



**US Army Corps
of Engineers
Afghanistan Engineer District**

AED Design Requirements: Total System Demand Calculations

**Various Locations,
Afghanistan**

MAY 2010

~Example – Finding Total System Demand~ (using UFC 3-501-01 and the included spreadsheet)

STEP 1: INDICATE BUILDINGS IN PROJECT - [*“Building Name”* and *“Number of Buildings”*]

The Contractor shall determine the name and number of all building types covered in this project. The building name information for each building type is entered in to the spreadsheet in the column with the header *“Building Name”*. The number of buildings of that specific name and type in the project is entered in to the spreadsheet in the column with the header *“Number of Buildings”*.

STEP 2: FIND TOTAL CONNECTED LOAD OF A BUILDING - [*“Connected Load (per Building)(kVA)”*]

The total connected load of a specific building type and name is found by summing the connected load of all panels within that building. Once the Total Connected Load has been determined for a specific building type and name, this information is entered in to the spreadsheet in the column with the header *“Connected Load (per building)(kVA)”*.

Equation 1
$$\text{Total Connected Load} = \sum(\text{All Connected Panel Loads within a Building})$$

STEP 3: FIND BUILDING CLASSIFICATION - [*“Building Classification (per UFC)”*]

Using Table 1 (UFC 3-501-01), determine the building classification for each building name and type in the project. Once the building classification has been determined, select this information in the spreadsheet in the drop down selection menu in the column with the header *“Building Classification (per UFC)”*.

STEP 4: FIND THE DEMAND FACTOR - [*“Demand Factor (average)”*]

Equation 2
$$\text{Demand Factor} = \frac{\text{Demand Load}}{\text{Total Connected Load}}$$

The Demand Factor, from Table 1 (UFC 3-501-01) is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Demand Factor is automatically populated in the spreadsheet in the column with the header *“Demand Factor (average)”*.

STEP 5: FIND THE DEMAND FACTOR - [*“Load Factor (average)”*]

Equation 3
$$\text{Load Factor} = \frac{\text{Average Load}}{\text{Max Load}}$$

The Load Factor, from Table 1 (UFC 3-501-01) is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Load Factor is automatically populated in the spreadsheet in the column with the header *“Load Factor (average)”*.

STEP 6: FIND THE COINCIDENCE FACTOR - [*“Coincidence Factor (average)”*]

Equation 4
$$\text{Diversity Factor} = \frac{1}{\text{Coincidence Factor}}$$

Solving Equation 4 for Coincidence Factor, the following equation is obtained:

Equation 5
$$\text{Coincidence Factor} = \frac{\text{Total System Demand}}{\sum(\text{All Building Demands})}$$

The Coincidence Factor, from Table 1 (UFC 3-501-01) is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Coincidence Factor is automatically populated in the spreadsheet in the column with the header *“Coincidence Factor (average)”*.

STEP 7: FIND THE BUILDING DEMAND - [*“Building Demand (per building)”*]

Equation 6
$$\text{Building Demand (per building)} = \text{Connected Load} * \text{Demand Factor} * \text{Coincidence Factor}$$

The Building Demand (per building) is automatically populated in the spreadsheet once all of the required user

populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Building Demand (per building) is automatically populated in the spreadsheet in the column with the header “*Building Demand (per building)*”.

STEP 8: FIND THE TOTAL BUILDING DEMAND - [“*Total Building Demand (per building type)*”]

Equation 7

$$\text{Total Building Demand (per building type)} = \text{Building Demand (per building)} * \text{Number of Buildings}$$

The Building Demand (per building) is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Building Demand (per building) is automatically populated in the spreadsheet in the column with the header “*Building Demand (per building)*”.

STEP 9: FIND TOTAL SYSTEM DEMAND - [“*Total System Demand*”]

Equation 8

$$\text{Total System Demand} = \Sigma(\text{All Total Building Demands})$$

The Total System Demand is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Total System Demand is automatically populated in the spreadsheet box indicate “*Total System Demand*”.

STEP 10: FIND TOTAL SYSTEM DEMAND + 25% SPARE - [“*Total System Demand + 25% Spare*”]

Equation 8

$$\text{Total System Demand} + 25\% \text{ Spare} = \text{Total Building Demand} * 1.25$$

The Total System Demand + 25% spare is automatically populated in the spreadsheet once all of the required user populated cells and user selected drop down menus (4 columns require user inputs total) have been completed. The Total System Demand is automatically populated in the spreadsheet box indicate “*Total System Demand + 25% Spare*”.