

<b>DESIGN CHECKLIST INTRODUCTION</b>			
	1	The checklist is intended to serve as a convenient guide in design development as well as the final checking of plans and specifications for construction projects. Its main usefulness for this purpose is that it points out errors and discrepancies that frequently occur. It is not intended to be all-inclusive, but if used conscientiously, it will serve to eliminate many of the design deficiencies which have been found in past construction projects.	
	2	The checklist will be utilized and completed for each project and will be submitted with the final Design Analysis. It will then be utilized by Middle East District(MED) for review of the completed design.	
	3	Each item in the checklist must be marked to indicate that the item has been examined by inserting a check mark in the space provided for the reviewer's notes. If an item is not applicable, the letters "NA" should be inserted in this space. If an entire section is not applicable, this may be noted on the first page.	
	4	Brief explanatory notes may be inserted in the space provided for reviewer's notes when appropriate. For example, when checking equipment space requirements, the manufacturer of the type of equipment used to check this item may be inserted in this space. Also, if special reasons exist for not complying with an item, an explanation must be inserted.	
	5	It is important that review comments be scrutinized for compliance as part of the checking procedures.	
	<b>PROJECT NAME</b>		
	<b>DISCIPLINE ELECTRICAL</b>		
	<b>DATE</b>		
	<b>TYPE REVIEW</b>		
	<b>REVIEWER</b>		
	<b>DRAWINGS REVIEWED</b>		
	<b>DESIGN CHECKLIST</b>	<b>Verified-X    Not Applicable-NA</b>	<b>Comment</b>
<b>A</b>	<b>DRAWINGS</b>		
	<b>1 General - Check</b>		
	a Symbol list against drawings to assure all symbols used are included in the symbol list.		
	b Drawing numbers and titles to assure all are correctly titles and numbered.		
	c Drawing index to assure all drawings are properly listed and titled.		
	<b>2 Exterior Electrical - Check</b>		
	<b>a Source of Power</b>		
	(1) Connection to Medium Voltage Feeder:		
	Routings shown on site plan		
	Medium Voltage Feeder described on one line diagram		
	Method of connection detailed		
	Sub-feeders described (if used)		
	Electrical Properties on one line diagram		
	Location on site plan		
	Metering and options shown		
	(2) Locally Generated Power:		
	Location shown on site plan		
	Size shown on one line diagram		
	Overcurrent protection shown		
	Overcurrent protection and conductor size coordinated		
	Switchboard or Main Breaker ratings shown		
	(3) Step Up Transformer:		
	Location shown on site plan		

	DESIGN CHECKLIST	Verified-X Not Applicable-NA	Comment
	Primary protection requirement shown on one line		
	Primary Voltage and configuration shown on one line		
	Transformer KVA shown on one line		
	Transformer KVA supported in design analysis		
	Secondary Voltage and configuration shown on one line		
	Secondary Protection Requirement defined on one line		
	Secondary Distribution Conductors defined on one line		
	Secondary Conductors sized for full load current		
	<b>b Main Transformer</b>		
	Location shown on site plan, Sheet _____		
	Primary protection requirement shown on one line		
	Lightning Arresters, including rating, shown on Primary side		
	Primary Voltage and configuration shown on one line		
	Transformer KVA shown on one line		
	Transformer KVA supported in design analysis		
	Secondary Voltage and configuration shown on one line		
	Secondary Protection Requirement defined on one line		
	Secondary Distribution Conductors defined on one line		
	Secondary Conductors sized for full load current of transformer		
	Grounding and (where needed) ground fault protection shown		
	Specifications correspond to one line diagram		
	<b>c Distribution Feeders</b>		
	Routing shown on site plan, Sheet _____		
	Size shown on one line diagram		
	Overcurrent protection shown		
	Overcurrent protection and conductor size coordinated		
	Voltage drop considered for long runs		
	Ductbank system detailed where required		
	Drawings checked for conflicts with other utilities		
	<b>d Generator (For Building)</b>		
	Location shown on site plan, Sheet _____		
	Size shown on one line diagram		
	Overcurrent protection shown		
	Overcurrent protection and conductor size coordinated		
	Voltage drop considered for long runs		
	Transfer switch ratings shown		
	Transfer switch location shown on site plan, Sheet _____		

	DESIGN CHECKLIST	Verified-X Applicable-NA	Not Applicable-NA  Comment
	<b>e Other Site Utilities</b>		
	Site one line diagram provided if required		
	(3) Site Lighting:		
	Street Lighting:		
	Locations shown on plan		
	Each fixture circuited		
	Method of Control indicated		
	Fixture types defined		
	Area Lighting:		
	Locations shown on plan		
	Each fixture circuited		
	Method of Control indicated		
	Fixture types defined		
	Perimeter/Security Lighting:		
	Locations shown on plan		
	Each fixture circuited		
	Method of Control indicated		
	Fixture types defined		
	(5) Cathodic Protection		
	Locations shown on plan		
	Ratings shown on plan		
	<b>3 Interior Electrical - Check</b>		
	<b>a Service Entrance Equipment</b>		
	Bus Rating Ampere rating shown on one line		
	Bus Rating Voltage and configuration shown on one line		
	Bus Rating coordinated with feeder and source of power		
	Interrupting capacity shown		
	Interrupting capacity consistent with source of power		
	Main Breaker rating shown		
	Ground Fault Protection shown for => 1,000 A disconnect		
	Location of service entrance panel shown on plans, Sheet _____		
	Building entrance details shown		
	Location shown on plan, space, clearance, and cooling adequate		
	Metering and other devices shown		
	Control power for electrically operated breakers (if any) shown		
	<b>b Distribution Feeders</b>		
	Overcurrent device ratings shown		
	Feeder sizes shown on one line diagram		
	Sizes coordinate with overcurrent device ratings		
	Design analysis supports feeder sizes		
	Destination panels/loads identified		

	DESIGN CHECKLIST	Verified-X Applicable-NA	Not Applicable-NA	Comment
	<b>c Panelboards</b>			
	For Each Panel:			
	Locations shown on plans			
	Names coordinated with one line diagram			
	Bus ampere ratings shown			
	Bus ampere ratings coordinated with feeder ratings			
	Bus ampere ratings coordinated with demand load			
	Demand factor reasonable for connected loads			
	MLO or Main Breaker indicated			
	Short circuit rating indicated			
	Check rating for circuits feeding all			
	sub-panels			
	transformers			
	pumps			
	chillers			
	other			
	Location shown on plan (space and cooling adequate)			
	<b>d Step Down Transformers</b>			
	For Each Transformer:			
	KVA Rating Shown			
	Primary and Secondary Voltages shown			
	Primary and Secondary Configurations shown (delta-wye)			
	Primary Protection sized properly and shown			
	Primary Feeder size coordinated w/OCD and shown			
	Secondary Protection sized properly and shown			
	Secondary Feeder size coordinated w/OCD and shown			
	Location shown on plan (space and cooling adequate)			
	<b>e Frequency Converters, UPS, Etc.</b>			
	(1) For Each Frequency Converter, Etc.			
	KVA Rating Shown			
	Primary and Secondary Voltages shown			
	Primary and Secondary Configurations shown (delta-wye)			
	Primary Protection sized properly and shown			
	Primary Feeder size coordinated w/OCD and shown			
	Secondary Protection sized properly and shown			
	Secondary Feeder size coordinated w/OCD and shown			
	Location shown on plan (space and cooling adequate)			
	(2) For 400 Hz Secondary Runs - Check			
	Maximum distance (75 ft, single phase, 130 ft 3 phase)			
	Non magnetic conduit (either aluminum or PVC)			
	Maximum conductor size (no larger than 2/0, or 70 mm <sup>2</sup> )			
	Check voltage drop calculations (approximately 7 times 60 Hz values)			
	(3) For Each UPS			
	KVA Rating Shown			
	Input Voltages shown			
	Input Protection sized properly and shown			
	Input Feeder size coordinated w/OCD and shown			
	Output Feeder size coordinated with KVA rating of the unit			
	Location shown on plan (space and cooling adequate)			
	Maximum input and output total harmonic distortion is specified			

	DESIGN CHECKLIST	Verified-X Applicable-NA	Not Applicable-NA	Comment
	<b>f Motors</b>			
	For Largest Motors Shown on Plan:			
	Check sizes against mechanical schedules			
	Show disconnect on one line for large motors			
	Check disconnect ratings			
	Check Overcurrent device ratings			
	Locations shown on plan with disconnects			
	<b>g Mechanical Equipment</b>			
	For Largest Pieces of Mechanical Equipment:			
	Check sizes against mechanical schedules			
	Show disconnect			
	Check disconnect ratings			
	Check Overcurrent device ratings			
	Locations shown on plans (adequate space and cooling)			
	Control wiring diagrams provided when needed			
	<b>h Lighting Circuits</b>			
	Check exits for Exit Lights			
	Check exit corridors and other rooms for Emergency Lights			
	Check Fixture Schedules against room layouts			
	Check fixture layout against reflected ceiling plan			
	Check for switch locations			
	Check for circuit identifications			
	All fixture types shown on fixture schedule			
	Details (or specs) shown for each fixture type on schedule			
	<b>i Power Circuits</b>			
	Check Symbol List against room layout for special outlet types			
	Check for circuit identifications			
	Check for FACP circuit requirement, if required is it shown			
	Check for EWH circuit requirements, if required, are they shown			
	Check for receptacles located at EWC's			
	(3) Fire Alarm Control Panel			
	Shown on plan drawing			
	Source of power indicated			
	Listed on panel schedule			
	One line diagram			
	<b>o Hazardous Locations</b>			
	Project includes hazardous locations			
	Locations defined clearly			
	Locations coordinated with architectural drawings			
	Economics of equipment locations considered			
	<b>p Grounding</b>			
	Service entrance grounding shown			
	Separate derived system grounds shown			
	Notes for dedicated grounds (if required)			
<b>B</b>	<b>DESIGN ANALYSIS</b>			
	<b>a</b> Catalog cuts provided for major equipment items.			
	<b>b</b> Calculations for:			
	Feeders			
	Transformers			
	Generators			
	Distribution Panels			
	Lighting Levels			

	DESIGN CHECKLIST	Verified-X Applicable-NA	Not Applicable-NA	Comment
<b>C</b>	<b>SPECIFICATIONS</b>			
	<b>a</b> Check reference documents for current edition.			
	<b>b</b> Check guide specs and drawings to make sure any items shown on the drawings, but not included in the guide specs have been added to the project specification.			
	<b>c</b> Check specification for voltages. Make sure all voltage references correspond to the local country standard.			
	<b>d</b> Check specifications for definition of electrical outlets to assure descriptions are correct for host country standards (i.e. DIN, BS, French Normale, NEMA, etc.).			
	<b>e</b> Check specifications to assure major pieces of equipment are specified.			
	<b>g</b> Submittal register prepared with references to specifications paragraphs.			
<b>D</b>	<b>PROPRIETARY MATERIALS AND EQUIPMENT INITIAL-Only Design Bid Build (DBB)</b>			
	To the best of my knowledge, the specifications and drawings do not include any proprietary or sole source materials or equipment except for the following approved items:			
	EVERY ITEM WILL BE REVIEWED AND NOTED FOR COMPLIANCE (C), OR NON-APPLICABILITY (NA).			
	<b>a GENERAL - Check Proposal Form</b>			
	<b>1</b> that Price Schedule listing all appropriate bid items and quantities is			
	<b>2</b> Special Contract Clauses.			
	Verify that Clause 1.18 entitled: IDENTIFICATION OF GOVERNMENT-			
	<b>3</b> In Unit Price contracts, check to see that Measurement and Payment paragraphs in the technical provisions are compatible with the unit prices stated in the proposal schedule.			
	<b>4</b> Payment Paragraphs:			
	(when applicable) Payment paragraphs in the technical provisions shall be used only to identify the method of unit payment. Payment paragraphs shall be omitted from the technical provisions when the entire work is to be a lump sum contract. Check all payment paragraphs in the specifications for coordination with the items listed in the proposal schedule. Whenever pay items are noted in payment paragraphs of the technical provisions they must agree word for word			
	<b>5</b> Additive and Optional Items:			
	(when applicable) All additive/optional items must be fully described. Drawings must show limits of construction for each additive/optional item. The item must be clearly defined to assure competitive bidding, with no doubt as to what is included in the additive or optional item. The pay item for additive/optional items must be properly set up in the			
	<b>6</b> Trade Names:			
	Trade names shall not be used except in unusual instances, and then only as a last resort, with approval of MED. When used, trade names shall be followed by "or approved equal", and a generic description listing the salient features of the item or equipment be included in the			
	Where the specification references details on the drawings "Where			
	<b>8</b> Only guide specifications Unified Facilities Guide Specifications (UFGS), obtained from the WBDG website here, <a href="http://www.wbdg.org/ccb/browse_cat.php?c=3">http://www.wbdg.org/ccb/browse_cat.php?c=3</a> , shall be used to prepare contract specifications.			
	<b>9</b> That specifications for equipment includes quantities, and if there is Government Furnished Property (GFP) or equipment, it is properly specified giving features such as size, weight, etc. in the GFP listing, and shown on the drawings.			
	<b>10</b> Verify that numbering of specifications sections is in accordance with CSI format in accordance with the MED Design Instructions Manual.			

	<b>DESIGN CHECKLIST</b>	<b>Verified-X Applicable-NA</b>	<b>Not Applicable-NA</b>	<b>Comment</b>
<b>11</b>	Verify that all referenced Appendices, Figures, Graphs etc., are included in the specifications.			
<b>12</b>	The following is a list of common deficiencies noted in past submittals of preliminary and final specifications submitted by designers. The reviewer will check these items for completeness and adequacy.			
<b>a</b>	All blanks should be filled in and non-applicable parenthesis and sentences are removed.			
<b>b</b>	Sections are referenced in the text but are not listed in Table of Contents.			
<b>c</b>	Paragraph numbers and titles have not been coordinated with section index.			
<b>d</b>	Publications are referenced in paragraphs but are not in REFERENCES paragraph and publications listed in paragraph REFERENCES are not contained in section paragraphs.			
<b>e</b>	Identification of any aspect of the project that must be addressed in the Special Clauses e.g. completion dates, scheduling of work' special planting schedules, manufacturer's rep's, O & M training, special safety requirements, etc.			
<b>13</b>	Submittals:			
	O&M Data, Spare Parts, Training, etc., should not be specified in the technical provisions. Detail requirements for these submittals are contained in Section 01 31 13.12 10: SPECIAL CLAUSES. Requirements for submittals in the technical provisions should be referenced to the SPECIAL CLAUSES for example: Submit O&M Data in accordance with Section 01 31 13.12 10: SPECIAL CLAUSES.			
<b>14</b>	Submittal procedures and detail requirements for submittal of shop Drawings are specified in Sections 01 33 00 for full design and 01 33 00.12 10 for Design Build, of the technical provisions.			
<b>15</b>	Assure that specifications furnished for final review are in accordance with MED Design Instructions Manual.			
<b>16</b>	Assure that the A-E has deleted all inapplicable specification requirements from guide specifications in his final submittal.			
<b>17</b>	Specifications must include requirements for all items to be included in the contract. Guide specifications are not available for some specialty items such as bakery and hospital equipment. These must be originated by Architect/Engineer (A-E) or designer in complete and adequate form. Reviewer will check for completeness and adequacy.			
<b>18</b>	Submittal Register:			
	Assure that A-E furnish submittal register in accordance with MED Design Instructions Manual. ENG FORM 4288, is available from MED.			
<b>E</b>	<b>PROPRIETARY MATERIALS AND EQUIPMENT</b>			
	<b>INITIAL</b>			
	To the best of my knowledge, the specifications and drawings do not include any proprietary or sole source materials or equipment except for the following approved items:			