

DoD Minimum Antiterrorism Construction Standards - Pre-Final Checklist

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD (AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. **The standards below are minimums set for DoD.**

Date:	Facility Name/Description:	Facility No. <i>(if assigned)</i>
Is This Facility New Construction?	Y	N
Is There a Controlled Perimeter?	Y	N

TRIGGERS

A MAJOR INVESTMENT	B. CONVERSION OF USE	C. GLAZING	D. BUILDING ADDITION	E. NEW/UPDATED LEASE	F. TEMPORARY STRUCTURES	G. NATIONAL GUARD BLDG	H. ON BASE TENANT
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SITE PLANNING - Standards 1 - 4

STD	REQUIREMENT	YES	NO	N/A	COMMENTS/REMARKS/NOTES
1	STANDOFF DISTANCES				
1.1	Is the facility located at least 148-ft (45m) from the installation perimeter?				
WITH A CONTROLLED PERIMETER					
1.2	Are parking lots and roadways located at least 82-ft (25m) away from the facility (billeting & primary gathering facilities)?				
1.3	Are parking lots and roadways located at least 33-ft (10m) away from the facility (inhabited facilities)?				
WITHOUT A CONTROLLED PERIMETER					
1.4	Are parking lots and roadways located at least 148-ft (45m) away from the facility (billeting & primary gathering facilities)?				
1.5	Are parking lots and roadways located at least 82-ft (25m) away from the facility (inhabited facilities)?				
1.6	Are trash containers located at least 82-ft (25m) away from the facility (billeting & primary gathering facilities)?				
1.7	Are trash containers located at least 33-ft (10m) away from the facility (inhabited facilities)?				
1.8	If the answer to any of the above is "No", has dynamic analysis of the facility been completed?				
2	UNOBSTRUCTED SPACE				
2.1	Are there any obstructions within 33-ft (10m) of the facility that would allow for concealment from observation of explosive devices 6 inches (150mm) or greater in height?				
2.2	Are enclosures within the 33-ft (10m) unobstructed space closed on all four sides and the top?				
2.3	Is the enclosure secured?				

MAJOR INVESTMENT: Implementation of these standards to bring an entire building into compliance is mandatory for all DoD building renovations, modifications, repairs, and restorations where those costs exceed 50% of the replacement cost of building except as otherwise stated in these standards. The 50% cost is exclusive of the costs identified to meet these standards. Where the 50% threshold is not met, compliance with these standards is recommended.

CONVERSION OF USE: Implementation of these standards is mandatory when any portion of a building is modified from its current use to that of an inhabited building, billeting, high occupancy family housing, or a primary gathering building for one year or more. Examples would include a warehouse (low occupancy) being converted to administrative (inhabited) use and an inhabited administrative building being converted to a primary gathering building or billeting.

GLAZING REPLACEMENT: Because of the significance of glazing hazards in blast environment, implementation of the glazing provisions of these standards is mandatory for existing inhabited buildings within any planned window or door glazing replacement project, regardless of whether that project meets the 50% cost trigger above. Such replacements may require window frame modification or replacement.

BUILDING ADDITIONS: Inhabited additions to existing inhabited buildings will comply with the minimum standards for new buildings. If the addition is 50% or more of the gross area of the existing building, the existing building will comply with the minimum standards for existing buildings in Appendix B.

LEASED BUILDINGS: DoD personnel occupying leased buildings deserve the same level of protection as those in DoD-owned buildings, implementation of these standards is therefore mandatory for all facilities leased for DoD use and for those buildings in which DoD receives a space assignment from another government agency except as established below. This requirement is intended to cover all situations, including General Services Administration space, privatized buildings, and host-nation and other foreign government buildings. This requirement is applicable for all new leases executed on or after 1 October 2005 and to renewal or extension of any existing lease on or after 1 October 2009. Leases executed prior to the above fiscal years will comply with these standards where possible.

Partial Occupancy: These standards only apply where DoD personnel occupy leased or assigned space constituting at least 25% of the net interior useable area or the area as defined in the lease, and they only apply to that portion of the building that is occupied by DoD personnel.

New Buildings: Buildings that are built to lease to DoD as the effective date established above will comply with the standards for new construction.

Existing Buildings: New leases or renewals of leases of existing buildings will trigger the minimum standards for existing buildings in accordance with the effective dates established above.

EXPEDITIONARY AND TEMPORARY STRUCTURES: Implementation of these standards is mandatory for all expeditionary and temporary structures that meet the occupancy criteria for inhabited or primary gathering buildings or billeting. See Appendix D for structure types that meet the expeditionary and temporary structures criteria.

New Structures: These standards apply to all new expeditionary sites effective immediately. **Existing Structures:** These standards will apply to all existing expeditionary activities beginning in Fiscal Year 2004. Prior to that fiscal year, existing expeditionary structures should comply with these standards where possible.

Existing Structures: These standards will apply to all existing expeditionary activities beginning in Fiscal Year 2004. Prior to fiscal year, existing expeditionary structures should comply with these standards where possible.

NATIONAL GUARD BUILDINGS: Any National Guard Buildings built that uses Federal funding for new construction, renovations, modifications, repairs, restorations, or leasing and that meets the applicability provisions above, will comply with these standards.

TENANT BUILDINGS ON DoD INSTALLATIONS: Because buildings built by tenants on DoD installations may be taken over by DoD during their life cycles, memoranda of understanding or similar agreements between DoD components and tenants will require tenant-built buildings to comply with these standards, regardless of funding source. For purpose of the standards, tenant-built building occupants will be calculated assuming that building occupants are DoD personnel.

STD	REQUIREMENT	YES	NO	N/A	COMMENTS/REMARKS/NOTES
3	DRIVE-UP/DROP-OFF AREAS				
3.1	Are drive-up/drop-off areas properly marked?				
3.2	Are procedures in place to preclude the unmonitored presence of vehicles in a drive-up/drop off area?				
3.3	Is the drive-up/drop -off area located under any inhabited portion of the facility?				
4	ACCESS ROADS				
4.1	Have controls been implemented to preclude unauthorized presence on access roads?				
STRUCTURAL DESIGN - Standards 5 - 9					
5	PARKING BENEATH BUILDINGS OR ON ROOFTOPS				
5.1	Has parking been precluded on the rooftops and under the facility?				

6 PROGRESSIVE COLLAPSE AVOIDANCE				
6.1	Are all vertical, load-carrying columns and walls able to sustain a loss of lateral support at any of the floor levels?			
6.2	Can the facility withstand a removal of one primary exterior vertical or horizontal load-carrying element without progressive collapse?			
6.3	Are floors designed to withstand a net uplift equal to the dead load plus one-half the live load?			
7 STRUCTURAL ISOLATION				
BUILDING ADDITIONS				
7.1	Are building additions structurally independent from adjacent existing buildings?			
7.2	If not, has analysis been completed which shows collapse of either the addition or the existing building will not result in collapse of the remainder of the building?			
PORTIONS OF BUILDINGS				
7.3	Are low occupancy areas of inhabited facilities designed structurally independent of the inhabited areas?			
8 BUILDING OVERHANGS				
8.1	Are restrictions in place to preclude parking or other vehicle travel under overhangs?			
8.2	Are floors of inhabited area above overhangs designed to prevent failure from the detonations of an explosive weight II?			
8.3	Is the superstructure within and adjacent to the overhang designed to the specifications in Standard 6?			
8.4	Do all building elements adjacent to the overhang area provide appropriate level of protection to explosive weight II?			
9 EXTERIOR MASONRY WALLS				
9.1	Do all external masonry walls have vertical and horizontal reinforcement distributed throughout the wall section?			
9.2	Is the vertical reinforcement ratio at least 0.05%, space no more than 4 ft (1200mm) with reinforcement within 1.3 ft (410mm) of the ends of the walls?			
9.3	Is the horizontal reinforcement ratio at least 0.025%, consisting of either joint reinforcement spaced no more than 1.3 ft (410mm), or bond beam reinforcement spaced no more than 4 ft (1200mm), with reinforcement within 1.3 ft (410mm) of the top and bottom of the wall?			

ARCHITECTURAL DESIGN - Standards 10 - 15

STD	REQUIREMENT	YES	NO	N/A	COMMENTS/REMARKS/NOTES
10	WINDOWS AND SKYLIGHTS				
10.1	Are all exterior windows and/or skylights at least 1/4-in (6mm) laminated glass consisting of two nominal 1/8-in (3mm) annealed glass panes bonded together with a minimum of a 0.030-in (0.75mm) polyvinyl-butryral (PVB) interlayer?				
10.2	Are windows and skylight frames created from aluminum or steel?				
10.3	Do framing members restrict deflections of edges of the blast resistant glazing they support to 1/160 of the length of the supported edge at allowable stress levels under equivalent 3-second design loading?				
10.4	<i>(Leased Facilities)</i> Do windows retrofit (e.g. fragment retention film or blast curtains) provide an equivalent level of protection as laminated windows?				
11	BUILDING ENTRANCE LAYOUT				
11.1	<i>(New Bldgs)</i> Does the main entrance to the facility face away from the perimeter or other uncontrolled vantage points with direct lines of sight?				
12	EXTERIOR DOORS				
12.1	Do all exterior doors open outwards?				
12.2	Does glazing in doors meet the glazing and frame bite provisions of Standard 10?				
12.3	Are doors positioned such that they will not be propelled into rooms if they fall in response to a blast?				
13	MAIL ROOMS				
13.1	Is the mail room located on the perimeter of the facility?				
13.2	Is the mail room located away from heavily populated portions of the facility?				
13.3	Is the mail room well sealed between its envelopes and other portions of the building?				
13.4	Are mail room walls of full height construction that fully extends and is sealed to the undersides of the roof, floor above them, or to hard ceilings (i.e. gypsum wallboard ceiling)?				
13.5	Do doors have weather stripping on all four edges?				

14	ROOF ACCESS				
14.1	(New Bldgs) Has roof access been limited to controlled internal access?				
14.2	(Existing Bldgs) Has the exterior roof access been secured with a locked cage or similar mechanism?				
15	OVERHEAD MOUNTED ARCHITECTURAL FEATURES				
15.1	Are overhead-mounted features weighing 31-lbs (14kg) or more mounted to resist forces of 0.5 times their weight in any horizontal direction and 1.5 times their weight in the downward direction?				
ELECTRICAL AND MECHANICAL DESIGN - Standards 16 - 22					
STD	REQUIREMENT	YES	NO	N/A	
16	AIR INTAKES				
16.1	Are outside air intakes located at least 10-ft (3m) above the ground?				
17	MAIL ROOM VENTILATION				
17.1	Does the mail room have a separate, dedicated air ventilation system?				
17.2	Does the mail room have a dedicated exhaust system?				
17.3	Does the mail room have ventilation system outside air intakes, relief air, and exhausts with low leakage isolation dampers?				
17.4	Can they be automatically closed to isolate the mail room?				
17.5	Do the low leakage dampers have a maximum leakage rate of 3 cfm/sq-ft with a differential pressure of 1in of water gage across the damper?				
18	EMERGENCY AIR DISTRIBUTION SHUTOFF				
18.1	Does the facility have an emergency shutoff switch in the HVAC control system that can immediately shut down the air handling system throughout the building?				
18.2	Is the switch(s) located where they are easily accessible by the facility management?				
18.3	Do all outside air intakes have relief air and exhaust openings with low leakage dampers that are automatically closed when the emergency air distribution shutoff switch is activated?				
18.4	Do the low leakage dampers have a maximum leakage rate of 3 cfm/sq-ft with a differential pressure of 1in of water gage across the damper?				
18.5	Do critical area air handling units close with low leakage isolation dampers?				

19	UTILITY DISTRIBUTION AND INSTALLATION				
19.1	Are critical or fragile utilities routed so that they are not on the exterior walls or on walls shared with mail room?				
19.2	Where required, are redundant utilities run in separate chases?				
19.3	When required, are emergency backup systems located away from system components for which they provide backup?				
20	EQUIPMENT BRACING				
20.1	Are all equipment mountings designed to resist forces 0.5 times the equipment weight in any horizontal direction and 1,5 times the equipment weight in the downward direction?				
21	UNDER BUILDING ACCESS				
21.1	Are crawl spaces, utility tunnels, and other means of under building access controlled?				
22	MASS NOTIFICATION				
22.2	Does the capability exist to provide real-time info to building occupants during emergency situations?				

ADDITIONAL NOTES

Verification of these items has been made by me or under my supervision and they conform to the DoD minimum antiterrorism standards for buildings, except where noted herein or on other supporting documents.	Verification of these items has been made by me or under my supervision and they conform to the DoD minimum antiterrorism standards for buildings, except where noted herein or on other supporting documents.
Signature of Civil Engineer Representative:	Signature of Antiterrorism Representative:
Typed Name and Title:	Typed Name and Title:

RECOMMENDED ADDITIONAL ANTITERRORISM MEASURES FOR NEW AND EXISTING BUILDINGS

SITE PLANNING. The following additional measures , if implemented , will significantly enhance site security with little increase in cost and should be considered for all new and existing inhabited buildings.

Recommendation 1. Vehicle Access Points. The first line of defense in limiting opportunities for aggressors to get vehicles close to DoD buildings is at vehicle access points at the controlled perimeter, in parking areas, and at drive-up/drop-off points. Keep the number of access points to the minimum necessary for operational or life safety purposes. This will limit the number of points at which access may have to be controlled with barriers and/or personnel at increased Force Protection Conditions or if the threat increases in the future.

Recommendation 2. High-Speed Vehicle Approaches. The energy of a moving vehicle increases with the square of its velocity; therefore, minimizing a vehicle's speed allow the vehicle barriers to be lighter and less expensive should vehicle barrier ever become necessary. To facilitate reductions in vehicle speeds in the future, ensure there is no unobstructed vehicle approaches perpendicular to inhabited buildings at the requires parking and roadway standoff distances.

Recommendation 3. Vantage Points. Vantage points are natural or man-made positions from which potential aggressors can observe and target people or other assets in and around buildings. Identify points outside the control personnel in targeted buildings and either eliminate them or provide means to avoid exposure to them. Means to avoid exposure may include actions such as reorienting buildings or shielding people or assets in and around them using such measures as reflective glazing, walls, privacy fencing, or vegetation.

Recommendation 4. Drive-up/Drop-off Areas. Locate these areas away from large glazed areas of buildings to minimize the potential for hazardous flying glass fragments in the event of an explosion. For example, locate the lane at outside corners of buildings or otherwise away from main entrances. Coordinate the drive-up/drop-off points with building geometries to minimize the possibility that explosive blast forces could be increased due to being trapped or otherwise concentrated. For further discussion of this issue, refer to the *DoD Security Engineering Facilities Design Manual*.

Recommendation 5. Building Location. Activities with large visitor populations provide opportunities for potential aggressors to get near buildings with minimal controls, and therefore, limit opportunities for early detection. To limit those opportunities, maximize separation distance between inhabited buildings and areas with large visitor populations.

Recommendation 6. Railroad Location. Avoid sites for inhabited building that are close to railroads. Where railroads are in the vicinity of existing buildings, provide standoff distances between the railroad and any inhabited buildings based the standoff distances and explosive weights associated with controlled perimeters in Table B-1. Where those standoff distances are not available, and since moving existing railroads may be difficult and prohibitively expensive, ensure that there are procedures in place to prohibit trains from stopping in the vicinity of inhabited buildings.

Recommendation 7. Access Control for Family Housing. For new family housing areas, provide space for controlling access at the perimeter of the housing area so that a controlled perimeter can be established there if the need arises in the future.

Recommendation 8. Standoff for Family Housing. For new family housing construction, maintain a standoff distance of 82ft (25m) from the installation perimeters and roads, streets, or highways external to housing areas.

Recommendation 9. Minimize Secondary Debris. To reduce the hazard of flying debris in the event of an explosion, eliminate unrevetted barriers and site furnishings in the vicinity of inhabited structures that are accessible to vehicle traffic. Revet exposed barriers and site furnishings near inhabited buildings with a minimum of 3ft (1m) of soil or equivalent alternative techniques to prevent fragmentation hazards associated with destruction of the barriers in events of an explosion.

Recommendation 10. Building Separation. This recommendation applies to new buildings and is established to minimize the possibility that an attack on one building causes injuries or fatalities in adjacent buildings. The separation distance is predicted on the potential use of indirect fire weapons such as those containing explosives equivalent to explosive weight III in Table D-1.

Primary Gathering Buildings, Billeting, and High Occupancy Family Housing. For all new billeting, high occupancy family housing, and primary gathering buildings, ensure that all adjacent inhabited buildings are separated from those buildings by at least 10 meters. Where it is necessary to encroach on those building separations, analyze the buildings and provide hardened buildings components as necessary to mitigate the effects of the indirect fire weapons equivalent to those identified as explosive weight III in Table D-1 to the low level of protection. Levels of protection are described in Table 2-1 and in UFC 4-020-01. The indirect fire weapon should be assumed to detonate at a distance from the target building of one-half of the separation distance.

Other Inhabited Buildings. There are no minimum separation distances recommended for antiterrorism purposes for inhabited buildings other than billeting, high occupancy family housing, and primary gathering buildings.

STRUCTURAL AND ARCHITECTURAL DESIGN. The following additional measures, if implemented, will significantly enhance building occupants' safety and security with little increase in cost. Consider these measures for all new and existing inhabited buildings.

Recommendation 11. Structural Redundancy. Unexpected terrorist acts can result in local collapse of building structural components. To limit the extent of collapse of adjacent components, utilize highly redundant structural systems such as movement resisting frames, detail connections to provide continuity across joints equal to the full structural capacity of connected members, and detail members to accommodate large displacements without complete loss of strength. This recommendation is consistent with paragraph B-2-1 (Standard 6) for preventing progressive collapse, but recommends selection of certain structural systems and greater attention to details.

Recommendation 12. Internal Circulation. Design circulation within buildings to facilitate visual detection and monitoring of unauthorized personnel approaching controlled areas or occupied spaces.

Recommendation 13 . Visitor Control. Controlling visitor access maximizes the possibility of detecting potential threatening activities. Keep locations in buildings where visitor access is controlled away from sensitive or critical areas, areas where high-risk or mission-critical personnel are located, or other areas with large population densities of DoD personnel.

Recommendation 14. Asset Location. To minimize exposure to direct blast effects and potential impacts from hazardous glass fragments and other potential debris, locate critical assets and mission-critical or high-risk personnel away from the building exterior.

Recommendation 15. Room Layout. In rooms adjacent to the exterior of the building, position personnel and critical equipment to minimize exposure to direct blast effects and potential impacts from hazardous glass fragments and other potential debris.

Recommendation 16. External Hallways. Since doors can become hazardous debris during explosive blast events, doors designed to resist blast effects are expensive, and because external hallways have large numbers of doors leading into inhabited areas, avoid exterior hallway configurations for inhabited structures.

Recommendation 17. Windows. To minimize the potential for glazing hazards, minimize the size and number of windows for new construction.