STATIONARY INFANTRY TARGET (SIT)

SIT Emplacement

General: The standard SIT emplacement utilizes a concrete emplacement with a geotextile/gravel drainage layer, a treated railroad tie front wall protection, and a protective earthen berm. Installations may prefer other materials, which are acceptable as long as compatibility with target equipment, equipment protection, and durability issues are satisfied. Low rounds are normally captured by the compacted earthen berm. All permanent electrical and communication boxes are to be mounted on the front wall of the emplacement; these boxes shall be mounted no higher than 50 mm (2") from the top of the emplacement wall. This mounting height should protect them from rounds that might skim over the top lip of the emplacement. The target mechanism will be located on the floor of the concrete emplacement as far forward as practical to minimize its potential to be hit by a low round, yet still allow access to the electrical/data boxes. SITs can be placed above or below grade. See the Civil and Electrical Details in the Appendix of this document.

Below-Grade Emplacement: The utilization of below-grade emplacements is optimal. They blend with the natural terrain, and do not present an anthill profile to the soldier/firer. Unfortunately, below-grade emplacements present several design issues:

a. Drainage: On flat or down-slope emplacements, a lower elevation to drain the emplacement must be available nearby; on up-slope emplacements, provisions must be made to prevent natural slope drainage from entering the emplacement. It is difficult with below-grade emplacements to achieve positive drainage.

b. Unexploded Ordnance (UXO): Disturbance potential increases with the depth of excavation; while an above-grade emplacement might only require disturbing the surface to 150mm (6 inches) below natural grade, a below-grade emplacement will require approximately 1 meter of excavation.

c. Line-of-Sight (LOS): LOS between the soldier/firer and the target emplacement may not be possible utilizing the natural terrain.

d. Other Debris: Below-grade emplacements will also gather sand, dirt, trash, and any wind blown objects which can cause maintenance problems. Some installations have installed covers to help keep debris from accumulating in the emplacement. Coordinate with the installation Range Office for adjustments to the emplacement to facilitate debris accumulation prevention.

Above-Grade Emplacement: Above-grade emplacements are more common in range construction due to their ease of drainage, obtaining line-of-sight, and small

disturbance to the existing grade. The disadvantage of an above-ground emplacement is the target emplacement profile easily recognized by the soldier/firer.

The designer should discuss with the Installation whether they desire above- or below- grade SIT emplacements, while ensuring that the Installation understands the design issues and costs associated with either choice.

Wall Height: The minimum front wall height is 457 mm. The front wall must be high enough to protect the targetry equipment while still allowing a minimum of 90% of the target to be visible from the firing position. The minimum wall height of 457 mm provides target equipment protection up to a 15^{o} angle of fire (The target arms and clamp are no protected above 10^{o}). It also allows 90% visibility down to -2^{o} angle of fire. A geometric analysis will be required for angles of fire greater than 15^{o} or less than -2^{o}. Angles of fire over 15^{o} may require increasing the height of the front wall. Angles of fire less than -2^{o} may require raising the target lifter or installing longer target arms. On ranges where targets are engaged from multiple points the designer must coordinate closely with the installation and the targetry provider to determine the correct front wall height.

Berm Criteria: Recommended widths for protective berms of SIT emplacements are determined from the Target Protection Design Curves in the Appendix of this document.

These berm widths are based upon weapon type, soil compactive effort, and the in-place soil density. However, the designer must also coordinate with the range trainer or user in order to determine the appropriate berm width for each target, since individual target sites may dictate added target protection. For example, when SIT emplacements are sited in front of or behind a Moving Armor Target (MAT) or Stationary Armor Target (SAT), the emplacements will need to be designed to withstand the largest weapon system that will engage that group of targets.

Historical experience shows that, under normal usage, well-compacted berms designed with the recommended widths require maintenance on 6-month cycles.

Electrical/Communications: This section discusses electrical/communication considerations unique to this specific emplacement type. Downrange power, communication, transformers, trenching requirements, etc., are discussed in the Downrange Distribution Section of this document.

Target Emplacement Wall Configuration: All conduits and/or cables should enter and exit from the side or rear of the emplacement. This cable routing helps to minimize damage to the cables from range operations and maintenance crews performing berm repair. The Load Center (LC) houses the secondary power cable and provides feed-through capability for the power cable to the next adjoining LC. The LC contains circuit breakers to provide power to the Target Power Receptacle (TPR), auxiliary receptacles (AR), maintenance receptacle (MR) and the Target Data

Receptacle (TDR). The MR shall be a Ground Fault Circuit Interrupter (GFCI) type receptacle. The Target Data Panel (TDP) shall house the fiber optic splicing, cross-connect panel, category 5e or better (copper) cabling, a combination of fiber and category 5e or better cables, or simply the category 5e or better cabling and the TDR. All fiber optic cabling will be terminated with SC type connectors, and the network cable will be terminated with category 5e or better rated RJ45 connectors. The TDP provides space for Other Appropriations-Army (OPA) funded equipment which can include the fiber optic jumpers, switch/media converter, target data outlet, and network cables; the designer needs to ensure the dimensions of the cabinet equipment provided are consistent with those dimensions stated on the detail plans for the MTDP and TDP equipment. A 120VAC power outlet is provided in the TDP for "Use by Others". The TDP and the GFCI maintenance receptacle (MR) may utilize the same power circuit, but the TDP equipment should be wired ahead of the MR to ensure no nuisance tripping occurs. All boxes and receptacles on the front wall of the emplacement should be mounted no higher than two inches from the top of the emplacement wall; this protects the boxes and receptacles from low rounds that might skim the top of the emplacement wall. Refer to Civil Details in the Appendix of this document for detailed mounting requirements.

Grounding: Grounding is required for safety at each downrange equipment location. A 19mm (3/4 in) by 3,050mm (10ft) copper-clad steel ground rod will be driven to a depth of 305mm (1 ft) below finished grade at each equipment location. The TDP and LC equipment will be connected to the emplacement's single ground rod with a #6 AWG bare copper conductor and exothermically welded connections. All data cable armor or shields are bonded to the ground bar in the TDP. The design will leave a 1829 mm (6') coil of #6 AWG bare copper that will be used to ground the target mechanism.

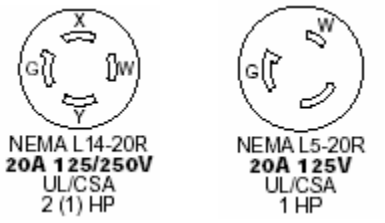
Surge Suppression: Power surge suppression equipment shall be provided in the LC, and data surge suppression equipment shall be provided on both ends of the CAT 5E or better data cables entering the TDP.

Seals: Ensure all penetrations into NEMA 4, NEMA 4X, and NEMA 6P rated enclosure are provided with the proper seal. Revised plan ED-01 illustrates a detail for the proper sealing method. **PLACING FOAM IN THE CONDUIT DOES NOT KEEP WATER STAYS OUT.** The SIT emplacement has been revised to require a NEMA 3R rated wall-mounted enclosure. The use of NEMA 3R equipment should negate the need for the more expensive seal illustrated on ED-01. Ensure all seals are provided as needed.

Target Outlets: All target power and target data receptacles shall be water-proof regardless of whether the outlet is in use. The standard TPR configuration is shown in the Table below:

TARGET POWER RECEPTACLE	AUXILIARY POWER RECEPTACLE	FIBER OPTIC CABLE CONNECTORS	CATEGORY 5e OR BETTER CABLE CONNECTORS
NEMA L14-20R	NEMA L5-20R	Type "SC"	MALE, RJ45

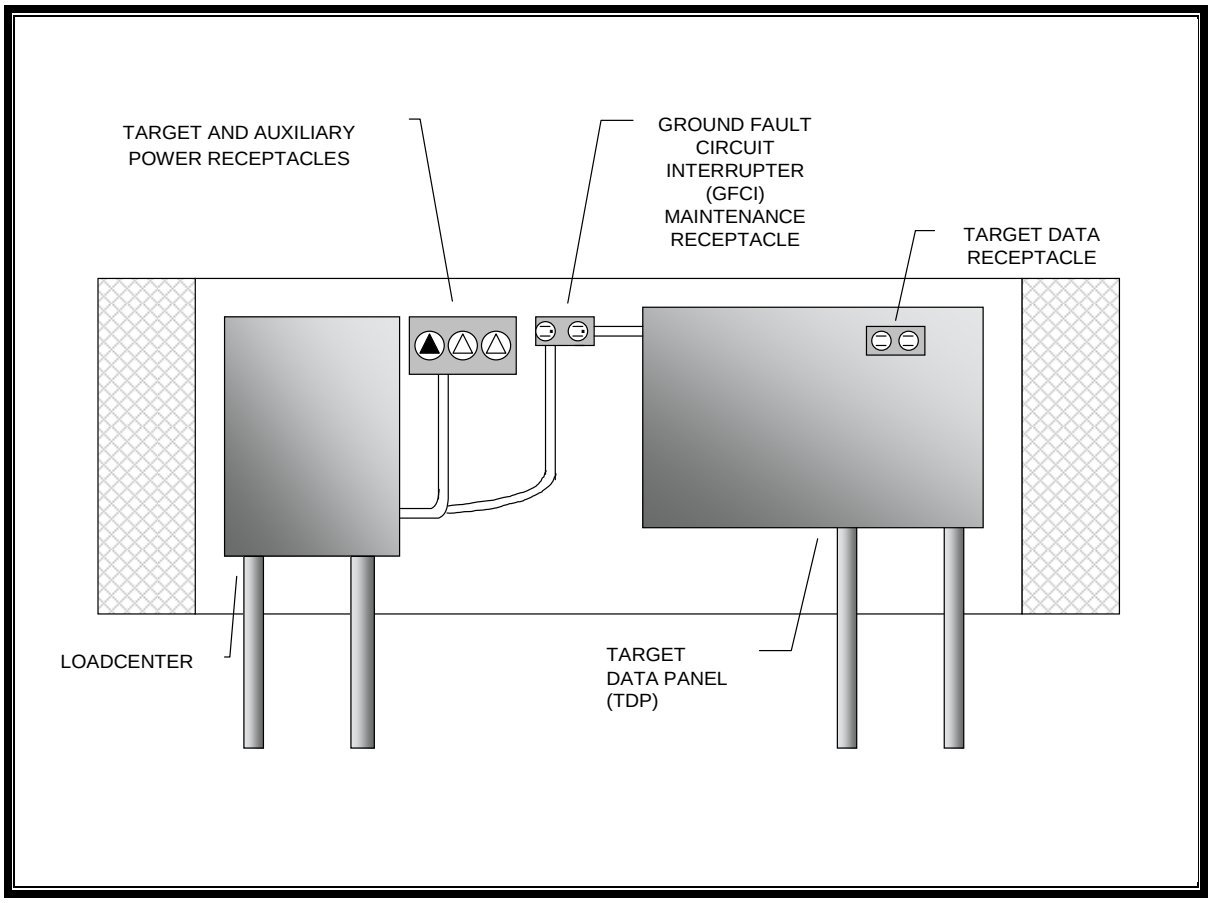
SIT Emplacement Target Interface Specifics



Target Power Receptacle (TPR) – Auxiliary Receptacle (AR)

EMPLACEMENT TYPE	POWER FEED TYPE	PEAK	STATIC LOAD	DESIGN LOAD
SIT with Thermal Blanket	120/240V, Single Phase	700VA while raising or lowering target. Add 260VA if Thermal Blanket is utilized	50VA Thermal Blanket 260VA	960VA
			Total	**960VA**

SIT Emplacement Target Power Table

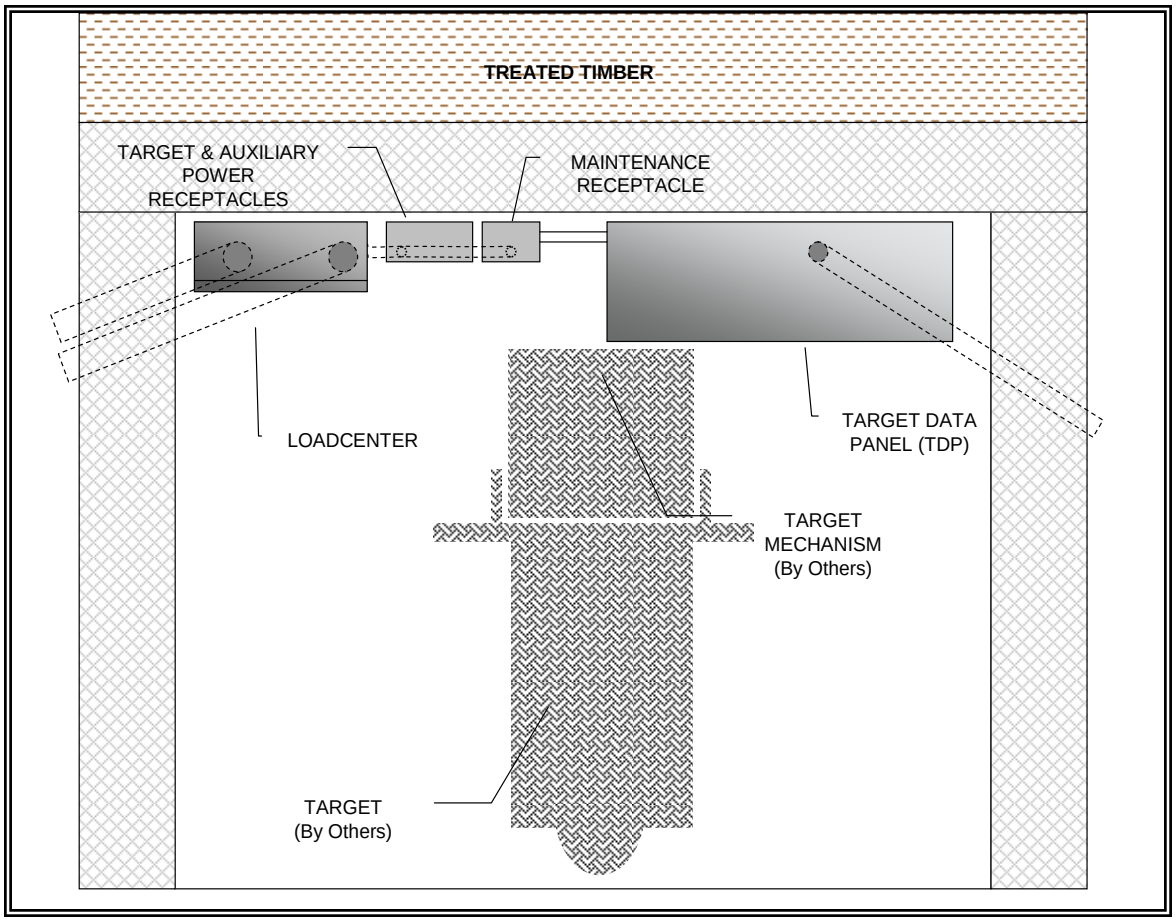


Representative SIT Elevation Drawing (Not to Scale)

Environmental Limits: The temperature and humidity limits for electronic equipment are as follows:

Outdoor:

a. Non-operating and operating temperature: -34.44°C (-30°F) to 60°C (140°F).
b. Humidity: 5% to 95% RH (non-condensing).



Representative SIT Plan Drawing (Not to Scale)

Miscellaneous Information:

a. Construction Materials: SIT emplacements have been successfully deployed when made out of wood in non-rot regions (e.g., Alaska). Other materials may also be used to construct SIT emplacements.

b. Weather Considerations: In regions with large quantities of blowing sand or snow, consideration should be given to providing elevated target mechanism platforms and emplacement covers. The elevated target mechanism platform allows for shoveling out snow and sand, while the emplacement cover keeps accumulation of blown or fallen material to a minimum.

c. Emplacement Protection: Though not endorsed by Army safety doctrine (DA PAM 385-63, DA PAM 385-64), some installations still favor skip plates on their SIT emplacements. Skip plates are hardened steel angles mounted to the top-front wall lip of a SIT emplacement. The concept is based on the theory that a round that hitting low will hit the skip plate and skip (ricochet) away from the target emplacement in lieu of hitting the emplacement's front concrete wall or protective treated timber beams, thus lowering long-term maintenance costs. Since the skip plate induces ricochet, it is not recommended. Installation Safety and ATSC must specifically approve the use of skip plates for the project.

d. Simulation Devices: Some types of training may require Night Muzzle Flash Simulators and Hostile Fire Simulators (HFS). These devices are to be utilized with the SIT emplacement. A night muzzle flash simulator is a flashlight-type device that is mounted on the target mechanism or coffin and flashes on the target to visually simulate enemy fire. Night muzzle flash simulators are self-contained units provided and installed by the target provider; no special design is required. The Hostile Fire Simulators can be built into the SIT emplacement or have their own emplacement next to the SIT-type emplacement.

e. Quality Control: A design checklist is provided in the target design guide. The designer shall ensure all items listed under the SIT section are illustrated or verbally defined completely within the design.