# APPENDIX A
# ARCHITECTURAL AND ENGINEERING DESIGN REQUIREMENT

## LEGEND and NOTES

## SYNOPSIS

Appendix A is a compilation of detailed architectural and engineering design criteria organized by standard Room Codes. The Room Codes used to organize the Appendix A are the same as the codes used to organize the Program for Design and the Equipment List, so the initial design requirements should be well established for the designer.

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1. Room Code (5 characters). Room identifier from DoD space planning criteria. This code is the reference key that ties the Appendix A criteria to the DoD Program for Design.

2. Room Name (37 characters). From the DoD space planning system.

3. Architectural (27 characters).

a. Matrls and Fin. Materials and Finishes (13 characters).

FL Floor and base finishes (2 characters). See Architectural Note 1.

- AR Acrylic resin system with integral coved base. See Architectural Note 12.
- CP Carpet with resilient base, see Architectural Note 2.
- CS Concrete sealer. Resilient base on gypsum. wallboard and plaster walls. No base on concrete or block walls.
- CT Ceramic tile with ceramic tile base.
- ER Epoxy resin system with integral coved base. See Architectural Note 12.
- ET Epoxy terrazzo with epoxy terrazzo base.
- PF Prefabricated.
- QT Quarry tile with quarry tile base.
- SP Special. Determined by designer.
- SV Sheet vinyl with integral vinyl base. See Architectural Note 3.
- VT Vinyl composition tile with resilient base. See Architectural Note 2.

WAL Wall Material & Finish (3 characters). First character is wall material. Second and third characters are finish. See Architectural Note 1.

Wall Material (first character)

- C Concrete
- B Concrete block or clay tile
- G Gypsum wallboard. See Architectural Note 4.
- P Plaster
- S Special. Determined by designer.

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Wall finish material (second and third characters)

| | |
|---|---|
| AF | Acoustical wall fabric |
| CS | Concrete sealer |
| CT | Ceramic tile |
| LG | Liquid Glaze Coat. See Architectural Note 5. |
| PF | Prefabricated |
| PT | Paint. |
| EL | Epoxy coating, seamless, lead lined. See Architectural Note 10. |
| EP | Epoxy coating, seamless. See Architectural Note 10. |
| SP | Special. Determined by designer. |
| VF | Vinyl wall fabric. See Architectural Note 6. |
| VP | Veneer plaster. See Architectural Note 7. |

CLG Ceiling Material and Finish (3 characters).
See Architectural Note 1.
First character is ceiling material.
Second and third characters are finish.

Ceiling material (first character).

| | |
|---|---|
| A | Acoustic ceiling tile |
| C | Concrete |
| G | Gypsum wallboard |
| P | Plaster |
| S | Special. Determined by designer. |

Ceiling Finish Material (Second and third characters)

| | |
|---|---|
| CS | Concrete sealer |
| LG | Liquid Glaze Coat |
| PF | Prefabricated |
| PT | Paint |
| SP | Special. Determined by designer. |
| EP | Epoxy coating, seamless, with coved corners. See Architectural Note 11. |
| T1 | Standard finish. |
| T2 | Waterproof finish. |

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b. CLG HT. Maximum ceiling height in millimeters (4 characters).

2400mm = 7'- 10.5" corresponds to 8'-0"
2600mm = 8'- 6.4" corresponds to 8'-6"
2700mm = 8'- 10.3" corresponds to 9'-0'
2900mm = 9'- 6.2" corresponds to 9'-6"
3000mm = 9'- 10.1" corresponds to 10'-0"
A = If this area is combined with a delivery room, provide 3000mm (10'-0") ceiling height, minimum. If not combined, provide 2400mm (8'-0") CLG HT.
B = 3000mm (10'-0") minimum.
VAR = Varies (designers choice)

c. D00R SIZE. First line is minimum door width in millimeters (4 characters). Second line is door width in feet and inches.

450mm corresponds to 1'-6"
900mm corresponds to 3'-0"
1050mm corresponds to 3'-6"
1200mm corresponds to 4'-0"
A = Pair 750mm (2'-6") doors.
B = Pair 900mm doors.
C = Pair 1050mm doors.
D = Double door, 1200mm and 450mm
E = Pair 900mm doors or 1200mm doors as directed by using service.
F = 900mm between scrub room and nursery. 1200mm between delivery room and nursery.
G = In clinics, provide 1050mm. In hospitals, provide double door, 1050mm and 450mm.
H = 2400mm (8'-0"), pair 1200mm doors, by 2600mm(8'6") breakaway glass doors or double door 1200mm and 450mm as directed by using service.
I = 3000mm (10'-0") by 3000mm (10'-0") minimum. Number as required by dock.
J = Main OR door, pair 900mm doors. Staff door from clean corridor, 1200mm. Door to sub-sterile, 1050mm.
K = Main OR door, pair 900mm doors or 1200mm and 450mm or 1050 mm and 450 mm as directed by using service. Staff door from clean corridor, 1200mm. Door to sub-sterile, 1050mm.
L = Darkroom door. Provide revolving door or light tight door, or vestibule entry, as appropriate.
M = Open (no door) or 900mm door as directed by using service.
N = Open (no door) or 1200mm door as directed by using service.
SP = Special, designers choice.
VAR = Varies, designers choice.
VET = Special door in veterinary facility. See Architectural Note 13.
OPEN = No door required.

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d. NOISE. ACOUSTIC NOISE LEVEL. (5 characters).

IN RM. Noise level in room (2 characters). First line is minimum, second line is maximum. See Architectural Note 8.

SC. Sound transmission Class (2 characters). see Architectural Note 9.

e. ARCHITECTURAL NOTES.

1. When two finishes are appropriate for a room, the preferred finish is shown in Appendix A first. The using Military Department may select the alternate finish.

2. Resilient Base. Rubber or vinyl coved base for use with resilient tile. Coved base shall terminate and butt at the face return of steel door jambs. A straight vinyl or rubber base or carpet base shall be used with carpet flooring. Fire-retardant wood blocking or metal runners shall be provided at the steel stud base channel runner for all gypsum board corridor walls.

3. Sheet Vinyl. Solid, seamless vinyl in either roll or tile format with routed, welded, grooved seams where melted vinyl is used for an impervious, waterproof seal. Chemical sealants are unacceptable. Cushioned sheet vinyl may not be used. Provide seamless sheet vinyl base integral with the flooring, using the same joint sealing application technique of grooved, melted, welded, vinyl for an impervious waterproof seal.

4. Gypsum wallboard. Minimum 5/8 inch ("green board" for damp or wet areas).

5. Liquid Glaze Coat. This coating is a seamless, sprayed-on, lusterless semi-gloss two-component polyester epoxy or polyurethane finish. Veneer plaster may be substituted for liquid glaze coat where impact resistance, cleanability, and moisture resistance is a factor.

6. Use type II vinyl wall fabric in all areas except corridors and cart traffic areas where type III vinyl wall fabric shall be used. Type III shall also be used in waiting rooms alcoved off major circulation corridors.

7. Veneer Plaster. May be used as an alternate to "green board" in damp or wet areas as a substitute for GVF, GLG, GCT; and, in corridors, litter holding, litter/wheelchair waiting/alcoves, Utility Rooms, Treatment Rooms, toilets without showers, Physical Therapy, Operating and Delivery Rooms, Nurse Stations, Laboratories and related spaces), Central Sterile Supply, patient bedrooms, and anywhere else water-resistance, cart abuse, cleanability, and impact resistance is required. Veneer Plaster Wallboard (GVP) is a suitable substitute for plaster.

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8. The acoustical noise level in the room is the design value for the NC-Level for the background (ambient) noise level.

9. The STC specifies the performance of the room enclosure in isolating against airborne sound. Where no door is specified, the remainder of wall partition/ceiling system should still be designed to this value. This design value is generally considered as a minimum rating.

10. Seamless epoxy coating shall be used on all walls throughout the veterinary facility. Concrete block substrate shall be vermin-proof construction with flush joints.

11. Seamless epoxy coating shall be used on ceilings in the veterinary facility. Gypsum wallboard substrate shall consist of two layers of fiber reinforced wallboard. Ceiling shall have coved corners.

12. Provide non-slip finishes in corridors and all areas where pedestrian traffic is anticipated. Provide smooth finish where greater degree of cleanability is required (under cage racks for example).

13. Provide vermin proof hollow metal doors, 48 inch by 96 inch, with 12 inch by 12 inch red glass vision panel and recessed hardware. Provide door seals. Do not provide door lock.

4. STRU FLR LOAD. Floor Load in kilo-Pascal (4 characters).

kPa corresponds to pounds/SF (PSF)

| | |
|---|---|
| 3 | 60 |
| 4 | 80 |
| 5 | 100 |
| 6 | 125 |
| 7.5 | 150 |
| 10 | 200 |
| 12 | 250 |
| 13 | 275 |
| 17 | 350 |

A = Design for actual wheel loads or 7.5 kPa (150 psf) minimum.
B = Design for actual equipment loads or 7.5 kPa (150 psf) minimum.
C = Design for actual equipment loads or 5 kPa (100 psf) minimum.
D = Design for actual weight of shelves plus 55 kg/filing meter (3.1 lbs/filing in.) or 7.2 kPa (150 psf) minimum on the floor.

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5. ELECTRICAL. (20 characters).

a. LIGHT.

LEV Maximum general lighting level in lux (4 characters). First line is general lighting level, second line is task lighting.

| LUX | corresponds to | Footcandles |
|---|---|---|
| 100 | | 10 |
| 150 | | 15 |
| 200 | | 20 |
| 300 | | 30 |
| 500 | | 50 |
| 700 | | 70 |
| 1100 | | 100 |
| 1600 | | 150 |
| 2100 | | 200 |

N Lighting Notes (1 character). Second line is second note.

A. Provide full-range dimming in room or special task area.

B. Provide recessed ceiling exam fixture with high color rendering type (80 minimum CRI) lamps and 1100 lux task illumination on bed or recovery area (see section 10)

C. Provide high color rendering index type (80 minimum CRI) lamps.

D. Provide O.R. Type Light Fixture or exam Light with dimmer at task location.

E. Explosion Proof design typically required.

F. Provide multi-level switching with conventional on/off switching. Provide lighting control at individual task location where practical.

G. Provide Safelight for film processing as required by Equipment List.

H. Provide full-range dimming at task location.

I. Provide recessed ceiling mounted task illumination with full-range dimming.

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b. EM. PWR. Emergency power required in room (9 characters).

PWR Approximate percentage of general power outlets on emergency system or note as listed below (3 characters).

R Selected receptacles.
R1 One receptacle per bed.
RA All receptacles.
RC Dedicated receptacles for critical care (refer to NFPA-70, Article 517).

LT Approximate percentage of general lighting on emergency system or note as listed below (3 characters).

L Task Lighting.
LB Task Lighting, General Illumination, and battery powered lighting. (refer to section 10).
LE Egress Lighting as required by NFPA 101.

N Emergency Power notes (1 character).

E. Selected equipment connections.
U. Provide emergency power only as required by using Military Department.
S. Special.

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6. Medical Gases (23 characters). The number of outlets required for each gas type is listed in the appropriate column. "0" is entered in columns where no outlet is required to make the table easier to read.

MCA - Medical Compressed Air
DCA - Dental Compressed Air
LA - Laboratory Air
PA - Process Air
MV - Medical Vacuum
DHV - Dental High Vacuum
DLV - Dental Low vacuum
LDE - Laboratory Dust Evacuation
OX - Oxygen
NO - Nitrous Oxide
NI - Nitrogen

N - See Medical Gas Notes (1 character).

MEDICAL GAS NOTES.

A. Each patient is provided an oxygen. In psychiatry and light care units, pipe medical gases through the zone valve box to a point immediately above the corridor ceiling where the piping will be capped.

Each patient is provided a medical vacuum inlet, see individual listing.

Each patient is provided access to a medical air outlet. Where two patients share a common wall, they may share a single outlet, excluding psychiatric patients. Do not provide in pediatric play area.

B. The medical gases specified will be per patient station, workstation, etc.

C. Each overhead service column will contain 2 OX, 2 MV, 1 MCA, 1 NO. In addition, 1 OX, 1 MCA, 1 MV will be wall or overhead track mounted, as indicated, for infant resuscitation. Dedicated c-section rooms may have 2 columns.

D. All anesthetizing locations will have a waste anesthetic gas disposal system. Use of medical vacuum system is not recommended for evacuation in DoD facilities. DLV may be used in dental treatment rooms for anesthesia scavenging where a central system is installed.

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E. One each OX, MCA, MV is required in both the headwall unit and the infant resuscitation area of the birthing room.

F. Each overhead service column will contain 2 OX, 2 MV, 2 MCA, 1 NO and 1 NI. An additional MV will be provided on each wall as appropriate.

G. The medical gases specified will be per bassinet or infant station.

H. The medical gases specified will be per 6-8 bassinets or infant stations. Where the LDR birthing room concept is used, a minimum of one grouping will be provided in each LDR.

I. For equipment testing and calibration, equipment shall be tested with the specific gas used in normal operation.

J. Provide valved regulator station for PA.

K. Each utility center requires 1 DCA and 1 DLV.

L. A natural gas outlet (counter mounted) and a lab air outlet (under counter-mounted) will be provided at each dental work station as shown in Appendix A.

M. All contingency beds require 1 OX, 1 MV, 1 MCA per bed station. In bed expansion situations in "peace time" facilities also provide 1 OX, 1 MV, 1 MCA per contingency bed expansion requirements noted in the program for design.

N. Facilities may use nitrogen for driving surgical handpiece in oral surgery DTRs.

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7. HVAC (23 characters).

a. BL. Air Balance (2 characters)

| | |
|---|---|
| +- | Room pressure to be positive or negative as required by isolation mode of assoicated bedroom. See HVAC Note "E" below. space as described below. |
| ++ | Room exhaust and/or return is 20% less than supply. |
| + | Room exhaust and/or return is 10% less than supply. |
| 0 | Room exhaust and/or return is equal to supply. |
| - | Room exhaust and/or return is 10% more than supply. |
| -- | Room exhaust and/or return is 20% more than supply. |
| EX | Room totally exhausted without supply. |

b. AC. Air Change (2 characters) is the minimum total air changes per hour required to meet ventilation requirements at design conditions. These rates are considered the minimum required for normal health and comfort consideration. Additional air may be required for temperature, dilution, and odor control, as well as air requirements for such items as hoods, glove boxes, clean-air stations, combustion equipment and dust collectors.

c. OA. Outside Air (2 characters) is the minimum outside air changes per hour required to meet ventilation requirements at design conditions.

* Asterisk indicates that ventilation is to be based on the greater of 4 outdoor air changes or 15 CFM outdoor air per person.

d. TEMP. Interior design temperature. First line is in degrees Celsius (C), second line is in degrees Fahrenheit (F), for heat gains calculations. When the only temperature listed is for the summer condition, this temperature will be used for year around operation. When cooling is required during winter, such as in interior zones, temperature listed under summer conditions should be used.

SM. Minimum design temperature (2 characters) for summer months.

WN. Maximum design temperature (2 characters) for the space during heating season.

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e. RH. Relative Humidity (1 characters). This is the relative humidity to be maintained in a space as part of the designed conditions.

Blank RH may vary from 30-60%.
Y RH must be controlled at 55%, + or - 5%.

f. FL. Filtration (5 characters) indicates the level and location of filtration required. See HVAC Note B.

IN Intermediate filtration in percent (2 characters).
FN Final filtration in percent (2 characters).

g. EX. Exhaust Outside (1 character). This column lists areas that require 100% exhaust directly to the outside.

Y Exhaust to outside required.
Blank Exhaust not required.

h. N. See HVAC Notes (3 characters)

HVAC Notes.

A. Nursery Isolation Room relative pressurization requirements may vary among individual facilities, depending upon functional requirements. Designers shall coordinate with the Using Service for each facility to determine whether disease isolation (negative pressurization) or protective isolation (positive pressurization) is required. While “switchability” (room convertible from disease isolation to protective isolation, or vice versa) is discouraged, facility function and program limitations may dictate that this feature be provided.

B. General Filtration. Prefilters, 25%, are required for all outdoor air. The values for the 25%, 80% and 90% filters are by the atmospheric dust spot efficiency test. The atmospheric dust spot efficiencies are the minimum average and are based on ASHRAE Standard 52-76. Designation “99” indicates that a 99.97 % efficiency HEPA filter is required, based on the DOP (Dy-Octyl Phthalate, or bis 2-ethylhexylphthalate) test method. The DOP test efficiency is based on MIL-STD 282. All filters should be installed to prevent leakage between the filter segments and between the filter and its supporting frame.

C. During period of non-use, the air volume may be reduced to 6 air changes per hour, while maintaining the required air balance. 90 percent intermediate filtration is indicated because the same AHU normally serves adjacent OR/DR support areas requiring this level of filtration. Where the AHU serves only OR/DR spaces, the 90% intermediate filter may be replaced with a 60%-80% filter, intended to prolong the life of the final filter.

D. When the Using Service intends the routine usage of nitrous oxide in

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the DTR, routine being defined as exceeding 5 hours per week, the following criteria shall apply:

- DTR room air changes shall be not less than 12 total AC/H.
- The room shall be totally exhausted.
- Provide a minimum of one low-level exhaust register, sized to remove a minimum of 20% of the total room exhaust volume.
- During period of non-use, air change rate may be reduced to 3 total AC/H.

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E. General, Isolation Rooms. For Disease Isolation Bedrooms, bedroom to be negative to anteroom, anteroom to be negative to corridor. For Protective Isolation Bedrooms, bedroom to be positive to anteroom, anteroom to be positive to corridor. Note that room description and engineering requirements for BRII1, BRIM1, BRIP1, and BRIS1 are for Disease Isolation; this does not preclude the provision of Protective Isolation bedrooms in pediatrics, ICU, or other ward locations when local conditions dictate need. Protective Isolation engineering requirements will be the same as for BRIT2.

F. Exhaust all to outside applicable to process only.

G. Design in accordance with NFPA 99.

H. May require vehicle exhaust, CO detection.

I. When the Using Service intends the routine usage of nitrous oxide in the DTR, routine being defined as exceeding 5 hours per week, the following criteria shall apply:

- DTR room air changes shall be not less than 12 total AC/H.
- The room shall be totally exhausted.
- Provide a minimum of one low-level exhaust register, sized to remove a minimum of 20% of the total room exhaust volume.
- During period of non-use, air change rate may be reduced to 5 total AC/H. Positive pressurization shall be maintained.

J. For projects incorporating brace/appliance fitting or shop applications, evaluate room and equipment exhaust requirements for removal of toxic or flammable fumes and dust.

K. Not Used

L. Not Used.

M. Provide exhaust or fume hoods,and localized exhaust as required.

N. Verify computer heat load requirement.

O. Provide adjustable (to user) humidistat within the room.

P. Provide adjustable (to user) thermostat and humidistat within the room.

Q. HEPA Filtration of room exhaust is not required if designed to discharge away from public areas (sidewalks, eg.) and such as to avoid reentrainment into any building opening or outside air intake. Exhaust of TB isolation room, toilet, and anteroom to be by dedicated exhaust system, ie., exhaust system serving only TB isolation room(s). Isolation room pressure to remain constant - not switchable from Disease Isolation mode to Protective Isolation mode, or vice versa.

R. HEPA Filtration of supply air required.

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S. Not used.