

# INDEX

	Paragraph	Page
Aggregate surfacing . . . . .	4.1.5, 4.3.4	19
Access to roofs . . . . .	1.1.10	2
Aluminum roofing . . . . .	11.4.4	72
Maintenance . . . . .	11.4.4.8	72
Repair . . . . .	11.4.4.9	72
Reroofing . . . . .	11.4.4.10	72
Application, improper (See Improper application) . . . . .	3.1.5	6
Asbestos-cement roofing:		
American method shingles . . . . .	7.1.2.2	47
Corrugated sheets . . . . .	7.1.2.6	47
Description and general discussion . . . . .	7.1	47
Dutch lap shingles . . . . .	7.1.2.3	47
Fire resistance . . . . .	7.1.3	48
Hexagonal shingles . . . . .	7.1.2.4	47
Maintenance and repair . . . . .	7.5	49
Multiple unit shingles . . . . .	7.1.2.5	47
Reroofing . . . . .	7.6	49
Roof decks for . . . . .	7.2	48
Storage and handling . . . . .	7.3	48
Treatment, determining . . . . .	7.4	48
Asphalt . . . . .		
Description . . . . .	4.1.3, 4.1.3.2	14
Storage and handling . . . . .	4.3.2	18
Temperature . . . . .	4.3.2.1	18
Application . . . . .	4.3.2.2	18
Asphalt roll roofing:		
Description and general discussion . . . . .	6.1	41
Fire resistance . . . . .	6.1.4	43
Maintenance . . . . .	6.5	43
Mineral-surfaced . . . . .	6.1.3	41
Repair . . . . .	6.6	44
Reroofing . . . . .	6.7	46
Roof decks . . . . .	6.2	43
Smooth-surfaced . . . . .	6.1.2	41
Storage and handling . . . . .	6.3	43
Treatment, determining . . . . .	6.4	43
Wide-selvage . . . . .	6.1.3	41
Asphalt strip shingles:		
Application . . . . .	5.6.3	39
Description and general discussion . . . . .	5.1	31
Fire resistance . . . . .	5.1.7	31
Head lap . . . . .	5.1.5	31
Maintenance and repair . . . . .	5.5	36
Recoating . . . . .	5.4.3	34
Reroofing . . . . .	5.6	39
Roof decks for . . . . .	5.2	33
Storage and handling . . . . .	5.3	33
Treatment for . . . . .	5.4	33
Wind-resistant . . . . .	5.1.9, 5.6.3.5	32, 40
Weight . . . . .	5.1.4	31
Batten-seam roofing . . . . .	11.1.5.1.1	61
Bitumen . . . . .	4.1.3	14
Blisters or buckles . . . . .	4.5.2.2, 4.5.3.2, 4.6.1.3	22, 26
Built-up roofing:		
Aggregate-surfaced . . . . .	4.1.5, 4.5.2, 4.6.1	15, 21, 25
Descriptions and general discussion . . . . .	4.1	14
Maintenance methods . . . . .	4.5	21

	Paragraph	Page
Repair methods .....	4.6	25
Reroofing .....	4.7	29
Roof decks .....	4.2	17
Smooth-Surfaced .....	416 4.5.3, 4.6.2	15, 22, 29
Storage, handling, and application of materials .....	4.3	18
Treatment, determining .....	4.4	21
Cant strip .....	4.3.3.2	19
Causes of roof failures		
Exposed nails .....	3.1.8	12
Failure of flashings .....	3.1.9	12
Improper application of roofing materials .....	3.1.5	6
Improper design .....	3.1.10	13
Improper storage .....	3.1.4	6
Lack of maintenance .....	3.1.1	6
Use of improper materials .....	3.1.6	9
Use of unseasoned lumber or improper grade plywood .....	3.1.3	6
Weathering .....	3.1.2	6
Wall, chimney, and monitor flashings .....	12.1.1.1	76
Wind damage .....	3.1.7	12
Clawed asphalt strip shingles .....	5.4.2	33
Coal-tar pitch		
Application .....	4.3.2.2	18
Discussion .....	4.1.3, 4.1.3.1	14
Storage and handling .....	4.3.2	18
Temperature .....	4.3.2.1	18
Compatibility of bitumen .....	4.5.1	21
Copper roofing .....	11.4.1	69
Maintenance .....	11.4.1.7	69
Repair .....	11.4.1.8, 11.4.1.9	69
Reroofing .....	11.4.1.10	70
Corrosion-resisting steel (See Stainless steel)		
Corrugated roofing		
Asbestos-cement .....	7.1.2.6	47
Metal .....	11.1.5.2	62
Curb type flashing .....	12.2.1, 12.6	80, 88
Decks, roof:		
Asbestos-cement roofing .....	7.2	48
Asphalt roll roofing .....	6.2	43
Asphalt strip shingles .....	5.2	33
Built-up roofing .....	4.2	17
Metal roofing .....	11.2	68
Slate roofing .....	8.2	51
Tile roofing .....	9.2	54
Wood shingle roofing .....	10.2	57
Design deficiencies .....	4.7.5	30
Design, improper .....	3.1.10	13
Determining treatment (See Treatment, determining)		
Drainage, roof .....	3.1.6, 4.1.11	9, 17
Drainage systems .....	12.4	83
General .....	12.4.1	83
Check list .....	12.4.2	84
Maintenance and repair .....	12.4.3	85
Drawings, contract .....	4.7.3	29
Drip edge .....	5.5.4, 5.5.5	37
Dripping of bitumen, preventing .....	12.5.3.4, 4.3.3.2	86, 19
Eaves flashing for asphalt strip shingles .....	5.6.3.3	40
Elastomeric roofing .....	13.1	89
Emulsion, asphalt .....	4.3.2.2, 4.5.3.3.2	18, 24
Expansion and contraction		
Aluminum .....	11.4.4.2	72
General .....	11.1.2	60
Stainless steel .....	11.4.5.4	3
Terne .....	11.4.2.2	70
Fasteners, seams and joints:		
Aluminum .....	11.4.4.7	72
Copper .....	11.4.1.5	69
Galvanized iron .....	11.4.3.4	71

	Paragraph	Page
Stainless steel .....	11.4.5.7	73
Terne .....	11.4.2.4	70
Fastening, built-up roofing .....	4.1.10	17
Felts, roofing .....	4.1.4	14
Application .....	4.3.3.2	19
Storage .....	4.3.3.1	19
Fire classification for roof coverings .....	1.1.5	1
Asbestos-cement roofing .....	7.1.3	48
Asphalt roll roofing .....	6.1.4	43
Asphalt strip shingle roofing .....	5.1.7	31
Slate roofing .....	8.1.4	51
Fire precautions		
Heating and handling bituminous materials .....	14.2.2	92
In shops .....	14.4.2	94
Fishmouths .....	4.6.1.4	27
Flashings and Appurtenances:		
Curb type flashing .....	12.2.1,12.6	80, 88
Drainage systems .....	12.4	83
Gravel stops and metal edging .....	12.5	86
Projections thru roof .....	12.6	88
Valley flashings .....	12.3	82
Vent flashings (ventilators, plumbing stacks, etc) .....	12.2	80
Wall, chimney, and monitor flashings .....	12.1	76
Flashings, failure of .....	3.1.9	12
Flashings, strip shingles .....	5.6.3.3, 5.6.3.4	40
Flat seam metal roofing .....	11.1.5.1.3	62
Flux, soldering .....	11.1.7.2	65
Galvanic action:		
Aluminum .....	11.4.4.3	72
Copper .....	11.4.1.4	69
General .....	11.1.3	60
Galvanized steel roofing .....	11.4.3	71
Maintenance .....	11.4.3.5	71
Repair .....	11.4.3.6	71
Gravel stops		
General .....	12.5.1	86
Inspection .....	12.5.2	86
Maintenance and repair .....	12.5.3	86
Guide specifications, use of .....	4.7.2, 11.12	29,2
Gutters and leaders .....	12.4.2, 12.4.3.2	84, 85
Hail damage, asphalt strip shingles .....	5.5.1	:36
Handling (See Storage and handling)		
Improper application .....	3.1.5	6
Asphalt roll roofing .....	5.3	8
Asphalt shingle roofing .....	3.1.5.4	6
Built-up roofing .....	3.1.5.2	6
Metal roofing .....	3.1.5.5	9
Rigid roofing materials (Slate, tile, asbestos-cement) .....	3.1.5.6	9
Inspection, importance of .....	2.1	4
Contract .....	2.1.3	4
Periodic .....	2.1.1	4
Special .....	2.1.2	4
Insulation, built-up roofing .....	4.1.7	16
Storage .....	4.3.5.1	20
Application .....	4.3.5.2	20
Ladders .....	14.1.3	91
Lead-coated copper .....	11.4.1.1.2	69
Maintenance:		
Aluminum roofing .....	11.4.4.8	72
Asbestos-cement roofing .....	7.5	49
Asphalt roll roofing .....	6.5	43
Asphalt shingle roofing .....	5.5	36
Built-up roofing .....	4.5	21
Copper roofing .....	11.4.1.7	69
Drainage systems .....	12.4.3	85

	Paragraph	Page
Galvanized steel roofing . . . . .	11.4.3.5	71
General . . . . .	2.1.4	86
Gravel stop and metal edging . . . . .	12.5.3	52
Slate roofing . . . . .	8.5	7:1
Stainless steel roofing . . . . .	11.4.5.8	70
Terne roofing . . . . .	11.4.2.5	9.5
Tile roofing . . . . .	12.3.3	82
Valley flashings . . . . .	12.2.3	81
Vent (Ventilator, plumbing stack, etc.) (flashings . . . . .)	12.1.3	78
Wall, chimney and monitor flashings . . . . .	10.5	58
Wood shingle . . . . .		
Metal roofing:		
Aluminum roofing . . . . .	11.4.4	72
Copper roofing . . . . .	11.4.1	69
Description and general discussion . . . . .	11.1	60
Expansion and contraction . . . . .	11.1.2	60
Fire protection . . . . .	11.1.6	6:1
Galvanic action . . . . .	11.1.3	60
Galvanized metal roofing . . . . .	11.4.3	71
Protected metal roofing . . . . .	11.4.6	73
Safety precautions . . . . .	14.3	92
Soldering . . . . .	11.1.7	63
Stainless steel roofing . . . . .	11.4.5	72
Storage and handling . . . . .	11.3	68
Terne . . . . .	11.4.2	70
Workability . . . . .	11.1.4	69
Mission tile (See Tile Roofing).		
Nailing, asphalt strip shingles . . . . .	5.5.1	36
Nail popping . . . . .	4.2.1	17
Painting:		
Aluminum . . . . .	11.4.4.6	72
Metal valleys . . . . .	12.3.2.1	82
Terne . . . . .	11.4.2.1.3	70
Parapet walls . . . . .	2.1.2(2), 4.4, 12.1, 12.1.3.6	4, 21, 76, 80
Patina . . . . .	11.4.1.1.1	69
Promenade tile . . . . .	9.1.3, 9.2.2, 9.4.2, 9.5.2	54, 55, 56
Recoating:		
Asphalt roll roofing . . . . .	6.5	43
Asphalt strip shingles . . . . .	5.4.3	34
Smooth surfaced built-up roofs . . . . .	4.5.3	22
Repair:		
Aluminum roofing . . . . .	11.4.4.9	72
Asbestos-cement roofing . . . . .	7.5	49
Asphalt roll roofing . . . . .	6.6	44
Asphalt shingle roofing . . . . .	5.5	36
Built-up roofing . . . . .	4.6	25
Copper roofing . . . . .	11.4.1.8, 11.4.1.9	69
Drainage systems . . . . .	12.4.3	85
Galvanized steel roofing . . . . .	11.4.3.6	71
General . . . . .	2.1.5	5
Gravel stops and metal edging . . . . .	12.5.3	86
Slate roofing . . . . .	8.5	52
Stainless steel roofing . . . . .	11.4.5.9	73
Terne roofing . . . . .	11.4.2.6	70
Tile roofing . . . . .	9.5	56
Valley flashings . . . . .	12.3.3	82
Vent (Ventilator, plumbing stack, etc.) (flashings . . . . .)	12.2.4	81
Wall, chimney and monitor flashings . . . . .	12.1.3	78
Wood shingle roofing . . . . .	10.5	58
Replacing individual slates . . . . .	8.5.2	52
Reroofing:		
Aluminum roofing . . . . .	11.4.4.10	72
Asbestos-cement roofing . . . . .	7.6	49
Asphalt shingle roofing . . . . .	5.6	39
Built-up roofing . . . . .	4.7	29
Copper roofing . . . . .	11.4.1.10	70
Galvanized steel roofing . . . . .	11.4.3.7	71
General . . . . .	2.1.6	5

	Paragraph	Page
Slate roofing .....	8.6	53
Stainless steel roofing .....	11.4.5.10	73
Theme roofing .....	11.4.2.7	70
Tile roofing .....	9.6	56
Vent (Ventilator, plumbing stack, etc.) flashings .....	12.2.4	81
Wall, chimney and monitor flashings .....	12.1.4	80
Wood shingle roofing .....	10.6	59
Research on roofing .....	2.1.7	5
Responsibility:		
Department of the Air Force .....	1.4	3
Department of the Army .....	1.2.1, 1.2.2	2
Department of the Navy .....	1.3.1, 1.3.2	2
Roll roofing (See Asphalt roll roofing)		
Safety:		
Asphalt and coal-tar pitch .....	4.3.2	18
Fire precautions in shops .....	14.4.2	94
General discussion .....	14.1.1	91
Heating and handling bituminous materials .....	14.2.1	92
Ladders .....	14.1.3	91
Roof brackets .....	14.1.5	92
Scaffolds .....	14.1.4	91
Sheet metal .....	14.3.1	92
Storage and handling of materials .....	14.1.2	91
Scaffolds .....	14.1.4	91
Shingles (see each type)		
Slate roofing:		
Description and general discussion .....	8.1	51
Fire resistance rating .....	8.1.4	51
Maintenance and repair .....	8.5	52
Reroofing .....	8.6	53
Storage and handling .....	8.3	52
Slope, recommended roof .....	3.1.6	9
built-up roofs .....	4.1.2	14
Smooth-surfaced built-up roofing .....	4.1.6, 4.5.3	15, 22
Soldering .....	11.1.7, 11.4.5.6	63, 73
Spanish tile (See Tile roofing)		
Special roofings:		
Bare concrete roofs-tropical areas .....	13.2	89
Elastomeric roofing .....	13.1	89
Reroofing in arctic areas .....	13.3	89
Specifications .....	1.1.12, 4.7.2	2, 29
Specifications and standards (app C)		
Specifications, Guide (app F)		
Splits .....	4.6.1.2	25
Standing seam roofing .....	11.1.5.1.2	61
Stainless steel roofing .....	11.4.5	72
Storage and handling:		
Asbestos-cement roofing .....	7.3	48
Asphalt roll roofing .....	6.3	43
Asphalt shingle roofing .....	5.3	33
Heating and handling of bituminous materials .....	4.3.2, 14.2.1	18, 92
Metal roofing .....	11.3	68
Safety .....	14.1.2	91
Tile .....	9.3	54
wood shingles .....	10.3	58
Storage, improper .....	3.1.4	6
Surfacing:		
Aggregate .....	4.1.5	15
Embedment of .....	4.3.4	19
Temper .....	11.4.1.2, 11.4.2.3,	69, 70, 71, 72
Terne roofing:		
General .....	11.4.2.1	70
Maintenance .....	11.4.2.5	70
Repair .....	11.4.2.6	70
Thickness of sheet metals (table 3 and table 5) .....	11.1.8	68, 75
Tile roofing:		
Description and general discussion .....	9.1	54
Fire classification .....	9.1.5	54
Maintenance and repair .....	9.5	56

	Paragraph	Page
Reroofing .....	9.6	56
Storage and handling .....	9.3	54
Treatment, determining:		
Asbestos-cement roofing .....	7.4	48
Asphalt roll roofing .....	6.4	43
Asphalt shingle roofing .....	5.4.1	33
Built-up roofing .....	4.4	21
Metal roofing .....	11.4	69
Slate roofing .....	8.4	52
Tile roofing .....	9.4	55
Wood shingle roofing .....	10.4	58
Underlayment for built-up roofing (See Insulation)		
Valley flashing:		
Asphalt strip shingles .....	5.6.3.4	40
Failure .....	12.3.2	
Maintenance and repair .....	12.3.3	82
Metal .....	12.3.1.1	82
Roll roofing .....	12.3.1.2	82
Woven asphalt strip shingle .....	12.3.1.3	82
Vapor barrier .....	4.1.8, 4.3.6	17, 21
Vent (Ventilators, plumbing stacks, etc.) flashings:		
Failures .....	12.2.2	80
General discussion .....	12.2.1	80
Maintenance .....	12.2.3	81
Repair during reroofing .....	12.2.4	81
Venting built-up roofs .....	4.1.9	17
Walkways .....	1.1.10	9
Wall, chimney, and monitor flashings .....	12.1	7(3)
Base flashing .....	12.1.1.2.1(1), 12.1.2.1, 12.1.2.2, 12.1.3.1 12.1.3.2 12.1.3.3 12.1.3.4	76, 77, 78
Cap flashing .....	12.1.1.2.1(2), 12.1.2.3, 76, 77, 78, 79 12.1.2.4, 12.1.3.3 12.1.3.4	79
Causes of failure .....	12.1.1.1	76
Maintenance and repair .....	12.1.3	78
Weathering:		
Asphalt strip shingles .....	5.4.1	33
Cause of roof failure .....	3.1.2	6
Weather conditions .....	4.3.1	18
Wind damage .....	3.1.7	12
Wind-resistant strip shingles .....	5.1.9, 5.6.3.5	32, 40
Wood shingle roofing .....	10.0	57
Workability of metal .....	11.1.4, 11.4.1.3, 11.4.4.5, 11.4.5.5	69, 72, 73

By Order of the Secretaries of the Army, the Navy, and the Air Force:

CREIGHTON W. ABRAMS,  
*General United States Army,*  
*Chief of Staff.*

Official:

VERNE L. BOWERS,  
Major General, United States Army,  
*The Adjutant General.*

A. R. MARSCHALL  
*Rear Admiral, CEC, US Navy*  
*Commander, Naval Facilities,*  
*Engineering Command.*

Official:

JACK R. BENSON, *Colonel, USAF*  
*Director of Administration.*

GEORGE S. BROWN, *General, USAF*  
*Chief of Staff.*

HARRY C. OLSON  
*Major General, US Marine Corps*  
*Quartermaster General of the Marine Corps..*

Distribution:

*Active Army:*

To be distributed in accordance with DA Form 12-34 (qty rqr block no. 92) requirements for TM 5-600 Series: Facilities Engineering: Maintenance and Operation of Facilities.

*NG and USAR:* None

*Navy:* SNDL

Distribution: (5 copies unless otherwise indicated)

E3A (Washington only), FA6 (less Key West, Norfolk, and Guantanamo), FA7, FA10, FA18, FA23, (Antigua, Barbados, Buxton, Eleuthera, Lewes, Nantucket, and Turks Island only), FA25, FA27; FB6, FB7, FB10, FB13, FB21, FB26, FB34 (Sasebo only), FB36 (Big Sur, Coos Head, Ferndale, and Pacific Beach only); FC3 (London only), FC4 (Naples and Sigonella only, FC5, FC7; FE2 FE4 (Ft. George G. Meade, Edzell, Homestead, Marietta, Galeta Island, and Winter Harbor only); FF4, FF6, FF19; FG2 (Adak, Asmara, Cheltenham, Diego Garcia, Londonderry, Morocco, Iceland, Nea Makri, Harold E. Holt, Ponce, P.R., San Francisco, and Wahiawa only), FGS (East Machias, Oso, and Thurso only); FG11; FH3 Hospitals (Beaufort, Camp Pendleton, Oakland, Orlando, Philadelphia, Portsmouth, Va., and St. Albans only), FH6 (Bethesda only) FH8 (Cairo only); FJ5, FJ52; FKA6A1, FKA6A2, FKA6A3A, FKA6A3B, FKA6A4, FKA6A8, FKA6A9, FKA6A11, FKA6A14, FKA6A1S, FKL1, FEL6 (Orange only); FKM3, FKM8, FKM9 (Oakland only), FKM13, FKM22; FKN1 (35 copies), FKN2, FKN3, FKNS, FKN1O, FKP1A, FKP1B, FKP1E, FKPIJ, FKP4C, FKR1A, FKR3A, FKR3H, FKR5; FR3; FT6, FT22 (Dam Neck, Va. only), FT31, FTSS, FT64, FT68, FT69, FT70

Copy to: (2 copies unless otherwise indicated)

21A, A2A (ONR only); A3 (OP-44 only), A4A (MAT only), AS, A6 (10 copies); FA1; FE1; FG1; FKA1, FKR3J, FKR6A; FR1, FR2, FR7; FT1, FT2, FT3, FTS, FT37 (30 copies), FT42 (5 copies); V3, VS, V8, V9, V12, V16

Additional copies may be obtained from:

U.S. Naval Publications and Forms Center  
5801 Tabor Avenue  
Philadelphia, PA 19120

*Marine Corps:*

MARCORPS CODES: 3700009 (18)

3700001 (16)

7315001(14)

6025002 (12)

3700002, 003 (10)

7256040 (7)

7315002 (6)

2005002/2020002/6901 (5)

2020004, 005, 006, 007/3700004, 005/6025001/ 6600002 (4)

2020001, 008, 009/3550001,19508110 (3)

1080006/2020003, 010/2030002/3520028/3700006, 008/ 4090005/6902003/7230004/72560 19/7401(2)

1070015, 021/2157010/2161002/2170001/3001001/3510016/3520004, 005, 006, 013, 015, 018, 021, 023,

026/3530001/3540005/4125003/4185001/4238003/6025003/7352018/7504003. 010, 019, 022,

68115, 120, 128, 133, 138/7777008/7781004, 008, 508111, 113, 114, 115, 116,

117/954001 (1)

It is requested that bulk shipments be made as follows:

Commanding General 390 copies  
Marine Corps Supply Center  
Albany, Georgia 31704  
(MIF PUBS STOCK MAX)

Commandant of the Marine Corps 60 copies  
(Code ABP-2C, Room 1304)  
Arlington Annex  
Washington, D. C. 20380

Air Force: F