ASTM D1837, 12
ASTM D1838, 12
ASTM D1840, 54
ASTM D2158, 12
ASTM D2163, 12
ASTM D2386, 51
ASTM D2420, 13
ASTM D2598, 11, 13
ASTM D2622, 58, 76
ASTM D2624, 61, 78
ASTM D2699, 17
ASTM D2700, 17, 72–73
ASTM D2713, 13
ASTM D2784, 13
ASTM D2887, 56
ASTM D3227, 59
ASTM D3241, 53 (figure), 53–54
ASTM D3338, 75
ASTM D3699, 6
ASTM D3700, 13
ASTM D3948, 61, 61 (figure)
ASTM D4054, 62
ASTM D4057, 65
ASTM D4529, 55, 75
ASTM D4806
  general discussion, 23
  history of, 23
  overview, 6
  performance requirements, 23–25
  regulatory aspects, 25
  storage handling and sampling, 25
  workmanship expectations, 25
ASTM D4809, 75
ASTM D4814
  versus ASTM D4806, 23–24
  blending components and additives, 19
    composition, 18
    corrosion, 19
    emission regulations, 19–20
    general discussion, 15–16
    octane number, 16–17
    overview, 5, 16
    storage and stability, 18–19
    volatility, 17–18
    workmanship, 19
ASTM D4865, 59–60
ASTM D4952, 59
ASTM D5001, 59
ASTM D5188, 18
ASTM D5191, 57, 75
ASTM D5501, 24, 29
ASTM D5798
  history of, 27–28
  ordering information, 30
  overview, 6, 27
  performance requirements, 28–30
  regulatory aspects, 30
  sampling, 30
  workmanship, 30
ASTM D5842, 65
ASTM D5972, 50
ASTM D6227, 79, 80 (table)
ASTM D6378, 57
ASTM D6379, 54
ASTM D6423, 24–25, 29
ASTM D6424, 80 (table)
ASTM D6667, 17
ASTM D6751, 95–99
ASTM D6792, 65
ASTM D6812, 80 (table)
ASTM D6897, 17
ASTM D7319, 24, 29
ASTM D7328, 24, 29
ASTM D7467, 95–99
ASTM D7524, 63
ASTM D7547, 68, 79, 80 (table)
ASTM D7566
  additives, 87–88
  approval of synthesized hydrocarbons, 83–84
  organization of, 84
  overview, 83
  semisynthetic jet fuel blends, 87
  synthetic blending components, 84–87
ASTM D7592, 80 (table)
ASTM D7619, 61
ASTM D7667, 19
ASTM D7671, 19
ASTM D7719, 80 (table)
ASTM D7795, 24, 29
ASTM D7862
  contaminant limits, 34–35
  history of, 33
  history of butanol, 33–34
  isomers, 34, 35 (table)
  performance requirements, 34–35
  regulatory aspects, 35–36
  storage handling, 36–37
  workmanship, 36
ASTM E29, 65
ASTM International Committee D02, 1
automotive fuel rating for gasoline, 5
automotive spark-ignition engine fuel specifications. See ASTM
D4806; ASTM D4814; ASTM D7862
avgas. See aviation gasoline
aviation gasoline
  additives, 77–78
  aircraft engine performance and knocking, 68, 70–72
  combustion characteristics and knock resistance, 72–73
  corrosivity, 76
  fluidity at low temperatures, 75–76
  fuel cleanliness, handling, and storage stability, 76–77
  fuel metering and aircraft range, 75
  history of main grades, 66–68
  other ASTM fuel specifications, 79
  performance requirements, 72
  quality control procedures, 78–79
  reporting, 78
  sampling, 78
  static electricity, 77
  table and appendix, 72
  test properties, 68, 69 (table)
  test results, matching to specifications, 78
  unleaded replacement for, 79–81
  volatility, carburetion, and vaporization, 73–75
aviation mix, 77
aviation piston aircraft engines, 66 (figure), 67 (figure), 68, 70 (figure), 70–72, 71 (figure)
aviation turbine fuels. See jet fuel

B
benzene, 18
Biobor JF, 63
biocidal additives, 63–64
bio-derived fuels, 83
biodiesel
ASTM D6751, 96–97
ASTM D7467, 97–98
commercial use of standards, 98–99
defined, 91
development of standards for, 95–96
history of, 95
biodiesel blend, 91, 94
biofuels, 20
blending components in gasoline, specifications for, 19
boiling range
of aviation gasoline, 73, 74 (figure)
of jet fuel, 56
boil-off, fuel, 74–75
BQ-9000 fuel quality program, 98–99
butanol for gasoline blending
contaminant limits, 34–35
history of, 33–34
isomers, 34, 35 (table)
performance requirements, 34–35
regulatory aspects, 35–36
storage handling, 36–37
workmanship, 36
Butanol Task Group, 33, 34

C
cadmium, 59
California Air Resources Board (CARB), 17, 27
Canadian General Standards Board (CGSB), 1
carbon dioxide (CO₂), 10
carbonyl sulfide (COS), 10
carburetion, 73–75
carburator icing, 75
cease and desist order, 7
CEN (European Committee for Standardization), 1
certificate of analysis (COA), 65
certificate of quality (COQ), 65
Cetane Index, 6
cetane number, 91–92
CGSB (Canadian General Standards Board), 1
chemical inhibitors, in LPG products, 10
chloride
in butanol, 35
in denatured fuel ethanol, 24
in ethanol fuel blends, 29
chromatography test method, 12, 24
citation, criminal, 7
civil penalty, 7
Clark, Alisdair, 71–72
cleanliness of aviation gasoline, 76–77
cloud point, for diesel fuel oils, 93
CO₂ (carbon dioxide), 10
COA (certificate of analysis), 65
cold soak filtration test (CSFT), 97
combustion
aviation gasoline, 72–73
jet fuel, 54–55
combustor, in jet engine, 46, 47 (figure)
composition
diesel fuel oils, 90–91
gasoline specifications, 18
compositional analysis, calculating physical properties from, 13
condemned product, disposition of, 7
condensation
additives for jet fuels, 60, 61
diesel fuel oils, 93
consensus specifications, 15, 89
consumers, reliance on specifications, 3
containers. See storage
contaminants
butanol, 34–35
jet fuel, 60–61
See also specific contaminants by name
Continental flat six engine, 71 (figure)
Coordinating Research Council (CRC) program, 62
copper strip corrosion test, 12, 19, 58, 58 (figure), 76
COQ (certificate of quality), 65
corrosion
aviation gasoline specifications, 76
gasoline specifications, 19
jet fuel specifications, 58
corrosion inhibitors, 64, 78
COS (carbonyl sulfide), 10
CRC (Coordinating Research Council) program, 62
criminal citation, 7
crystal formation in aviation gasoline, 75–76
CSFT (cold soak filtration test), 97
cycloparaffins, 42

D
D02 committee, ASTM International, 1
d56 test method, 57
d86 test method, 17–18, 56, 73
d130 test method, 19, 58, 76
d323 test method, 57, 75
d381 test method, 19, 60
d396 specification. See ASTM D396
d512 test method, 24
d525 test method, 18–19
d873 test method, 76
d909 test method, 73
d975 specification. See ASTM D975
d1094 test method, 76
d1265 practice, 11
d1266 test method, 76
d1267 test method, 11
d1319 test method, 54
d1322 test method, 54
d1655 specification. See ASTM D1655
d1657 test method, 11–12
d1835 specification. See ASTM D1835
d1837 test method, 12
d1838 test method, 12
d1840 test method, 54
D2158 test method, 12
D2163 test method, 12
D2386 test method, 51
D2420 test method, 13
D2598 practice, 13
D2622 test method, 58, 76
D2624 test method, 61, 78
D2699 test method, 17
D2700 test method, 17, 72–73
D2713 test method, 13
D2784 test method, 13
D2887 test method, 56
D3227 test method, 59
D3241 test method, 53 (figure), 53–54
D3338 test method, 75
D3699 specification. See ASTM D3699
D4054 standard practice, 62
D4057 standard practice, 65
D4529 test method, 55, 75
D4806 specification. See ASTM D4806
D4809 test method, 75
D4814 specification. See ASTM D4814
D4865 guide, 59–60
D4952 test method, 59
D5001 test method, 59
D5188 test method, 18
D5191 test method, 57, 75
D5501 test method, 24, 29
D5798 specification. See ASTM D5798
D5842 standard practice, 65
D5972 test method, 50
D6227 specification, 79, 80 (table)
D6378 test method, 57
D6379 test method, 54
D6423 test method, 24–25, 29
D6424 standard practice, 80 (table)
D6667 test method, 17
D6751 specification, 95–99
D6792 standard system, 65
D6812 standard practice, 80 (table)
D6897 test method, 17
D7319 test method, 24, 29
D7328 test method, 24, 29
D7467 specification, 95–99
D7524 test method, 63
D7547 specification, 68, 79, 80 (table)
D7566 specification. See ASTM D7566
D7592 specification, 80 (table)
D7619 test method, 61
D7667 test method, 19
D7671 test method, 19
D7719 specification, 80 (table)
D7795 test method, 24, 29
Defence Standard (Def Stan) 91–91, 83
denatured fuel ethanol, 6, 23–25, 28
density
  of jet fuel, 57
  of light hydrocarbons, testing, 11–12
deposit control additives, 19
deposition in jet fuel, 52–54
DI (drivability index), 18
Di-EGME (diethylene glycol monomethyl ether), 63, 77–78
diesel engines, 1, 89
diesel fuel oils
  alternative fuels and blend stocks, 94
  definitions, 91
  fuel composition, 90–91
  fuel grades, 90, 90 (table)
  overview, 5–6, 89
  properties, 91–94
test methods, 90
types of specifications, 89–90
di-ethylene glycol monomethyl ether (Di-EGME), 63, 77–78
dirt, in jet fuel, 60–61
disposition of condemned product, 7
distillation
  aviation gasoline, 73, 74 (table)
  diesel fuel, 6
  gasoline, 17–18
  jet fuel, 56, 56 (figure)
doctor test method, 59
downgrade, product, 7
drag reducer additive (DRA), 64
drivability index (DI), 18
drum filling requirements, for aviation gasoline, 79
dry vapor pressure equivalent (DVPE), 17
dryness of propane, testing, 13
dual-fueled vehicles, 27
dust contamination, 27
DVPE (dry vapor pressure equivalent), 17
dye in aviation gasolines, 77, 78 (table)
E
E29 practice, 65
EASA (European Aviation Safety Agency), 84
EIA (Energy Information Administration), 89
EISA (Energy Independence and Security Act of 2007), 36
elastomers, effect of aromatics on, 55
electrical conductivity improver, 63
emission regulations, 19–20
Energy Independence and Security Act of 2007 (EISA), 36
Energy Information Administration (EIA), 89
Energy Policy Act (EPACT), 36
engine-cleaning detergent additives, 19
engines
  automotive versus aviation, 70–71
  aviation piston aircraft performance and knocking, 66 (figure),
  67 (figure), 68, 70 (figure), 70–72, 71 (figure)
development of specific fuels for, 1
diesel, 89
importance of gasoline specifications, 15
jet engine operations and fuel systems on aircraft, 40 (figure),
45–49, 47 (figure), 48 (figure)
manufacturer specifications, 89–90
Environmental Protection Agency (EPA)
  benzene regulations for gasoline, 18
  butanol specifications, 33
denatured fuel ethanol regulations, 25
emission regulations, 19–20
oxygenate regulations, 19
renewable fuel standard, 20
"substantially similar" rule, 33, 36
sulfur regulations for gasoline, 18
unleaded replacement aviation gasoline fuel, 79–81
vapor pressure gasoline specifications, 17
environmental regulations, 1, 15–16
EPA. See Environmental Protection Agency
ethane, 9, 10, 11
ethanol, 25, 76–77
See also ASTM D4806
ethanol flex fuel, 28–30
ethanol fuel blends, 6, 25, 27–30
ethylene, 12
ethylene dibromide, 77, 77 (figure)
European Aviation Safety Agency (EASA), 84
European Committee for Standardization (CEN), 1
excise tax on undenatured ethanol, 24
expansion method for vapor pressure testing, 14
F
FAA (Federal Aviation Administration), 80–81, 84
fan engine, 48 (figure), 48–49
fats for biodiesel production, 97
fatty acid methyl ester (FAME), 60, 64–65, 86
Federal Aviation Administration (FAA), 80–81, 84
federal fleet usage, alternative fuel for, 29–30
federal regulatory agencies, 3–7
See also Environmental Protection Agency; regulatory agencies
fermentation processes for butanol, 33–34, 36
FFV (flexible-fuel vehicle), 27
Fischer-Tropsch (FT) process, 83, 84–86, 85 (figure)
fit-for-purpose properties, 83–84
fixed timing engines, 70–71
flammability
butanol, 36–37
jet fuel, 65–57
flash point
of diesel fuel, 5, 92
of jet fuels, 39, 40–41, 55, 57
of kerosine, 6
flexible-fuel vehicle (FFV), 27
floating piston cylinders, obtaining samples with, 13
fluidity at low temperatures, 75–76
fluoride contamination, 10
FOE (Friends of the Earth), 81
FPMUs (fuel property measurement units), 57
freeze point
of aviation gasoline, 75–76
of jet fuel, 50–51, 56
Friends of the Earth (FOE), 81
FSIs (fuel system icing inhibitors), 63, 77–78
FT (Fischer-Tropsch) process, 83, 84–86, 85 (figure)
fuel ethanol, 24
fuel grades, diesel oil, 90, 90 (table)
fuel metering
aviation gasoline, 75
jet fuel, 57–58
fuel oil specifications, 6
fuel property measurement units (FPMUs), 57
fuel supply system, jet engine, 47, 48 (figure), 49
fuel system icing inhibitors (FSIs), 63, 77–78
fuels specifications
development of, 1
noncompliance, regulatory actions for, 6–7
overview, 3
regulatory agencies use of, 3–5
routinely monitored products, 5–6
stakeholder reliance on, 3
technical definitions, 3
updates in, 1
See also specific specifications by name
fusel oil concentration, 34
G
GA (general aviation) market, 67
gas chromatography test method, 12, 24
gas turbine engine, 45–49, 47 (figure), 48 (figure)
gasoline specifications
blending components and additives, 19
composition, 18
corrosion, 19
emission regulations, 19–20
enforcement of, 16
importance of, 15
octane number, 16–17
overview, 5
renewable use mandates, 20
sources of, 15–16
stakeholder involvement in, 16
storage and stability, 18–19
test methods and definitions, 15
use of, 16
variations in, 16
volatility, 17–18
workmanship, 19
See also ASTM D7862; ASTM D910
general aviation (GA) market, 67
General Requirements for Competence of Testing and Calibration Laboratories (ISO 17025), 65
glycol contamination, 10
government regulations, 3–7, 90
See also Environmental Protection Agency; regulatory agencies
GPA Standard 2140 (Liquefied Petroleum Gas Specifications and Test Methods), 9
Grade 80 fuel, 66, 67 (table)
Grade 91 fuel, 66, 67 (table)
Grade 100 fuel, 67, 67 (table)
Grade 100LL fuel, 67, 67 (table), 68
Grade 100VLL fuel, 67, 67 (table)
Grade UL82 fuel, 67
Grade UL87 fuel, 67
greases, in LPG products, 10
"Green Book, the, " 3
guide, definition of, 3
gums, 18, 19, 25, 44, 60
H
H2S (hydrogen sulfide), 10, 12, 13, 58
handling
aviation gasoline, 76–77
butanol, 36–37
ethanol fuel blends, 25, 30
See also storage
HEFA (hydroprocessed esters and fatty acids), 86
HF (hydrofluoric) acid contamination, 10
high temperature oxidation and deposit formation in jet fuel, 52–54
Horiba sulfur analyzer, 58, 76
hydrocarbon blendstock, 29
hydrocarbon oil, 91
hydrocarbons in jet fuels, 42–43
hydrofluoric (HF) acid contamination, 10
hydrogen sulfide (H2S), 10, 12, 13, 58
hydrometer, testing hydrocarbon density with, 11–12
hydroprocessed esters and fatty acids (HEFA), 86
hydroprocessed fermented sugars, 86–87, 87 (figure)
IATA (International Air Transportation Association), 83
ice formation, in jet fuel, 52, 52 (figure)
ignition system, aviation piston aircraft engine, 70 (figure), 70–71, 71 (figure)
incidental materials, in jet fuel, 41, 64–65
inorganic chlorides, 35
inspectors, regulatory, 4
internal combustion engine, 1
International Air Transportation Association (IATA), 83
IPA (isopropyl alcohol), 77–78
iron corrosion, 19
iron oxides, 59
ISO 17025 (General Requirements for Competence of Testing and Calibration Laboratories), 65
isobutanol, 34, 35 (table), 36
isomers, butanol, 34, 35 (table)
isopropyl alcohol (IPA), 77–78
Jet A, 40, 42, 56
Jet A1, 40, 42, 56
Jet B, 40
jet engine operations and fuel systems on aircraft, 45–49, 47 (figure), 48 (figure)
jet fuel
additives, 61–64
annexes and appendices, 41
combustion, 54–55
density or relative density of light hydrocarbons, testing, 11–12
dirt, particulates, surfactants, and other contaminants, 60–61
diesel fuel, 57–58
high temperature oxidation and deposit formation, 52–54
history of main grades, 39–40
incidental materials, 64–65
jet engine operations and fuel systems on aircraft, 45–49, 47 (figure), 48 (figure)
low temperature and water related effects, 51–52
low temperature properties, 49–51
lubricity, 59
other metal contaminants, 58–59
overview, 66
property limits, 41–42
quality control procedures, 65
sampling, 65
static electricity, 59–60
Tables 1, 2, and 3, 40–41
test properties, 45
test results, matching to specifications, 65
test results, matching to specifications, 65
volatility and flammability, 55–57
wording of specifications, 40
See also synthesized hydrocarbons
JFTOT™ tube rating scale, 53 (figure), 54
JP-8, 39
K
Kathon FP 1.5, 63
kerosine, 6, 39, 40
knock resistance
automobile gasoline, 16–17
aviation gasoline, 68, 70–73
knock-induced pre-ignition, 70
L
lamp method, 76
LCFS (low carbon fuel standard), 20
LDTA-A (Tracer A), 63
lead acetate method for hydrogen sulfide testing, 13
lead alkyls, in gasoline, 18
lead deposits on spark plugs, 68, 68 (figure)
leded aviation gasoline, 66–68, 67 (figure)
leak detectors, 63
lean engine test, 72–73
Liquefied Petroleum Gas Specifications and Test Methods (GPA Standard 2140), 9
liquefied petroleum (LP) gases
ASTM D1835, 6
basis for NGL products, 10
calculating properties from compositional analysis, 13
copper strip corrosion test, 12
copper strip corrosion test, 12
copper strip corrosion test, 12
copper strip corrosion test, 12
common contaminants in, 10–11
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
density or relative density of light hydrocarbons, testing, 11–12
LPGs. See liquefied petroleum gases
lubricity
diesel fuel oils, 92–93
jet fuel, 59
LPG products, 10
lubricity improvers, 64
M
maximum allowable take-off weight (MTOW), 57
MBC (microbiological contamination), 63 (figure), 63–64
(MDA) NN-disalicylidene-1,2-propane diamine, 62–63
mercaptans, 44, 59
mercury, 10
metal contaminants
in gasoline, 18
in jet fuel, 58–59
metal deactivator additives, 62–63
metering jet fuel levels, 57–58
methane, 10
methanol, 10, 24, 29, 35
methyl mercaptan, 13
methyl tert-butyl ether (MTBE), 19
methylcyclopentadienyl manganese tricarbonyl (MMT), 18
microbiological contamination (MBC), 63 (figure), 63–64
microseparometer rating, 60–61, 61 (figure)
military use of jet fuel, 39
MMT (methylcyclopentadienyl manganese tricarbonyl), 18
molecular sieve particles, 10
motor octane number (MON), 13, 16–17
MTBE (methyl tert-butyl ether), 19
MTOW (maximum allowable take-off weight), 57

N
NACE (National Association of Corrosion Engineers) test, 19
naphthalenes, 54–55
naphthenic acids, 44
NASA’s Alternative Aviation Fuel Experiment (AAFEX), 55, 56
(NACE) test, 19
National Association on Corrosion Engineers (NACE) test, 19
National Conference on Weights and Measures (NCWM), 4
National Institute of Standards and Technology (NIST)
Handbook 130, 4
National Technology Transfer and Advancement Act, 4
natural gas liquids (NGLs), 19
ASTM D1835, 9
common contaminants in, 10–11
commomon products, 9
GPA Standard 2140, 9
LPGs as basis for products, 10
test methods, 9–10
n-butanol, 34, 35 (table), 36
NCWM (National Conference on Weights and Measures), 4
net heat of combustion, measuring, 55, 75
NGLs. See natural gas liquids
NIST (National Institute of Standards and Technology) Handbook
130, 4
nitrogen in jet fuel, 43–44
noncompliance, regulatory actions for, 6–7
non-hydrocarbon compounds in jet fuel, 43–44

O
octane number, 5, 16–17
OEMs (original equipment manufacturers), 62, 83–84
oil stain test, 12
oils for biodiesel production, 97
olefins, 43, 44 (figure)
1-butanol, 34, 35 (table)
ordering information, ethanol fuel blends, 30
original equipment manufacturers (OEMs), 62, 83–84
oxidation resistance of gasoline, testing, 18–19
oxidation stability test, 76
oxygen in jet fuel, 43–44
oxygenates, 5, 19
oxy-hydrogen burner test method, 13

P
PAFI (Piston Aviation Fuels Initiative), 81
paraffins, 42, 43 (figure)
Paragraph 8, ASTM D910, 72, 76
Paragraph 8, ASTM D1655, 41
particulates, in jet fuel, 60–61
penalty, civil, 7
performance requirements
aviation gasoline, 72
denatured fuel ethanol, 23–25
ethanol fuel blends, 28–30
performance requirements of jet fuel
combustion, 54–55
corrosivity, 58
dirt, particulates, surfactants, and other contaminants, 60–61
fuel metering, 57–58
high temperature oxidation and deposit formation, 52–54
low temperature and water related effects, 51–52
low temperature properties, 49–51
lubricity, 59
other metal contaminants, 58–59
static electricity, 59–60
volatility and flammability, 55–57
pHe requirement, 24–25, 29
pipeline specifications, 10, 89
Piston Aviation Fuels Initiative (PAFI), 81
plasticizers, 10
post-ignition, 70
practice, definition of, 3
predator drone, 67 (figure), 68
pre-ignition, 70
producer specifications, 3, 89
product downgrade, 7
propane products, 9, 11, 12, 13
propylene, 9

Q
Quality Assurance Requirements for the Manufacture, Storage,
and Distribution of Aviation Fuels to Airports (EI 1530), 79
quality control procedures, 65, 78–79

R
reformulated gasoline (RFG), 20
Regulations Governing ASTM Technical Committees (“the Green
Book”), 3
regulatory actions for noncompliance, 6–7
regulatory agencies
butanol specifications, 35–36
denatured fuel ethanol specifications, 25
ethanol fuel blend specifications, 30
gasoline specifications, 15–16
noncompliance, regulatory actions for, 6–7
role of, 3–5
routinely monitored products, 5–6
Reid vapor pressure (RVP), 17
relative density of light hydrocarbons, testing, 11–12
remediation of product by blending, 7
renewable fuel standard (RFS), 20, 36
renewable fuels, 20
renewable identification number (RIN), 36
reporting
aviation gasoline specifications, 78
jet fuel specifications, 41, 65
research octane number (RON), 16–17
residue testing for LPG products, 12
retail facilities, sample collection at, 4
RFG (reformulated gasoline), 20
RFS (renewable fuel standard), 20, 36
rich engine test, 73
RIN (renewable identification number), 36
RON (research octane number), 16–17
Rotax piston engine, 67 (figure), 68
rust, 59, 78
RVP (Reid vapor pressure), 17
sampling
aviation gasoline, 78
denatured fuel ethanol specifications, 25
ethanol fuel blends, 30
jet fuel, 65
LPGs, 11, 13
Sasol, 83
Saybolt color, 6
SDO (standards development organization), 15, 16, 89
seasonal vapor pressure classes, 17
seasonal volatility classes, 28–29
semisynthetic jet fuel blends, 87
silicon contamination, 30, 36
silver corrosion, 19
SIP (synthesized iso-paraffins), 86–87, 87 (figure)
smoke point, 54–55
solvent washed gums, 19, 35
spark knock, 70
spark plugs, lead deposits on, 68, 68 (figure)
spark-ignition engine fuel specifications. See ASTM D4806; ASTM D4814; ASTM D7862; ASTM D910
spark-ignition engines, 16
specification, definition of, 3
SPK (synthesized paraffinic kerosine), 83, 84–86, 85 (figure), 86 (figure)
stability of diesel fuel oils, 93–94
Stadis 450, 63, 77
standard, definition of, 3
standards development organization (SDO), 15, 16, 89
state regulatory agencies, 3–7
See also regulatory agencies
static dissipater additive, 77, 78
static electricity
aviation gasoline, 77
fire or explosion of butanol, preventing, 36–37
jet fuel, 59–60
stop sale order, 6–7
storage
of aviation gasoline, 76–77, 78–79
of butanol for gasoline blending, 36–37
of denatured fuel ethanol specifications, 25
Sulfur in aviation gasoline, 76
in butanol, 35
in denatured fuel ethanol, 25
in diesel fuel, 92
in ethanol fuel blends, 29–30
in gasoline, 18
in jet fuel, 43–44, 58
in LPG products, 10, 12, 13, 14
surfactants, in jet fuel, 60–61
synthesized hydrocarbons
additives, 87–88
approval of, 83–84
organization of ASTM D7566, 84
overview, 83
semisynthetic jet fuel blends, 87
synthetic blending components, 84–87
synthesized iso-paraffins (SIP), 86–87, 87 (figure)
synthesized paraffinic kerosine (SPK), 83, 84–86, 85 (figure), 86 (figure)
Synthesis
of diesel fuel oils, 93–94
of gasoline, 18–19
Subcommittee D02.A on Gasoline and Oxygenates, 25
Subcommittee J on Aviation Fuels, 41–42
substandard fuel, disposition of, 7
sulfates in denatured fuel ethanol, 25
TER (tert-butyl-alcohol), 34
tel (tetraethyl lead), 72–73, 77, 77 (figure), 81
temperatures, effects of
on aviation gasoline, 73–76
on jet fuel, 49–54
tert-butyl-alcohol (TBA), 34
test methods
ASTM D910, 69 (table)
defined, 3
test results, matching to specifications, 65, 78
tetraethyl lead (TEL), 72–73, 77, 77 (figure), 81
thermal stability of jet fuel, 52–54, 53 (figure), 62
thiophens, 44
titration test method, 24, 29
Tracer A (LDTA-A), 63
TTB (U.S. Alcohol and Tobacco Tax and Trade Bureau), 24, 25, 28
turbo-fan engines, 48 (figure), 48–49
turbo-jet engine, 45–46 (figure), 48 (figure)
2-butanol, 34, 35 (table)
2-methyl-1-propanol, 34, 35 (table)
UAT ARC (Unleaded Avgas Transition Aviation Rulemaking Committee), 81
UL (Underwriters Laboratories Inc.), 36
UL Power UL260i engine, 70 (figure)
ultraviolet fluorescence, testing for volatile sulfur levels with, 14
Underwriters Laboratories Inc. (UL), 36
Index

Uniform Engine Fuels and Automotive Lubricants Regulation, NCWM, 4
Unleaded Avgas Transition Aviation Rulemaking Committee (UAT ARC), 81
unleaded replacement aviation gasoline fuel, 79–81
U.S. Alcohol and Tobacco Tax and Trade Bureau (TTB), 24, 25, 28
user specifications, 90

V
valve freeze method, 13
vapor lock, 18, 73–74
vapor pressure
  aviation gasoline, 73, 74 (table), 75
  ethanol fuel blends, 6, 28
  gasoline specifications, 17
  of jet fuels, 57
  test procedure for LPGs, 11, 14
vaporization, of aviation gasoline, 73–75
variable fuel vehicles, 27
violations, regulatory actions for, 6–7
viscosity of jet fuel, 50, 50 (figure)
volatile sulfur levels, testing for, 14
volatility
  aviation gasoline, 73–75
  ethanol fuel blends, 28–29

W
water
  in butanol for gasoline blending, 35
  in denatured fuel ethanol, 24
  in ethanol fuel blends, 29
  in gasoline, 5, 6 (figure)
  in jet fuels, 51–52, 52 (figure)
wax buildup in jet fuel, 50, 50 (figure)
Weizmann, Chaim, 34, 36
wide cut fuels, 39, 55
workmanship
  butanol for gasoline blending, 36
  denatured fuel ethanol specifications, 25
  ethanol fuel blends, 30
  gasoline specifications, 19
Wright Brothers’ Aero engine, 66, 66 (figure)

Z
zinc, 58–59