Subject Index

A
Accelerated weathering, 9
Adhesion
cold-laid, two-ply bitumen roofing, 116, 126
rubberized asphalt, 75–91
Adhesive bond, seams, single-ply rubber membranes, 53–62
lap-shear test, 54–62, 57(table)
T-peel test, 54–62
Asphalt
ductility of, ASTM Standards
D 312-84: 89
D 449-79: 89
nuclear magnetic resonance (NMR) tests, 63–74
roofing production, 63–74
rubberized, 75–91
adhesion/cohesion, 84, 85(table), 88–89
ductility of, 84, 86(table), 87(table), 89
toughness-tenacity test, 76–83, 78(table), 83(table), 84–88
specific gravity of, ASTM Standard D 71-84: 64
ASTM Standards
C 165-83: 24
D 70-82: 84
D 71-84: 64
D 113-85: 84, 89
D 153-84: 64
D 312-84: 89
D 412-83: 84, 101
D 449-79: 89
D 2523-78: 101
D 3701-83: 64
D 3746-78: 33, 41, 50
D 3980-83: 76
development of, 7–9

B
Bituminous materials
ductility of, 84, 86(table), 87(table), 89
ASTM Standard D 113–85: 84, 89
impact tests, 25–38

ASTM Standard D 3746-78: 30–31(table), 33
Canadian General Standards Board (CGSB), 30–31(table), 33, 37
European Union of Agreement (EUAtc), 30–31(table), 38
nuclear magnetic resonance (NMR) tests, 63–74
polymer-modified, 7, 92–99, 100–109, 110–126
specific gravity of, ASTM Standard D 70–82: 64
static load tests
Canadian General Standards Board (CGSB), 38, 41, 46–47(tables)
European Union of Agreement (EUAtc), 38, 41, 46–47(tables)
Bituminous membranes (see Bituminous roofing systems)
Bituminous roofing systems
coefficient of expansion values, 92–99, 96–98(tables)
cold-laid system, 110–126
critical loading, 100–101
durability tests, 9
joint-bridge tests, 101–109
self-adhesive, 110–126
tension tests, 101–109, 122, 124(table)
two-ply system, 110–126
ultraviolet test, 9
Built-up roofs, 92–99

C
Calcination, stabilizer measurement, 66
Canadian General Standards Board (CGSB)
impact tests, 26–31(tables), 33–37
static tests, 38, 41, 42–47
Cap sheet, self-adhesive, 110–126
CGSB (see Canadian General Standards Board)
Coatings, stabilizer content, 68–70, 69(table), 73(table)
Coefficient of expansion, bituminous roofing systems, 92–99, 96–98(tables)
Cohesion, rubberized asphalts, 75–91
Cold-applied glue (see Glue, cold-applied)
Cold-laid bituminous roofing system, 110–126
  blisters in, 124
  properties of, 124(table)
  tensile strength, 124(table)
  testing of, 119
Compressive strength, insulating materials,
  ASTM Standard C 165-83: 24(table)
Condensation, on metal fasteners, 21

D
Decking, and metal fasteners, 10–21
DOE (see U.S. Department of Energy)
Ductility, asphalts, 84, 86(table), 87(table), 89
  ASTM standards
    D 113-85: 84, 89
    D 312-84: 89
    D 449-79: 89
Durability of roofing, 9

E
Elastomeric membranes
  impact tests, 25–38, 26(table)
  ASTM Standard D 3746–78: 33
  Canadian General Standards Board, 3, 37
  European Union of Agrement, 38
  static load tests, 38, 41, 42–43(table)
  Canadian General Standards Board, 38, 41
  European Union of Agrement, 38, 41
  Federal Test 2031: 41
European Union of Agrement (EUAtc), 5–7, 9
  General Directive for Assessment of Roof
  Waterproofing Systems, 6
  impact tests, 38
  static load tests, 38, 41

F
Fasteners, metal roof, 10–21
  condensation on, 21
  heat transfer, 11–21
Felt, saturated, nuclear magnetic resonance
  measurement, 67–68, 70–71, 71(table)
Filled coatings, stabilizer content, 68–70,
  69(table), 73(table)
Finite-difference theory, heat transfer, metal
  roof fasteners, 12–15
Fire risk, glue, cold-applied, 117–118

G
Glass, in bituminous membranes, 92–99, 95(table)
Glue, cold-applied
  adhesion of, 111–113, 112(table), 116
  applicator equipment, 114–115
  peeling resistance, 112–113, 113(table)
  testing of, 111–116
  use in bituminous roof system, 110–126

H
Hail damage tests, single-ply roof membranes, 25
Heat aging test, roof durability, 9
Heat transfer analysis, metal roof fasteners, 10–21
Humidity, effect on metal fasteners, 21

I
Insulation
  compressive strength of ASTM Standard C
    165-83: 24(table)
  and heat transfer, 16–20
  under single-ply membranes 16–20, 23–52

J
Johannesson test, heat transfer, 10, 15–20
Joint-bridge test, 101–109

L
Lap-shear test, adhesive bonds, 54–62
Loading, roof systems, 23, 100–101
Low-slope roofs, use of metal fasteners, 10–20

M
Membranes, single-ply
  adhesive bonds, 53–62
  fracture, 33
  impact tests, 25–38, 41, 50–51
  puncture resistance, 25–38, 41, 50–51
  static load tests, 38, 41, 50–51
Membranes, two-ply, cold-laid bituminous roofing,
  110–126
Metal decking, 11–16, 11(illustration)
Metal fasteners (see Fasteners, metal roof)

N
Neoprene, in contact adhesives, 55, 56(table)
Nuclear magnetic resonance
  asphalt roofing production, 63–74,
    72(illustration)
  ASTM Standard D 3701-83: 64
P
Paint and related materials, ASTM Standard D 3980-83: 76
Peeling resistance, cold-applied glue, 111–113
Perfotest Baronnie, 38, 51
Pigments, specific gravity of, ASTM Standard D 153-84: 54
Plastic cap, metal fasteners, 18–20
Polyester, in modified bitumen membranes, 53–62, 92–99, 95(table), 102–109
Polypropylene, atactic, in modified bituminous membranes, 93–95, 102–109
Polystyrene foam, glue damage, 113–114

R
Regression analysis, coefficient of expansion values, 93, 96
Reinforcement, roof (see also Propylene, atactic; Styrene-butadiene-styrene) membranes, 56(table), 102–109
Research, roofing
European, 3–9
organizations, 5
and standards development, 3–9
United States, 4, 7–9
Roofing materials (see also Asphalt; Asphalt roofing; Bituminous materials; Elastomeric membranes; Felt, saturated; Glass; Polyester; Rubber; Thermoplastic membranes) guide to, 3
Roofing systems (see also Bituminous roofing systems) critical loading of, 100–101
ASTM Standard D 2523-78: 101
standards for, 6–7
Rubber
in asphalt, 75–91
in bituminous membrane, 92–99, 110
in roof cap sheet, 110–126
in single-ply membranes, 53–62, 56(table)
tensile testing of, ASTM Standard D 412–83: 84, 101
Self-adhesive cap sheet, 110–126
Single-ply membranes (see Membranes, single-ply)
Single-ply roofing systems, 23–52
Specific gravity
asphalt, 64–66
ASTM Standard D 71-84: 64
bituminous materials, ASTM Standard D 70-82: 64
filled coatings, 64, 68
pigments, ASTM Standard D 153-84: 64
pitch, ASTM Standard D 71-84: 64
Stabilizer, measurement methods, 64–70, 69(table), 71(table), 73(table)
calcination, 66, 69
extraction, 66, 68
nuclear magnetic resonance, 63, 66–67, 69–70
specific gravity, 64–66
Standards
consensus, 3–9
development of, 3–9
performance, 3, 6–9
prescriptive, 7
Styrene-butadiene-styrene rubber, in bituminous membranes, 93, 95(table), 102–109, 110–126
Substrates, compressive strength of, 24(table)

T
Temperature
asphalt, rubberized, and ductility, 86(table), 87(table), 89
bituminous membranes, coefficient of expansion, 93, 96–99
cold-laid bitumen roofing, and blister formation, 124
and peeling resistance, 113
single-ply rubber membranes, and adhesive binding, 58–59
Tests (see also ASTM Standards)
accelerated weathering, 9
adhesion, 84, 85(table), 88–89
Chang-Busching heat transfer, 16
ductility, 84, 86, 89
durability, 9
hail, 25
heat transfer, 10–21
impact, 24, 25–38
Johannessen heat transfer, 15–16
joint-bridge, 101–109
Seams, adhesive-bonded
environmental effects on, 53–54
single-ply rubber membranes, 53–62
136 ROOFING RESEARCH AND STANDARDS DEVELOPMENT

lap-shear, 53, 55–62
nuclear magnetic resonance spectrometry, 63–74
Perfotest Baronnie, 38
pull-off adhesion, 84
puncture resistance, 25–38, 41, 50–51
specific gravity, 64–66
and standards development, 6, 9
static, 24, 38, 41
tension, 101–109, 122, 124(table)
toughness-tenacity, 76–83, 78(table), 83(table), 84–89
T-peel, 53, 55–62
ultraviolet aging, 9
Xenotest, 9
Thermal bridge, metal fasteners, 10–21
Thermoplastic membranes
impact testing, 25–38, 28(table)
ASTM Standard 3746–78: 33
Canadian General Standards Board (CGSB) test, 33, 37
European Union of Agrement (EUAtc), 38
static load testing, 38, 41, 44–45(table)
Canadian General Standards Board (CGSB) test, 38, 41
European Union of Agrement (EUAtc), 38, 41
Federal Test 2031: 41

U
UEAtc (see European Union of Agrement)
Ultraviolet test method, roof durability, 9
U.S. Department of Energy (DOE), roofing research, 4

W
Waterproofing systems, 6, 53
Water vapor, and blister formation, 124
Weathering, 9
Wood decking, use of metal fasteners, 11–15, 11(illustration), 16–21

X
Xenotest, roof durability, 9