Table 1
Lead exposure limits

Personnel Exposure Limits for Intermittent Atmospheric Lead Exposures		
Airborne lead concentrations (mg/m3)	Maximum hours of allowable exposure per day	
	Firing 30 or more days per year	Firing less than 30 days per year
0.0 - 0.03	8	8
0.03 - 0.04	6	8
0.04 - 0.05	4-1/2	8
0.05 - 0.06	4	6-1/2
0.06 - 0.08	3	5
0.08 - 0.10	2-1/4	4
0.10 - 0.15	1-1/2	2-1/2
0.15 - 0.20	1	2
0.20 - 0.30	3/4	1-1/4
0.30 - 0.40	1/2	1
0.40 - 0.50	1/2	3/4
0.50 - 0.75	1/4	1/2
0.75 - 1.00	1/4	1/4
1.00	0	0

BY ORDER OF THE SECRETARY OF THE ARMY:

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Administrative Assistant to the
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INITIAL INSPECTION CHECKLIST FOR INDOOR RANGES

For use of this form, see HQDA LTR 385-91-1; the proponent agency is OCSA

On ranges built prior to May 1980, firing is limited to M16 and .22 caliber adapter and .22 caliber pistols and revolvers. On ranges built to the May 1980 Kansas City Corps of Engineers drawing and specifications or later OCE design, firing is limited to M16, .38 caliber wadcutter and .45 caliber service ammunition. **FIRING OF MAGNUM CARTRIDGES IN RIFLES OR HANDGUNS IS PROHIBITED. If the answer to a particular item is Yes, check Safe.**

	YES	NO	SAFE	LIMITED	UNSAFE
1. Range was built, month_____ year_____.					
a. If after May 1980 and to an approved Corps of Engineer design, place an X in *Safe*.					
b. If built before May 1980, place an X in *Limited*.					
2. Range has an operational ventilation system:					
a. Make-up air inlets are provided and all are behind the firing line. If not provided, check *No* and *Unsafe*.					
b. Air velocity at the firing line is 50-75 fpm for ventilation systems exhausting 100% at the bullet trap. If *No*, check *Limited*.					
c. Downrange volume of air being moved is 35 cfm or greater with no observable turbulence. If *No*, check *Limited*.					
d. Exhaust air exceeds make-up air, range is maintained at a negative pressure. If *No*, check *Limited*. If exhaust is not working, check *Unsafe*.					
e. Make-up air and exhaust systems are electrically interlocked. If *No*, check *Limited*.					
f. If Limited has been checked any one or more of 2b, c, d, or e: has lead sampling been accomplished? If *No*, sample ASAP using the guidance contained in Section 3 according to the frequency specified in 29 CFR 1910.1025(d).					
3. Range has a working target retrieval system. If *No*, check *Limited*.					
4. Bullet stop is made of steel. If any material other than steel, check *Unsafe*.					
5. Steel bullet stop is in good condition, not bowed or pitted.					
NOTE: If it appears punctures *(holes)* in the backstop are caused by authorized weapons/ammunition, thickness of steel should be checked against bullet stop specifications.					
If it appears holes are caused by overshooting the range by use of large and higher velocity cartridges than those authorized, this indicates lack of range discipline.					
If the possibility exists of shooting through the bullet stop and building walls, floor, or ceiling, firing will be prohibited immediately until the limiting condition can be corrected.					
6. Range has a venetian-blind type bullet stop and forward edges of steel plates are maintained knife-sharp to prevent ricochets. If *No*, check *Limited*.					
7. Windows and/or door openings in front of the firing line are locked, barred, or protected. If *No*, check *Limited* or *Unsafe* as appropriate.					

8. List any other building envelope structural deficiencies that limit the use of the range or make it unsafe for use.

CLASSIFICATION and Comments: Based upon the above findings, this range is classified as:

UNSAFE - Any X in this category.
LIMITED - Any X in this category limits use to conditions that must be specified.
SAFE - ONLY X's in this category. Range is considered safe for all authorized firing.

DETAILED INSPECTION CHECKLIST FOR INDOOR RANGES

For use of this form, see HQDA ETR 385-91-1. The proponent agency is OCSA

SECTION I - BUILDING ENVELOPE

	YES	NO	REMARKS
1. Width of firing lanes is adequate *(a minimum of 4 feet to fire rifle and/or pistol). (Noncritical but may present some operational problems particularly when firing in the prone position.)*			
2. Single steel plate bullet stop with sand type trap *(plate/sand trap)* set at an angle of 45° (+ or -5°) from the vertical and inclined forward towards the firing line. *(Critical only if it appears backspatter of lead particles occurs all the way back to the firing line.) (.22 Caliber firing (std))*			
3. Escalator bullet stop is set at an angle of 30° from the horizontal. *(Criticality as discussed in para 2 above.) (M16 firing)*			
4. Thickness of steel plate/sand trap type bullet stop is adequate to attenuate the maximum caliber of ammunition authorized to be fired on the range. *(Critical only if bullet stop is damaged to the point where repair/replacement is necessary.*			

DIMENSIONS OF ARMOR BACKSTOPS, SIDE PLATES AND BAFFLING PLATES

Caliber *(up to)*	Thickness of Backstops *(minimum)*	Thickness of Side Plates *(minimum)*	Thickness of Steelplate in Baffling
.22 S/LR	1/4" @ 45°	3/16"	3/16" @ 30°
.38 wadcutter	3/8" @ 45°	1/4"	1/4" @ 30°
.45	1/2" @ 45°	3/8"	3/8" @ 30°
5.56mm *(M193)*	5/8" steel plate w/8" reinforced concrete	3/8"	3/8" @ 30°
5.56mm *(M855)*	1" hardened steel plate permanently affixed to backstop w/1" armor plate facing	armor plate 1"	armor plate @ 30°

	YES	NO	REMARKS
5. Plate/sand trap type bullet stop is properly installed and joints and edge lines backed with a continuous 1/4" thick steel backing plate 4 inches in width or wider. *(Critical if missing and joints and edge lines show signs of bullet damage.)*			
6. Plate/sand trap bullet stop is suspended by angle braces faced with wood to prevent ricochet or backspatter. *(Critical only if braces show signs of bullet damage.)*			
7. Bullet stop sidewalls are of steel or covered with steel plate. *(Critical only if there is evidence of plate being punctured by bullets.)*			
8. Plate/sand trap type sideplates extend vertically downward from the top edge of the bullet stop to the bottom of the sandpit to the bottom rear edge of the bullet stop. *(Critical to protect building and adjacent areas.)*			
9. Sideplates extend vertically downward from the top edge of the bullet stop to the bottom rear edge of the bullet stop. *(Critical to protect building and adjacent areas.)*			
10. In high ceiling buildings where the plate/sand trap type of bullet stop has been installed, the rear wall above the stop is lined with 2" of wood *(or 2 sheets of 3/4" plywood over a 1/8" steel plate to prevent shooting through the rear wall).*			
11. Pitted or bowed steel bullet stop plates are repaired by cutting out the damaged piece and welding in a new piece. *(Critical to the extent that this condition may result in ricochet, backspatter, or damage to the building walls.)*			
12. Welds are ground smooth to prevent backspatter. *(Self-explanatory, also should prolong life of the weld.)*			
13. Forward leading edges in a louvre or venetian-blind type of bullet stop are maintained "knife-sharp" to prevent ricochet. *(Critical where leading edges are blunted and cause ricochets or backspatter.)*			

SECTION I - BUILDING ENVELOPE *(Continued)*

	YES	NO	REMARKS
14. On a plate/sand trap type of range, targets are not suspended in front of plate seams or welds. *(Noncritical, except where seam/weld is damaged.)* Reposition, relocate to correct.			
15. On ranges constructed prior to 1980, pipes, conduit, lights, lighting fixtures and other projecting surfaces in front of the firing line are baffled or covered with 3/4-inch plywood. *(Critical to protect items mentioned above and reduce maintenance costs.)*			
16. Side wall windows or doors in front of the firing line are bricked in, baffled or otherwise protected with wood or steel. *(To prevent shooting outside of the building.)*			
17. On plate/sand type ranges, width of sandpit is determined to be adequate by dropping a plumb line from the edge of the bullet stop to the floor. *(Necessary to prevent damage to the floor.)*			
18. Special Situation Type Comments:			
a. Range floor is constructed of wood and there is a room below, the floor in front of the firing line for at least 8 feet is covered with steel plate of 3/16-inch minimum thickness for .22 caliber and 1/4-inch for .38 and .45 caliber ranges. *(Where used, steel plate must be covered with a non-skid composition floor covering such as linoleum.)*			
b. Wooden floor at firing line is covered with a non-skid composition floor covering to prevent powder from accumulating in cracks and presenting a fire hazard.			
c. Wooden ceiling is protected for 10 feet in front of *(extending from the firing line to the first baffle)* and 10 feet in back of firing line with 3/16" steel plate covered with 2" douglas fir planking or one sheet of 3/4" douglas fir plywood for .22 caliber and 1/4" steel plate for .38 and .45 caliber faced with 2 inches of douglas fir planking or 2 sheets of 3/4" plywood. *(Mandatory - where applicable.)*			
d. Ceiling baffles are constructed and positioned properly to prevent shooting into the ceiling. *(Mandatory where ceiling design only utilizes one ceiling target light and no ceiling baffles.)*			
e. Ceiling baffles are placed so they do not restrict vision or interfere with operation of the target carrier system. *(Self explanatory.)*			
f. Partitions or baffles extending from floor to ceiling between firing positions are used only when all positions are visible from the control point. *(Mandatory, but generally applies to the older ranges.)*			
19. Plate/sand trap type range - sandbagging, heavy padding or other means are used on the back of the bullet stop to reduce impact noise.			
20. Range illumination eliminates undesirable contrasts between bright target and dark surroundings. Fifty foot candles or better are desired. *(Desirable, but noncritical.)*			
21. Lower edges of overhead lighting protection baffles do not interfere with shooters' seeing uprange. *(CRITICAL - shooters cannot hold a correct sight picture if they must bend over to see under the baffles. Applies to handgun and off-hand rifle shooting.)*			
22. On pistol ranges, center of target is on a line extended 5% above firing position to and through the target. *(Noncritical but a height below or above this makes it more difficult to hit the target.)*			
23. On rifle and pistol ranges, target heights of 18" and 5' are provided. *(Noncritical but desirable.)*			
24. Target holders are constructed of round bar metal stock without any flat surfaces exposed to the firing line. *(Exposed flat surfaces can cause ricochet or backsplatter.)*			
25. Targets are numbered to coincide with numbered firing positions. *(Essential to ensure firing on proper target.)*			
26. Range is equipped with floor drain and trap to facilitate cleaning by wet methods.			

SECTION II - ENVIRONMENTAL CONSIDERATIONS

	YES	NO	REMARKS
27. An industrial hygienist has determined that the installed ventilation system is acceptable. This determination shall be based on measurement of exhaust and supply air volumes, air velocity at the firing line, downrange transport velocity, and observation of turbulent flow.			
NOTE: When ventilation is inadequate, the range must be closed or exposure controlled per Table of Lead Exposure Limits until corrective action can be taken.			
28. Personnel assigned or detailed to work in the firing range on a permanent basis are enrolled in a Medical Surveillance Program and in a Hearing Conservation Program.			
NOTE: Personnel will not be permitted to work in firing range unless the foregoing medical requirements are satisfied.			

SECTION III - OPERATIONAL SURVEY

	YES	NO	REMARKS
29. Plate/sand trap type bullet stop has a layer of clean sand used to catch deflected lead 6" to 8" deep running the width and in front of the stop. *(Required to attenuate bullets, prevent ricochet and backspatter.)*			
30. Sand is screened regularly to remove lead and reduce the possibility of backspatter. Lead analysis is required before disposal of sand. *(Frequency of firing will determine amount of lead bullet-mass buildup and frequency of cleaning required.)*			
31. When using a sand-filled "crib" type of bullet stop, slope is maintained at a 1:1 slope ratio. *(This will provide best bullet attenuation.)*			
32. Door openings into the range *(from the outside or adjacent rooms)* in front of the firing line are secured from the inside to prevent personnel from entering while firing is in progress. *(MANDATORY from a life safety standpoint. Where possible, doors should be locked/secured and keys controlled.)*			
33. Ventilation system is in operation when range is in use and during cleanup. *(MANDATORY - no exceptions.)*			
34. Cleaning of the range is accomplished by vacuuming or wet methods. HEPA filters are required on vacuum cleaners. *(Dry cleaning methods, i.e., use of a hand broom, with or without sweeping compound, are prohibited.)*			
35. Personnel assigned or detailed to work in the range are required to wear a NIOSH approved respirator *(for the removal of lead dust and fumes)* while cleaning, repairing, or reclaiming lead from the bullet trap. *(MANDATORY - TB MED 502, 15 February 1982, Occupational and Environmental Health, Respiratory Protection Program, Table 2, Part 1, Dust, Fume, and Mist Respirators, lists respirators and filters suitable to provide protection against lead exposure.)*			
36. Smoking and/or the consumption of food/beverages in the range is prohibited to preclude the ingestion of lead into the body. *(Should be included in prefiring orientation and appropriate signs should be posted.)*			
37. Firers are advised to wash hands thoroughly after firing.			
38. All personnel permitted in the range during weapons firing are required to wear appropriate hearing protection devices, i.e., firers, coaches, spectators *(where permitted)* and assigned/detailed operating personnel. *(Failure to comply is basis for removal from range.)*			
39. Personnel assigned to, or employed full-time at the range, are enrolled in a hearing conservation program *(TB MED 501)*. *(MANDATORY - base level audiogram must be made prior to beginning work in the range and periodically as prescribed by the Support Activity Command Surgeon.)*			
40. All drapery has been removed from firing range. *(Noise attenuation capability of drapery is questionable, and it collects lead dust.)*			

SECTION III - OPERATIONAL SURVEY *(Continued)*

	YES	NO	REMARKS
41. Range signs are posted denoting caution in handling weapons and stating the conditions under which the range may be used *(to include weapons and ammunition authorized to be fired). (MANDATORY)*			
RANGE SIGNS			
a. An easily read "Caution" sign will be prominently posted near the firing line of each indoor range. The color, size, and design of the sign will conform to guidance provided in AR 385-30.			
b. The sign will carry the following message with wording modified, as appropriate, for caliber of ammunition and types of weapons authorized:			
CAUTION! USE OF THIS RANGE FACILITY IS RESTRICTED TO SUPERVISED FIRING WITH *(Select from the following: RIFLE CAL. 22; PISTOL CAL. 22; PISTOL CAL. 38; PISTOL CAL. 45)* WITH SOFT NOSED LEAD OR LEAD ALLOY AMMUNITION ONLY.			
c. Large numbers, indicating target position, will be painted on the top of the steel plate bullet stop above the top target position, or painted on wooden boards installed above the top of the bullet stop plate, or painted on front backing material above the targets.			
d. Signs specifying who may use the range, under what conditions, and under what controls will be posted.			
42. Signs are posted requiring all personnel to wear hearing protection. *(MANDATORY)*			
43. Quick-draw type firing and/or hip shooting is prohibited. *(MANDATORY)*			
44. Only authorized paper targets are used. *(Use of nonstandard targets can produce ricochets.)*			
45. Where space permits and spectators are authorized, they are physically separated by a railing from the firing line. *(MANDATORY to preclude any interference with firing controls.)*			

SECTION IV - REMARKS

46. NAME OF INSPECTOR	47. DUTY STATION
48. TITLE AND GRADE OF INSPECTOR	
49. SIGNATURE OF INSPECTOR	50. DATE