

**A**

- API hydraulics equations ..... 5.21
- API filtration, testing ..... 3.7, 3.55
- Abnormal pressure ..... 17.3
  - Detection and evaluation of ..... 17.9
- Acids ..... 4A.20, 23.2
- Acoustic velocity log ..... 17.11
- Activity testing ..... 3.57
- Aerated mud drilling ..... 21D.1, 21D.4
- Air (dust) drilling ..... 21D.1, 21D.2
  - Flow rate requirements for ..... 21D.5
- Air/gas, drilling equipment for
  - Compressors ..... 21D.8
  - Hammers/bits ..... 21D.9
  - Mist/foamer pump ..... 21D.8
  - Nitrogen generators ..... 21D.8
  - Rotating heads ..... 21D.8
- Air sampling ..... 23.3
- All-oil systems ..... 11.9
- Alkalinity ..... 4A.19, 11.2
  - Testing ..... 3.17, 3.59
- Amines ..... 19.19
- Ammonium chloride brines ..... 21B.10
- Analytical testing ..... 23.5
- Angstrom ..... 8.4
- Anhydrite contamination ..... 4C.2
- Aniline point testing ..... 3.52
- Annular,
  - Casing displacement ..... 20C.1
  - Geometry ..... 5.32
  - Injection ..... 23.8, 23.9
- Annular pressure loss ..... 18.20
- Annular velocity, calculation of ..... 9.15
- Annulus, concentric ..... 20B.6
- Apparent viscosity ..... 5.3
  - Testing ..... 3.6, 3.54
- Aquifer ..... 17.7
- Atomic structure ..... 4A.3
- Attapulgite ..... 4B.2, 22B.2
- Average bulk velocity ..... 5.21

**B**

- Bacterial degradation ..... 23.10
- Bactericides ..... 19.18, 21B.13
- Balanced-column method ..... 14.19
- Balanced static condition ..... 18.25
- Barite, gas stripping of ..... 11.18
- Barite sag ..... 2.4
- Base oil ..... 12.11
- Bases, *see Pollution Identification* ..... 23.2
- Bengum squeeze ..... 14.22
- Bentonite ..... 4B.1
- Bentonite bed ..... 16.5
- Binary salt titrations ..... 22B.8
- Bingham Plastic Model ..... 5.13, 20B.8
  - Testing ..... 3.6, 3.54
- Bioaccumulation ..... 23.11
- Bioassay testing ..... 23.4
- Biodegradability ..... 23.11
- Biological Oxygen Demand (BOD) ..... 23.6
- Bioturbation ..... 16.4
- "Bird Nests" ..... 22D.3

- Bit hydraulics optimization ..... 5.27
- Bits, drill ..... 1.6, 21D.9
- Blowout preventers ..... 1.13
  - Subsea ..... 22A.3
- Bonding,
  - Covalent ..... 4A.9
  - Hydrogen ..... 4A.9
  - Ionic ..... 4A.7
- Bottom-hole assembly ..... 1.8
- Bottom-hole cleaning ..... 5.29
- Boycott settling ..... 20B.2, 20B.3, 20C.4
- Breakers ..... 21B.14
- Bridging agents ..... 14.13
- Brines ..... 7.18, 21B.10, 21B.20
  - Salinity of ..... 11.38
- Brookfield viscometer
  - Testing ..... 3.45
- Bullhead, squeeze displacement ..... 20C.1
- Burial diagenesis ..... 4B.11
- Bypassed flow ..... 5.28

**C**

- CMC (Carboxymethylcellulose) ..... 6.1, 6.6, 6.7, 6.8, 7.15
- Cable tool-drilling ..... 1.4
- Calcium content testing ..... 3.22, 3.60
- Calcium bromide ..... 21B.12
- Calcium chloride ..... 12.13, 21B.11
- Calcium-treated drilling fluids ..... 10.6
- Calculations, of
  - Annular velocity ..... 9.15
  - Capacity, volume, displacement ..... 9.7
  - Circulation time ..... 9.16
  - Drill pipe, drill collars ..... 9.8
  - General wellbore ..... 9.3
  - Hydraulics ..... 5.20
  - Hydrostatic pressure ..... 9.17
  - Material balance ..... 9.23
  - Non-aqueous emulsions ..... 11.32
  - Pit and tank capacity, volumes ..... 9.4
  - Pressure loss ..... 5.23
  - Pump output ..... 9.12
  - Solids analysis ..... 9.31
- Capacity, volume, displacement, calculation of ..... 9.7
- Carbon dioxide ..... 18.48
- Carbonate contamination ..... 4C.7
  - Testing ..... 3.19
- Carnallite ..... 4C.15
- Cartridge filters ..... 21B.18
- Casing
  - Annular casing displacement ..... 20C.1
- Casing-pack fluids ..... 11.27
- Cation Exchange Capacity (CEC) ..... 4B.7
- Caustic soda ..... 21B.13
- Cavitation ..... 19.5
- Cement contamination ..... 4C.4
- Cementing ..... 1.14, 11.25, 20C
- Centrifuges ..... 8.2, 8.13, 8.17, 8.19, 8.25, 11.24
- Cesium formate ..... 21B.12
- Charged sands ..... 17.8
- Chemical Oxygen Demand (COD) ..... 23.6
- Chemical reactions ..... 4A.26

**C – Index**

Chemistry, of	
Clays .....	4B.1, 16.8
Polymers .....	6.1
Synthetic-base systems .....	13.12
Testing .....	3.3
Chlorites .....	4B.6
Testing .....	3.21, 3.59
Choke,	
Plugged .....	18.61
Washout .....	18.61
Circulate-and-weight, well control .....	18.41
Circulation,	
Loss of, deepwater .....	22A.7
Mud .....	1.12
Circulation time, calculation of .....	9.16
Classification, of	
Matter .....	4A.1
Solids size .....	8.3
Clay-water systems, unweighted .....	10.2
Clays,	
Chemistry of .....	4B.1, 16.8
Effect of pH on .....	4B.17
Types of .....	4B.2
Particle-linking processes .....	4B.12
Clay-water muds, composition of .....	4B.8
Yield of .....	4B.13
Cleaning, bottom hole .....	5.29
Cleaners, mud .....	8.17
Clear brines .....	21B.4, 21B.25
Coefficient of friction .....	2.7
Coiled-tubing drilling .....	1.9, 22E.1
Equipment for .....	22E.2
Fluids for .....	22E.8
Procedures .....	22E.2
Well control in .....	22E.7
Collars, drill .....	1.8
Collection, sample .....	23.3
Community Right-to-Know law .....	23.13
Complete loss .....	14.18
Completion, well .....	1.16, 21B.2
Completion and workover fluids .....	21B.1
Compounds .....	4A.2, 4A.5, 4A.11
Compressibility, filter cake .....	7.6
Testing .....	3.11
Compressive failure/collapse .....	16.15
Compressors, for air drilling .....	21D.8
Concentration cell .....	19.4
Concentrations, solutions .....	4A.24
Concentric annulus .....	20B.6
CONQOR 404 .....	19.16
Consistometer, Fann Model 5STDL .....	22C.13
Contact time .....	20C.10
Contamination,	
Anhydrite of gypsum, treatment for .....	4C.2
Carbonate, treatment for .....	4C.7
Cement, treatment for .....	4C.4
Hydrogen sulfide ( $H_2S$ ) .....	4C.17
Quick reference .....	4C.18
Magnesium, treatment for .....	4C.19
Salt, treatment for .....	4C.14
Control Of Substances Hazardous to Health (C.O.S.H.H.) .....	23.13
Conversions,	
Coring .....	21C.1, 21C.3
Copolymerization .....	6.13
Coring .....	
Conversions .....	21C.1, 21C.3
Fluid types .....	21C.1, 21C.3
Corrosion .....	
Coupon testing .....	3.48
Factors .....	19.7
Fundamentals of .....	19.1
In completion fluids .....	21B.10
Measurements .....	19.21, 3.48
Products for controlling .....	19.16, 21B.13
Ring testing .....	3.48
Testing .....	3.32, 3.48
Types of .....	19.3
Corrosion fatigue .....	19.5
Covalent bonding .....	4A.9
Corrosion ring coupons .....	19.21
Crevice corrosion .....	19.4
Critical velocity .....	5.22
Crosslinked-polymer squeezes .....	14.22
Crystallization temperature .....	21B.6
Cuttings-bed .....	20B.2
Cuttings concentration ( $C_{conc}$ ) .....	20B.9
Cuttings Transport Ratio (CTR) .....	20B.9
<b>D</b>	
Damage, formation .....	21B.4
Dealloying .....	19.5
Deepwater,	
Drilling in .....	22A.1
Flow line temperature in .....	22A.8
Fracture gradients of .....	22A.6
Hole cleaning in .....	22A.9
Logistics of .....	22A.6
Lost circulation in .....	22A.7
Pore pressure of .....	22A.6
Surge in .....	22A.6
Swab in .....	22A.6
Well control, methods of .....	22A.9
Defoamers .....	21B.14
Deformation .....	22B.5
Degree of Substitution (C.S.) .....	6.8
Degree of Polymerization (D.P.) .....	6.8
Degradation, bacterial .....	23.10
Density,	
Differences .....	20C.10
In workover fluids .....	21B.5
Of intruding fluids .....	18.50
Testing .....	3.3, 3.52
Deposition, of shale .....	16.2
Desanders .....	8.16, 8.24
Desilters .....	8.16, 8.24
Dewatering .....	8.19
Deviation, wellbore .....	20C.4, 20C.10
Diagenesis .....	16.3
Diatomaceous earth filters .....	21B.18
Differentially stuck pipe .....	15.1, 15.8
Dimerization .....	13.13
Directional drilling .....	1.15

Displacement, annular casing .....	20C.1
Displacement, bullhead squeeze .....	20C.1
Displacement, considerations for	
Cementing .....	20C.8
Contact time .....	20C.10
Density differences .....	20C.10
Drilling fluid conditioning .....	20C.8
Hole size .....	20C.10
Laminar flow .....	20C.9
Pipe centralization .....	20C.8
Pipe movement .....	20C.8
Plug flow .....	20C.9
Spacers, flushes .....	20C.9
Turbulent flow .....	20C.9
Displacement, conventional standard ...	20C.1
Techniques (oil muds) .....	12.18
Displacements, factors affecting	
Fluid condition .....	20C.3
Fluid density .....	20C.2
Fluid viscosity .....	20C.3
Pumping operations .....	20C.4
Rig equipment .....	20C.4
Rotation and reciprocation .....	20C.4
Sweeps and spacers .....	20C.3
Displacements, types	
Oil-base mud to completion brine .....	20C.7
Oil-base mud to water-base mud .....	20C.6
To clear fluids .....	21B.15
Water-base mud to	
completion brine .....	20C.6
Water-base mud to oil-base mud .....	20C.6
Water-base mud to	
water-base mud .....	12.18, 20C.5
Displacement spacer chemicals .....	21B.15
Dissolution .....	22B.3
Drag, reduction of .....	5.29
Drill bits .....	1.6, 21D.9
Drill-in fluids .....	21A.1
Types and applications .....	21A.5
Driller's method, well control .....	18.32
Drilling fluids,	
Calcium-treated .....	10.6
Conditioning, for displacements .....	20C.8
Functions of .....	2.1
Invert-emulsion systems .....	22B.3, 22B.8
Oil-base .....	12.1
Saturated-saltwater-base systems .....	22B.1
Selection (HTHP) .....	22C.4
Synthetic-base systems .....	13.2
Undersaturated water-base systems .....	22B.2
Drill pipe, drill collars, calculation of .....	9.8
Drilling, methods of	
Cable tool-drilling .....	1.4
Coiled-tubing drilling .....	1.9
Rotary .....	1.5, 1.6
Drilling rig, rotary .....	1.5
Drillstring, components of	
Bits .....	1.7
Drill collar .....	1.8
Drill pipe .....	1.8
Jars .....	1.8
MWD/LWD .....	1.10
Mud motor .....	1.10
Stabilizers .....	1.8
Drillstring washout .....	18.61
Drawworks, components of .....	1.11
Kelly .....	1.9
Tongs .....	1.11
Top drive .....	1.10
Drill Stem Testing (DST) .....	2.8
DURATHERM system .....	10.16, 22C.7
DUROGEL .....	7.12, 22B.2
DUO-VIS .....	6.5, 20A.5, 22b.2
DURASTAR .....	6.19
Dynamic filtration .....	7.10
Dynamic settling .....	20A.2
<b>E</b>	
Earth stresses .....	16.10
Eccentricity .....	20B.6
ECOGREEN .....	13.8
Effective viscosity .....	5.3
Electric logs .....	17.11
Electrical Emulsion Stability (ES) ..	22B.8, 11.13
Testing .....	3.57
Electrically neutral pyrophyllites .....	4B.3
Elements, table of .....	4A.2
Emulsifiers .....	7.18, 11.6
Emulsion stability .....	12.16
Emulsions,	
Fundamentals of .....	11.3
Non-aqueous .....	11.1
Engineering indicators,	
Pressure control .....	18.6
Environment,	
Regulations .....	23.11
<i>See also Pollution Sources</i> .....	23.1
Pollution identification .....	23.2, 23.5
Synthetic fluids .....	13.15
Environmental Protection	
Agency (EPA) .....	23.11
ENVIROTHERM system .....	10.17, 22C.9
Equation, balancing .....	4A.14
Equivalent Circulating	
Density (ECD) .....	14.3, 18.20
Equivalent weight .....	4A.13
Erosion,	
Corrosion .....	19.5
Shales .....	16.23
Excess gyp procedure .....	10.8
Exploration,	
Geophysical .....	1.4
<b>F</b>	
Fann Model 5STDL HTHP	
consistometer .....	22C.13
Fann Model 50, high-temperature	
viscometer .....	22C.12
Fann Model 70/75 high-temperature	
viscometer .....	22C.13
FER-OX .....	18.56
Filter cake,	
Pressure differential .....	7.6
Permeability .....	7.7
Testing .....	3.7, 3.55
Thickness .....	7.1

**C — Index**

Filtrate invasion .....	7.1
Filtrate, relaxed .....	11.9
Filtration control .....	7.1
Additives for .....	7.18, 11.8
Chemistry testing .....	3.3
In oil/synthetic systems .....	7.17
With brines .....	7.18
Filtration,	
Factors affecting .....	7.4
Fundamentals of .....	7.2
Static filtration .....	7.3
Testing .....	3.7, 3.55
Theory of .....	7.3
Fires, downhole .....	21D.7
Flash point .....	23.6
Flocculation .....	16.4
Flow line temperature, in deepwater .....	22A.8
Flow rate requirements for air drilling .....	21D.5
Flows, saltwater .....	4C.16
FLO-PRO .....	20B.6, 20B.8, 20A.5
FLO-TROL .....	6.11, 22B.2
FLO-VIS .....	6.5, 20A.5, 22b.2
Fluid, factors affecting in displacements	
Condition, fluid .....	20C.3
Density, fluid .....	20C.2
Viscosity, fluid .....	20C.3
Fluid loss,	
Additives for controlling .....	7.12
In non-aqueous fluids .....	11.12
In water-base fluids .....	10.2
Testing .....	3.7, 3.55
Fluids, types of	
Newtonian .....	5.9
Non-Newtonian .....	5.11
Foam (completion fluids) .....	21B.25
Foam drilling .....	21D.1, 21D.3
Formation-damage mechanisms .....	21A.4, 21B.4
Formation integrity test procedures .....	18.18
Formation-Interval Testing (FIT) .....	1.15
Formation pressure,	
Indications of .....	18.5
Shut-in .....	18.27
Formation Testing (FT) .....	2.8
Formations, reactive .....	22A.5
Formulas .....	4A.12
Fracture gradient,	
In deepwater .....	22A.6
Quantifying .....	18.16
Fracturing .....	14.3
Fracture pressure, measuring .....	18.17
Free settling .....	20B.2, 20B.3
Functions, of drilling fluids .....	2.1
Funnel viscosity .....	5.2, 3.4, 3.53
<b>G</b>	
G-SEAL .....	14.13
Galvanic corrosion .....	19.5
Garrett Gas Train .....	22B.8
Testing .....	3.19
Gas cutting .....	18.45
Gas hydrates,	
In deepwater .....	22A.4
In well control .....	18.62
Gas migration .....	18.53
Gas solubility .....	11.17
Gas stripping, of barite .....	11.18
GEL SUPREME .....	7.12
GELEX .....	6.17
Gel strengths, thixotropy .....	5.7
Testing .....	3.6, 3.54
Geological indicators, pressure control .....	18.11
Geophysical exploration .....	1.4
Geothermal drilling .....	22C.4
Glass jar test .....	22B.3
GLYDRIL system .....	10.25
Concentration testing .....	3.40
Gravity,	
High solids .....	8.1
Low solids .....	8.1
Specific .....	4A.1
Gum,	
Welan .....	6.5
Xanthan .....	6.2, 6.4
<b>H</b>	
HEC (Hydroxyethylcellulose) .....	6.1, 6.9, 21A.5, 21B.22, 22B.2
Halite .....	4C.14
Hammers (bits), air .....	21D.9
Hard plugs .....	14.18
Hardness (total) testing .....	3.22
Hazard Communication Act .....	23.13
Hazardous Materials Identification System (HMIS) .....	23.14
Heat aging, pressurized testing cell (HTHP) .....	22C.11
High-filter-loss-slurry squeeze .....	14.16
High-gravity solids .....	8.1
High-Temperature, High-Pressure (HTHP) drilling .....	22C.1
Filtration testing .....	3.8, 3.55
Hindered settling .....	20B.2, 20B.3
Hole cleaning .....	20B.1
Guidelines of .....	20B.11
In deepwater .....	22A.9
When milling .....	22D.2
Size, in displacements .....	20C.10
Hot wire survey .....	14.9
Hydrates, gas .....	22A.4
Hydration,	
Of clays .....	4B.9
Of shales .....	16.20
Hydrocarbon, Total Petroleum (TPH) .....	23.5
Hydroclones .....	8.2, 8.14, 8.15
Hydrogen ion concentration (pH), testing .....	3.15
Hydrogen sulfide (H <sub>2</sub> S) .....	4C.17, 11.21, 18.48, 19.11, 19.25
Concentration testing .....	3.33
Hydraulic horsepower .....	5.26
Hydraulics,	
API equations .....	5.21
Average bulk velocity .....	5.21
Calculations of .....	5.20, 5.26
Optimization of .....	5.21
Problem examples .....	5.31
Reynolds number .....	5.21
Hydrophilic-Lipophilic Balance (HLB) .....	11.5

- Hydrostatic pressure ..... 2.3  
     Calculation of ..... 9.17  
 Hydroxypropyl (HP) starch ..... 6.10

**I**

- Illite ..... 4B.4  
 Iron sulfide scale testing ..... 3.33  
 Incineration ..... 23.10  
 Inhibitive potassium systems ..... 10.13  
 Injector head ..... 22E.4  
 Intergranular corrosion ..... 19.5  
 International Air Transport Association (IATA) ..... 23.14  
 International Maritime Organization (IMO) ..... 23.14  
 Invasion ..... 14.2  
 Invert-emulsion systems ..... 22B.3, 22B.8, 11.9  
 Ionic bonding ..... 4A.7

**J**

- Jars ..... 1.10  
 Jets plugged ..... 18.61

**K**

- KCL (sylvite) ..... 4C.15  
 K-MAG system ..... 10.15  
 Kaolinites ..... 4B.6  
 Kelly ..... 1.9  
 Key seating ..... 15.6  
 Kick,  
     Detection of ..... 18.28  
     Off bottom ..... 18.29, 18.51  
 Kwikseal ..... 14.13

**L**

- LC<sub>50</sub>, *see Testing* ..... 23.4, 23.11  
 LD<sub>50</sub>, *see Testing* ..... 23.4  
 Laminar flow,  
     In displacements ..... 20C.9  
 Landfarming ..... 23.9, 23.12  
 Leachate testing ..... 23.5  
 Leak-off ..... 7.9  
 Leak-off test procedures ..... 18.17  
 Lignite ..... 4B.19  
 Lignosulfonates ..... 4B.20  
 Lime content, testing ..... 3.17, 3.59  
 Liners ..... 1.13  
 Linear alpha olefin ..... 13.13  
 Linear paraffin ..... 13.13  
 Liquid content ..... 3.12, 3.58  
 Logging,  
     Mud ..... 1.14  
     While Drilling (LWD) ..... 2.7  
     Wireline ..... 1.15  
 Logs, types of  
     Acoustic velocity ..... 17.11  
     Electric ..... 17.11  
     Mud ..... 2.8  
 Logistics, in deepwater ..... 22A.6

- Lost circulation,  
     Causes of ..... 14.2  
     Corrective measures ..... 14.11  
     In deepwater ..... 22A.7  
     In non-aqueous emulsions ..... 11.22  
     Lost-Circulation Materials (LCM) ..... 14.13  
     Preventative measures ..... 14.4  
     Techniques for treating (oil muds) ..... 14.23  
     Well control ..... 18.50  
 Low-gravity solids ..... 8.1  
 Low-Shear-Rate  
     Viscosity (LSRV) ..... 2.2, 5.6, 20C.4  
     Testing ..... 3.45  
 Low-Shear Yield Point (LSYP) ..... 20B.8, 20A.5

**M**

- MCAT polymer system ..... 10.22  
 M-I BAR ..... 18.56  
 M-I GEL ..... 7.12, 10.2  
 M-I SEAL ..... 14.13  
 M-I-X ..... 14.13  
 Magnesium,  
     Contamination ..... 4C.19  
     Testing ..... 3.22  
 Marsh funnel viscosity, testing ..... 3.4, 3.53  
 Material balance, calculation of ..... 9.23  
 Material Safety Data Sheets (MSDS),  
     Labeling of ..... 23.13  
     Training in ..... 23.13, 23.15  
 Measurement While Drilling (MWD) ..... 2.7  
 Mechanical stress failure ..... 16.14  
 Mesh equivalents, screens ..... 8.3, 8.4  
 Metallurgy ..... 19.7  
 Metric units ..... 9.1  
 M-I GEL ..... 8.3  
 Microannulus injection ..... 21D.4  
 Microclones ..... 8.14  
 Micron ..... 8.3  
 Milling,  
     “Bird nests” during ..... 22D.3  
     Fluids for ..... 22D.1, 22D.4  
     Hole cleaning while ..... 22D.2  
     Solids control, methods of ..... 22D.3  
 Minimum Transport Velocity (MTV) ..... 20B.11  
 Mist drilling ..... 21D.1, 21D.2  
 Mist/foamer pump, for air drilling ..... 21D.8  
 Mixed Metal Hydroxide (MMH) .. 10.24, 20B.7  
 Mobile, source of pollution ..... 23.1  
 Modified Power Law ..... 5.18  
 Montmorillonites ..... 4B.4  
 MOR-REX ..... 6.11  
 Motor, mud ..... 1.10  
 Mud,  
     Circulation ..... 1.12  
     Cleaners ..... 8.17, 11.24  
     Density, testing ..... 3.3, 3.52  
     Invert-emulsion systems ..... 22B.3, 22B.8  
     Logs ..... 2.8  
     Report ..... 9.37  
     Synthetic-base systems ..... 13.2  
     Systems, deepwater ..... 22A.4  
     Weight, testing ..... 3.3, 3.52  
 Mutual solubility ..... 22B.4

My-Lo-JEL ..... 6.3, 7.14, 22B.2  
Mysidopsis bahia ..... 23.4, 23.11

**N**

National Pollutant Discharge  
    Elimination System (NPDES) ..... 23.11  
Naturally Occurring Radioactive  
    Material (NORM) ..... 23.2  
Neutral point ..... 2.7  
New Source Performance  
    Standards (NSPS) ..... 23.11  
Newtonian fluid ..... 5.9  
Nitrite content testing ..... 3.28  
Nitrogen generators, for air drilling ..... 21D.8  
Non-aqueous emulsions ..... 11.1  
    Additives ..... 11.6  
    Calculations ..... 11.32  
    Controlled activity in ..... 11.15  
    Fundamentals of ..... 11.3  
    Properties of ..... 11.9  
    Systems ..... 11.9  
Non-dispersed systems ..... 7.16  
Non-Newtonian fluids ..... 5.11  
Non-point source pollution ..... 23.1  
Nozzle velocity ..... 5.26  
NOVADRIL ..... 21A.8  
NOVAMOD ..... 20A.5  
NUTPLUG ..... 14.13  
NOVAPLUS ..... 13.3, 21A.8  
NOVATEC ..... 13.6, 21A.8

**O**

Occupational Safety and Health  
    Administration (OSHA) ..... 23.13  
Oil and grease (O&G) test ..... 23.5  
Oil-base systems,  
    Conventional ..... 12.2  
    For HTHP ..... 22C.5  
    Mixing of ..... 12.2  
    Products ..... 12.11  
    Properties of ..... 12.15  
    Testing ..... 3.52  
    Troubleshooting ..... 11.29  
Oil content ..... 3.12, 3.58  
Oil or synthetic ratio (O/W or S/W) ..... 11.16  
    Testing ..... 3.58  
Oil-wetting solids ..... 22B.3  
Olefins ..... 13.13  
Organic waste ..... 23.2, 23.5  
Orientation of stresses ..... 16.12  
Osmosis ..... 4A.22  
Overburden pressure ..... 16.10, 17.1  
Oxygen scavengers ..... 19.17, 21B.14  
    Testing ..... 3.38

**P**

PAC (Polyanionic  
    Cellulose) ..... 6.7, 6.8, 7.16, 22B.2  
PAC PLUS ..... 7.16  
PAC PLUS UL ..... 22B.2

Packer fluids ..... 11.26, 12.20, 19.24  
Partial loss ..... 14.17  
Partial-size analysis, HTHP wells ..... 22C.13  
Permeability, of filter cake ..... 7.7  
Permeability plugging apparatus, testing .. 3.43  
Periodic table ..... 4A.7, 4A.8  
 $P_f$  alkalinity, testing ..... 3.17  
 $P_m$  alkalinity, testing ..... 3.17  
 $P_{om}$  alkalinity, testing ..... 3.59  
pH ..... 4A.16, 4A.18, 19.7  
    Effect on clays ..... 4B.17  
    Modifiers ..... 21B.13  
    Testing ..... 3.15  
Phenolphthalein ..... 4A2.23  
    Alkalinity ..... 4A.19  
    Testing ..... 3.17, 3.59  
Phosphates ..... 4B.19  
    Testing ..... 3.35  
PHPA (Partially Hydrolyzed  
    Polyacrylamide) ..... 6.1, 6.6, 6.15, 22B.2  
    Content testing ..... 3.30  
PIPE-LAX ..... 15.11, 15.13  
PIPE-LAX ENV ..... 15.12, 15.15  
PIPE-LAX W ..... 15.12, 15.14  
Pipe,  
    Drill ..... 1.8  
    Centralization of in displacements .... 20C.8  
    Stretch ..... 15.23  
    Movement of in displacements ..... 20C.8  
Pit and tank capacity/volumes,  
    calculation of ..... 9.4  
Pit closure ..... 23.12  
Pitting corrosion ..... 19.4  
Plastic flow ..... 22B.5, 16.15, 16.19  
Plastic viscosity ..... 5.3, 5.13  
    Testing ..... 3.6, 3.54  
Plug flow ..... 20C.9  
Pollution, identification  
    Heavy metals ..... 23.2  
    Salt compounds ..... 23.2  
Pollution, sources of  
    Mobile source ..... 23.1  
    Point source ..... 23.1  
    Non-point source ..... 23.1  
Polyanionic Cellulose  
    (PAC) ..... 6.7, 6.8, 7.16, 22B.2  
Polymer,  
    Chemistry of ..... 6.1  
    Classification of ..... 6.2  
    Effects of pH on ..... 6.6  
    Effects of salt ..... 6.7  
    Structure of ..... 6.1  
POLYPAC ..... 6.9  
POLYPAC UL ..... 22B.2  
POLY-PLUS ..... 6.15, 10.21, 20A.5  
Polysaccharides ..... 6.2  
POLY-SAL ..... 6.3, 22B.2  
POLYSTAR 450 ..... 6.19, 10.18, 22C.10  
Pore pressure ..... 16.11, 17.2  
    In deepwater ..... 22A.6  
Pore pressure plotting ..... 17.13  
Potassium chloride brines ..... 21B.10  
Potassium content testing ..... 3.26  
Potassium formate ..... 21B.11

Power Law model .....	5.14
Pressure,	
Abnormal .....	17.3
Control, failure of .....	18.1
Engineering indicators .....	18.6
Formation, indications of .....	18.5
Geological indicators .....	18.11
Hydrostatic .....	2.3
Loss of .....	18.19
Measuring of .....	18.6
Normal .....	17.3
Overburden .....	16.10,17.1
Pore .....	16.11
Pressure/transistion zone analysis .....	18.15
Pressure/velocity profile	
in air drilling .....	21C.6
Primary control .....	18.1
Secondary control .....	18.1
Subsurface .....	18.3
Subnormal .....	17.5
Tertiary control .....	18.1
Pressure control, special problems	
Gas cutting .....	18.45
Gas migration .....	18.53
Hydrogen sulfide, carbon dioxide .....	18.48
Lost circulation .....	18.50
Saltwater intrusions .....	18.48
Pressure loss calculations .....	5.23
Pressure prediction, advances in .....	17.16
Pressure transducer survey .....	14.9
Pressured shales .....	16.17
Pressurized testing cell	
(high-temperature heat aging) .....	22C.11
Probes, galvanic .....	19.23
Products, oil muds .....	12.11
Properties, of oil-base muds .....	12.15
Pull-up-and-wait technique, <i>see Lost circulation</i> .....	14.12
Pump output, calculation of .....	9.12
Pumping,	
Methods of .....	1.17
Operations, in displacements .....	20C.4

**Q**

QUEBRACHO .....	4B.20
-----------------	-------

**R**

Radioactive tracer survey .....	14.8
Radioactivity .....	23.2
Reactive solids .....	22C.3
Recrystallization .....	22B.7
Relaxed-filtrate .....	12.1, 12.5
Retort testing .....	3.12, 3.58
RESINEX .....	7.16
Reverse circulation .....	20C.1, 21B.17
Reynolds number .....	5.21
Rheological models .....	5.13
Rheology .....	5.1, 22C.2, 11.10
RHEOSTAR .....	6.19
Rig, drilling .....	1.5
Rise velocity .....	20B.9
Riser .....	22A.3, 22A.6

Rock,	
Characteristics of .....	16.7
Sedimentary .....	1.1, 16.2
Types of .....	16.6
Rotary,	
Drilling rig .....	1.5, 1.6
Table .....	1.9
Rotating heads, for air drilling .....	21D.8
Rotation and reciprocation .....	20C.4

**S**

SI-1000 scale inhibitor .....	19.18
SP-101 .....	7.16
SV-120 .....	22B.7
Safe Handling Of Chemicals (SHOC) .....	23.13
Sag, barite .....	2.4
Sag Index .....	20A.3, 20A.8
Sag Register ( $S_r$ ) .....	20A.3
Sag Test, Viscometer (VST) .....	20A.3, 20A.6
Salinity, brines .....	11.38
Testing .....	3.21, 3.59
Salt domes .....	1.2
Salt,	
Binary titrations .....	22B.8
Concentration .....	3.21, 3.59
Contamination of .....	4C.14
Drilling of .....	22B.1
Effects on polymers .....	6.7
Sample, collection of .....	23.3
Solubility of .....	22B.3
Tables .....	9.40
Testing .....	3.21, 3.59
Types of .....	22B.1
SALT GEL .....	7.12, 22B.2
Saltwater, flows .....	4C.16, 18.48
Sampling of,	
Air .....	23.3
Solid waste .....	23.3
Water .....	23.3
Sands, charged .....	17.8
Sand content testing, .....	3.11
SARA Title III .....	23.13
Saturated-saltwater-base systems ..	10.11, 22.B1
Scale inhibitors .....	19.10, 21B.13
Testing .....	3.33, 3.35, 3.48
Screen	
Sedimentary rock .....	1.1, 16.2
Seeping loss .....	14.17
Sepiolite .....	4B.2, 22B.2
Settling, types of	
Boycott .....	20A.2
Dynamic .....	20A.2
Hindered .....	20A.2
Shale shakers .....	11.23
Shear-strength measurement .....	22C.11
Shear stress .....	5.3
Shearometer tube .....	22C.11
Shut-in casing pressure .....	18.21
Shut-in drill pipe pressure .....	18.21
SILDRIL system .....	10.27
Solids control .....	11.23
Sodium bromide .....	21B.11
Sodium chloride brines .....	21B.10

**C — Index**

- Sodium formate brines ..... 21B.11  
 Soft plugs ..... 14.21  
 SPERSENE system ..... 10.4  
 Stability, electrical testing ..... 3.57  
 Static ..... 20A.2  
 Shaker screens ..... 8.8, 8.9, 8.10, 8.11, 8.12  
 Shale,  
     Deposition ..... 16.2  
     Instability of ..... 15.3  
     Pressured ..... 16.17  
     Shakers ..... 8.6, 8.23  
     Stability ..... 16.1  
     Stressed ..... 16.16  
     Testing ..... 16.21  
     Water-sensitive ..... 16.19  
 Shut-in formation pressure ..... 18.27  
 Shut-in procedures ..... 18.28  
 Size, hole ..... 20C.10  
 Skin damage ..... 2.6  
 Slip velocity ..... 2.2  
 Slumping ..... 20A.2  
 Soaps ..... 11.6  
 Sodium Carboxymethylcellulose  
     (CMC) ..... 6.1, 6.6, 6.7, 7.15  
 Sodium Polyacrylate (SPA) ..... 6.12  
 Solids,  
     Composition and orientation of ..... 7.9  
     Content, testing ..... 3.12, 3.58  
     Control while milling ..... 22D.3  
     High-gravity ..... 8.1  
     Low-gravity ..... 8.1  
     Oil-wetting ..... 22B.3  
     Plugging ..... 21A.4  
     Separation, methods of ..... 8.5  
     Size classification ..... 8.3  
     Total Dissolved (TDS) ..... 23.6  
     Total Suspended (TSS) ..... 23.2, 23.6  
     Water-wetting ..... 22B.3, 22B.8  
 Solids analysis, calculation of ..... 9.31  
     Testing ..... 3.12, 3.58  
 Solid waste sampling ..... 23.3  
 Solubility, of ..... 4A.15  
     Acids ..... 4A.20  
     Bases ..... 4A.20  
     Gas ..... 11.17  
     Salts ..... 4A.20, 22B.3  
 Solutions, concentrations ..... 4A.24  
 SP-101 ..... 6.14  
 Spacers,  
     For completion and  
         workover systems ..... 21B.16  
     Flushes ..... 20C.9  
     In displacements ..... 20C.3  
 SPERSENE ..... 4B.20  
 Squeezes ..... 14.20  
 Specific gravity ..... 4A.1  
 Stability, wellbore ..... 16.1  
 Stabilizers ..... 1.8  
 Starch ..... 6.2, 6.10  
     Hydroxypropyl ..... 6.10  
 Static filtration ..... 7.3  
 Static filtration tests ..... 7.2, 3.7, 3.55  
 Static settling ..... 20A.2  
 Stoichiometry ..... 4A.13  
 Stokes' Law ..... 8.2  
 Stress corrosion cracking ..... 19.4  
 Stressed shales ..... 16.16  
 Stresses,  
     Earth ..... 16.10  
     Mechanical ..... 16.14  
     Orientation of ..... 16.12  
 Structure of,  
     Polymer ..... 6.1  
 Stuck pipe,  
     Differentially ..... 15.1, 15.8  
     Mechanically ..... 15.1, 15.2  
     U-tube technique ..... 15.20  
 Subnormal pressures ..... 17.5  
 Subsurface pressures ..... 17.1, 18.3  
 SULF-X ..... 19.18, 22B.7, 22B.8  
 Sulfate concentration testing ..... 3.25  
 Sulfide stress cracking ..... 19.4,  
 Sulfide testing (qualitative) ..... 3.33, 3.60  
 Swab and surge pressures ..... 5.30, 22A.6  
 Sweeps and spacers ..... 20C.3  
 Sylvite (KCL) ..... 4C.15  
 Synthetic-base systems,  
     Applications ..... 13.19  
     Chemistry of ..... 13.12  
     Descriptions of ..... 13.2  
     Formulation of ..... 13.3  
     HS&E issues ..... 13.15  
     Maintenance of ..... 13.10  
     Mixing ..... 13.10  
     Polymers ..... 6.11  
     Problems with ..... 13.19  
     Special applications for ..... 13.17  
     Testing of ..... 13.11, 13.20  
 Systems,  
     Mud, deepwater ..... 22A.4  
     Synthetic-base ..... 13.2
- T**
- TACKLE ..... 6.13  
 Tectonic forces ..... 16.13  
 Temperature, effects of ..... 22C.1  
 Temperature survey ..... 14.8  
 Tensile failure-fracturing ..... 16.14  
 Testing, methods of  
     Analytical ..... 23.5  
     Drill Stem (DST) ..... 2.8  
     Leachate ..... 23.5  
     Total ..... 23.5  
     Toxicity ..... 23.2, 23.11  
 Tests, types of  
     LC<sub>50</sub> ..... 23.4, 23.11  
     LD<sub>50</sub> ..... 23.4  
     Glass jar ..... 22B.3  
     Oil and grease (O&G) ..... 23.5  
     Radioactivity ..... 23.2  
     Turbidity ..... 21B.19  
     Weight-up ..... 22B.3, 22B.9  
 Thermally Activated Mud  
     Emulsion (TAME) ..... 10.25  
 THERMPAC UL ..... 6.10  
 Thinners, chemical ..... 7.17

Thixotropic .....	2.2, 2.4
Thixotropy, gel strengths .....	5.7
Testing .....	3.6, 3.54
Through-tubing drilling .....	22E.11
Titrations .....	4A.23
Tongs .....	1.11
Top drive .....	1.10
Total Dissolved Solids (TDS) .....	23.6
Total hardness, testing .....	3.22
Total Petroleum Hydrocarbon (TPH) .....	23.5
Total Suspended Solids (TSS) .....	23.2, 23.6
Total testing .....	23.5
Toxicity,	
Testing for .....	23.2, 23.11
Transport velocity .....	2.2
Traps .....	1.3
Trimerization .....	13.13
Tubing guide arch .....	22E.5
Tuff .....	16.5
Turbidity testing .....	21B.19
Turbulent flow,	
In displacements .....	20C.9
<b>U</b>	
U.S. units of measurement .....	9.1
Underbalanced static condition .....	18.26
Under-compaction .....	17.6
Undersaturated water-base systems .....	22B.2
Uplift .....	17.6
U-tube analysis .....	18.25
Technique .....	15.20
<b>V</b>	
VG-69 .....	12.2
Valence .....	4A.6
Velocity, types of	
Critical .....	5.22
Rise .....	20B.9
Slip .....	2.2
Transport .....	2.2
VERSAsystems .....	12.2
VERSACLEAN .....	21A.8
VERSACORE .....	12.9
VERSACOAT .....	12.2
VERSADRIL .....	21A.8
VERSA-HRP .....	12.2
VERSALIG .....	12.2
VERSAMOD .....	12.2, 20A.5
VERSAMUL .....	12.2
VERSAPORT .....	21A.8
VERSATHIN .....	12.14
VERSATROL .....	12.9, 12.14
VERSAVERT .....	12.2
VERSAVERT F, P, S .....	12.14
VIRTUAL HYDRAULICS .....	5.29, 22A.7, 11.12
Viscosifiers .....	7.18, 21B.14, 21B.21, 11.7
Viscometer,	
Fann Model 50 .....	22C.12
Fann Model 70/75 .....	22C.13
Rotational, testing .....	3.5, 3.53
Sag Test (VST) .....	20A.3, 20A.6
Testing .....	3.5, 3.53
Viscosity,	
Apparent .....	5.3
Testing .....	3.6, 3.54
Chemical treatment principals .....	4B.18
Effective .....	5.3
Effects of temperature, pressure on .....	5.9
Filtration control .....	7.8
Funnel .....	5.2
Testing .....	3.4, 3.53
Low-Shear-Rate Viscosity (LSRV) .....	2.2
Plastic .....	5.3
Testing .....	3.6, 3.54
Testing .....	3.4, 3.53
V-G meter (Fann), testing .....	3.5, 3.53
Volatile Organic Compounds (VOC) .....	23.6
V <sub>SA</sub> alkalinity (API) testing .....	3.59
<b>W</b>	
Wait-and-weight method, well control ...	18.36
Washout,	
Choke .....	18.61
Drillstring .....	18.61
Waste management, options for .....	23.8
Water activity (A <sub>w</sub> ) .....	11.15
Water-base muds,	
Calcium-treated .....	10.6
For HTHP wells .....	22C.6
Inhibitive potassium systems .....	10.13
Saturated saltwater .....	10.11
SPERSENE system .....	10.4
Testing .....	3.3
Unweighted clay-water systems .....	10.2
Water sampling .....	23.3
Water-sensitive shales .....	16.19
Water-wetting, solids .....	11.18, 22B.3, 22B.8,
Weighting agents, completion fluids ...	21B.13
Weight materials .....	11.8
Weight-up test .....	22B.3, 22B.9
Welan gum .....	6.5
Well control,	
Complications .....	18.60
In deepwater .....	22A.9
In salt formations .....	22B.6
Well control, methods of,	
Circulate-and-weight .....	18.41
Driller's method .....	18.32
Wait-and-weight method .....	18.36
Wellbore,	
Calculations, general .....	9.3
Deviation of .....	20C.4, 20C.10
Stability .....	16.1
Wellbore plugs,	
Oil-base .....	18.58
Water-base .....	18.57
Wet, classification .....	8.13
Wetting agents .....	7.18, 11.7
Wireline logging .....	1.15
Wireline logs .....	17.10
Workers' Right-to-Know law .....	23.13
Workover and completion fluids ...	7.19, 11.28
Compatibility with .....	21B.9
Other types .....	21B.24

Workplace Hazardous Materials  
Information System (W.H.M.I.S.) ..... 23.13

**X**

Xanthan gum ..... 6.2, 6.4, 21B.22  
XCD ..... 22B.2

**Y**

Yield point ..... 5.5

**Z**

Zag Tube ..... 20B.2  
Zinc bromide ..... 21B.12  
Zinc content testing ..... 3.32