stability
Hole Instability Caused by Interaction between the Drilling Fluid and Shale FormationsNotation; References; Chapter 9. Drilling Problems Related to Drilling Fluids; Drill String Torque and Drag; Differential Sticking of the Drill String; Slow Drilling Rate; Loss of Circulation; High Temperatures; Corrosion of Drill Pipe; Notation; References; Chapter 10. Completion, Reservoir Drilling, Workover, and Packer Fluids; Expense versus Value; The Skin Effect; Prevention of Formation Damage; Selection of Completion and Workover Fluids; Tests for Potential Formation Damage by Completion Fluids
Packer Fluids and Casing Packs

Sommario/riassunto

The petroleum industry in general has been dominated by engineers and production specialists. The upstream segment of the industry is dominated by drilling/completion engineers. Usually, neither of those disciplines have a great deal of training in the chemistry aspects of drilling and completing a well prior to its going on production. The chemistry of drilling fluids and completion fluids have a profound effect on the success of a well. For example, historically the drilling fluid costs to drill a well have averaged around 7% of the overall cost of the well, before completion. The success

2. Record Nr. UNINA9910138987503321

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| Autore | Kaschke Michael |
| Titolo | Optical devices in ophthalmology and optometry : technology, design principles and clinical applications / / Michael Kaschke, Karl-Heinz Donnerhacke, and Michael Stefan Rill ; cover design, Simone Benjamin |
| Pubbl/distr/stampa | Weinheim, Germany : , : Wiley-VCH, , 2014<br>©2014 |
| ISBN | 3-527-64898-4<br>3-527-64896-8<br>3-527-64899-2<br>9783527410682 |
| Descrizione fisica | 1 online resource (639 p.) |
| Altri autori (Persone) | DonnerhackeKarl-Heinz<br>RillMichael Stefan<br>BenjaminSimone |
| Disciplina | 617.70028 |
| Soggetti | Oftalmologia - Aparells i instruments<br>Optometria - Aparells i instruments<br>Ophthalmology - Equipment and supplies<br>Optometry - Equipment and supplies |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Cover; Title page; Contents; Preface; Part One; 1 Structure and Function; 1.1 Anatomy of the Human Eye; 1.2 Retina: The Optical Sensor; 1.2.1 Retinal Structure; 1.2.2 Functional Areas; 1.3 Recommended Reading; References; 2 Optics of the Human Eye; 2.1 Optical Imaging; 2.1.1 Entrance and Exit Pupils; 2.1.2 Cardinal Points; 2.1.3 Eye Axes; 2.1.4 Accommodation; 2.1.5 Resolution; 2.1.6 Adaption; 2.1.7 Stiles-Crawford Effect; 2.1.8 Depth of Field; 2.1.9 Binocular Vision; 2.1.10 Spectral Properties; 2.2 Schematic Eye Models; 2.2.1 Paraxial Model: The Gullstrand Eye; 2.2.2 Finite Wide-Angle Models<br>2.2.3 Applications of Eye Models2.3 Color Vision; 2.4 Recommended Reading; References; 3 Visual Disorders and Major Eye Diseases; 3.1 Refractive Errors; 3.1.1 Axial-Symmetric Ametropia: Myopia and |

Hyperopia; 3.1.2 Astigmatism; 3.1.3 Notations of Spherocylindric Refraction in Astigmatic Eyes; 3.1.4 Anisometropia; 3.1.5 Distribution of Refractive Errors; 3.1.6 Refractive Errors Caused by Diseases; 3.2 Cataract; 3.3 Glaucoma; 3.4 Age-Related Macular Degeneration; 3.4.1 ARM; 3.4.2 Dry AMD; 3.4.3 Wet AMD; 3.5 Diabetic Retinopathy; 3.6 Retinal Vein Occlusions; 3.7 Infective Eye Diseases
3.7.1 Trachoma3.7.2 Onchocerciasis; 3.8 Major Causes for Visual Impairment; 3.9 Major Causes of Blindness; 3.10 Socio-Economic Impact of Eye Diseases; 3.11 Recommended Reading; Problems to Chapters 1-3; References; Part Two; 4 Introduction to Ophthalmic Diagnosis and Imaging; 4.1 Determination of the Eye's Refractive Status; 4.2 Visualization, Imaging, and Structural Analysis; 4.3 Determination of the Eye's Functional Status; 4.3.1 Global Functional Status; 4.3.2 Local Functional Status; 4.4 Light Hazard Protection; References; 5 Determination of the Refractive Status of the Eye
5.1 Retinoscopy 5.1.1 Illumination Beam Path; 5.1.2 Observation Beam Path; 5.1.3 Measurement Procedure; 5.1.4 Accuracy in Retinoscopy; 5.1.5 Applications; 5.2 Automated Objective Refractometers (Autorefractors); 5.2.1 Common Characteristics of Autorefractors; 5.2.2 Measuring Methods; 5.2.3 Measurement Accuracy and Limitations of Automatic Refractometers; 5.3 Aberrometers; 5.3.1 Fundamentals of Aberrometry; 5.3.2 General Measurement Principles for Aberrometers; 5.3.3 General Remarks on Aberrometry; 5.3.4 Hartmann-Shack Wavefront Aberrometer (Outgoing Light Aberrometer)
5.3.5 Ingoing Light Aberrometers 5.3.6 Commercial Aberrometers; 5.4 Wavefront Reconstruction and Wavefront Analysis; 5.4.1 From Wavefront to Refraction (Wavefront Analysis); 5.4.2 Applications of Wavefront Analysis; 5.5 Excursus: Refractive Correction with Eye Glasses and Contact Lenses; 5.6 Recommended Reading; 5.7 Problems; References; 6 Optical Visualization, Imaging, and Structural Analysis; 6.1 Medical Magnifying Systems; 6.1.1 Optics of a Single Loupe; 6.1.2 Medical Loupes; 6.2 Surgical Microscopes; 6.2.1 Requirements for Surgical Microscopes; 6.2.2 Functional Principle
6.2.3 Modular Structure of Surgical Microscopes

Sommario/riassunto

Medical technology is a fast growing field. This new title gives a comprehensive review of modern optical technologies alongside their clinical deployment. It bridges the technology and clinical domains and will be suitable in both technical and clinical environments. It introduces and develops basic physical methods (in optics, photonics, and metrology) and their applications in the design of optical systems for use in medical technology with a special focus on ophthalmology. Medical applications described in detail demonstrate the advantage of utilizing optical-photonic methods. Exercises an