Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: March 6, 2000

SUBJECT: Design Standard (DST) 2000-02, Electrical Cable

Effective immediately, all projects at Baltimore/Washington International (BWI) and Martin State (MTN) Airports shall be designed and specified per the following:

Indoor wiring methods:

1. Exposed where subject to physical damage: Rigid galvanized steel (RGS) conduit from slab up to 10 feet above finished floor. Electrical metallic tubing (EMT) above 10 feet above finished floor.

2. Exposed where not subjected to physical damage: EMT.

3. Concealed: EMT.

4. Concealed where installing/fishing new wiring in existing wall or partition: Flexible metal conduit (FMC) or metal clad cable (MC). FMC and MC shall be directly connected to junction box located directly above existing wall or partition.

5. Connection to vibrating equipment (Including transformers and hydraulic, pneumatic, electric solenoid, or motor-driven equipment): Liquidtight flexible metal conduit (LFMC) or FMC. Use maximum of 6 foot length.

6. Final connection to recessed and semirecessed lighting fixtures: FMC or MC. Use

maximum of 6 foot length from fixture to junction box only.

7. Minimum raceway size: ¾ inch.

8. The use of any type flexible raceway or flexible cable other than those specifically mentioned above will not be accepted unless approved in advance.

Cable tray shall be permitted for low voltage communication wiring/cable only. All fire alarm and security related wiring/cable shall be installed in a raceway system as detailed in indoor wiring methods 1 through 8 shown above. All raceways and cables shall be properly installed and supported in accordance with the National Electrical Code (NEC) and the Code of Maryland Regulations (COMAR). All new construction materials shall be fire retardant. All new wiring/cable shall be plenum-rated. Cable and raceways shall be permanently labeled at a minimum of every 50 feet, at all junction boxes and at all terminations. Label information shall include equipment type/usage, supply panelboard/equipment and circuit number. Wherever old raceways, wiring and/or cables are to be abandoned, they shall be removed.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Distribution:

Mr. David Benner (Urban)
Mr. Alek Beri Jr. (MAA)
Mr. Lynn Bezilla (MAA)
Mr. Ian Bricknell (TAMS)
Mr. Emory Carrigan (MAA)
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Mr. Charles Steen (MAA)
Mr. William Tsai (MAA)
Mr. Ron Walden/Building Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

cc: Mr. Ned Carey/Electronics Committee (MAA)

BC 14 A:/DESIGN STANDARDS.'00/..

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: March 23, 2000

SUBJECT: Design Standard (DST) 2000-03, Closed Transition of Substation Secondary Switches

---

Effective immediately, please incorporate the following design requirements into all projects and checklists for Baltimore/Washington International (BWI) Airport.

NOTE: This standard applies only to new equipment installation.

This standard details electric substation equipment requirements necessary to provide secondary 480 volt closed transition switching at 13,800-480 volt secondary-selective substations with main-tie-main secondary circuit breaker configuration. The purpose of the closed transition switching is to provide a smooth transfer of power to an alternate feeder when the "normal" feeder needs to be taken out of service for non-emergency maintenance or testing. When the "normal" feeder is ready to be placed back in service the closed transition switching again makes the transfer smoothly, so that users are unaware that there have been any changes in their electrical system.

1. All equipment shall be in accordance with the latest edition of the National Electrical Code (NEC).

2. All equipment locations shall be coordinated with Maryland Aviation Administration (MAA) Office of Planning and Engineering.

3. The substation secondary closed transition switch scheme shall include, but not be limited to, equipment shown in the attached Sheet No. SK-1.

4. The substation shall be 13,800-480 volt secondary-selective with main-tie-main

secondary (480V) circuit breaker configuration.

5. Main breaker No. 1, main breaker No. 2 and the tie breaker shall be electrically operated draw-out type low voltage power circuit breakers or insulated case circuit breakers. Key interlocks shall be coordinated with other key interlock functions as required.

6. All substation short-circuit current ratings shall be adequate for the combined available fault current contribution due to secondary closed transition. The available fault current shall be calculated for the moment that 480 V main breaker No. 1, main breaker No. 2 and the tie breaker are simultaneously closed and both transformers are energized from their primary source.

7. The closed transition control scheme and all associated components shall be manufactured by the substation equipment manufacturer and designed specifically for this application. All components shall be integral to the substation.

8. The designer shall contact MAA maintenance personnel to see if any operating problems have occurred recently with closed transition operation at existing substations. If so, the designer shall request that BGE perform a circulating current study. The designer shall make recommendations based on the results.

9. The designer shall contact BGE to see if any changes have been made that could affect the synchronization of incoming feeders and closed transition operation. If so, the designer shall request that BGE perform a circulating current study. The designer shall make recommendations based on the results.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Attachment

Distribution:

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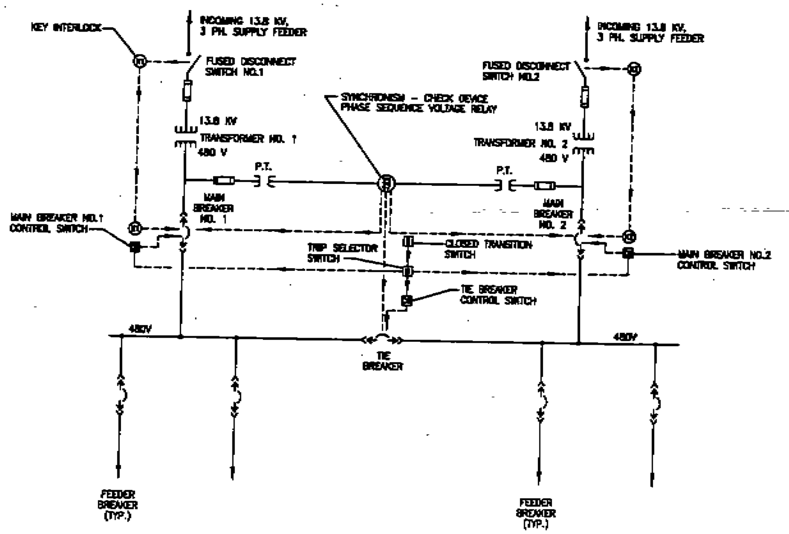
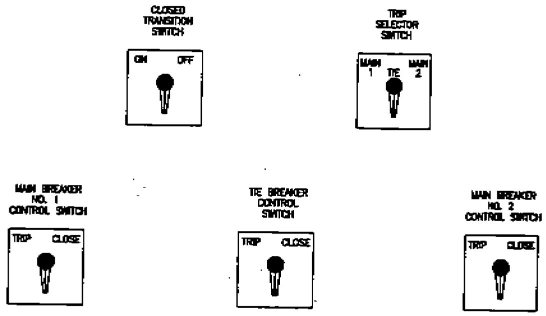
Mr. William Tsai (MAA)
Mr. Ron Walden/Bldg. Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

cc: Mr. Ned Carey/Electronics Committee (MAA), w/ attachment



SUBSTATION SECONDARY CLOSED TRANSITION SWITCH SCHEME ONE-LINE DIAGRAM

SCALE: NONE



SUBSTATION SECONDARY SWITCH CLOSED TRANSITION SWITCH SCHEME CONTROL SWITCH LAYOUT

SCALE: NONE

NOTE: CONTROL SWITCH LAYOUT SHOWN FOR CLARITY.

SUBSTATION SECONDARY CLOSED TRANSITION SWITCH SCHEME OPERATING DESCRIPTION

1. ONE - LINE DIAGRAM IS SHOWN ONLY FOR FUNCTIONAL DESCRIPTION OF SECONDARY CLOSED TRANSITION SWITCHING SCHEME AND DOES NOT SHOW ALL SUBSTATION EQUIPMENT REQUIREMENTS.
2. KEY INTERLOCKS K1 AND K2 INTERLOCK PRIMARY FUSED DISCONNECT SWITCH AND SECONDARY MAIN BREAKER. SECONDARY MAIN BREAKER CAN BE CLOSED ONLY AFTER PRIMARY SWITCH IS CLOSED. PRIMARY SWITCH CAN BE OPENED ONLY AFTER SECONDARY MAIN BREAKER IS OPENED. KEY IS CAPTIVE IN PRIMARY SWITCH WITH SWITCH IN OPEN POSITION. KEY IS CAPTIVE IN SECONDARY MAIN BREAKER WITH BREAKER IN CLOSED POSITION.
3. BREAKER CONTROL SWITCH ELECTRICALLY OPEN AND CLOSE BREAKER UNLESS OVERRIDDEN BY INTERLOCK FUNCTIONS.
4. CLOSED TRANSITION SWITCH ACTIVATES SUBSTATION SECONDARY CLOSED TRANSITION SWITCHING SCHEME ALLOWING FOR MOMENTARY SIMULTANEOUS CLOSING OF BOTH SECONDARY MAIN CIRCUIT BREAKERS AND TIE CIRCUIT BREAKER.
   - CLOSED TRANSITION SWITCH TO "OFF" POSITION PERFORMS THE FOLLOWING FUNCTIONS:
     (1) PREVENTS SIMULTANEOUS CLOSING OF MAIN BREAKER NO.1, MAIN BREAKER NO.2, AND TIE BREAKER VIA ELECTRICAL INTERLOCK
     (2) DISABLES TRIP SELECTOR SWITCH FUNCTIONS.
   - CLOSED TRANSITION SWITCH TO "ON" POSITION PERMITS SECONDARY CLOSED TRANSITION SWITCHING WITH SELECTIVE TIME-OUT FUNCTION.
5. TRIP SELECTOR SWITCH SELECTS SECONDARY BREAKER (MAIN BREAKER NO.1, MAIN BREAKER NO.2, OR TIE BREAKER) THAT WILL AUTOMATICALLY OPEN AFTER SECONDARY CLOSED TRANSITION SWITCH OPERATION HAS BEEN INITIATED. SELECTED BREAKER WILL OPEN AFTER TIME-OUT PERIOD WHICH STARTS AT THE INSTANT WHEN ALL SECONDARY BREAKERS ARE SIMULTANEOUSLY CLOSED (MAIN BREAKER NO. 1, MAIN BREAKER NO.2, AND TIE BREAKER). FEEDER CIRCUIT BREAKERS WILL NOT EXPERIENCE ANY TYPE OF OUTAGE DUE TO THIS SWITCHING OPERATION.
6. SYNCHRONISM CHECK DEVICE PREVENTS SECONDARY CLOSED TRANSITION SWITCHING OPERATION IF VOLTAGE PHASE SHIFT ACROSS OPEN SECONDARY BREAKER (MAIN BREAKER NO.1, MAIN BREAKER NO.2 OR TIE BREAKER) EXCEEDS A PRESET VALUE.
7. CONTROL POWER TRANSFORMER (CPT) THROW OVER (NOT SHOWN ON ONE - LINE DIAGRAM) PROVIDES AUTOMATIC SWITCHING FOR CPT FUNCTIONS TO PROVIDE ALL REQUIRED CONTROL POWER FUNCTIONS REGARDLESS OF PRIMARY SWITCH OR SECONDARY BREAKER STATUS.
8. SECONDARY BREAKER TRIP DEVICE BELL ALARM INTERLOCK (NOT SHOWN ON ONE - LINE DIAGRAM) PREVENTS SECONDARY CLOSED TRANSITION SWITCHING OPERATION IF BELL ALARM ACTIVATED ON ANY SECONDARY BREAKER (MAIN BREAKER NO. 1, BREAKER NO. 2 OR TIE). BELL ALARM IS INDICATION OF BREAKER TRIP DUE TO FAULT AND REQUIRES MANUAL RESET AT BREAKER.
9. ELECTRICAL INTERLOCK SHALL PREVENT CLOSED TRANSITION SWITCHING OPERATION ONTO A DEAD BUS.

SUBSTATION SECONDARY CLOSED TRANSITION SWITCH SCHEME SEQUENCE OF OPERATION

OPERATION 1: PERFORM CLOSED TRANSITION SECONDARY SWITCHING FROM NORMAL TO ALTERNATE CONFIGURATION.

CIRCUIT BREAKER	INITIAL STATUS	STATUS AFTER SWITCHING
MAIN NO. 1	CLOSED	CLOSED
TIE	OPEN	CLOSED
MAIN NO. 2	CLOSED	OPEN

1. CLOSED TRANSITION SWITCH TO "ON" POSITION.
2. TRIP SELECTOR SWITCH TO "MAIN 2" POSITION.
3. CLOSE TIE BREAKER VIA CONTROL SWITCH.
4. AFTER TIME-OUT PERIOD MAIN BREAKER NO. 2 AUTOMATICALLY OPENS.

OPERATION 2: PERFORM CLOSED TRANSITION SECONDARY SWITCHING FROM OPERATION 1 ALTERNATE BACK TO NORMAL CONFIGURATION.

CIRCUIT BREAKER	INITIAL STATUS	STATUS AFTER SWITCHING
MAIN NO. 1	CLOSED	CLOSED
TIE	CLOSED	OPEN
MAIN NO. 2	OPEN	CLOSED

1. CLOSED TRANSITION SWITCH TO "ON" POSITION.
2. TRIP SELECTOR SWITCH TO "TIE" POSITION.
3. CLOSE MAIN NO. 2 BREAKER VIA CONTROL SWITCH.
4. AFTER TIME-OUT PERIOD TIE BREAKER AUTOMATICALLY OPENS.

OPERATION 3: PERFORM CLOSED TRANSITION SECONDARY SWITCHING FROM NORMAL TO ALTERNATE CONFIGURATION.

CIRCUIT BREAKER	INITIAL STATUS	STATUS AFTER SWITCHING
MAIN NO. 1	CLOSED	OPEN
TIE	OPEN	CLOSED
MAIN NO. 2	CLOSED	CLOSED

1. CLOSED TRANSITION SWITCH TO "ON" POSITION.
2. TRIP SELECTOR SWITCH TO "MAIN NO. 1" POSITION.
3. CLOSE TIE BREAKER VIA CONTROL SWITCH.
4. AFTER TIME-OUT PERIOD MAIN BREAKER NO. 1 AUTOMATICALLY OPENS.

OPERATION 4: PERFORM CLOSED TRANSITION SECONDARY SWITCHING FROM OPERATION 3 ALTERNATE BACK TO NORMAL CONFIGURATION.

CIRCUIT BREAKER	INITIAL STATUS	STATUS AFTER SWITCHING
MAIN NO. 1	OPEN	CLOSED
TIE	CLOSED	OPEN
MAIN NO. 2	CLOSED	CLOSED

1. CLOSED TRANSITION SWITCH TO "ON" POSITION.
2. TRIP SELECTOR SWITCH TO "TIE" POSITION.
3. CLOSE MAIN NO. 1 BREAKER VIA CONTROL SWITCH.
4. AFTER TIME-OUT PERIOD TIE BREAKER AUTOMATICALLY OPENS.

OPEN TRANSITION: OPEN TRANSITION SECONDARY SWITCHING CAN BE PERFORMED WHEN CLOSED TRANSITION SWITCH IS IN "OFF" POSITION.

URS Greiner Woodward Clyde
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DESIGNED	D.M.W.
DRAWN	C.W.M.
CHECKED	R.A.M.
APPROVED	D.L.B.

REVISION NO.	REVISION DATE	DESCRIPTION

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
DIVISION OF ENGINEERING
BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT

BWI

PROJECT TITLE	CLOSED TRANSITION OF SUBSTATION SECONDARY SWITCHES	PROJECT NO.	
SHEET TITLE	SEQUENCE OF OPERATION	SHEET NO.	SK-1
SCALE	AS SHOWN	DATE	FEBRUARY 2000

DST 2000-04 Substation Emergency Power Quick Connect

BCIA A:/DESIGNSTANDARDS/...

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: March 23, 2000

SUBJECT: Design Standard (DST) 2000-04, Substation Emergency Power Quick Connect

---

Effective immediately, please incorporate the following design requirements into all projects and checklists for Baltimore/Washington International (BWI) Airport.

NOTE: This standard applies only to new equipment installation.

This standard details electric substation and associated equipment necessary to provide a permanent connection point for a temporary electric generator in order to supply temporary power to a single substation in the event of a complete substation power outage.

1. All equipment shall be in accordance with the latest edition of the National Electrical Code (NEC).

2. All equipment locations shall be coordinated with Maryland Aviation Administration (MAA) Office of Planning and Engineering.

3. The substation emergency power quick connection system shall include, but not be limited to, equipment shown in the attached one-line diagram, Sheet No. SK-1.

4. The substation shall be 13,800-480 volt secondary-selective with main-tie-main secondary (480V) circuit breaker configuration.

5. Circuit breakers 51-1, 52-2, 52-T and 52-G shall be electrically operated draw-out type low voltage power circuit breakers or insulated case circuit breakers. Circuit breakers 51-1, 52-2, 52-T and 52-G shall each have a rated ampacity to allow for the transformer continuous full load current rating. Key interlocks shall be provided so that 52-G can be

closed only if 52-1 and 52-2 are both in the open position. Key interlocks shall be coordinated with other key interlock functions as required.

6. The bus duct shall be totally enclosed type, 480V, three phase, four wire (100% neutral), with individual ground bus and all copper bus conductors. The bus duct shall be feeder type which shall not allow plug-in units to be used. The bus duct continuous ampere rating shall be equal to or greater than the continuous ampere rating of circuit breakers 51-1, 52-2, 52-T and 52-G. The bus duct and all associated equipment shall have a short circuit rating equal to or greater than the double ended substation equipment. Indoor bus duct equipment shall be rated for indoor use. Outdoor bus duct equipment including the bus duct service head shall be rated for outdoor use. The bus duct and all associated components shall be manufactured by the substation equipment manufacturer and designed specifically for this application. The bus duct service head generator connections shall be bus bars with pre-drilled NEMA standard hole pattern with bolt on bottom entry configuration.

7. The generator connection point shall be at a bus duct service head installed in a metal, pad mounted NEMA 4X enclosure at a predetermined outdoor location. The enclosure shall have an upper front hinged door with handle and padlock provision. The bottom front cover of the enclosure shall be removable and be at least 24 inches high. Intended operation is for the generator cables to pass through the bottom opening up to the bus duct connections. When connected to a generator and energized the top section door will be closed and the bottom cover will be off. The enclosure shall be of sufficient size and configuration to allow for generator cable connections. The enclosure shall include permanent interior supports for the bus duct service head and for generator cables. The pad for the enclosure shall be concrete and sloped to drain away from the building. The pad surface shall be at least four (4) inches above the surrounding grade and extend at least two (2) inches beyond the enclosure base. Provide 4-inch diameter galvanized steel concrete filled bollards as required for physical protection of enclosure.

8. Provide permanently attached engraved instruction placards detailing substation emergency power quick connect operating instructions. Locate one placard at substation interior wall. Locate one placard on the inside of the enclosure on the front door. Provide emergency lighting fixture with integral battery back up in close proximity to interior instruction placard. Provide permanently attached equipment designation placard on enclosure exterior.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Attachment

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Mr. Mike West (MAA)

cc: Mr. Ned Carey/Electronics Committee (MAA), w/ attachment

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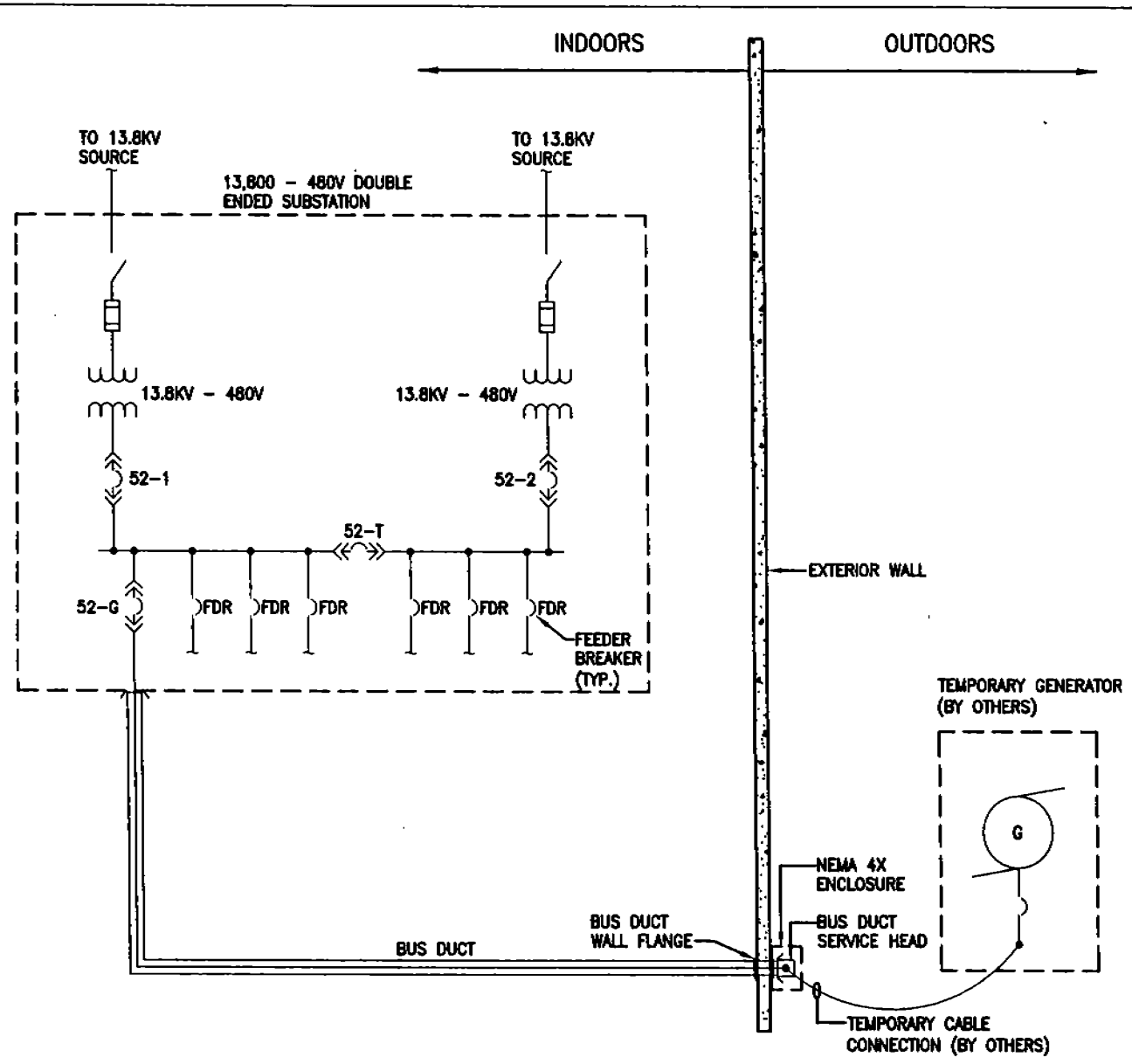

SUBSTATION EMERGENCY POWER QUICK CONNECTION ONE-LINE DIAGRAM

NOT TO SCALE

BWI BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

SUBSTATION EMERGENCY POWER QUICK CONNECTION
ONE-LINE DIAGRAM

URS Greiner Woodward Clyde
CONSULTING ENGINEERING AND PLANNING
HUNT VALLEY, MARYLAND

SCALE	DATE	SHEET NO.
NONE	FEB. 2000	SK-1

BC14 A:/DESIGN STANDARDS.100/...

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: March 24, 2000

SUBJECT: Design Standard (DST) 2000-05, Federal Aviation Administration (FAA) Requirements for Proposed Development

---

The purpose of this standard is to outline various FAA requirements for proposed development at Baltimore/Washington International (BWI) and Martin State (MTN) Airports. Designers shall take these items into consideration during the design process and develop project schedules accordingly. During preliminary design, designers shall identify to the Maryland Aviation Administration (MAA) Project Manager the impact of each requirement on the project.

Unless otherwise approved by the MAA Project Manager, it shall be the designers' responsibility to submit all required information identified below well enough in advance to receive all FAA approvals and permits prior to advertisement of the construction documents. Construction Notice to Proceed (NTP) shall not be given on any project until all FAA approvals have been obtained.

With prior approval from the MAA Project Manager, Consultants may submit items directly to the FAA on behalf of the MAA. All submissions shall be made to the FAA Washington Airports District Office (WADO) unless otherwise noted.

Please modify project design checklists per the following:

- At the initiation of each project, designers shall identify and coordinate with the MAA Division of Planning all changes to the Airport Layout Plan. FAA review time is approximately 14 days for pen and ink revisions and approximately 60 days for more

substantial revisions.

- Environmental document coordination for all development projects as follows:

  1. At the initiation of each project, the Consultant shall obtain a determination from the MAA Office of Planning on the required environmental coordination and documentation needed for each project.

  2. For large/complex projects, designers shall set up a preliminary coordination meeting with the MAA Division of Planning to coordinate the design with the environmental documentation preparation.

  3. For development projects with the potential to be categorically excluded, plans shall be submitted to the MAA Division of Planning at the same time the review plans are submitted to the MAA Project Manager. MAA needs approximately 30 days to prepare and submit an Environmental Impact Evaluation Form A to the FAA. FAA review time is approximately 15 days. Note: Durations may be longer due to project specifics and the coordination required with state and federal agencies.

- Pre-design meetings are required for all airfield projects prior to 30% design completion.

- Line of sight (shadow studies), ground radar interference and reflectivity studies for new or modified structures and buildings shall be submitted to the FAA prior to 30 % design completion.

- Prior to 30% design completion, designers shall meet with the BWI's FAA Facilities Section to identify underground utilities and coordinate project requirements.

- Seven copies of the construction safety and phasing plan shall be submitted for FAA approval. The safety and phasing plan shall include locations and heights of all structures that penetrate any navigational surfaces and shall be prepared in accordance with DST 99-16, High Structure Approval Procedures. FAA review time is approximately 60-90 days.

- Completed Modification of Standards (MOS) forms shall be submitted to the FAA for approval for each modification requested. FAA review time is approximately 60 days.

- Changes to the FAA Part 139 signing and marking plans shall be submitted (on a separate drawing) to the MAA Project Manager and Office of Airport Operations (OPS) for internal review. Upon MAA approval, Consultants shall provide OPS with three copies of the

plan(s), which will be forwarded on to the FAA Eastern Region for coordination and approval. Upon approval, the Eastern Region will send a copy of the approved plan(s), stating that the changes will be added to the next revision of the signage plan, to MAA and WADO. The MAA Project Manager will forward an approved copy of the sign plan(s) to the designer. MAA coordination and review time is approximately 14 days, and FAA review time is approximately 30 days.

- Temporary and permanent changes to the Airport Operations fence lines shall be submitted to the FAA for approval. FAA review time is approximately 30 days.

- Copies of the plans, specifications and design report for all projects which MAA plans to request AIP or PFC funding shall be submitted for FAA approval. In addition to the final submission, designers shall submit 80% plans and specifications to FAA for review and comment. MAA shall review the design report internally and submit it directly to the FAA. FAA review time is approximately 14 days.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Distribution:

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cc: Mr. Tom Priscilla (FAA)

DST 2000-06 Roadway and Parking Lot Light Poles and Fixtures and Airfield Ramp Lamps

BC 15 A./DESIGN STANDARDS-2000.

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: May 24, 2000

SUBJECT: Design Standard (DST) 2000-06, Roadway and Parking Lot Light Poles and Fixtures and Airfield Ramp Lamps

---

Effective immediately, please incorporate the following requirements into the design and specification of all projects at Baltimore/Washington International (BWI) Airport.

All light poles and fixtures shall be specified based on aesthetics, design parameters, and replacement/maintenance considerations. Consultants shall match existing products when modifying and/or expanding existing facilities. A list of lamps that are kept in stock is available to Consultants in the Office of Planning and Engineering. Consultants shall limit the lamps specified to the list unless prior approval has been obtained from the Maryland Aviation Administration (MAA), Director of Engineering. In addition, all designs shall be coordinated with the MAA Resident Architect for aesthetics.

Consultants shall provide MAA's Project Manager and the Division of Maintenance (DOM) with cut-sheets on every light fixture and lamp proposed for MAA projects.

Roadway and Parking Lot Light Poles

Light poles shall be round tapered, fiberglass, breakaway poles with anchor base shrouds, transformer base and a smooth black finish. Poles shall meet the performance of Shakespeare #AHW30-0251BB01.

Roadway and Parking Lot Luminaries

Luminaries shall meet the performance of Holophane (Somerset) contemporary low profile, rectangular luminaries with 5-3/4" arms and smooth black finish. Existing luminaries that are to be matched are 250W, 400W, or 1000W, HPS at 277V with a separate grounding wire.

Airfield Ramp Lighting

Exterior lighting on the airfield ramp shall meet the performance of Crouse-Hinds, GAL series with energy efficient high-pressure sodium lamps and ballast.

Identification

Each pole shall bear an identification tag (engraved on aluminum plate) which shall list the manufacturer, model number, and date of manufacture and installation.

Banners

The need to install banners on light poles shall be coordinated with MAA's Project Manager and DOM. Light poles, banner supports, and foundations shall be designed for banners, when required by MAA. The attached sketch shows BWI's standard banner configuration. NOTE: The banner supports and hardware shall be coordinated with and approved by DOM.

Light Pole Height

Heights of the poles should match existing. Designers shall coordinate each light pole installation(s) with and submit an Airport Zoning Application to MAA's Office of Planning and comply with all state and federal regulations. Light pole design should make every attempt to avoid penetrating any navigational surfaces, i.e. FAR Part 77. If penetration is unavoidable, Federal Aviation Administration approval must be acquired per DST 99-16, High Structure Approval Procedure.

Foundation Height

Parking lot foundation heights shall be a minimum of 2-1/2 feet above finished grade to resist vehicle impact.

Color

Color shall be black and smooth, unless otherwise approved by MAA's Resident Architect. Arms, luminaries, and all other attachments shall be provided in matching color.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

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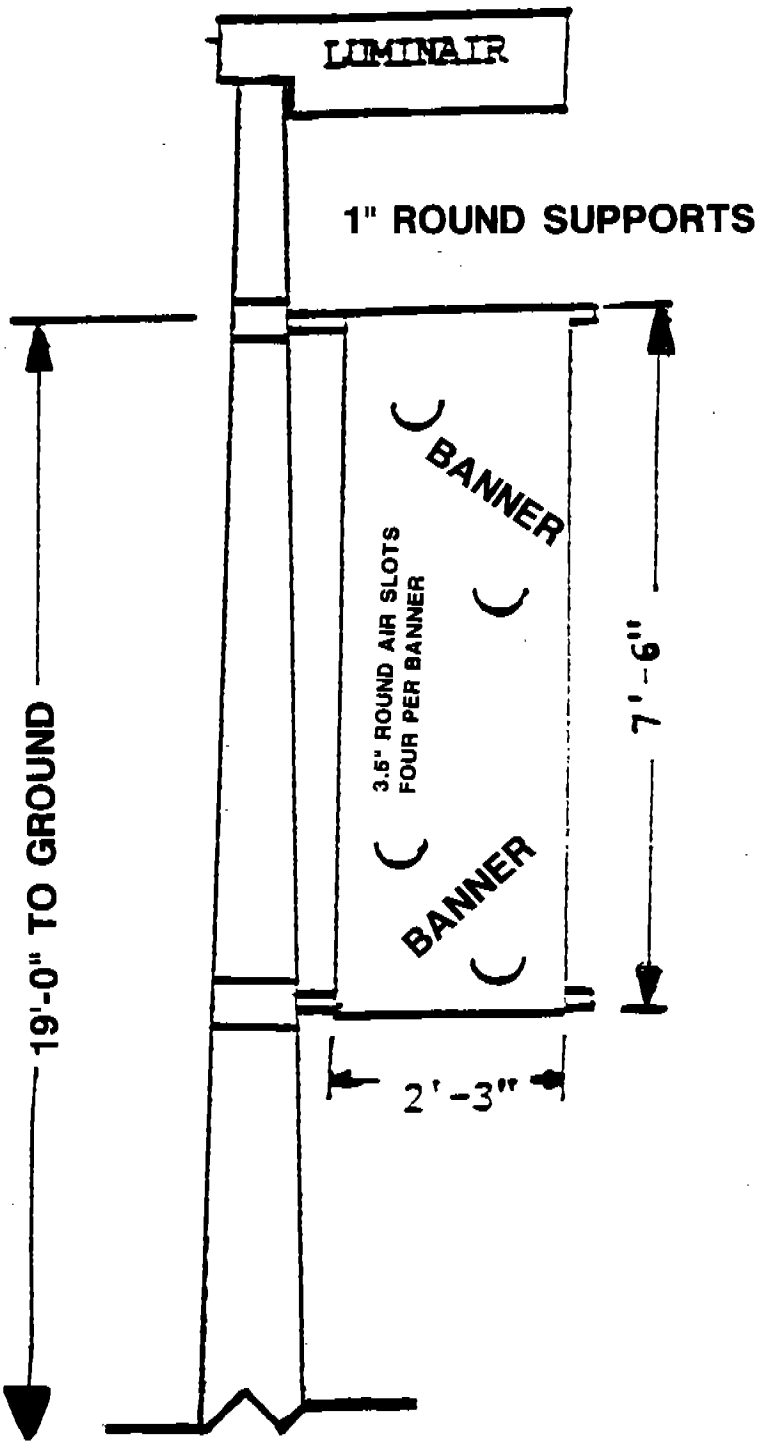
Mr. David Lookenbill (JMT)
Mr. Steve Lucchesi (URSGWC)
Ms. Suzette Moore (MAA)
Mr. Chirantan Mukhopadhyay (Parsons)
Mr. Alex Noorani (MAA)
Mr. Charles Steen (MAA)
Mr. William Tsai (MAA)
Mr. Ron Walden/Bldg. Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)


LUMINAIR
1" ROUND SUPPORTS
BANNER
3.5" ROUND AIR SLOTS
FOUR PER BANNER
BANNER
7'-6"
19'-0" TO GROUND
2'-3"

BC15A:/DESIGNSTANDARDS-2000/...

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: June 12, 2000

SUBJECT: Design Standard (DST) 2000-07, Statewide Roofing Policy

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Attached for your information and use is a copy of the revised Department of General Services (DGS) Statewide Roofing Policy and specifications. Revisions have been made to design, construction, and maintenance requirements. All projects at Baltimore/Washington International and Martin State Airports, which are to be designed after July 1, 2000, shall comply with the attached policy and the following criteria.

Design shall include a 60-year life cycle cost analysis for all new construction projects. Re-roofing rehabilitation projects are exempt from this requirement. Any method of analysis is acceptable as long as assumptions include: 1) 20-year life for built-up and modified bitumen roofs, 2) biannual maintenance performed.

If the proposed roofing system has not been previously approved by DGS, designers shall submit the system to Mr. William Gluck, Chief Project Management Design, DGS Engineering, for review and approval. Mr. Gluck can be reached at 410-767-4439. DGS review time is approximately 14 days.

Based on project specifics, DGS may waive the requirement to install vapor retarders for roof installation and/or replacement projects. DGS shall evaluate the need for vapor retarders on a case-by-case basis. Requests for waivers shall be submitted to Mr. Gluck.

All projects shall be specified to insure qualified contractors perform the work. Qualified contractors shall be approved by the manufacturer, have a minimum of 5 years experience in the installation of roof systems, and meet the following guarantee and warranty requirements:

1. Provide Manufacturer's roof warranty, including the following minimum criteria:

   - Complete coverage of the cost of the labor and materials for repair of leaks due to poor workmanship or materials failure.

   - Complete systems warranty must include each and every component of the roofing system.

   - Non-prorated, non-penal sum (no dollar limit), twenty (20) year warranty period.

     Note: The use of polyisocyanurate (Iso) insulation, to make up the two layers of insulation (base and tapered layer) needed to achieve a 20-year no dollar limit roof, is no longer allowed unless a ½" cover board is applied. Roof systems in which felts are attached directly to the Iso boards shall be rejected and must be remedied.

   - Coverage of the cost of removal and replacement of damaged or wet insulation which is a result of leaks from poor workmanship or failed materials.

   - No exclusion from coverage for damage to the roof system as a result of wind gusts of less than 55 mph.

2. Submit and provide components required by the roofing system manufacturer for the specific warranty.

3. At the completion of the work, the contractor shall guarantee in writing to the Maryland Aviation Administration (MAA) representative that the roofing system, flashing, sheet metal work and all associated components as installed are of the highest quality, weathertight, waterproof and free from defects due to improper or defective materials, and/or workmanship developing under normal wear and tear for a period of five (5) years from the date of final acceptance of all work under this contract. The contractor shall be notified by the MAA representative of any defective work, and shall correct water leaks into the building within forty-eight (48) hours after notification and within ten (10) days for all other defects. Failure of the contractor to correct any defects in the time allowed shall allow the MAA to contract for repairs and charge the contractor for all costs incurred. All repairs/replacement shall be at no cost to the MAA.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Attachment

Distribution:

Mr. David Benner (Urban)
Mr. Lynn Bezilla (MAA)
Mr. Emory Carrigan (MAA)
Mr. Peter Florian (PB)
Mr. Ray Heverling (MAA)
Mr. Andy Hriz (MAA)
Mr. Ernie Lepore (Baker)
Mr. Ali Logmanni (MAA)
Mr. Dave Lookenbill (JMT)
Mr. Steve Lucchesi (URSGWC)
Ms. Suzette Moore (MAA)
Mr. Chirantan Mukhopadhyay (Parsons)
Mr. Alex Noorani (MAA)
Mr. Stephen Sheehan (MAA)
Mr. Charles Steen (MAA)
Mr. William Tsai (MAA)
Mr. Ron Walden/Building Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

cc: Mr. William Gluck (DGS)

5. STANDARDS FOR NEW ROOFING CONSTRUCTION, REROOFING CONSTRUCTION AND ROOFING SYSTEM GUARANTEE REQUIREMENTS.

5.1 GENERAL:

a. For all new building projects, the selection of either a steep slope or low slope roofing system shall be based on the results of a 60 year life cycle cost analysis. This analysis shall consider the scope impact on building structural, mechanical and electrical systems required to configure the building for both a steep slope and a low slope roofing system, as well as the maintenance and replacement intervals and costs for both roofing systems.

b. For roof replacement projects, the selection of the replacement roofing system shall be based on an evaluation of costs associated with factors affecting the proposed system, including span dimension, structural condition, foundation design/capacity, and disposition or accommodation of roof top equipment.

c. All roofs on new construction shall be pitched to drains or gutters, with the roof slope achieved structurally.

d. References to national standards documents such as the American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Factory Mutual System (FM), Underwriters' Laboratories (UL), Building Officials and Code Administrators (BOCA), American Institute of Steel Construction Manual (AISC), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), National Roofing Contractors Association (NRCA), National Institute of Standards and Technology (NIST), Asphalt Roofing Manufacturers' Association (ARMA), etc., shall be interpreted to refer to the most current edition or revision in effect at the time a design is in progress.

e. All materials used for roofing systems shall be asbestos free.

f. A site visit to verify existing conditions will be made for all roof replacement and roof repair projects to verify existing conditions and dimensions even when as-built drawings are provided. Where composition, thickness or make up of the existing roof system or any of its components cannot be determined by visual means alone, conduct exploratory investigation to include dismantling or opening up a representative portion of the roof system. Patch and make watertight all areas disturbed during investigation.

5.2 STEEP SLOPE ROOFS: Steep roofs with a minimum slope of 2-1/2 inches per foot, may be finished with a standing seam metal or sheet metal system or an asphalt coated fiberglass shingle system surfaced with ceramic coated mineral aggregate.

a. Standing Seam Metal Roofing Systems shall be fabricated metal panel systems from nominal 22 gauge G-90 galvanized steel conforming to ASTM A446 Grade A and ASTM A525. Alternative panel thickness of 24 gauge or 20 gauge may be considered based on an evaluation of roof framing and purlin spacing. All standing seams shall be double locked. The system shall conform to the requirements of ANSI Publication A 58.1, BOCA, and the American Institute of Steel Construction Manual. The panels shall have a UL Class 120 rating and the structural uniform uplift load capacity shall be in accordance with ASTM E330.

The finish shall be equal to at least 70% Kynar and shall be tested in accordance with ASTM procedures. The system shall have a 20 year manufacturer's weatherproof warranty. The Kynar color finish shall also be covered by a 20 year manufacturer's warranty.

b. Asphalt Shingles shall be reinforced with fiberglass wind resistant type, UL Class A, and comply with ASTM D3462 and ICBO ES AC 127. Shingle manufacturer shall provide a 30 (+) year warranty covering repair or replacement of defective shingles as necessary to eliminate leaks.

c. Special Roofs: Under special conditions relating to aesthetic compatibility with surrounding buildings or historical consideration, the use of clay tiles, slate tiles, or cedar shakes may be deemed appropriate. In these cases specifications and details shall be developed in strict accordance with applicable national standards. The roofing tile or slate manufacturer shall provide material defects warranty coverage of 20 years minimum to 50 years or more based on the specific roof material and facility under consideration.

d. Steep slope roofs shall be provided with adequate means for interior ventilation through eave or soffit louvers, ridge vents and thermostatically controlled power fans to prevent moisture condensation and excessive heat under roofing or sheathing.

5.3 LOW SLOPE ROOFS: Low slope roofs shall be required to have a minimum slope of 1/4 inch per foot. New buildings shall be designed to achieve the minimum slope of 1/4 inch per foot structurally. Existing buildings may have to be provided with tapered insulation to achieve the minimum slope. Lightweight concrete shall not be used to create slope. Prior to placement of insulation and the roofing system, all low slope roof decks shall have a two ply vapor retarder installed in hot asphalt.

On low slope roofs from 1/4 inch per foot up to 2 1/2 inches per foot, the following types of roofing systems shall be evaluated in the preliminary or schematic design phase of a project to identify the optimum roofing system for the building under consideration. In general a four ply built-up roofing system is preferred. A modified bitumen membrane system is considered an acceptable alternative.

a. Four Ply Built-up System: This system shall consist of four plies of roofing felts alternately placed and overlapped and saturated with hot asphalt bitumen. Roofing felts shall be glass fiber and shall meet the requirements of Tables 1 and 2 ASTM D-2178 Type VI (Asphalt Impregnated). Steep roofing asphalt shall conform to ASTM D-312, Type III.

The manufacturer's warranty shall cover the roofing system material, the insulation and the base flashing, and shall be for a term of not less than 20 years with no dollar limit.

b. Modified Bitumen Membrane System: The roofing system shall consist of a reinforced APP or SBS polymer-modified bitumen membrane over a fiberglass base sheet and two plies of Type VI roofing felts, or modified bitumen membrane over three plies of Type VI roofing felts. One or two plies of modified bitumen membrane may be installed. The bottom ply must be smooth surfaced, and the top ply must be granule surfaced. Loose granules must be embedded at all end and side laps while asphalt is hot. Membrane shall be installed by the standard method

of hot asphalt mopping (torch applied membranes require DGS approval). All modified bitumen membrane materials shall conform to ASTM D 6222-98, D 6223-98, D 6162-97, D 6163-97 and D 6164-97 procedures, and shall meet the interim standards of the National Institute of Standards and Technology (NIST) Building Science Series Publication BSS 167. Steep roofing asphalt shall conform to ASTM D312 Type III. Roofing felts shall be glass fiber and shall conform to ASTM D2178 Type VI. Asphalt coated base sheets shall conform to ASTM D4601 or D4897. Guarantee by manufacturer shall cover membrane, base sheets, insulation, and base flashing for a term of not less than 20 years with no-dollar limit.

5.4 INSULATION

a. All low slope roofing systems shall include insulation. The majority of insulating value shall be accomplished with the necessary thickness of flat polyisocyanurate boards. Where necessary, roof slope shall be developed with tapered perlite board. Organic insulation material shall not be used under built-up roofs. Light weight concrete insulating fill is not acceptable.

b. Heat Transmission: Insulation heat transmission values shall be established in accordance with the latest revision of the DGS Energy Conservation Guidelines. For new buildings the suggested insulation value of the roof area envelope is R-30. For roof replacements/renovations on older buildings, a lower "R" value will be considered.

c. Structural: The first ply of insulation systems over metal decks and wood decks shall be mechanically fastened using steel fasteners acceptable to the manufacturer furnishing guarantee of roofing system. Insulation shall also be installed in accordance with Factory Mutual System Class 120 wind uplift guidelines.

d. Compatibility: Insulation material installed between the roof deck and the roof ply shall be compatible with the roof ply material and asphalt bitumen binder or other adhesive used in the roofing system.

e. Warranty: Insulation materials shall be considered an integral component of the roofing system; and shall be furnished or approved by the roofing system supplier or manufacturer; and shall be covered by the roofing system warranty.

f. Insulation shall be applied in several layers, with the joints staggered, in accordance with the manufacturer's recommendation.

5.5 FLASHING

a. Base Flashing is part of the roofing system and shall meet requirements of manufacturer furnishing roofing system. Where roof meets a parapet or adjacent building wall, the base flashing shall extend up the wall at least 8 inches, but generally not more than 14 inches unless necessary to be consistent with existing conditions or design requirements. If flashing height is greater than 14 inches, than a 2 piece flashing system may be required.

b. Other Flashing: Other than base flashing - metal flashing including expansion joint flashing shall be in accordance with SMACNA Standards and the NRCA Roofing and Waterproofing Manual. Pitch pockets are to be avoided. Roof penetrations will be flashed with preformed flexible flashing using clamps and tents unless the penetration is such a complex shape that a pitch pocket is required.

5.6 ROOF DRAINS shall be provided with shallow sumps, gravel stops, and minimum 4.0 pound lead flashing in accordance with the NRCA Roofing and Waterproofing Manual. Drains will be located wherever possible at the low points, and crickets must be provided between drains in structurally formed valleys and around any structure impeding the flow of water in the drain field to assure positive water flow to the drains. Roof drainage patterns should be designed to locate roof drains at the mid-points between columns and beams. Overflow scuppers should be provided through perimeter parapet walls to relieve storm water build-up caused by clogged roof drains. Where roof drainage is directed to exterior downspouts, splash blocks shall be provided at all ground discharge points. Where possible, downspouts may discharge directly into a storm drainage system.

5.7. ROOF ACCESS: Permanent access to all roof areas from the inside of the building shall be provided for all buildings over two stories high with low slope roofs. Roof access for one and two story buildings with low slope roofs and for buildings with steep slope roofs will be evaluated based on building and roof configuration and roof type.

5.8 ROOF MOUNTED EQUIPMENT shall be minimized; penthouse enclosures of equipment are preferred.

a. Roof mounted equipment shall be installed on curbs and shall be provided with suitable vibration isolation devices.

b. If it is necessary to mount equipment above the roof, without using a curb, sufficient clearance shall be provided under the equipment to permit maintenance of the roofing system as well as adequate clearance for future roof replacement.

c. Inorganic walking pads shall be provided from roof access to roof mounted equipment. Modified bitumen membrane is acceptable.

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

MEMORANDUM

TO: Joe Nessel

FROM: Ben Chin BC

DATE: October 14, 1998

SUBJECT: Roof Design

Attached are pages III-4 through III-8 from Department of General Services (DGS) Procedure Manual for Professional Services, dated July 1998. The referenced pages specify DGS's requirements for new roofing construction, reroofing construction, and roofing system guarantee.

Regarding the Piers A and B project, the roof design will comply with the slope requirements of section 5.3, Low Slope Roofs, i.e. have a minimum slope of ¼ inch per foot. Furthermore, we intend to comply with the requirement to achieve the minimum slope structurally. Please advise if this meets with the Board's direction and intent.

For future projects, we will issue a Design Standard for minimum roof slopes.

If you should have any questions regarding this matter, please see me.

BC/jao

Attachment

cc: Alex Noorani w/attachment
Charles Steen w/attachment

Julie

please start a Design standard file for "Roofs - minimum slope requirements"

DST to follow.

Thank you

bc

PROCEDURE MANUAL

for

PROFESSIONAL SERVICES

STATE OF MARYLAND
DEPARTMENT OF GENERAL SERVICES

Gene Lynch, Secretary

OFFICE OF FACILITIES PLANNING, ENGINEERING AND CONSTRUCTION

PROJECT MANAGEMENT AND DESIGN DIVISION

State Office Building
301 West Preston Street. Room 1405
Baltimore, Maryland 21201

July, 1998

project. This notice shall be sent to the following: Maryland Department of the Environment, Water Management Administration, Bureau of Mines, 160 South Water Street, Frostburg, MD 21532.

4. VOLUMETRIC BATCHING AND CONTINUOUS MIXING OF CONCRETE

4.1 OPTIONS: Contractors shall have the option of furnishing drum transit mixed concrete according to ASTM C-94, or volumetric batched concrete according to ASTM C-685. It is therefore directed that unless an A/E has a valid objection thereto. all future concrete specifications for State (DGS) projects shall include the provision that a Contractor may supply either transit mixed concrete conforming to ASTM C-94, or upon approval of the A/E, volumetrically batched concrete conforming to ASTM C-685. The A/E shall include such special provisions as may be necessary with the latter specification.

5. STANDARDS FOR NEW ROOFING CONSTRUCTION, REROOFING CONSTRUCTION AND ROOFING SYSTEM GUARANTEE REQUIREMENTS.

5.1 GENERAL:

a. All roofs on new construction shall be pitched to drains or gutters, with the roof slope achieved structurally if feasible.

b. References to national standards documents such as the American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Factory Mutual System (FM), Underwriters' Laboratories (UL), Building Officials and Code Administrators (BOCA), American Institute of Steel Construction Manual (AISC), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), National Roofing Contractors Association (NRCA), National Institute of Standards and Technology (NIST), etc., shall be interpreted to refer to the most current edition or revision in effect at the time a design is in progress.

c. All materials used for roofing systems shall be asbestos free.

d. A site visit to verify existing conditions will be made for all roof replacement/repair projects to verify existing conditions and dimensions even when as-built drawings are provided. Where composition, thickness or make up of the existing roof system or any of its components cannot be determined by visual means alone, conduct exploratory investigation to include dismantling or opening up a representative portion of the roof system. Patch and make watertight all areas disturbed during investigation.

5.2 STEEP SLOPE ROOFS: Steep roofs with a minimum slope of 2-1/2 inches per foot, may be finished with a standing seam metal or sheet metal system or an asphalt coated fiberglass shingle system surfaced with ceramic coated mineral aggregate.

a. Standing Seam Metal Roofing Systems shall be fabricated metal panel systems from nominal 22 gauge G-90 galvanized steel conforming to ASTM A446 Grade A and ASTM A525.

steel conforming to ASTM A446 Grade A and ASTM A525. Alternative panel thickness of 24 gauge or 20 gauge may be considered based on an evaluation of roof framing and purlin spacing. All standing seams shall be double locked. The system shall conform to the requirements of ANSI Publication A 58.1, BOCA, and the American Institute of Steel Construction Manual. The panels shall have a UL Class 90 rating and the structural uniform uplift load capacity shall be in accordance with ASTM E330. The finish shall be equal to at least 70% Kynar and shall be tested in accordance with ASTM procedures. The system shall have a 20 year manufacturer's warranty. The Kynar color finish shall also be covered by a 20 year manufacturer's warranty.

b. Asphalt Shingles shall be reinforced with fiberglass wind resistant type, UL Class A, and comply with ASTM D3018 Type I and ASTM D3462. Shingle manufacturer shall provide a 30 year warranty covering repair or replacement of defective shingles as necessary to eliminate leaks.

c. Special Roofs: Under special conditions relating to aesthetic compatibility with surrounding buildings or historical consideration, the use of clay tiles, slate tiles, or cedar shakes may be deemed appropriate. In these cases specifications and details shall be developed in strict accordance with applicable national standards. The roofing tile or slate manufacturer shall provide material defects warranty coverage of 20 years minimum to 50 years maximum based on the specific roof material and facility under consideration.

d. Steep slope roofs shall be provided with adequate means for interior ventilation through eave or soffit louvers to prevent moisture condensation under metal roofing or sheathing.

5.3 LOW SLOPE ROOFS: Low slope roofs shall be required to have a minimum slope of 1/4 inch per foot. New buildings shall be designed to achieve the minimum slope of 1/4 inch per foot structurally. Existing buildings may have to be provided with tapered insulation to achieve the minimum slope. Lightweight concrete shall not be used to create slope. Prior to placement of insulation and the roofing system, all low slope roof decks shall have a two ply vapor retarder installed in hot asphalt.

On low slope roofs from 1/4 inch per foot up to 2 1/2 inches per foot, the following types of roofing systems shall be evaluated in the preliminary or schematic design phase of a project to identify the optimum roofing system for the building under consideration. In general a four ply built-up roofing system is preferred. A modified bitumen membrane system is considered an acceptable alternative. Prior approval of DGS is required for the use of a single ply membrane system.

a. Four Ply Built-up System: This system shall consist of four plies of roofing felts alternately placed and overlapped and

saturated with hot asphalt bitumen. Roofing felts shall be glass fiber and shall meet the requirements of Tables 1 and 2 ASTM D-2178 Type VI (Asphalt Impregnated). Steep roofing asphalt shall conform to ASTM D-312, Type III.

The manufacturer's warranty shall cover the roofing system material, the insulation and the base flashing, and shall be for a term of not less than 20 years with no dollar limit.

b. Modified Bitumen Membrane System: The roofing system shall consist of a reinforced APP or SBS polymer-modified bitumen membrane over a fiberglass base sheet and two plies of Type VI roofing felts, or modified bitumen membrane over three plies of Type VI roofing felts. One or two plies of modified bitumen membrane may be installed. The bottom ply must be smooth surfaced, and the top ply must be granule surfaced. Loose granules must be embedded at all end and side laps while asphalt is hot. Membrane shall be installed by the standard method of hot asphalt mopping. All modified bitumen membrane materials shall conform to ASTM D5147 procedures, and shall meet the interim standards of the National Institute of Standards and Technology (NIST) Building Science Series Publication BSS 167. Steep roofing asphalt shall conform to ASTM D312 Type III. Roofing felts shall be glass fiber and shall conform to ASTM D2178 Type VI. Asphalt coated base sheets shall conform to ASTM D4601 or D4897. Guarantee by manufacturer shall cover membrane, base sheets, insulation, and base flashings for a term of not less than 20 years with a no-dollar limit.

c. Single Ply Membrane System: Occasionally, specific project conditions, or peculiar project constraints might suggest the practical utilization of a single-ply membrane roofing system. Utilization of EPDM, Hypalon, PVC, CPVC and related type roofing materials may be considered if reviewed with and approved by DGS. Such applications shall be in strict and complete conformance with the installation recommendations of the particular manufacturer. Guarantee by manufacturer shall cover roof membrane, insulation, and flashing system for a term of not less than 20 years.

5.4 INSULATION

a. All low slope roofing systems shall include insulation. The majority of insulating value shall be accomplished with the necessary thickness of flat polyisocyanurate boards. Where necessary, roof slope shall be developed with tapered perlite board. Organic insulation material shall not be used under built-up roofs. Light weight concrete insulating fill is not acceptable.

b. Heat Transmission: Insulation heat transmission values shall be established in accordance with the latest revision of the DGS Energy Conservation Guidelines. For new buildings the suggested insulation value of the roof area envelope is R-30. For roof replacements/renovations on older buildings, a lower "R" value will be considered.

c. Structural: The first ply of insulation systems over metal decks and wood decks shall be mechanically fastened using steel fasteners acceptable to the manufacturer furnishing guarantee of roofing system. Insulation shall also be installed in accordance with Factory Mutual System 1-90 wind uplift guidelines.

d. Compatibility: Insulation material installed between the roof deck and the roof ply shall be compatible with the roof ply material and asphalt bitumen binder or other adhesive used in the roofing system.

e. Warranty: Insulation materials shall be considered an integral component of the roofing system; and shall be furnished or approved by the roofing system supplier or manufacturer; and shall be covered by the roofing system warranty.

f. Insulation shall be applied in several layers, with the joints staggered, in accordance with the manufacturer's recommendation.

5.5 FLASHINGS

a. Base Flashing is part of the roofing system and shall meet requirements of manufacturer furnishing roofing system. Where roof meets a parapet or adjacent building wall, the base flashing shall extend up the wall at least 8 inches, but generally not more than 2 feet unless necessary to be consistent with existing conditions or design requirements.

b. Other Flashing: Other than base flashing - metal flashing including expansion joint flashing shall be in accordance with SMACNA Standards and the NRCA Roofing and Waterproofing Manual. Pitch pockets are to be avoided. Roof penetrations will be flashed with preformed flexible flashings using clamps and tents unless the penetration is such a complex shape that a pitch pocket is required.

5.6 ROOF DRAINS shall be provided with shallow sumps, gravel stops, and minimum 4.0 pound lead flashings in accordance with the NRCA Roofing and Waterproofing Manual. Drains will be located wherever possible at the low points, and crickets must be provided between drains in structurally formed valleys to assure positive water flow to the drains. Roof drainage patterns should be designed to locate roof drains at the mid-points between columns and beams. Overflow scuppers should be provided through perimeter parapet walls to relieve storm water build-up caused by clogged roof drains. Where roof drainage is directed to exterior downspouts, splash blocks shall be provided at all ground discharge points. Where possible, downspouts may discharge directly into a storm drainage system.

5.7. ROOF ACCESS: Permanent access to all roof areas from the inside of the building shall be provided for all buildings over two stories high with low slope roofs. Roof access for one and two story buildings with low slope roofs and for buildings with steep slope roofs will be evaluated based on building and roof configuration and roof type.

5.8 ROOF MOUNTED EQUIPMENT shall be minimized; penthouse enclosures of equipment are preferred.

a. Roof mounted equipment shall be installed on curbs and shall be provided with suitable vibration isolation devices.

b. If it is necessary to mount equipment above the roof, without using a curb, sufficient clearance shall be provided under the equipment to permit maintenance of the roofing system.

C. Inorganic walking pads shall be provided from roof access to roof mounted equipment.

6. FOREST CONSERVATION PROCEDURES

6.1 REQUIREMENTS: In accordance with Natural Resources Article, Title 5, Forest and Parks, subtitle 16, Forest Conservation, all construction activities involving but not limited to clearing, grading, erosion and sediment control on areas greater than 40,000 square feet by a unit of State government or any person using State funding for a construction project, shall require a "Forest Stand Delineation" and a "Forest Conservation Plan" for submission to and approval by the Department of Natural Resources, Resource Conservation Service, Forestry Division.

6.2 SITE: Subsequent to preparation of a "Forest Stand Delineation", in accordance with DNR Article, Title 5 and as an integral part of the site planning process, a "Forest Conservation Plan" shall be prepared and submitted which outlines the proposed forest retention, reforestation, afforestation and/or forest protection procedures associated with the proposed land use change.

6.3 CONSERVATION FUND: If site and development constraints preclude the aforementioned "Forest Conservation Procedures", then a monetary contribution to the Conservation Fund shall be made at the rate of 10 cents ($0.10) per square foot of the area requiring planting as determined by the "Forest Stand Delineation" and the "Forest Conservation Plan".

7. EARTHQUAKE CONSTRUCTION

7.1 REQUIREMENTS: Facilities should be designed for earthquake loads per applicable provisions of BOCA or the Building Seismic Safety Council (BSSC) whichever is more stringent. Of particular concern should be "provisions of adequate ductility to structural components, especially connections, consistent with the design levels assumed; and adequate anchorage of nonstructural components such as parapets."

8. CHESAPEAKE BAY POLICY

8.1 REQUIREMENTS: A/E's are required to incorporate the Chesapeake Critical Area and Wetlands Regulations administered by the Chesapeake Bay Critical Areas Commission, Dept. of Natural Resources, into the design of construction projects.

DST 2000-08 Glycol Aboveground Storage Tank (Glycol AST) System

BC 15 A:/DESIGNSTANDARDS-2000/...

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

*"To provide services to our customers and the air transportation industry
To foster and develop aviation in Maryland • To develop and empower our employees."*

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: June 16, 2000

SUBJECT: Design Standard (DST) 2000-08, Glycol Aboveground Storage Tank (Glycol AST) System Design Standard

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Note: This Standard supersedes (DST) 98-15, Above Ground Glycol Storage Tank (Glycol AST) System Design Standards.

Effective immediately, all Baltimore/Washington International (BWI) and Martin State Airports projects involving the design and specification of Glycol ASTs, both permanent and temporary, shall be per the following:

1. All Glycol ASTs shall be in compliance with the most recent regulations of: Code of Maryland Regulations (COMAR) 26.10, Maryland Department of the Environment, Oil Pollution and Tank Management Regulation and all related Environmental Protection Agency or Federal regulatory requirements.

2. All Glycol ASTs shall be in compliance with all applicable codes of the National Fire Protection Association (NFPA), particularly NFPA 1, 10, 30 & 30A, 70, 415 and 704, COMAR 12, State of Maryland Fire Prevention Code, Code of Federal Regulations, and BWI Tenant Directives as follows:
   - A. NFPA 1, Fire Prevention Code
   - B. NFPA 704, Identification of Fire Hazards
   - C. NFPA 10, Fire Extinguishers
   - D. NFPA 30, 30A, Flammable & Combustible Liquids Code
   - E. NFPA 70, National Electric Code

F. NFPA 101, Life Safety Code
G. NFPA 415, Airport Terminal Building, Fuel Ramp Drainage
H. NFPA 704, Identification of Fire Hazards, Signs/Signal System
I. Code of Maryland Regulations (COMAR) 26.10, Oil Pollution and Tank Management
J. COMAR 12.03.01.02, Fire Prevention Code
K. Code of Federal Regulations 40 CFR 112.7, Spill Prevention Control and Countermeasure Plan
L. BWI Tenant Directive 215.1, Deicing Procedures at Baltimore/ Washington International Airport
M. BWI Tenant Directive 007.1, Building Permits-Baltimore/Washington International Airport
N. BWI Tenant Directive 502.1, Airport Fuel/Oil and Hazardous Material Spill Procedures for Legal Reporting Responsibilities

3. Effective September 1, 2000, all new and existing Glycol ASTs must meet or exceed Maryland Aviation Administration's (MAA) design standards or be removed at the owner's expense.

4. Transport trailer tanks will not be permitted for glycol storage after September 1, 2000. Transport style tanks utilized until September 1, 2000 must be cradled and must not rest on landing legs.

5. The MAA will permit glycol tanks to be placed only at those pier locations where gate deicing is permitted (See BWI Tenant Directive 215.1, Deicing Procedures at Baltimore/Washington International Airport). Positioning of tanks shall not interfere with:
   - Emergency terminal exits
   - Fire protection equipment
   - Vehicle traffic
   - Other airport operations
   - Line of sight concerns from the Air Traffic Control Tower.

6. Request for tank locations must be approved by MAA prior to design and installation.

7. All Glycol ASTs shall be: 1) single-wall steel with containment, or 2) double-wall polypropylene (fiberglass) with containment. Installation is to be in accordance with the manufacturer's specifications.

8. All Glycol ASTs, regardless of capacity, shall be surrounded by a continuous containment dike, either self-contained or constructed, capable of holding 110% of the total tank volume, providing protection from collision, and shall include a lockable drain valve, in accordance with COMAR 26.10.01.12B-1.

9. The tank owner must submit a Spill Control Plan to the MAA Environmental Compliance Section. The spill plan must be developed according to BWI Tenant Directive 502.1, Airport Fuel/Oil and Hazardous Material Spill Procedures for Legal Reporting Responsibilities, to address any possible spills or leaks that may occur. In addition, the plan shall include a procedure for emptying stormwater from the containment dike area. The procedure shall be developed to prevent stormwater from reaching a level that will decrease the capacity of the containment dike area below the storage capacity of the tank. The tank owner must also have a spill kit available at the tank location. The kit must contain drain protection booms or mats.

10. Tanks must be placed on concrete pads of sufficient strength to support the tanks' full weight (including other necessary structural support).

11. All tanks must be provided with a flow meter and totalizer applicable for glycol usage. They must be capable of providing a reading of the total amount of glycol discharged from the tank. The monitoring equipment must be maintained and calibrated to assure accuracy of the measurements according to the Annotated Code of Maryland Paragraph 9, Section 343. Annual calibration must be performed according to manufacturer's recommendations. The meter must be accessible to the MAA at all times.

12. All tanks shall have a label affixed identifying their contents and tanks' maximum capacity. The NFPA-704 symbol shall be displayed, e.g., Propylene Glycol, Type IV, 2000 gallons.

13. All tanks located next to the Terminal must be white, gray or black in color.

14. All Glycol AST equipment must be secure from tampering and unauthorized use, and must be limited to personnel trained by the tenant according to its company's standards.

15. All operator hoses must be in good working order and be securely fastened in an upright manner to prevent any leaking.

If the above requirements conflict with any other codes or regulations, it should be brought immediately to the attention of the Manager, Design Services Section.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Distribution:

Mr. David Benner (Urban)
Mr. Lynn Bezilla (MAA)
Mr. Ian Bricknell (TAMS)
Mr. Emory Carrigan (MAA)
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Mr. Ron Walden/Building Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

cc: Mr. John Stewart (MAA)
Mr. Mark Williams (MAA)

BC 15 A:/DESIGN STANDARDS-2000/...

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

*"To provide services to our customers and the air transportation industry
To foster and develop aviation in Maryland • To develop and empower our employees."*

David L. Blackshear Executive Director

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: July 13, 2000

SUBJECT: Design Standard (DST) 2000-09, Fire Safety Symbols

The purpose of this Design Standard is to reinforce the need to follow NFPA 170 in the design and construction of signs for fire safety and associated hazards. The attached NFPA 170 shall be used for all new construction and renovation projects at Baltimore/Washington International and Martin State Airports.

Also, attached for your use is a current list of all DSTs issued to date.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Attachments

Distribution:

Mr. David Benner (Urban)
Mr. Lynn Bezilla (MAA)
Mr. Ian Bricknell (TAMS)
Mr. Emory Carrigan (MAA)
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Mr. Charles Steen (MAA)
Mr. William Tsai (MAA)
Mr. Ron Walden/Bldg. Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

NFPA 170

Standard for

Fire Safety Symbols

1996 Edition

This edition of NFPA 170, *Standard for Fire Safety Symbols*, was prepared by the Technical Committee on Fire Safety Symbols and acted on by the National Fire Protection Association, Inc., at its Annual Meeting held May 20–23, 1996, in Boston, MA. It was issued by the Standards Council on July 18, 1996, with an effective date of August 9, 1996, and supersedes all previous editions.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

This edition of NFPA 170 was approved as an American National Standard on July 26, 1996.

Origin and Development of NFPA 170

The 1994 edition of NFPA 170 represented the completion of an effort to combine four previously separate documents that covered fire safety symbols for different purposes. These documents were:

NFPA 171, *Public Firesafety Symbols*

NFPA 172, *Fire Protection Symbols for Architectural and Engineering Drawings*

NFPA 174, *Fire Protection Symbols for Risk Analysis Diagrams*

NFPA 178, *Symbols for Fire Fighting Operations.*

The Technical Committee on Fire Safety Symbols believes that placing all fire safety symbols in one document will make it easier for users of symbols to find the one(s) most appropriate for their application. It will also eliminate duplication between these and eventually other NFPA documents.

The first edition of NFPA 170 placed these four documents in one document, but did not combine them, except for definitions that were in each document. For the second edition of NFPA 170, the Technical Committee on Fire Safety Symbols completely restructured the text into a logical and cohesive arrangement. It also eliminated the duplication of symbols that had occurred because several of the previous separate documents had included symbols from one or more of the other documents for completeness. New symbols added included those for campfire prohibitions, smoke barriers, illuminated exit signs, and belowground tanks.

For this new (third) edition of NFPA 170, changes include the following:

Upgrading recommendations on *pre-incident planning* to requirements (new Chapter 6).

Adding new symbols for *pull station, area of refuge,* and *cooking prohibition.*

Clarifying the symbols for *smoke detectors, battery-powered emergency lights,* and *fire service/emergency telephone station.*

Recognizing the phase out of halon now taking place, and the introduction of *clean agents.*

Technical Committee on Fire Safety Symbols

Lydia A. Butterworth, *Chair*
Smithsonian Institution, DC

Phillip A. Brown, American Fire Sprinkler Assn., Inc., TX
Rep. American Fire Sprinkler Assn., Inc.
Randal G. Brown, Randal Brown & Assoc., Ltd, Ontario, Canada
Randall S. Chaney, Wausau HPR Engr, CA
Scott D. Corrin, University of California–Riverside, CA
David C. Cox, Fire Safety Displays Co., MI
August F. DiManno, Jr., Fireman's Fund Insurance Co., NY
William P. MacDonald, New York Power Authority, NY
Edward P. Quinn, Jr., Aetna Life & Casualty, NY
Brad Schiffer, Brad Schiffer/Taxis, Inc., FL
James J. Vorce, Johnson Controls Inc., WI
Harry J. Walsh, Pennsylvania Lumbermens Mutual Ins Co., PA
Derik White, The CAD Zone, OR
Thomas R. Wood, Boca Raton Fire Rescue Services, FL

Burton R. Klein, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on fire safety symbols including those for building design plans, investigation diagrams, maps, and for public fire safety. It shall coordinate its work with NFPA technical committees and other groups dealing with subjects to which fire safety symbols apply.

Contents

NFPA 170

Standard for

Fire Safety Symbols

1996 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 7 and Appendix B.

Chapter 1 General

1-1 Scope. The scope of this standard is symbols used for fire safety and associated hazards.

1-2 Purpose. The purpose of this standard is to standardize the symbols used in representing fire and associated hazards.

1-3 Units. Metric units of measurement used in this standard are in accordance with the International System of Units (SI). One unit (liter), outside of but recognized by SI, is commonly used in international fire protection. For conversion factors, see Appendix C-5.4.

Chapter 2 Definitions

2-1 Official NFPA Definitions.

Approved.* Acceptable to the authority having jurisdiction.

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed.* Equipment, materials, or services included in a list published by an organization acceptable to the authority having jurisdiction and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

2-2 Definitions of Terms Used in the Standard.

Pre-Incident Planning A written document resulting from the gathering of general and detailed information/data to be used by public emergency response agencies and private industry for determining the response to reasonable anticipated emergency incidents at a specific facility. (Extracted from NFPA 1420, *Recommended Practice for Pre-Incident Planning for Warehouse Occupancies.*)

Referent.* An object or concept (message) represented by a symbol.

Self-Luminous. A type of sign that is self-energized with respect to luminosity, and requires no external power source.

Supplementary Indicators.* Figures, numbers, subscripts, or letter abbreviations used to enhance the effectiveness of symbols.

Symbol.* A graphic representation of a referent.

Chapter 3 Symbols for General Use

3-1 Introduction.

3-1.1 Scope. This chapter provides general referents and symbols for fire prevention and visual alerting for fire and related life safety emergencies.

3-1.2 Purpose.

3-1.2.1 The purpose of this chapter is to provide uniform fire safety symbols to improve communication wherever signs and symbols are employed to provide fire safety information.

3-1.2.2 This chapter provides uniformity in the selection of symbols designed to assist in locating exits, fire safety alerting equipment, and safe areas.

3-1.2.3* The fundamental imagery for symbols, as well as their background color and shape, is designated in this chapter.

3-1.2.4* This chapter does not specify viewing distance, size, or optimal combinations of symbols, words, or other presentations.

3-1.3* Symbol Presentation.

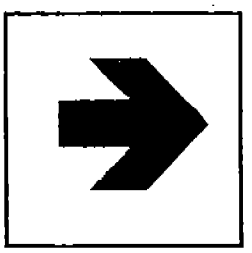
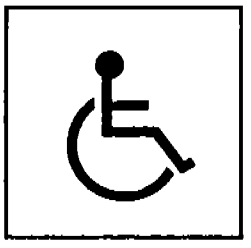
3-1.3.1 The orientation for prohibition symbols shall not be altered from that shown in this chapter.

3-1.3.2 The symbol background shape shall be square.

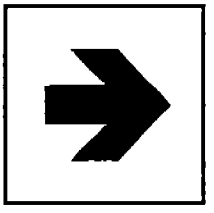
Exception: For prohibition symbols a circle and diagonal slash (at 45 degrees from upper left to lower right) shall be used.

Example:

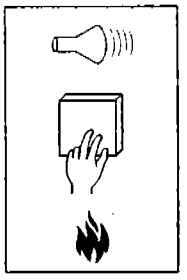
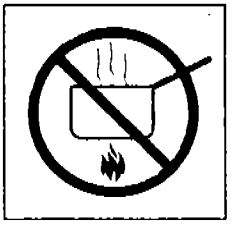
3-1.3.3 Symbol Color. The symbol color shall meet the requirements of ANSI Z535.1, *Safety Color Code.*

	Referent	Symbol	Characteristics	Application†
3-2 Symbols for General Use.				
3-2.1	Emergency Exit		Square Field; Background Green; Door Opening White; Image in Green or Black.	The identification and location of an emergency exit. Example: • The location of exit for use in a fire emergency.
3-2.2	Emergency Exit Route		Square Field; Background Green; Door Opening White; Image in Green or Black.	The identification and location of a route to be used in an emergency. Example: • The direction to a fire exit.
			For Arrows: Square Field; Background White; Arrow in Green or Black.	
3-2.3	Accessible Emergency Exit		Square Field; Background Green; Door Opening White; Image in Green or Black.	The identification of an emergency exit that is accessible to disabled users, as specified by ANSI A117.1. Example: • The location of a fire exit that is accessible to disabled users.
			International Symbol of Accessibility per ANSI A117.1.	

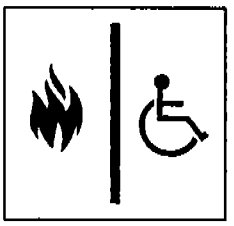
†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
3-2.4	Accessible Emergency Exit Route		Square Field; Background Green; Door Opening White; Image in Green or Black.	The identification of a route that leads to an emergency exit that is accessible to disabled users. Example: • The location of the route toward a fire exit that is accessible to disabled users.
			International Symbol of Accessibility per ANSI A117.1.	
			For Arrows: Square Field; Background White; Arrow in Green or Black.	
3-2.5	Not an Exit		Square Field; Background White; Door frame Green; Door Opening White; Image in Green or Black; Red Circle and Diagonal Slash.	The identification of doors that do NOT lead to an exit. Example: • The location of an interior door such as one leading to a closet, interior court yard, or basement.
3-2.6	Use Stairs in Case of Fire		Square Field; Red Flame; Black Figure; White Background.	An instruction to the user to use stairs (downward egress) in case of fire. Example: • The identification that stairs are to be used in case of fire.
3-2.7	Use Stairs in Case of Fire		Square Field; Red Flame; Black Figure; White Background.	An instruction to the user to use stairs (upward egress) in case of fire. Example: • The identification that stairs are to be used in case of fire.

†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
3-2.8	Do Not Use Elevator in Case of Fire		Square Field; Red Flame; Black Figures; White Background; Red Circle and Slash	An instruction to not use elevators in case of fire. Example: • Posted near elevator call button.
3-2.9	No Smoking		Circular Field; Red Circle and Slash; Black Image; White Background.	The identification of areas in which smoking is prohibited. Example: • Identification of areas, such as those for flammable liquid storage, where smoking could lead to fire or explosion.
3-2.10	No Campfires		Circular Field; Red Circle and Slash; Black Image; White Background.	Identification of areas, such as municipal parks, where campfires are not permitted.
3-2.11	Manually Activated Alarm Initiating Device (Manual Pull Station)		Rectangular Field; White Background; Red Flame; Black Hand; Red Box; Red Horn; Red Wave.	An instruction to actuate an alarm initiating device in a fire emergency. Example: • Posted above a manually activated initiating device.
3-2.12	No Cooking		Square Field; White Background; Red Flame; Black Pot and Steam; Red Circle and Slash.	An instruction not to cook food in an area. Example: • Posted inside a guest room in a hotel or a student room in a college dormitory.

†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
3-2.13	Area of Refuge		Square Field; White Background; Red Flame;	Identification of an area of refuge. Example: • A designated area of refuge to be used in a fire emergency.

Chapter 4 Symbols for Use by the Fire Service

4-1 Introduction.

4-1.1 Scope. This chapter presents standard referents and symbols for visually alerting fire fighters and other emergency responders during fire and related emergencies.

4-1.2 Purpose.

4-1.2.1 The purpose of this chapter is to provide uniform fire fighting symbols to improve communication whenever symbology is employed to provide information to fire fighters and other emergency responders.

4-1.2.2 This chapter provides uniformity in the selection of symbols intended to assist fire fighters in locating utilities and fire fighting equipment.

4-1.2.3* Fundamental shapes of symbols as well as background color and shape are designated in this chapter.

4-1.3* Symbol Presentation.

4-1.3.1* Symbol Shapes. Basic fundamental symbol shapes are the primary emphasis of this chapter.

4-1.3.2 Symbol Background.

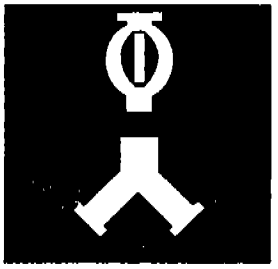
4-1.3.2.1 The symbol background shall be square.

4-1.3.2.2 The symbol background color shall be red, white, or blue as designated and shall meet the requirements of ANSI Z535.1, *Safety Color Code*, for safety red, white, or blue.

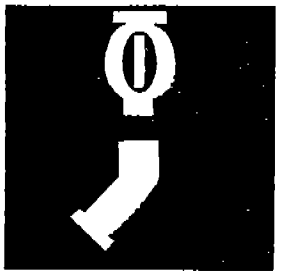
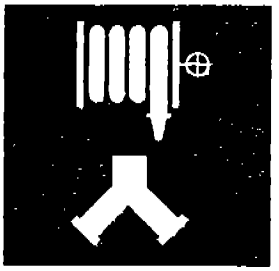
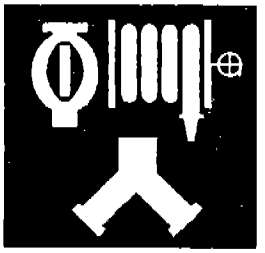
4-1.3.3 Symbol Color.

4-1.3.3.1 The symbol color shall be safety white or blue and shall meet the requirements of ANSI Z535.1, *Safety Color Code*, for safety white or blue.

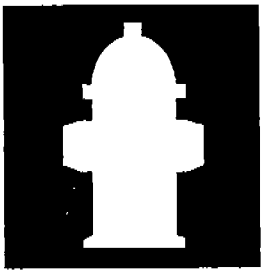
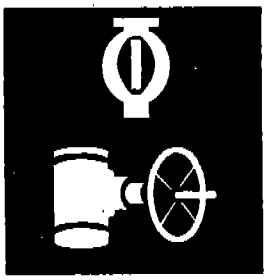
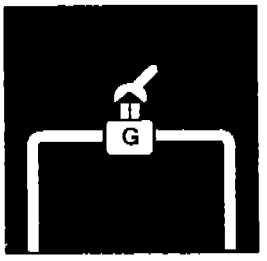
4-1.3.4 Symbol Orientation. Symbol orientation shall not be altered from that shown in this chapter.

	Referent	Symbol	Characteristics	Application†
4-2 Symbols for Use by the Fire Service.				
4-2.1	Fire Department Automatic Sprinkler Connection — Siamese		Square Field; Red Background; White Symbol.	The identification and location of a fire department automatic sprinkler connection. Examples: • The location of siamese automatic sprinkler connections on buildings. • The location of siamese free-standing automatic sprinkler connections.

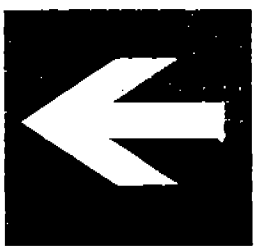
†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
4-2.2	Fire Department Automatic Sprinkler Connection — Single		Square Field; Red Background; White Symbol.	The identification and location of a fire department automatic sprinkler connection. Examples: • The location of a single automatic sprinkler connection on buildings. • The location of a single free-standing automatic sprinkler connection.
4-2.3	Fire Department Standpipe Connection		Square Field; Red Background; White Symbol.	The identification and location of a fire department standpipe connection. Examples: • The location of standpipe connections on buildings and structures. • The location of Tree-standing connections.
4-2.4	Fire Department Combined Automatic Sprinkler/Standpipe Connection		Square Field; Red Background; White Symbol.	The identification and location of a department fire combined automatic sprinkler/standpipe connection. Examples: • The location of combined sprinkler/standpipe connections on buildings. • The location of free-standing combined sprinkler/standpipe connection locations.

†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
4-2.5	Fire Hydrant (All Types)		Square Field; Red Background; White Symbol.	The identification and location of a fire hydrant. Examples: • The location of a fire hydrant, wall hydrant, underground hydrant, or other fire fighting water supply. • NOTE: The symbol can be of particular use where vehicles or snowfall frequently obscure hydrant locations.
4-2.6	Automatic Sprinkler Control Valve		Square Field; Red Background; White Symbol.	The identification and location of automatic sprinkler control valves. Examples: • The location of control valves for automatic sprinkler systems. • On doors of rooms containing control valves.
4-2.7	Electric Panel or Electric Shutoff		Square Field; Blue Background; White Symbol.	The identification and location of an electrical panel or other electric shutoff device. Example: • The location of electric panels or other electric control devices that can be located in basements or mechanical rooms.
4-2.8	Gas Shutoff Valve		Square Field; Red Background; White Symbol; Red Letter G.	The location of a gas shutoff valve. Examples: • The location of gas shutoff valve(s). • On doors of rooms containing gas shutoff valves.

†Use is not restricted to the examples cited.

	Referent	Symbol	Characteristics	Application†
4-2.9	Fire Fighting Hose or Standpipe Outlet		Square Field; Red Background; White Symbol.	The location of a fire fighting hose or a standpipe outlet. Examples: • The location of interior fire fighting hose stations and standpipe outlets in buildings and structures. • The location on bridges or elevated highways.
4-2.10	Fire Extinguisher		Square Field; Red Background; White Symbol.	The location of a fire extinguisher. Example: • The location of a fire extinguisher in buildings and exterior locations.
4-2.11	Directional Arrow		Square Field; Background (Red or Blue) to correspond to accompanying sign; White Symbol.	Direction to the location of fire fighting equipment or utility. Always used in conjunction with, and adjacent to, another symbol indicating the particular equipment or utility.
4-2.12	Diagonal Directional Arrow		Square Field; Background (Red or Blue) to correspond to accompanying sign; White Symbol.	Direction to the location of fire fighting equipment utility. Always used in conjunction with, and adjacent to, another symbol indicating the particular equipment or utility.
4-2.13	Child Care Center		Square Field; Blue Infant and Hands; White Background.	The identification and location of child care centers. Examples: • On the door opening into child care center. • At a fire department command or access point indicating presence and location of child care center.

†Use is not restricted to the examples cited.

DST FILES

1990

DST 90-1 Topsoiling Temporary Airfield Wiring & Asbestos Checklist
DST 90-2 Contractor Key Deposit 5-22-90
DST 90-3 Six Inch Bollards & Dust Control 7-31-90

1991

DST 91-1 Lead Paint Regulations 3-28-91
DST 91-2 Manhole Covers 10-3-91
DST 91-3 Americans with Disabilities Act (ADA) 12-17-91

1992

DST 92-1 Monitoring Well Permits 2-28-92
DST 92-2 Executive Order 01.01.1992.11, Building Performance Standards for State Buildings 8-17-92 (Replaced by DST 98-8)
DST 92-3 Environmental Regulation: Guide to MDE's Permitting Process 5-7-92
DST 92-4 Greiner's Invoicing Procedures 6-17-92
DST 92-5 Preformed Thermoplastic Pavement Marking System – Reviewed But Not Approved As Standard 7-17-92
DST 92-6 Asbestos Column Covers 10-30-92

1993

DST 93-1 Montgomery Escalators 2-9-93
DST 93-2 Runway 10-28 Extension Overflight During Construction 2-2-93
DST 93-3 Adoption of SHA Standard Construction Specifications for Non-Airfield Work 9-30-93
DST 93-4 ADA Ruling on Assembly Areas and Assistive Listening Devices 12-7-93

1994

DST 94-1 Adding Federal Security Manager to Attendees List 2-4-94
DST 94-2 Submission of FAA Form 7460-1 & MAA Form 010 to FAA & MAA 2-24-94
DST 94-3 Design Update to Transmit FAA Memorandum, Dated January 14, 1994
DST 94-4 Parking Facility Public Phones 4-27-94
DST 94-5 Preparation of Construction Estimates 4-27-94
DST 94-6 Maryland Department of the Environment Notice of Intent (NOI) Procedural Changes 5-18-94
DST 94-7 Satellite Dish Locations 6-24-94
DST 94-8 Ted Mathison's Title Change 10-1-94

1995

DST 95-1 Master Format 2-3-95
DST 95-2 Airport Construction Project Checklist, Division of Engineering 5-16-95
DST 95-3 Current FAA Advisory Circulars for AIP and PFC Projects - Missing

1996

DST 96-1 Fire Alarm System, Loading Bridges, and Concrete Construction
DST 96-2 FAA Eastern Region Order EA 5210.1C 2-12-96
DST 96-3 Repeal of the State Highway Administration (SHA) Highway Development Manual 3-11-96
DST 96-4 Temporary Support of Excavation 7-19-96
DST 96-5 Fire Egress Analysis 8-23-96
DST 96-6 Knox Box System 8-30-96
DST 96-7 UPS Protection 9-3-96
DST 96-8 Fire Hydrant 9-10-96 (Replaced by DST 99-08)
DST 96-9 N/A
DST 96-10 MAA Fire Alarm Issues 9-19-96

1997

DST 97-1 Jetway Systems Service Bulletin #091 1-15-97
DST 97-2 Vehicle Access on BWI Airport Movement Area 1-15-97
DST 97-2A Movement Area Driver Training Program 2-11-97
DST 97-3 Carpeting Specification for BWI 2-19-97
DST 97-4 Sewage Ejector Pit Design, BWI 2-10-97

1998

DST 98-1 New International Pier Millwork Modifications 1-13-98
DST 98-2 ???
DST 98-3 New Designation of Old Pier "E" 4-22-98
DST 98-4 CAD Standards Manual 4-24-98
DST 98-5 Federal Aviation Administration Specification Incentives 5-1-98
DST 98-6 Building Specification Format and Technical Specifications 5-12-98
DST 98-7 Underground Fuel Storage Tank System 5-20-98
DST 98-8 Building Codes 5-22-98
DST 98-9 Electronic Equipment and Building System Specifications 7-6-98
DST 98-10 Cement Treated Base Course Material 7-6-98
DST 98-11 Fire Hydrant Color (Replaced by DST 99-08)
DST 98-12 Metasys Facility Management System and Duct Liner Standards 9-1-98
DST 98-13 Restroom Paper Towel and Toilet Paper Dispensers and Trashcans 9-23-98
DST 98-14 Runway 10-28 and 15R-33L Intersection Closure 12-16-98

DST 98-15 Above Ground Glycol Storage Tank (Glycol AST) Systems (Replaced by DST 2000-08) 12-14-98

1999

DST 99-1 Aboveground Fuel Storage Tank System (AST) 10-14-98
DST 99-2 Airport Wide Standard for Interface of Fire Alarm, Life Safety, and Security Systems at BWI 11-10-98 (Amended by DST 99-04)
DST 99-3 Electrical System Ground Fault Protection 2-10-99
DST 99-4 Airport Wide Standard for Interface of Fire Alarm, Life Safety, and Security Systems at BWI – Amendment Number 1 2-10-99
DST 99-5 Certification of Fire Protection and Detection System Design 2-19-99 (Replaced by DST 99-14)
DST 99-6 Procedures for Review of Contract Documents & Shop Drawings/Submittals 3-1-99
DST 99-7 Magnetic Tape Identifier
DST 99-8 Fire Hydrants
DST 99-8A Fire Hydrants - Amendment Number 1
DST 99-9 Door Numbers
DST 99-10 Traffic Cones
DST 99-11 Design Review Committees
DST 99-12 As-Built Preparation
DST 99-13 Fabric Roll-Up Doors
DST 99-14 Certification of Fire Protection and Detection System Design
DST 99-15 Procedures for Coordination with the Maryland Department of the Environment
DST 99-16 High Structure Approval Procedure
DST 99-17 No. 2 Stone
DST 99-18 Radar Reflectors
DST 99-19 Airport Wide Standard for Interface of Fire Alarm, Life Safety, and Security Systems at BWI – Amendment Number 2

2000

DST 2000-01 Architectural Design and Specification Guidelines
DST 2000-02 Electrical Cable
DST 2000-03 Closed Transition of Substation Secondary Switches
DST 2000-04 Substation Emergency Power Quick Connect
DST 2000-05 Federal Aviation Administration Requirements for Proposed Development
DST 2000-06 Roadway and Parking Lot Light Poles and Fixtures and Airfield Ramp Lamps
DST 2000-07 Statewide Roofing Policy
DST 2000-08 Glycol Aboveground Storage Tank (Glycol AST) System
DST 2000-09 Fire Safety Symbols

BC 1.5 A/DESIGN STANDARDS-20

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

David L. Blackshear Executive Director

MEMORANDUM

TO: Distribution

FROM: Benjamin Chin, Manager
Design Services

DATE: September 20, 2000

SUBJECT: Design Standard (DST) 2000-10, Square-D Equipment

Effective immediately, all Baltimore/Washington International and Martin State Airport projects shall only specify Square-D 120/208 circuit breaker panelboards. The attached memorandum provides the justification for the No Substitution Procurement. Accordingly, "No substitutions will be accepted" shall be used when specifying Square-D circuit breaker panelboards.

If you should have any questions regarding this matter, please contact me at 410-859-7093.

BC/tmt

Attachment

Distribution:

Mr. David Benner (Urban)
Mr. Lynn Bezilla (MAA)
Mr. Ian Bricknell (TAMS)
Mr. Emory Carrigan (MAA)
Mr. Jose Chaves (MAA)
Mr. Charles Flood (MAA)
Mr. Peter Florian (PB)
Mr. Ray Heverling (MAA)
Mr. Melvin Hoefler, Jr. (MAA)
Mr. Andy Hriz (MAA)
Mr. Rogers Jewell (MAA)
Mr. Ernie Lepore (Baker)
Mr. Ali Logmanni (MAA)
Mr. David Lookenbill (JMT)
Mr. Steve Lucchesi (URS)
Ms. Suzette Moore (MAA)
Mr. Chirantan Mukhopadhyay (Parsons)
Mr. Alex Noorani (MAA)
Mr. Charles Steen (MAA)
Mr. William Tsai (MAA)
Mr. Ron Walden/Building Permit Committee (MAA)
Mr. Reginald Weaver (Baker)
Mr. Mike West (MAA)

cc: Mr. Ned Carey/Electronics Committee (MAA), w/ attachment

Parris N. Glendening
Governor

John D. Porcari
Secretary

Maryland Aviation Administration

*"To provide services to our customers and the air transportation industry
To foster and develop aviation in Maryland • To develop and empower our employees."*

David L. Blackshear Executive Director

MEMORANDUM

TO: Suzette Moore, Manager
Contract Administration
Office of Planning and Engineering

FROM: Melvin Hoefler, Jr.
Power and Distribution
Division of Maintenance

DATE: August 15, 2000

SUBJECT: Square D Breakers for Panel
Replacement Contract
No Substitution Procurement

This memorandum provides justification for the No Substitution Procurement of Square D products for the panel replacement contract number MAA-CO-00-004 and future construction contracts. Having Square D products will reduce down time for electrical circuits in two ways.

First, this product will reduce time in finding a tripped circuit. The Square D product has a red indicator on its 120/208 breakers indicating when the breaker is tripped. For troubleshooting, this is important because an electrician will not have to go to each breaker and feel to perceive if it is tripped; with the 120/208 breakers it will be clearly displayed by a red indicator. This feature is not available on other manufacturer's products.

Secondly, parts availability will be improved as most suppliers have Square-D breakers in stock. At the present time, we have seven different types of circuit breakers we have to keep in stock, none of which fits any other product. In stocking each type, we have to stock single pole, double pole, and triple pole breakers, and some manufacturers do not stock the larger breakers. This results in an unacceptable waiting period of one week or more. Square D has most of the breakers we would use available locally and the ability to order others in about a day.

The Maryland Aviation Administration (MAA) has developed contract number MAA-CO-00-004 to change all the existing panels due to their age. Some of the panels are 20 to 30 years old and their parts are in short supply. Therefore, the Division of Maintenance requests the use of Square-D in this contract and all future MAA contracts, as it is in the best interest of the State of Maryland and the Administration to begin installing this type of breaker. We are also requiring all tenants to comply. This allows the MAA to achieve compatibility of equipment and replacement parts, and reduces the amount of stock maintained.

Andrew Hriz
Director
Division of Maintenance

Stephen D. Sheehan
Associate Administrator
Office of Airport Operations

Patricia Crosby
Acting Deputy Administrator