

171 10 ACADEMIC INSTRUCTION BUILDING (SF)

A facility dedicated entirely to academic instruction will seldom be planned. In most cases, instruction of this type will be part of another training function, such as at a Service School or conducted in some other type of applied instruction building. The criteria for this type facility is based on net classroom square feet per student seat.

For planning purposes, academic classrooms can be divided into two general categories:

1. General Academic Classroom - is one which supports approved training programs and provides accommodations for classroom lecture instruction, using standard chairs with fixed tablet arms or a similar seating configuration providing the student a writing surface and book depository. An instructor station is provided, with space for the use of portable training aids.

The individual general academic classroom sizes in net square feet (i.e., within the interior walls of the room), as dictated by the required number of seats, shall not exceed the figures given in Table 171-10.

2. Modified Academic Classroom - is one which is equipped with desks or other working surfaces in lieu of standard chairs with fixed tablet arms.

PLANNING STEPS

The number and size of individual classrooms must be determined in accordance with the general guidelines given under the topic Planning Procedures in the preceding general section for Basic Category 171.

GROSS SQUARE FEET - BROAD PLANNING

The space allowances for general and modified academic classrooms represent net classroom space only. The requirements for supporting spaces must be calculated separately in order to obtain gross SF building area. This may be done by either one of the two alternate methods:

1. In the absence of detailed data during early stages of planning, the gross SF building area (including all necessary support space) shall be computed as follows:

- a. In cases where the training building is composed entirely of general academic classrooms, use the broad planning factor of 45 gross SF per student station for the entire building.

- b. In cases where some or all of the classrooms are of the modified academic classroom type, by using the broad planning factor of 75 gross SF per student station for the entire building.

2. In cases where, within an academic training facility, a number of classrooms must be modified to accommodate working surfaces different than standard chairs, the net area for such modified academic classrooms may be increased. For instance, modified academic classrooms (with standard office desks) will require approximately 45 net SF per student station, including circulation. Larger increases will require specific justification.

a. Maximum consideration must be given to provide a variety of classroom sizes in order to optimize space utilization.

TABLE 171- 10
Space Criteria for General Academic Classrooms

No. of Seats	Sq Ft per Seat	No. of Seats	Sq Ft per Seat
20	22	81 to 90	17
30	21	91 to 100	16
40	20	101 to 120	15.5
50	19.5	121 to 140	15
60	19	141 to 160	14.5
70	18.5	161 to 180	14
80	18	over 180	14

171 15 RESERVE TRAINING BUILDING (SF)

See 171 Supplement - Naval and Marine Corps Reserve Training Facilities (at the end of code group 171 text) for applicable criteria.

171 17 TV CENTER FOR INSTRUCTIONAL MATTER. (SF)

This facility may be provided only when specifically authorized by CNET. Requirements will be determined for each individual case, with CNET guidance.

171 20 APPLIED INSTRUCTION BUILDING (SF)

This facility provides for training personnel through the applied use of technical equipment and tools. Some of the characteristic features of applied instruction classrooms are:

- The use of drafting tables
- The use of workbenches to train personnel in trade/specialized skills such as electronics, machine tool operation, welding and similar.
- The use of operational training machinery such as automotive or other engines, refrigeration equipment, etc.
- The requirement for complete functional systems such as weapons delivery systems, fire control systems, etc.

For planning purposes, applied instruction facilities can be divided into two general categories:

1. General Applied Instruction Facilities (for example, Service School Shops and Laboratories).
2. Specialized Applied Instruction Facilities (for example, Multi-engine Patrol Plane Training Building).

Facilities for each category must be planned separately because planning methodologies are different for each group. General applied instruction facilities have flexible space allowances and must be planned to individually suit the type of instruction to be accommodated. Specialized applied instruction facilities have fixed space allowances. In the following text, each category is discussed separately.

BROAD PLANNING FACTORS

1. GENERAL APPLIED INSTRUCTION FACILITIES. The gross SF building area (for BFR purposes) may be computed by either one of the two alternate methods:

- a. In the absence of detailed data or when close approximation to precise requirements is not considered necessary, the gross building area should be computed based on 150 gross square feet per student station.

- b. If specific personnel data is available follow the planning procedure and table given under Basic Category 171 and 171-20.

Figure 171-20 provides a method to calculate floor area requirements for hands-on mockup training devices.

FIGURE 171-20
Planning Formula for Determining Floor Requirements
for Hands-on Mockup Space

FORMULA: $A = B (CD + E)$

DEFINITIONS

A= Area of classroom in net SF

B = Number of items of practice equipment required. This figure is obtained by dividing c into the average number of students in each class session.

C = Number of students assigned to each item of practice equipment.

D= Net SF of floor area required for one student working on an item of practice equipment.

E= Net SF of floor area occupied by one item of practice equipment. Includes clearances and aisles. Human engineering factors, including safety, must be considered. In cases where student working areas (item D) partially overlap equipment clearance areas, insure that the space requirements are not duplicated.

2. SPECIALIZED APPLIED INSTRUCTION FACILITIES. This category includes facilities designed for training in specialized functions requiring a dedicated building. Space allowances are either fixed or given in gross SF per student and in every case includes all necessary support spaces, such as administration, lounges, training aid storage, library space, reproduction areas, learning centers, toilets, showers, locker rooms, corridors, and janitorial space. For some of the facilities listed below which require a specific building configuration, definitive designs have been prepared. Those cases are annotated in the text. For design criteria also see NAVFAC DM-27.

a. Flight Training and Briefing Building. This building provides space for student pilots in support of direct flight training. Included in the allowance is space for lecture rooms and classrooms, instructor pilot offices, ready rooms, flight planning rooms, briefing rooms, and other support space. The facility provides the necessary space for interaction of student and instructor in briefing and debriefing of actual training flight, singly or in groups. This space is over and above the space requirements for extensive classroom, instrument trainer or flight simulator training which are covered in other category codes or in other sublistings under this category code. Also, this space is in addition to the normal squadron administrative space covered under category code 211 07. The planning factor for Flight Training and Briefing Building is .125 gross SF Per student, based on the average on-board student load.

b. Naval Air Maintenance Training Building. Naval Air Maintenance Training Buildings provide the necessary classrooms and other space in support of one or more Maintenance Trainer Sets (MTS's). MTS's,

consisting of instructional items as displays, actual systems/subsystems/equipment/parts/materials, cut-aways, mock-ups, audio/visual aids, provide maintenance personnel and pilots with technical training on aeronautical systems and associated equipment, organizational and intermediate maintenance, operation and special techniques as applied to aircraft subsystems, missiles and specific equipment and other training as the Chief of Naval Operations may direct.

The planning factor for the Naval Air Maintenance Training Building is 160 gross SF per student. The number of students for planning purposes shall be the average on-board student loading.

Highly sophisticated new weapon systems may require more space than would be computed on the basis of 160 square feet per student. The facility or site study prepared for each new weapon system provides the necessary information for making such determination. When the maintenance training space requirement is found to exceed 160 square feet per student, the requirements shall be fully documented, to include data relative to size of trainers, students per trainer, support space requirements and other pertinent matters to enable evaluation of the actually required gross area.

c. Fleet Readiness Aviation Maintenance Personnel (FRAMP) and Aircrew Learning Center. This facility provides classrooms, briefing rooms and environmentally protected FRAMP practical training work areas to support initial and recurrent training for fleet aircrew (pilots, Naval Flight Officers, and when applicable, enlisted crew members) and aircraft maintenance personnel. Gross area requirements vary with model of aircraft and student loading and must be determined for each individual case. Although FRAMP and aircrew training facilities can be separate, integrated facilities permit efficient utilization of classrooms, study carrels, media reproduction and support areas and administrative spaces. Simulator facilities (code 171 35) may be attached to this building.

d. All Weather Training Building. The all-weather training building provides the necessary space to house the special devices used by pilots, crewmen, and ground controllers to maintain their operating proficiency for adverse weather conditions. The planning factor for this facility is one (1) standard all-weather training building for an all-weather training station supporting two or more all-weather squadrons. The standard all-weather training building has an area of 7702 gross SF. The building contains six classrooms of about 600 square feet each to house special devices, a map-making room, support spaces and space for routine maintenance and equipment testing. See NAVFAC P-272.

e. Multi-engine Patrol Plane (VP) Training Building. This facility houses special devices and gear used by patrol pilots and crewmen to maintain proficiency in submarine search and detection, aircraft and missile detection, and the employment of counter-measures against enemy radar. The planning factor is one (1) standard multi-engine patrol plane training building for a patrol plane station with a mission for continuous support of two or more patrol squadrons. The facility has an area of 26,120 gross SF, and contains 23 classrooms (18 feet by 22 feet average size), support spaces, and a lecture-demonstration hall. See NAVFAC P-272.

f. Aviation Physiological Training Building. This building provides classroom and support space for implementation of the aviation physiology training syllabus. The syllabus pertains to aeromedical aspects of night vision, acceleration and deceleration forces, explosive decompression, oxygen equipment, pressure suits, survival, protective and safety equipment. The planning factor is one (1) aviation physiological training building for each station that will support four carrier air groups or the equivalent of one HATWING OF VAH jet aircraft. The building is planned with the concurrence of NAVMEDCOM. The size of the building is 15,000 gross SF.

g. Delivery Retaining Detachment Building. This facility provides refresher training for teams that handle and maintain special weapons and for pilots and crews assigned special weapons missions. The planning factor is one (1) delivery retraining detachment building for each air station supporting operational units with a special weapons capability. The building has an area of 1,590 gross SF. See NAVFAC P-272.

h. Naval Construction Battalion Unit (CBU) Facility. This facility provides a construction unit contingency augmentation capability to the Naval Construction Forces and assures unit and individual skill training essential to required readiness posture. Space requirements may be satisfied by a single or multiple building configuration. Facilities of this type will be planned only at locations designated by higher authority. Space allowances for CBU's are given in Table 171-20A

i. Band Practice Facility. Table 171-20B provides a summary list of the recommended areas for each of the spaces for both small and large bands. Local differences in operational patterns and function programs may require some modifications to the space program. These differences may, for example, include; larger or smaller size for individual spaces; different relationship patterns between spaces; or elimination or addition of specific spaces. See Army Design Guide DG-1110-3-119 for more details on space requirements and functional relationships.

Table 171-20B - Recommended Space Allocations for Navy Band Training Facilities

Function-Space	Small Fleet Band (35 piece)		Large Fleet Band (45 piece) or Large Fleet Band- Plus (60 piece)	
	approx. no. of spaces	Square Meters	approx. no. of spaces	Square Meters
Main Rehearsal Room	1	146	1	211
Practice Rooms - Group				
Large Group	1	65	1	65
Small Group	1	28	2	30
Practice Rooms - Individual				
Large Individual	2-4	7-12 ea.	3-6	7-12 ea.
Small Individual	6-8	5-6 ea.	9-12	5-6 ea.
Subtotal	8-10	77	12-15	106
Recording/Audio Control Booth	1	23	1	23
Library	1	46	1	59
Offices (No. of persons)	9	109	13	157
Personal Support				
Individual Instructor Lockers	1	48	1	63
Instrument Cleaning	1	7	1	7
Day Area	1	59	1	80
Toilets/Lockers/Showers				
Men		82		112
Women		42		45
Officer's Toilet				
Storage and Supply				
Unit Supply/Storage	1	93	1	121
Instrument Repair	1	9	1	9
Janitor's Closet	1	5	1	5
Transition				
Lobby	1	56	1	84
Circulation				
Subtotal Indoor Spaces-Net Only		895		1182
Circulation, Walls, etc. @25%		224		296
Subtotal		1119		1478
Mechanical Spaces @ 5%		56		74
GROSS TOTAL (Rounded)		1171		1552
Outdoor Spaces				
Drill Area		See CCN 179-60		See CCN 179-60
Parking Area (1 space per band piece)		See CCN 852-10		See CCN 852-10

TABLE 171-20A
Space Criteria for Naval Construction Battalion Units

Functional space	Notes	Gross Sq Ft	Gross Sq M
Administration		1,460	136
Engineering Lab		570	53
Locker/Showers	(3)	1,000	93
Classroom/Workbench		1,060	98
Classroom/Academic		580	54
Equipment Maintenance Shops	(1)	4,400	409
Vertical Shops (BU/SW/CE/UT)	(2)	4,000	372
Central Tool Room (CTR)	(2)	2,940	273
Project Material Storage (MLO)	(2)	2,540	236
Greens Issue/782 Issue	(2)	810	75
TOTAL GROSS AREA		19,360	1,799

Notes: (1) Based on three equipment repair bays.
(2) Definition for the abbreviations used in this criteria are as follows:

BU	= Builder
SW	= Steelworker
CE	= Construction Electrician
UT	= Utilitiesman
CTR	= Central Tool Room
MLO	= Construction Project Material Storage (operated by the Materials Liaison Officer)
Greens/782 Issue	= Organizational Clothing/Gear Issue

(3) Total Gross Area includes both men and women.

j. Combat Training Pool/Tank, Enclosed. This facility provides an enclosed pool/tank for instruction in swimming and survival under combat conditions. It generally includes the pool and supporting spaces, such as locker room, instructional deck, mechanical room, etc., however the actual composition of individual facilities may vary according to their particular training requirements. A recruit training pool may utilize typical swimming pool design criteria as found in Definitive Designs NAVFAC P-272 and Morale, Welfare, and Recreational Facilities, NAVFAC DM-37, however, unique pool/tank design considerations may be required for special&d training facilities such as aviators' survival training tanks and EOD/underwater demolition training. For general planning criteria, See Category Code 179-55.

171 25 GENERAL PURPOSE AUDITORIUM (SF)

An auditorium may be authorized when required as an adjunct to training or other functions (except administration). The primary purpose of the auditorium is an assembly area for instruction and training. General purpose auditoriums will not be planned at an installation where a motion picture theater is authorized except where justified by special circumstances. Seating capacity of an auditorium is to be determined in each specific case and justification provided. The size of an auditorium shall be calculated based on 12 square feet per seat gross floor area or 9 square feet per seat net floor area (in cases where auditorium is a part of a multiple use building sharing common circulation and service spaces).

171 35 OPERATIONAL TRAINER FACILITY (SF)

This category is assigned to training space which meets one or more of the following criteria:

1. It houses large operational trainers, usually duplicating part or all of surface or air weapons system.
2. It is specifically designed and sized for a trainer; has characteristics such as high ceiling height, large room dimensions, and removable exterior wall panels to facilitate servicing; it may also include special design features to satisfy stability requirements of visual systems, unique environmental control requirements (HVAC & filtering), loads associated with motion base(s), and abnormal power requirements.
3. Actual space requirement is dictated by the size of the trainer rather than student loading.

Examples of the type of trainers which should be categorized under this code area:

- a. Weapons System Trainer/Flight Simulator.
- b. Part-Task Trainer (air).
- c. Cockpit Procedure Trainer.
- d. Instrument Trainer.
- e. Mock-ups of ships and submarines and their associated armament.
- f. Full scale models of ships boiler rooms.
- g. Full scale mock-up of a Polaris tube.
- h. Full scale mock-up of a Tartar Launcher.
- i. Large scale models of water basins for practice of berthing procedures.

Space which houses small trainers, such as radios, etc., is not categorized under this code, even though the trainers are operational. Use Category Code 171 20.

As space for operational trainers may occur as either a separate facility or as a wing or room of an applied instruction building, the following method of assigning the appropriate category code shall be used.

In the case of a building to be used solely for the housing of a trainer and its required support space, the entire building shall be categorized as 171 35. The support space includes corridors, storage, briefing rooms, offices, mechanical room, and the like.

In the case of an operational trainer meeting the requirements for this category and which can be or is suitably located in space which is part of a large instruction building, the room housing the trainer shall be categorized as 171 35, Space used solely for the support of the trainer such as storage, briefing room equipment, repair room, etc., shall also be assigned the 171 35 Category Code. However, if any of the above space or any other support space such as administration offices, lounges, staff offices, etc., is used jointly for the operation of the trainer and the instruction given in the rest of the building, the support space shall be given the category assigned to the building, usually 171 20.

Planning factors are given for a limited number of operational trainer facilities. Others will be added as they are developed. Where planning factors are not available, space requirements must be fully justified. Room sizes, size of trainers, and support space should be listed, and the justification should be accompanied by drawings.

Flight Simulator Space. This facility houses the Flight Simulator/Weapon System Trainer (WST) and associated Part Task Trainers (PTT). It is planned for stations supporting naval aircraft and is sized depending on aircraft type and average number of squadrons on-board. The total number of organizational units permanently assigned plus the average number of organizational units of rotational and special aircraft on-board shall be used for planning. Table 171-35A provides information on the gross areas required. The 6,000-square-foot area for example, will contain the following basic components:

(1) Trainer Room. An air conditioned room of 50 by 50 feet minimum size, to house the necessary equipment of one (1) Weapon System Trainer (WST).

(2) Briefing Room. A classroom to house a maximum class of 20 pilots at 20 square feet per man.

(3) Administration. Office space for the officer-in-charge and two assistants.

(4) Maintenance Shop. A 20- by 15-foot space for the periodic maintenance of the test equipment.

(5) Mechanical and Electrical Equipment Room. Space of about 15 by 20 feet for the heating, air conditioning, and electrical distribution panels.

(6) Part Task Trainer Rooms. A minimum of two rooms of 20 by 20 feet for the housing of two Part Task Trainers (PTT).

The other sizes will have similar requirements.

TABLE 171-35A
Flight Simulator Trainer Space Requirements

Type of Squadron	Number of Squadrons	Number of Trainers	Gross Area (sq ft)
VA/VF/HS/HM	2 - 8	1-WST, 2-PTT	6,000
VA/VF/HS/HM	9 - 15	2-WST, 2-PTT	7,500
VA/VP	1 - 4 (VS) 1 - 2 (VP)	1-WST, 2-PTT	9,000
VS/VP	5 - 8 (VS) 3 - 5 (VP)	2-WST, 4-PTT	12,000

Instrument Trainer Space. This facility houses instrument trainers and cockpit procedure trainers. The size of this facility is based upon the number and type of aircraft squadrons or attack carrier air wings (CVW). Table 171-358 provides information on the gross area requirements. Included is space for: administrative office, briefing room, technical order library, storage room, equipment maintenance shop, mechanical equipment room, and trainer room. In using Table 171-358, the total number of permanently assigned organizational units on-board shall be counted.

TABLE 171-358
Basic Instrument Trainer Space Requirements

Type of Unit	Number of Units	Gross Sq Ft
VP, VS, or AEW squadron	1 squadron	5,000
	2 squadrons	8,000
CVW of VF/VA/HS/HM	1 or 2 wings	5,000
	3 or 4 wings	8,000

171 36 RADAR SIMULATOR FACILITY (SF)

This facility may be provided only when specifically authorized by CNT. Requirements will be determined for each individual case, with CNT guidance.

171 40 DRILL HALL (SF)

Need for this facility must be determined on an individual basis and requires specific justification. This code is generally intended for inventory purposes.

171 45 MOCK-UP AND TRAINING AID PREPARATION CENTER (SF)

This facility may be provided only when specifically authorized by CRT. Requirements will be determined for each individual case, with CNT guidance.

171 50 SMALL ARMS RANGE -- INDOORS (SF)

An indoor small arms range provides training space for the use of pistols and small caliber (22) rifles. Ranges will be used by all services on a joint basis when feasible, and they must be of sufficient size and capacity to provide continual training and retraining for all military personnel that require weapons training/qualification.

The capacity of existing ranges or new requirements can be determined by:

1. Identifying the number of personnel to be trained.
2. Establish the number and size of training sessions.
3. Determine the number of hours per session and schedule training over an annual basis.
4. Calculate the required number of firing points based upon efficient arrangement of the size and schedules of the training groups.

In the absence of detailed information compute the number of firing points based upon the number of military personnel requiring weapons qualification in accordance with the following tabulation:

<u>Military Strength</u>	<u>Number of Firing Points</u>
up to 2,000	6
3,500	10
5,000	13
7,000	15

Indoor ranges are generally planned at locations where prevailing weather conditions seriously interfere with the scheduling of training. Otherwise, plan for outdoor ranges (Code 179 40).

For indoor range design and design and safety criteria SEE NAVFAC W-27.

171 60 RECRUIT PROCESSING BUILDING (SF)

A recruit processing building is a facility for receiving, examining, and outfitting recruits. The processing building must provide space for the complete orientation, examination, and processing (medical, dental, supply, administrative) of all newly inducted and recruited personnel. The size of the facility will be determined by an engineering survey.

171 77 TRAINING MATERIAL STORAGE (READY ISSUE/SHOP STORES/MISC) (SF)

Storage facilities for miscellaneous goods or equipment related to training facility support will be provided only where it can be individually justified. There are no criteria for this type of facility. General information on storage parameters is provided in Category Code 440 series.