**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS AIR FORCE SAFETY CENTER**

MEMORANDUM FOR ALMAJCOM/SE
USCENTAF/SE

DEC 2003

FROM: HQ AFSC/SEW
9700 G Avenue, SE
Kirtland AFB NM 87117-5670

SUBJECT: AFSC/SEW Policy #2003-4, Updated Paragraph 3.18 and Corrected Values for Table 3.13

The following two changes to AFMAN 91-201, Explosives Safety Standards (18 Oct 01), is effective immediately:

1. Paragraph 3.18. Warehouses. Facilities related to the PES: As a minimum, these facilities will be separated by the applicable unbarricaded, intermagazine distance. When the warehouse is used for non-munitions WRM (trailers, etc) use IL. Separation by PTR or IB distance should be used, when possible, to further limit damage or loss of assets. Facilities unrelated to the PES, or accessed by personnel unrelated to the PES: If a structure is involved, minimum separation is incremental inhabited building distance; if no structure is involved, minimum separation is incremental PTR.

2. Replace Table 3.13 with the attached table. An Excel spreadsheet titled Table 3.13 Formulas is available at: http://afsafety.af.mil/AFSC/RDBMS/Weapons/oteam_site_planning.htm#tools for interpolations.

The above requirements will be incorporated into the next revision to AFMAN 91-201. My POC is Lea Ann Cotton, lea.cotton@kirtland.af.mil, DSN 246-1395.

Mark V Brooks
For DANIEL T. TOMPKINS, Colonel, USAF
Chief, Weapons Safety Division

Attachment:
Hazard Division 1.3 Table

**Table 3.13. Hazard Class/Division 1.3 and 1.2.3 Separation Distances.** [(4)(5)(6)(7)(8)(9)]

| NEWQD (lbs) | ABOVEGROUND IBD & PTRD (ft) [1] | ABOVEGROUND IMD & ILD (ft) [2] | NEWQD (lbs) | ABOVEGROUND IBD & PTRD (ft) [1] | ABOVEGROUND IMD & ILD (ft) [2] |
|---|---|---|---|---|---|
| ≤ 1,000[3] | 75 | 50 | 70,000 | 268 | 181 |
| 1,500 | 82 | 56 | 100,000 | 300 | 204 |
| 2,000 | 89 | 61 | 150,000 | 346 | 234 |
| 3,000 | 101 | 68 | 200,000 | 385 | 260 |
| 5,000 | 117 | 80 | 300,000 | 454 | 303 |
| 7,000 | 130 | 88 | 500,000 | 569 | 372 |
| 10,000 | 145 | 98 | 700,000 | 668 | 428 |
| 15,000 | 164 | 112 | 1,000,000 | 800 | 500 |
| 20,000 | 180 | 122 | 1,500,000 | 916 | 572 |
| 30,000 | 204 | 138 | 2,000,000 | 1,008 | 630 |
| 50,000 | 240 | 163 | | | |

**NOTES:**

1. The same distances are used for IBD and PTRD. NEWQD in lbs, d in ft

NEWQD ≤ 1,000 lbs: $d_{IBD,PTRD} = 75$

1,000 lbs < NEWQD ≤ 96,000 lbs:

$$d_{IBD,PTRD} = \exp[2.47 + 0.2368*(\ln(NEWQD)) + 0.00384*(\ln(NEWQD))^2]$$

with a minimum distance of 75 ft

96,000 lbs < NEWQD ≤ 1,000,000 lbs:

$$d_{IBD,PTRD} = \exp[7.2297 - 0.5984*(\ln(NEWQD)) + 0.04046*(\ln(NEWQD))^2]$$

NEWQD > 1,000,000 lbs: $d_{IBD,PTRD} = 8*NEWQD^{1/3}$

75 ft ≤ $d_{IBD,PTRD}$ ≤ 296 ft: $NEWQD = \exp[-30.833 + (307.465 + 260.417*(\ln(d_{IBD,PTRD})))^{1/2}]$

with a minimum NEWQD of 1,000 lbs

296 ft < $d_{IBD,PTRD}$ ≤ 800 ft: $NEWQD = \exp[7.395 + (-124.002 + 24.716*(\ln(d_{IBD,PTRD})))^{1/2}]$

800 ft < $d_{IBD,PTRD}$: $NEWQD = d_{IBD,PTRD}^3/512$

2. The same distances are used for IMD and ILD. NEWQD in lbs, d in ft

NEWQD ≤ 1,000 lbs: $d_{IMD,ILD} = 50$

1,000 lbs < NEWQD ≤ 84,000 lbs:

$$d_{IMD,ILD} = \exp[2.0325 + 0.2488*(\ln(NEWQD)) + 0.00313*(\ln(NEWQD))^2]$$

with a minimum distance of 50 ft

84,000 lbs < NEWQD ≤ 1,000,000 lbs:

$$d_{IMD,ILD} = \exp[4.338 - 0.1695*(\ln(NEWQD)) + 0.0221*(\ln(NEWQD))^2]$$

1,000,000 lbs < NEWQD: $d_{IMD,ILD} = 5*NEWQD^{1/3}$

50 ft ≤ $d_{IMD,ILD}$ ≤ 192 ft: $NEWQD = \exp[-39.744 + (930.257 + 319.49*(\ln(d_{IMD,ILD})))^{1/2}]$

with a minimum NEWQD of 1,000 lbs

192 ft < $d_{IMD,ILD}$ ≤ 500 ft: $NEWQD = \exp[3.834 + (-181.58 + 45.249*(\ln(d_{IMD,ILD})))^{1/2}]$

500 ft < $d_{IMD,ILD}$: $NEWQD = d_{IMD,ILD}^3/125$

3. For quantities less than 1,000 lbs, the required distances are those specified for 1,000 lbs. The use of lesser distances may be approved when supported by test data and/or analysis.

4. List of items (examples only): Military pyrotechnics; solid propellants in bulk, in containers, or in ammunition items; and nontoxic chemical ammunition.

5. For reasons of operational necessity, limited quantities of items in this hazard division, such as document destroyers, signaling devices, riot control munitions and the like, may be stored without regard to quantity-distance in accordance with fire protection regulations in facilities such as hangars, arms rooms, and operating buildings.

6. Earth-covered buildings may be used to their physical capacity for this hazard division provided they comply with the construction and siting requirements of Chapter 3 for HC/D 1.1. Earth-covered magazines used to store only HC/D 1.3 items must be sited for a minimum of 100 lbs of HC/D 1.1 item.

7. See Table 3.11 for HC/D 1.2.3 IMD guidance. PTR and IL for HC/D 1.2.3 are computed as 60% and 36% of the determined IBD, with a minimum distance equal to IMD based on Table 3.11. IBD for HC/D 1.2.3 is determined for the NEWQD of the item multiplied by the number of rounds present, but with a minimum IBD determined as follows:

(a) If the items are in a heavy structure capable of stopping the primary fragments, the minimum IBD is the hazardous debris distance given in Table 3.9 for an MCE equal to the NEWQD of the greatest single round. A heavy structure is defined as a structure with wall thickness $\geq$12 inches of reinforced concrete and a roof thickness >5.9 inches of reinforced concrete.

(b) If the items are in a structure that can contribute to the debris hazard the minimum IBD applied is the greater of either the debris distance given in Table 3.9 for an MCE equal to the NEWQD of the greatest single round or parenthetical (xx) fragment distance assigned to the HC/D 1.2.3 item to be stored. All structures are assumed to create building debris unless an engineering analysis shows debris will not go beyond a lesser distance

(c) If the items are in the open the minimum IBD is the greatest parenthetical (xx) fragment distance assigned to the HC/D 1.2.3 item to be stored.

8. See paragraph 2.41, *Multicube or Segregated Magazines,* for special considerations when storing limited amounts of explosives.

9. See Table 3.12 for side and rear exposures of igloos (HC/D 1.2.3 only).